

SRTechnology Corp.

This edition Copyright © 2018 SRTechnology Corporate And published by SRTechnology Corporate

Registered office SRTechnology Corporate, 614 (Guro-dong, E-space), 36 Digital-ro 27-gil, Guro-gu, Seoul, 08381, South Korea

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.srtechnology.com.

The right of SRTechnology Corporate to be identified as the author of this wok has been asserted

All right reserved. No part of this book may be reproduced or utilized in any form of by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

All the specifications and information regarding the products in this book are subject to change without any notice in advance. All specifications, statements, information, and recommendations in this book are believed to be accurate but are presented without warranty of any kind, express or implied. Users and readers must take full responsibility for their application of any products.

Preface

It is our pleasure to publish 3rd edition of RF Bible. Since we published 1st RF Bible in 2014, engineers in RF field, global partners and customers would like the uniqueness and concept of RF Bible which has showed the RF theory, product specification, and product's application to system. It is indeed gratifying to know that many of customers and engineers are satisfied with our RF Bible for their coworkers and junior colleagues to learn the product with applications. We have noticed that many of RF companies take advantages of RF Bible and use them onto their promotional materials in publication and on their website. It is one of our objective to publish RF Bible in RF industry.

Since there are lots of applications and requests for the RF products, SRTechnology have devoted much time to listen customer's and engineer's requirements, the key factors affect the product's best performance to the system and other conditions that purchasing team can obtain the reliable products without deep consideration. In 3rd edition of RF Bible, we have tried to introduce World Best Power terminations, Power attenuators and Power dividers to you with their features, applications, and full specification for each product that nobody inform you what are really needed in the field.

Many thanks to global partners, R&D engineers, production managers and designers who researched, suggested and reviewed for 3rd edition of RF Bible in SRTechnology Corporate. We, sincerely, hope the RF Bible helps you to understand RF business and grow your business.

If you have any question to RF Bible or suggestion to SRTechnology, please feel free to contact us at any time. We, SRTechnology Corporate, appreciate the opportunity to be of service of the Best Solution of RF Technology.

Prologue

This is our pleasure to publish 3rd edition of RF BiBLE. Since the 1st edition of RF BiBLE had been published, there have been a lot of positive feedbacks and encouragements from customers, partners and users in RF industry. We appreciate all of them for enjoyment and good response from this book. So we think that our objectives of RF BiBLE at 1st edition which helps a beginner in RF business, somebody who has a hard time to get a reliable products or the student majoring in RF has been achieved According to the purpose of RF BiBLE.

There have been inquires about Filters and other products after the 1st edition RF BiBLE. So we decided to publish 3rd edition with more Filter contents which had many inquiries and other products information additionally to enhance the convenience and information for the users of this book.

Many thanks to R&D engineers, global and local marketers and production managers who researched, wrote, designed, suggested and reviewed for 3rd edition of RF BiBLE in SRTechnology Corporate. They worked devotedly for 3rd edition for the sake of our customers, partners and users who read this book.

If you have any question or suggestion regarding this book, please feel free to contact SRTechnology Corporate at any time. We will do our best to give you a great solution. Thank you!

MAY 2015.

It has already passed about 20 years for a new world of mobile communications. In the initial period, most of engineers majored in electronics engineering, started to study RF and they have developed RF in wireless communication systems, even they did not specialized in RF. Therefore, the currently 4th Generation technology has brought about enormous changes in our lives.

Let's look back on their lives how they started to study RF about 20 years ago. They began the study by just memorizing the products, specification and products catalogues even they did not know the scientific theory and the applicable theory. Even we have still picked them up from our colleagues. It is unexpectedly more difficult than you can get the organized theory and data in order to specialize in systematically. Even, when you try to get some information, it is usually said about RF theory, there is not rational connection with theory and products, and we had no idea how to get the products. Of course, there are lots of developments in wireless communication, the development lead way of prosperous markets and there are a lot of special publication and electronic major at present. However, as long as practitioner's point of view, they are hard books to understand and the information which can't apply them in the field.

Since SRTechnology Corporate (SRT) has specialized in this RF business over decade, we also looked back on SRT's past experience. SRT at present hope to provide hands others who endure the same problem at present.

That is the reason why we start "RF BiBLE". Now we take our first step carefully. We hope that RF BiBLE will help the student majoring in RF, beginner in RF business or the one who have a hard time to get the reliable products, it is the right cause of Bible in RF published. Right here, all of executives and staffs in SRTechnology have an earnest mind that the book named "RF BiBLE".

SRTechnology wish you tremendous success in RF business you do.

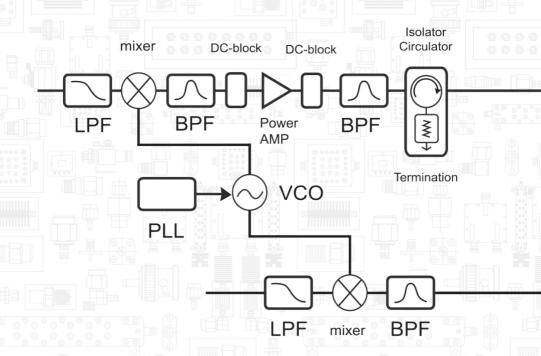
MAY 2014.

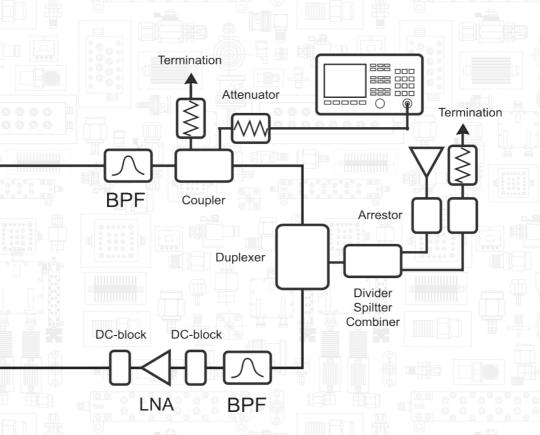
Contents

Preface	3
Prologue	4
Block Diagram	8
1. Passive components	10
01. TERMINATION	12
02. ATTENUATOR	48
03. FILTER	84
04. POWER DIVIDER	108
05. ARRESTOR	128
06. DC BLOCK & BIAS TEE	136

2. Connector & adaptor	144
01. 2.92mm	146
02. SMA	152
03. BNC	160
04. TNC	168
05. N	174
06. 7/16DIN	180
07. MCX	186
08. MMCX	194
09. SMB	202
10. Adaptor	208
11. Cable	220
12. Cable Assembly	246
3. RF Basic	250
4. Terms & Conditions	274
5. Index	280
6. SRTechnology Introduction	286

Block Diagram

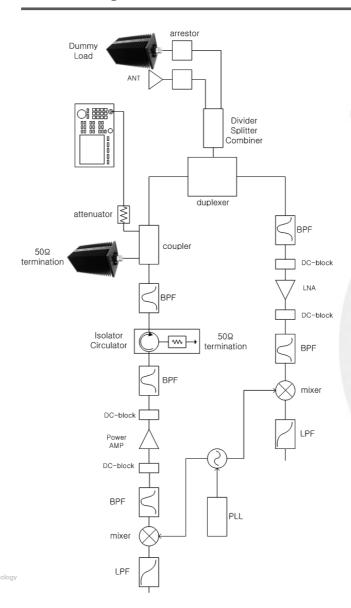


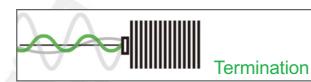


01. TERMINATION	12
02. ATTENUATOR	48
03. FILTER	84
04. POWER DIVIDER	108
05. ARRESTOR	128
06. DC BLOCK & BIAS TEE	136

Passive components

1 TerminationBlock Diagram





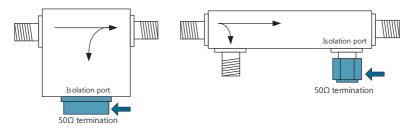
About Termination	14
SMA Termination	20
N Termination	28
7/16DIN Termination	38
Other Termination	44





You may remember the movie "Terminator" if you are in the middle of 30 ~ 40 years old. Even though he got shot and there are lots of obstacles to him, terminator chased and removed until the target is terminated in the end, There is also Terminator in RF circuit. The terminator's target in RF circuit is the noise which ruins the RF circuit performance.

Termination in RF system is composed of that 50Ω resistor is connected with Ground(GND). In a coupler or isolator, 50Ω resistor is connected with isolation port which is connected with GND. By connecting this way, the reflective wave is diffused to the heat energy, and the signal of reflective wave is terminated. There is another purpose of using terminator that it prevent a minute signal, which should not be occurred, from occurring beside of terminating the signal.



(Dra. 2-1) Termination in Isolator (Dra. 2-2) Termination in Coupler

The above pictures on Dra. 2-1 and Dra. 2-2 are shown the termination examples in isolator and coupler from the left to right. The termination in isolator is installed in order to diffusing the reflective signal to the heat. The termination in coupler is installed on isolation port in order to remove the minute signal, even though signal would not be occurred at the isolation port actually.

If there are more than 3 input and output ports in the power divider, coupler and circulator, the termination is also used to check the electrical performance of the power divider, coupler and circulator after selecting them. Termination is connected to the un-using port while other two ports are checked in use.

Let's see how the termination is worked in coupler.

When we measure S11 or S21 in Network analyzer, Coupler should be connected with terminator not only isolation port but coupled port. Some of input signals from input port are transferred to the coupled port. The transferred signal to coupled port could be returned to the input port if the coupled port is not installed by termination. The S11 and S21 in coupler can't be measured properly without termination in coupled port.

Power divider is same as like coupler. Termination is connected with port No. 3 when it is checked S21 value, and terminator is connected at port No. 2 port when we measure to get S31 value in order not to occur a reflective wave.

There is a dummy load which concept is similar to the termination.

When it is designed RF transmitter system, antenna is the final object to radiate the signal. Let's try to power on and send an input signal to test into transmitter whether this transmitter works properly or not. If the transmitter is designed well, the input signal is modulated and amplified, and the output signal is radiated through antenna. But if the transmitter is not designed properly even in some small parts, signal would be radiated away. It could be against the law if this radiated signal get out of his originally intended frequency range or exceed allowed transmitting power. It is also required to get permission from government to transmit intended signal.

At this time, we need the dummy load. If the dummy load is installed on the port instead of antenna, all of the signal, which is supposed to be radiated at the final stage in transmitter system, will be absorbed and diffused to heat energy without any reflective signal to the out of the system. The signal is looked like to be radiated through Antenna in transmitter system. In general, Dummy load has a large area of heatsink in order to bear high input power.

If you would understand the above explanation, the return loss is very important in termination. Since there is only 1 port, you don't need to care about the insertion loss but return loss only.

The additional thing for the consideration is the input power. While Termination is working, the energy of electromagnetic waves are diffused to the heat and the waves are terminated. When it is tried to remove an electromagnetic wave energy, heat is generated. If we would compare the same 3GHz frequency range applied

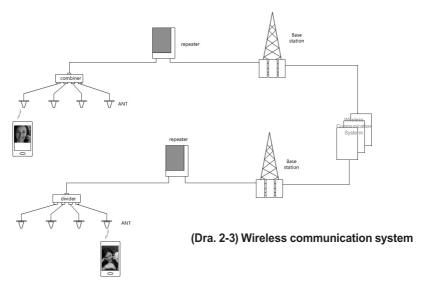
termination with other types of termination, their application and the area of surface should be different from 1Watt 3GHz termination and 100Watt 3GHz termination. If the input power is higher, it will generate more heat, and the termination requires more area of surface and a large heatsink to cooling it down.

For example, if transmitter send the 50dBm power into antenna port, 1Watt(30dBm) of termination which is installed on the port of antenna is not good enough to cover the 50dBm input power. 100Watt(50dBm) termination should be used at least or it is recommended to use more than 100Watt termination such as 125Watt or 150Watt termination. The termination will be safe just in case by this way.

As the principle in termination and dummy load is same, it is all right to use any kind of termination or dummy load if applied input power and coverage of frequency is capable for.

In the conclusion, Termination delete useless input signal by diffusing way at the end of RF circuit.

Termination can be used in all telecommunication equipment and devices including not only mobile telecommunication system but wired and wireless telecommunication systems.

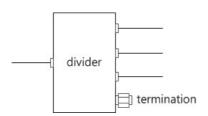


It will be easy to understand of the application of the termination with the explanation of using mobile telecommunication system.

When you input number in your mobile, and then push 'Send' to call your friend. The signal from your mobile phone is transmitted to the antenna located in the building. The antenna transmits the signal to the combiner(or divider) which is connected to the antenna. The combiner(divider) transmits the signal to repeater, and the repeater transmits the received signal to base station, and then the base station finally transmits the signal to the system operator. The signal is transmitted to the receiver in a reverse way. The signal which is transmitted to the base station goes through the repeater and then is transmitted to the antenna which is installed in the building through the divider(combiner). And the signal is finally transmitted to the other mobile phone receiver.

As you can see Dra. 2-3 Mobile telecommunication system, the sender and the receiver used the divider(combiner). You probably know that the divider is an asymmetrical circuit for input and output. When the divider is used in reverse, it works as the combiner and when the combiner is used in reverse, it works as the divider. Please refer to the divider section in this RF Bible at the page 108.

The divider can be used as 2, 3, 4, 8 or more ways of output port depending on the installation environment. However, all the ports are not available according to the installation environment. It means that one port may not be available while the remaining three ports are available although the divider is used as 4 ways. For such cases, you need to add termination to the port which is not used in order to prevent reflected signals.



(Dra. 2-4) Connected termination at divider

It is recommended to select termination with a certain handling power margins in accordance with each output port power which are divided by the output port of power divider from the input power. The reason for using the over power of termination is to secure the safety of

system from the uncertain over input power to the termination.

I took the divider which is connected to the repeater as an example, and the repeater is also recommended to be terminated with over coverage handling power

termination on the output port which is not used. Termination is usually used with connecting chains to the repeater to prevent loss.



(Dra. 2-5) Termination with chain

It is exampled the isolator and coupler to explain the application of the termination. As explained, termination is designed with connection to many products such as isolator, circulator, coupler, cavity filter and so on having signals corresponding to the purpose of the product or system, or is used in connection

to the external port of the product. As you look into wireless routers, mini repeaters and other various modules which are commonly used, you can see that terminations are frequently used to terminate signals which are injected to the unused ports of various devices.

It is good for you to consider the following in advance when you select terminations.

First of all, you need to check what kind of connectors is connected for each product, module or system.

You need to understand what kind of connector is when you develop or purchase a product to connect it to the end of the RF circuit. If you don't know how to distinguish connector types, please refer to 144 page of this RF Bible to find out the same connector and check the gender of the male or female.

Secondly, you need to check the maximum frequency available to each connector. MIL-C-39012 specifies BNC connectors as DC-4GHz, SMA connectors as DC-18GHz and N connectors as DC-11GHz (or DC-18GHz). So it may not be available if you are looking for the termination of BNC connector type with 10GHz.

Thirdly, you need to check the output power from the equipment, in other words, input power of Termination.

After checking the output power of the RF circuit for which you want to use the termination, you may consider the termination with the input power same as the output power. However, it is recommended to get the termination with 30%~50% of the additional Termination power coverage for safety reason from the over power

incidentally by the system. Somebody select the terminations with the input power same as the output power of the RF circuits, but most of them use terminations which have more power up to 30%~50% normally than actual input power to termination. Because, if the unintended over power due to an unstable power system may be transmitted to the termination, and the termination may degrade or deteriorate the function. The over power may be transmitted to the system, and the expensive system may be broken so that the high power of termination of application rather than the real input power as an insurance characteristic is recommended to use.

Fourthly, you need to consider the size of the product.

Terminations are designed and manufactured for either indoor or outdoor purpose. Indoor terminations are installed within devices or buildings. So the size matters when the termination is installed within a device. As the power increases, the size of heatsink of the termination increases. It means that high power terminations may not be used in a small system device or in a narrow space. Under the same input power, smaller size of the termination including the heatsink means better efficiency. However, those terminations with higher input power and smaller size are relatively expensive.

Outdoor terminations mean they can be used in external environments. External environments mean the terminations comply with IP rating standard in its own function. Please refer to 270 page of RF Bible for the explanation of IP rating.

Fifthly, we have checked the physical conditions of the product, and now you need to check the electrical functionality of the product.

As explained above, the termination is a 1-port device. Therefore it only has return loss and doesn't have insertion loss. So you need to check the bandwidth of the RF circuit that you are designing, and then you can check the Return loss in that bandwidth or V.S.W.R. values.

We have reviewed the definition of terminations, their applications and considerations for selection of proper product. Though termination seems simple devices but if you look into them you will understand they are very critical products in telecommunication system.

SMA Termination



Check out the Difference!

Reliable V.S.W.R. Specification; 1.20:1 Max

100% of input power test approved under severe conditions

Full data files (Test data, Outlined drawing and Product photos) are available

Customized design available

Within 1 week of delivery

RoHS Compliant

Connector Type	Power	Frequency	V.S.W.R.(max)	PN	Page
SMA Male	1 Watt	DC ~ 6GHz	1.20 : 1	E01-A0106-01	21
SMA Male	1 Watt	DC ~ 18GHz	1.20 : 1	E01-A0118-02	22
SMA Male	2 Watt	DC ~ 6GHz	1.15 : 1	E01-A0206-02	23
SMA Male	2 Watt	DC ~ 18GHz	1.20 : 1	E01-A0218-03	24
SMA Male	5 Watt	DC ~ 6GHz	1.15 : 1	E01-A0506-02	25
SMA Male	5 Watt	DC ~ 18GHz	1.20 : 1	E01-A0518-01	26

SMA Male 1Watt 6GHz





- Excellent V.S.W.R. 1.15: 1 (max) @ 6GHz
- Broad application such as LTE, 5G Sub-6GHz and 5.8GHz WiFi
- Easy Installation
- Same day Shipment



BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

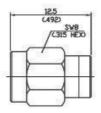
Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (Nominal)	50Ω
Input Power rating (max)	1 Watt (CW)
V.S.W.R. (max)	1.15 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Gold plating
Coupling nut	Brass / Gold plating
Center contact (Pin)	Brass / Gold plating

DRAWING





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.



SMA Male 1Watt 18GHz









Part No.: E01-A0118-02

- Excellent V.S.W.R. 1.20 : 1 (max) @ 18GHz
- Very broad application such as LTE,
 5G Sub-6GHz, 5.8GHz WiFi, satellite and other Microwave performance
- Easy installation
- Same day Shipment

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

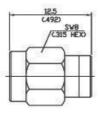
Electrical Specification

Item	Specification
Frequency range	DC ~ 18 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	1 Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Gold plating
Coupling nut	Brass / Gold plating
Center contact (Pin)	Brass / Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

SMA Male 2Watt 6GHz





Part No.: E01-A0206-02

- World Best V.S.W.R. 1.15: 1 (max) @ 6GHz
- Broad application such as, LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power test approved
- Stainless Steel SMA coupling Nut for reliable 500 mating life cycle
- Tri-Alloy plating for housing and connector body
- Smallest diameter for limited inner and outer space

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

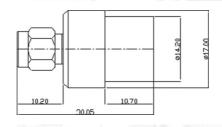
Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2 Watt (CW)
V.S.W.R. (max)	1.15 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	SUS / Passivated
Center contact (Pin)	Brass / Gold plating
Dimension	Ø17 * 30mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



SMA Male 2Watt 18GHz







Part No.: E01-A0218-03

- World Best V.S.W.R. 1.20:1 (max) @ 18GHz
- Very Broad application such as LTE, 5G Sub-6GHz,
 5.8GHz WiFi, satellite and other Microwave purpose
- Input power test approved
- Stainless Steel SMA coupling nut for reliable 500 Mating life cycle
- Tri-Alloy plating for Termination housing and connector body

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

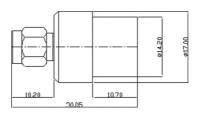
Electrical Specification

Item	Specification
Frequency range	DC ~ 18 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	SUS / Passivated
Center contact (Pin)	Brass / Gold plating
Dimension	Ø17 * 30mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con
All specifications are subject to change without notice at any time.

SMA Male 5Watt 6GHz





Part No.: E01-A0506-02

- World Best V.S.W.R. 1.15: 1 (max.) @ 6GHz
- Broad application such as, LTE, 5G Sub-6GHz, and 5.8GHz WiFi.
- Input power test approved
- Tri-Alloy plating for Termination body and connector body
- Stainless Steel SMA coupling Nut for reliable 500 mating life cycle
- Minimized 20mm cooling heat sink diameter

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

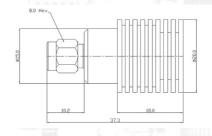
Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	5Watt (CW)
V.S.W.R. (max)	1.15 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body & Housing	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	SUS / Passivated
Center contact (Pin)	Brass / Gold plating
Dimension	Ø20 * 37.3mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



SMA Male 5Watt 18GHz







Part No.: E01-A0518-01

- World Best V.S.W.R. 1.20: 1 (max) @ 18GHz
- Very Broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi, satellite and other Microwave purpose
- Input power test approved
- Tri-Alloy plating for Termination body and connector body
- Stainless Steel SMA coupling Nut for 500 Mating life cycle
- Minimizing 20mm Cooling pin Diameter

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

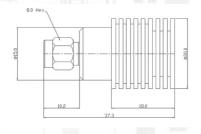
Electrical Specification

Item	Specification
Frequency range	DC ~ 18 GHz
Impedance (Nominal)	50Ω
Input power rating	5Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	SMA male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body & Housing	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	SUS / Passivated
Center contact (Pin)	Brass / Gold plating
Dimension	Ø20 * 37.3mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con
All specifications are subject to change without notice at any time.



N Termination



Check out the Difference!

Reliable V.S.W.R. Specification; 1.20:1 max

100% of input power test approved under severe conditions

Full data files (Test data, Outlined drawing and Product photos) are available

Customized design available upon request

Short delivery within 1 week of delivery from valuable order

RoHS Compliant

Connector Type	Power	Frequency	V.S.W.R.(max)	PN	Page
N Male	2 Watt	DC ~ 6GHz	1.15 : 1	E04-A0206-01	29
N Male	2 Watt	DC ~ 18GHz	1.18 : 1	E04-A0218-05	30
N Male	5 Watt	DC ~ 6GHz	1.15 : 1	E04-A0506-04	31
N Male	5 Watt	DC ~ 18GHz	1.20 : 1	E04-A0518-03	32
N Male	10 Watt	DC ~ 4GHz	1.20 : 1	E04-A1004-04	33
N Male	30 Watt	DC ~ 4GHz	1.20 : 1	E04-A3004-07	34
N Male	50 Watt	DC ~ 4GHz	1.20 : 1	E04-A5004-08	35
N Male	50 Watt	DC ~ 6GHz	1.20 : 1	E04-A5006-02	36
N Male	100 Watt	DC ~ 3GHz	1.20 : 1	E04-H1003-11	37

N Male 2Watt 6GHz





- World Best lowest V.S.W.R. 1.15: 1 (max) @ 6GHz
- Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power test approved
- Same day shipment







BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

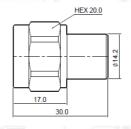
Electrical Specification

Item	Specification	
Frequency range	DC ~ 6 GHz	
Impedance (Nominal)	50Ω	
Input power rating (max)	2Watt (CW)	
V.S.W.R. (Max)	1.15 : 1	
Connector type	N male (plug)	
Operating temperature	-65°C ~ +85°C	

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø14.2 * 30mm

DRAWING





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



N Male 2Watt 18GHz





- World Best lowest V.S.W.R. 1.20:1 (max) @ 18GHz
- Very Broad application such as LTE, 5G Sub-6GHz,
 5.8GHz WiFi, satellite and other Microwave purpose
- Input power test approved
- Same day shipment







BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

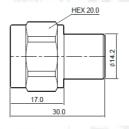
Electrical Specification

Item	Specification	
Frequency range	DC ~ 18 GHz	
Impedance (Nominal)	50Ω	
Input power rating (max)	2Watt (CW)	
V.S.W.R. (max)	1.20 : 1	
Connector type	N male (plug)	
Operating temperature	-65°C ~ +85°C	

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø14.2 * 30mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

N Male 5Watt 6GHz







Part No.: E04-A0506-04

- World Best lowest V.S.W.R. 1.15: 1 (max) @ 6GHz
- Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power test approved
- Tri-Alloy plating for Termination body and connector body
- Minimizing 20mm Cooling heat sink Diameter

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

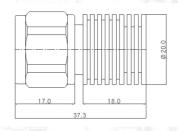
Electrical Specification

Item	Specification	
Frequency range	DC ~ 6 GHz	
Impedance (Nominal)	50Ω	
Input power rating (max)	5Watt (CW)	
V.S.W.R. (max)	1.15 : 1	
Connector type	N male (plug)	
Operating temperature	-65°C ~ +85°C	

Material specification

Item	Specification
Body & Housing	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø20 * 37.3mm

DRAWING





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



N Male 5Watt 18GHz







Part No.: E04-A0518-03

- World Best lowest V.S.W.R. 1.20: 1 (max) @ 18GHz
- Very Broad application such as LTE, 5G Sub-6GHz,
 5.8GHz WiFi, satellite and other Microwave purpose
- Input power test approved
- Tri-Alloy plating for Termination and connector body
- Minimized 20mm Cooling heat sink Diameter

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

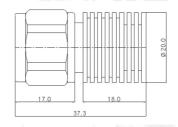
Electrical Specification

Item	Specification
Frequency range	DC ~ 18 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	5Watt (CW)
V.S.W.R. (Max)	1.20 : 1
Connector type	N male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body & Housing	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø20 * 37.3mm

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

N Male 10Watt 4GHz





- World Best lowest V.S.W.R. 1.20: 1 (max) @ 4GHz
- 3G, 4G LTE application
- Input power test approved
- Shortest delivery
- Smallest dimension for 10Watt termination

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

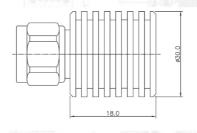
Electrical Specification

Item	Specification
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	10Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	N male (plug)
Operating Temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body & Housing	Brass / Nickel plating
Connector body	Brass / Nickel plating
Coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø14.2 * 30mm

DRAWING





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.



N Male 30Watt 4GHz





Part No.: E04-A3004-07

- Reliable V.S.W.R. 1.20 : 1 (max) @ 4GHz
- 3G, 4G LTE application
- Input power test approved
- Shortest delivery
- 3 years long life warranty

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

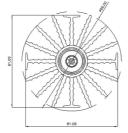
Electrical Specification

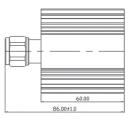
Item	Specification
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	30Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	N male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Body	Brass / Nickel plating
Connector body	Brass / Nickel plating
Coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass / Gold plating

DRAWING







^{**} If you wish to get more detailed information, specification or samples,

please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con

All specifications are subject to change without notice at any time

N Male 50Watt 4GHz





Part No.: E04-A5004-08

- Reliable V.S.W.R. 1.20: 1 (max) @ 4GHz
- 3G, 4G LTE application
- Input power test approved
- Shortest delivery
- 3 years long life warranty

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

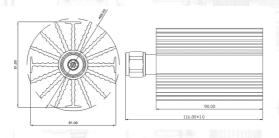
Electrical Specification

Item	Specification
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	50Watt (CW)
V.S.W.R. (max)	1.15 : 1
Connector type	N male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Body	Brass / Nickel plating
Connector body	Brass / Nickel plating
Coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass / Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

N Male 50Watt 6GHz



Part No.: E04-A5006-02

- Reliable V.S.W.R. 1.20: 1 (max) @ 6GHz.
- Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power Test approved
- Shortest delivery
- 3 years long life warranty



BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

- SPECIFICATION

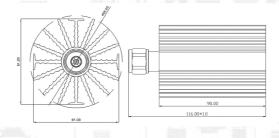
Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	50Watt (CW)
V.S.W.R. (Max)	1.20 : 1
Connector type	N male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Body	Brass / Nickel plating
Connector body	Brass / Nickel plating
Coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø66 * 116mm

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

N Male 100Watt 3GHz



Part No.: E04-H1003-11

- Reliable V.S.W.R. 1.20 : 1 (max) @ 3GHz
- Telecommunication application
- Input power test approved
- Shortest delivery
- 3 years long life warranty

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

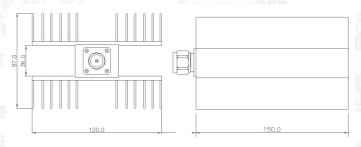
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	DC ~ 3 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	100Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	N male (plug)
Operating Temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Body	Brass / Nickel plating
Coupling nut	Brass / Nickel plating
Connector body	Brass / Nickel plating
Center contact (Pin)	Brass / Gold plating





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

7/16DIN Termination



Check out the Difference!

Reliable V.S.W.R. Specification, 1.20:1 max

100% of Input power test approved under severe conditions

Full data files (Test data, Outlined drawing and Product photos) are available

Customized design available upon request

Within 2 weeks of short delivery from valuable order

		The second of th				
	Connector Type	Power	Frequency	V.S.W.R.(max)	PN	Page
	7/16DIN Male	2 Watt	DC ~ 7.5GHz	1.20 : 1	E05-A0208-01	39
	7/16DIN Male	30 Watt	DC ~ 4GHz	1.20 : 1	E05-A3004-02	40
	7/16DIN Male	50 Watt	DC ~ 4GHz	1.20 : 1	E05-A5004-01	41
	7/16DIN Male	100 Watt	DC ~ 3GHz	1.20 : 1	E05-H1003-04	42

7/16DIN Male 2Watt 7.5GHz





- World Best V.S.W.R. 1.20 : 1 (max) @ 7.5GHz
- Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power test approved
- Tri-Alloy plating for Termination body and connector body
- 3 Years long life Warranty



BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

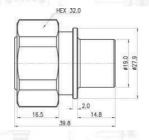
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	DC ~ 7.5 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	7/16DIN male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Gold plating
Dimension	Ø27.9 * 39.8mm





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



7/16DIN Male 30Watt 4GHz





- Reliable V.S.W.R. 1.20 : 1 (max) @ 4GHz
- 3G, 4G LTE application
- Input power test approved
- 3 years long life warranty



BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

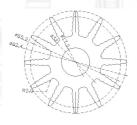
Electrical Specification

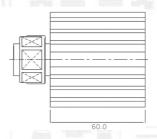
Item	Specification
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input Power rating (max)	30Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	7/16DIN male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Silver plating

DRAWING







** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con
All specifications are subject to change without notice at any time.

7/16DIN Male 50Watt 4GHz





- Reliable V.S.W.R. 1.20 : 1 (max) @ 4GHz
- 3G, 4G LTE application
- Input power test approved
- IP 65 Water and dust-proof rating for outdoor application
- 3 years long life warranty



BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

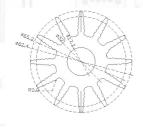
Electrical Specification

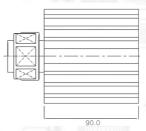
Item	Specification
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input Power rating (max)	50Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	7/16DIN male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass / Silver plating

DRAWING









** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

7/16DIN Male 100Watt 3GHz





Part No.: E05-H1003-04

- Reliable V.S.W.R. 1.20 : 1 (max) @ 3GHz
- Telecommunication application
- Input power test approved
- 3 years long life warranty

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

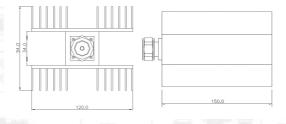
- SPECIFICATION

Electrical Specification

Item	Specification	
Frequency range	DC ~ 3 GHz	
Impedance (Nominal)	50Ω	
Input power rating (max)	100 Watt (CW)	
V.S.W.R. (max)	1.20 : 1	
Connector type	7/16DIN male (plug)	
Operating temperature	-65°C ~ +85°C	

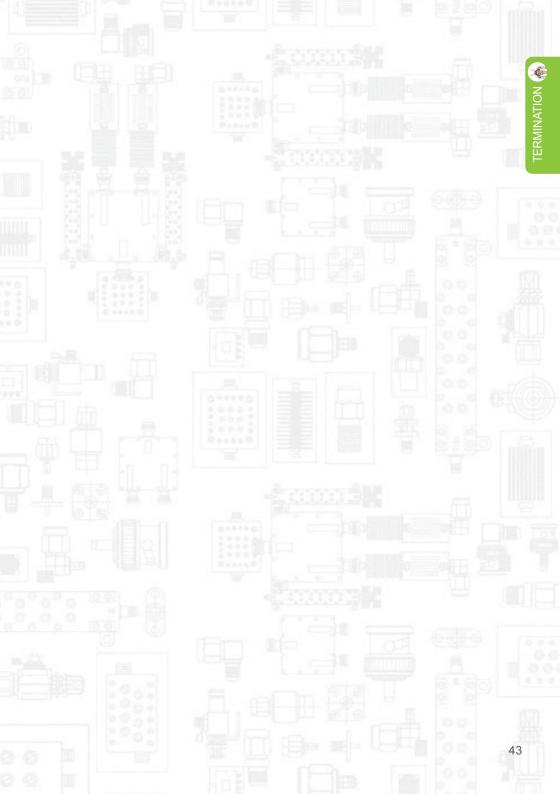
Material specification

Item	Specification
Housing	Aluminum / Black Anodizing
Body	Aluminum / Black Anodizing
Connector body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center Contact (Pin)	Brass / Silver plating





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con
All specifications are subject to change without notice at any time.



Other Termination



Check out the Difference!

Reliable V.S.W.R. Specification; 1.20:1 max

100% of input power test approved under severe conditions

Full data files (Test data, Outlined drawing and Product photos) are available

Customized design available upon request

Within 2 weeks of short delivery

RoHS Compliant

				A SECTION 1	
Connector Type	Power	Frequency	V.S.W.R.(max)	PN	Page
BNC Male	1 Watt	DC ~ 3GHz	1.20 : 1	E02-A0103-01	45
BNC Male	2 Watt	DC ~ 3GHz	1.20 : 1	E02-A0203-01	46
TNC Male	2 Watt	DC~6GHz	1.20 : 1	E03-A0206-01	47

BNC Male 1Watt 3GHz









Part No.: E02-A0103-01

- V.S.W.R. 1.20: 1 (max) @ 3GHz
- Telecommunication and radio application
- Input power test approved
- 3 years long life warranty

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

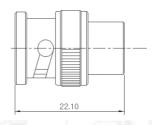
Electrical Specification

Item	Specification
Frequency range	DC ~ 3 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	1Watt (CW)
V.S.W.R. (max)	1.20 : 1
Connector type	BNC male (plug)
Operating Temperature	-65°C ~ +85°C

Material specification

Item	Specification	
Body	Brass / Nickel plating	
Connector Body	Brass / Nickel plating	
Coupling nut	Brass / Nickel plating	
Center contact (Pin)	Brass / Gold plating	

DRAWING







** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

BNC Male 2Watt 3GHz









Part No.: E02-A0203-01

- V.S.W.R. 1.20 : 1 (max) @ 3GHz
- Telecommunication and radio application
- Input power test approved
- Long 3 years life warranty

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

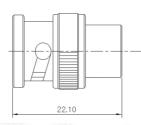
- SPECIFICATION

Electrical Specification

Item	Specification	
Frequency range	DC ~ 3 GHz	
Impedance (Nominal)	50Ω	
Input power rating (max)	2Watt (CW)	
V.S.W.R. (max)	1.20 : 1	
Connector type	BNC male (plug)	
Operating temperature	-65°C ~ +85°C	

Material specification

Item	Specification	
Body	Brass / Nickel plating	
Connector body	Brass / Nickel plating	
Coupling nut	Brass / Nickel plating	
Center contact (Pin)	Brass / Gold plating	





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

TNC Male 2Watt 6GHz



Part No.: E03-A0206-01

- V.S.W.R. 1.25: 1 (max) @ 6GHz
- Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Input power test approved
- Same day shipment

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

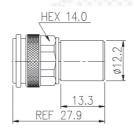
- SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2Watt (CW)
V.S.W.R. (max)	1.25 : 1
Connector type	TNC male (plug)
Operating temperature	-65°C ~ +85°C

Material specification

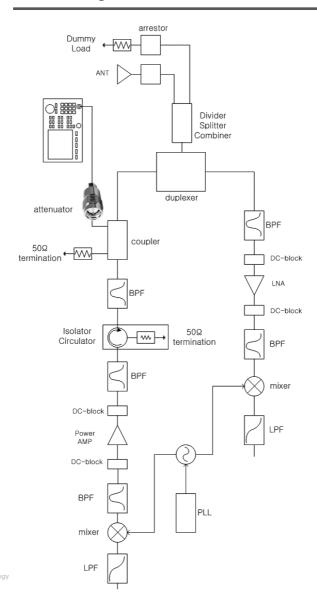
Item	Specification	
Body	Brass / Tri-alloy plating	
Connector body	Brass / Tri-alloy plating	
Coupling nut	Brass / Tri-alloy plating	
Center contact (Pin)	Brass / Gold plating	





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

O2 Attenuator Block Diagram







About Attenuator	50
SMA 2Watt DC~4GHz Attenuator	56
SMA 2Watt DC~8GHz Attenuator	62
SMA 2Watt DC~18GHz	68
SMA 5Watt DC~3GHz	69
2.92mm 2Watt DC~40GHz	70
N 2Watt DC~4GHz Attenuator	71
N 2Watt DC~8GHz Attenuator	75
N 5Watt DC~3GHz Attenuator	79
N 30Watt DC~3GHz Attenuator	80
N 50Watt DC~3GHz Attenuator	81
N 100Watt DC~3GHz Attenuator	82



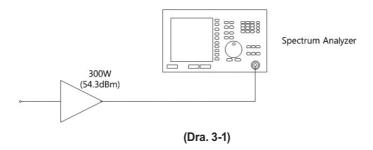


Attenuator makes decreasing output power in some module or RF system without distorting or transforming of signal waveform or data when the output power is too high and could cause damage on the system or equipment.

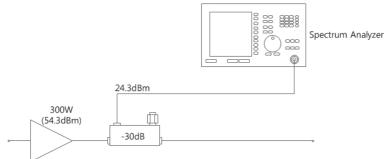
There are some reasons to attenuate a power.

- 1. Attenuator is used to improve the Impedance matching and secure the reliability of circuit. Attenuator is also used to adapt the level between the two different circuits or devices. For example, if there are Power Amplifier(hereinafter we refer to Amplifier as AMP) which output power is +15dBm at the first and then connected duplexer which the input power range is 0 ~ +5dBm, the -12dB of attenuator is used between Power AMP and duplexer to revise the gap of output and input power between both equipments to protect duplexer safely from the exceed input power.
- 2. Beside of this case, Attenuator is used to attenuate the power when there is not coupler for power monitoring, or even the coupled power seems too high enough to brake connected next equipment, attenuator could be applied to keep safe the equipment from undesired excessive input power.

For example, when we try to monitor the output waveform and power of power AMP which generate +54.3dBm(300Watt), it is highly risky to connect directly the power AMP to spectrum analyzer. The valuable spectrum analyzer could be damaged due to the excessive high input power which is out of coverage of handling power.



In order to prevent this problem in advance, we measure the power and waveform of the signal while a -30dB of coupler is connected with power AMP, and the coupled port in coupler is connected to spectrum analyzer. If it works well in normal, the waveform is same and the power is measured -30dB lower at the coupling port.

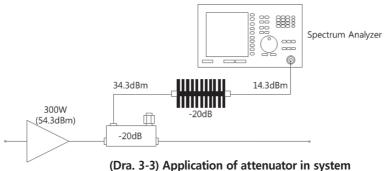


(Dra. 3-2) Application of coupler

However, even though the -30dB coupler is applied or not on the system, it would be highly risky if the spectrum analyzer's input power handling capability is lower than the output power to the spectrum analyzer which is lowered by the coupler.

If there is -20dB coupler, the output power of coupled port get lower to +34.3dBm from +54.3dBm input power of AMP. But it is still high power level to the spectrum analyzer. -20dB 10Watt(40dBm) attenuator could be applied to attenuate the high output power on the coupled port.

Otherwise, the same –20dB 10Watt(40dBm) attenuator could be connected to the input port of spectrum analyzer which has low capability of handling power.



then you say that the input power range of the measuring instrument

When you say that the input power range of the measuring instrument is low, it means the level of the input power to which the measuring instrument is tolerable is low. Most of the measuring instruments have their power levels between mWatt and a few Watts which are not that high.

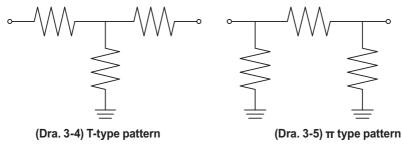
Whenever you use any kind of measuring instruments, you need to check the input power level of the instrument in before using it to ensure that the input power appropriate to the level is injected. When the input power level of the measuring instrument is lower than the output power of the device to be measured, you must use an attenuator to protect your measuring instrument.

When do you need to use the attenuator in practices?

As explained above, the attenuator decreases the output power of Power Amp or instrument down to a requiring level. You can face the situation that the actual output power of a Power AMP or other device is higher than the power which was initially designed. In such cases, you can easily, safely and reasonably verify the functions of the product without modifing or tuning, by decreasing the output power as assigned by the attenuator rather than carrying out a new design and development.

When the product design is successfully completed and the production line begins manufacturing, the production line and the Quality Control will occasionally inspect the quality of the products for the next step. At this time, there may be dangers of injecting or outputting the power under the actual field condition. Especially for products like AMP which have higher output power, this will cause damages to the measuring instruments, production lines and production personnel. Because of these dangerous situations, the attenuator should be connected at the out port of AMP so that the damages can be prevented at the production lines.

Attenuator is consisted of 3 resistors in circuit which is placed like T-type shape or π type shape to attenuate input power by diffusing to heat.



There are two types of attenuators. One is fixed attenuator and the other is variable attenuator.

Until now, the above explained attenuator is the fixed attenuator. Variable attenuator is the attenuator which attenuation dB can be adjusted and can be used to measure

a various dB easily with the variable attenuator itself. Variable attenuator is more expensive than the fixed attenuator but it is very convenient for use.

The key factors to choose the attenuator are insertion loss(S21) in the frequency range, a flatness of insertion loss, return loss(S11) and power handling capability in input power. As below, you can see the explanation for key factors with the examples.

Let's try to choose the attenuator for the 2GHz +50dBm output power system. Coupler is the one of the good option. It is possible to measure a power through coupled port of coupler simply out of +50dBm output power. But we just suppose there is not a coupler available at this moment. If maximum handling input power is +30dBm at spectrum analyzer, it would be desirable to give +20dBm or lower power to protect spectrum analyzer. +50dBm is converted into 100Watt in watt scale. You can check the dBm and Watt table in this RF Bible (Page 258). Therefore, at least 100Watt attenuator should be used. It could be happened a bounced power in a moment so that the margin over 100watt at the attenuator is recommended. Even though someone choose the attenuator with margin in power, the unexpected over power could be flowed into the attenuator, and the attenuator could be out of order. You should check it out the nominal input power and peak power in attenuator before selecting the attenuator. Because of the over power, the attenuator could not carry out its function and could make damage to the equipment when attenuator is damaged and the input signal would return to the equipment.

The insertion loss(S21) should be -30 dB to attenuate the input power from + 50dBm to +20dBm. The working frequency with a margin is recommended that 2.5GHz or 3GHz of attenuator is better than 2GHz attenuator itself. Because the return loss and insertion loss is getting worse from the 2GHz frequency, as long as the product guarantee the electrical specification upto 2GHz. In conclusion, 150Watt -30dB 2.5GHz attenuator is recommended to select with the 2GHz +50dBm output power system. If it is not available -30dB attenuator, it could be connected -10dB and -20dB attenuator together alternatively. But you should pay attention that -20dB attenuator is placed in front of the other. Then +50dBm of power is attenuated to +30dBm, through -20dB attenuator, and 1watt will be carried after the -20dB attenuator. Therefore it could be used 2watt -10dB attenuator even if you would consider the attenuating margin.

The next step to consider is to check S11 and S21 S-parameter specification graph. It is

same way to check V.S.W.R., instead of S11 as the final outcome. You can refer to the concept of V.S.W.R. and S-parameter at this RF Bible(Page 259, 262).

It should be careful at the direction of attenuator. If you would connect the attenuator in reversed direction at the power test, the attenuator could be burned out so that it could cause severe damage to the test equipment and circuit. Mostly there is an input and output mark at the high power attenuator. If there is not a mark, the male (plug) connector port is input port and female (jack) connector port is output normally. There is bi-directional attenuator which could be used on the both side, but it is usually cost higher than directional attenuator.

One more thing you need to consider is the type of the input and output connectors.

You need to clearly check the type of the cable assembly or connector of the device which is connected to the attenuator so that you can determine the appropriate type of the connector for the attenuator. Usually SMA type connectors are used for the power less than 10Watt and N type or 7/16DIN type connectors are used for the power of 50Watt, 100Watt, 200Watt or more.

SMA type connectors can be used up to 18GHz bandwidth despite of their lower injected power while N type connectors are limited to 18GHz despite of their higher injected power.

SMA 2Watt DC~4GHz Attenuator



Check out the Difference!

Outstanding flatness of Attenuation accuracy value

Stainless steel material for the long life usage and reliable specification

Excellent power capacity in anti-burnout.

Full data files (Test data, Outlined drawing and Product photos) are available

Optimized for Telecommunication application

Various dB (1 ~ 40dB) available

1 week of fastest delivery

RoHS Compliant

Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
SMA 2Watt 1dB DC~4GHz	1.18:1	1 ±0.35dB	F01-B0401-03	58
SMA 2Watt 2dB DC~4GHz	1.18:1	2 ±0.35dB	F01-B0402-03	30
SMA 2Watt 3dB DC~4GHz	1.18:1	3 ±0.4dB	F01-B0403-03	
SMA 2Watt 4dB DC~4GHz	1.18:1	4 ±0.4dB	F01-B0404-03	59
SMA 2Watt 5dB DC~4GHz	1.18:1	5 ±0.4dB	F01-B0405-03	39
SMA 2Watt 6dB DC~4GHz	1.18:1	6 ±0.4dB	F01-B0406-03	
SMA 2Watt 7dB DC~4GHz	1.18:1	7 ±0.55dB	F01-B0407-03	
SMA 2Watt 8dB DC~4GHz	1.18:1	8 ±0.55dB	F01-B0408-03	60
SMA 2Watt 9dB DC~4GHz	1.18:1	9 ±0.55dB	F01-B0409-03	00
SMA 2Watt 10dB DC~4GHz	1.18:1	10 ±0.55dB	F01-B0410-03	

Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
SMA 2Watt 11dB DC~4GHz	1.18:1	11 ±0.55dB	F01-B0411-03	
SMA 2Watt 12dB DC~4GHz	1.18:1	12 ±0.55dB	F01-B0412-03	
SMA 2Watt 13dB DC~4GHz	1.18:1	13 ±0.55dB	F01-B0413-03	
SMA 2Watt 14dB DC~4GHz	1.18:1	14 ±0.55dB	F01-B0414-03	
SMA 2Watt 15dB DC~4GHz	1.18:1	15 ±0.55dB	F01-B0415-03	
SMA 2Watt 16dB DC~4GHz	1.18:1	16 ±0.55dB	F01-B0416-03	
SMA 2Watt 17dB DC~4GHz	1.18:1	17 ±0.55dB	F01-B0417-03	60
SMA 2Watt 18dB DC~4GHz	1.18:1	18 ±0.55dB	F01-B0418-03	60
SMA 2Watt 19dB DC~4GHz	1.18:1	19 ±0.55dB	F01-B0419-03	
SMA 2Watt 20dB DC~4GHz	1.18:1	20 ±0.55dB	F01-B0420-03	
SMA 2Watt 21dB DC~4GHz	1.18:1	21 ±0.55dB	F01-B0421-03	
SMA 2Watt 22dB DC~4GHz	1.18:1	22 ±0.55dB	F01-B0422-03	
SMA 2Watt 23dB DC~4GHz	1.18:1	23 ±0.55dB	F01-B0423-03	
SMA 2Watt 24dB DC~4GHz	1.18:1	24 ±0.55dB	F01-B0424-03	
SMA 2Watt 25dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0425-03	
SMA 2Watt 26dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0426-03	
SMA 2Watt 27dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0427-03	61
SMA 2Watt 28dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0428-03	01
SMA 2Watt 29dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0429-03	
SMA 2Watt 30dB DC~4GHz	1.18:1	25 ±0.55dB	F01-B0430-03	
to the second se				

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

SMA 2Watt 1~2 dB DC~4GHz









- 2 Watt Bi-directional type
- 2 Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

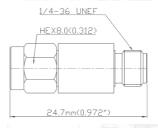
Electrical Specification

Item	Specification	
Part number	F01-B0401-03	F01-B0402-03
Frequency range		
Impedance (Nominal)		
Input power rating (max)		
Attenuation accuracy	1 ±0.35 dB	2 ±0.35 dB
V.S.W.R. (max)	1.18	3:1
Operating temperature	g temperature -65°C ~ +85°C	

Material specification

Item	Specification	
Body	Stainless steel / Passivated	
Coupling nut	Stainless steel / Passivated	
Center contact (Pin)	Brass (male), Be-Cu(female)/ Gold plating	

DRAWING





** If you wish to get more detailed information, specification or samples,

please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

All specifications are subject to change without notice at any time.

SMA 2Watt 3~6 dB DC~4GHz





- 2 Watt Bi-directional type
- 2 Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

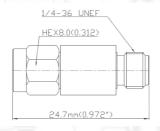
Electrical Specification

Item	Specification	
Part number	F01-B0403-03 F01-B0405-03	F01-B0404-0 F01-B0406-0
Frequency range	DC ~	4 GHz
Impedance (Nominal)	<i>'</i>	
Input power rating (max)		
Attenuation accuracy	3 ±0.4 dB 5 ±0.4 dB	4 ±0.4 dB 6 ±0.4 dB
V.S.W.R. (max)	1.18	3:1
Operating temperature	-65°C ~	+85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass (male), Be-Cu(female)/ Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com



SMA 2Watt 7~24 dB DC~4GHz









- 2 Watt Bi-directional type
- 2 Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

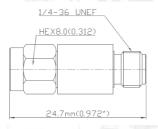
SPECIFICATION

Electrical Specification

Item	Specification
Part number	F01-B0407-03 ~ F01-B0424-03 (ex, F01-B04**dB-03 / **: 07~24dB)
Frequency range	DC ~ 4 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2 Watt (CW)
Attenuation accuracy	7 ~ 24 ±0.55 dB
V.S.W.R. (max)	1.18 : 1
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass(male), Be-Cu(female)/ Gold plating





^{**} If you wish to get more detailed information, specification or samples,

please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

All specifications are subject to change without notice at any time.

SMA 2Watt 25~30 dB DC~4GHz







- World Best ±0.55dB Attenuation accuracy
- 2 Watt Bi-directional type
- 2 Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

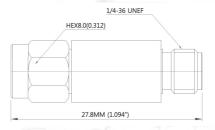
- SPECIFICATION

Electrical Specification

	Item	Specification
	Part number	F01-B0425-03 ~ F01-B0430-03 (ex, F01-B04**dB-03 / **: 25~30dB)
	Frequency range	DC ~ 4 GHz
	Impedance (Nominal)	50Ω
	Input power rating (max)	2 Watt (CW)
	Attenuation accuracy	25 ~ 30 ±0.55 dB
	V.S.W.R. (max)	1.18 : 1
	Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass(male), Be-Cu(female)/ Gold plating





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.



SMA 2Watt DC~8GHz Attenuator



Check out the Difference!

Stainless Steel material for the long life usage and reliability specification

Outstanding flatness of Attenuation value

Excellent power capacity in anti-burnout Full data files (Test data, Outlined drawing and Product photos) are available

Optimized for Various application, from FM Radio to WiMax including telecommunication system such as 3G, 4G, 5G LTE

1~ 2weeks of shortest delivery from your valuable order

RoHS Compliant

Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
SMA 2Watt 1dB DC~8GHz	1.20:1	1 ±0.35dB	F01-B0801-05	64
SMA 2Watt 2dB DC~8GHz	1.20:1	2 ±0.35dB	F01-B0802-05	04
SMA 2Watt 3dB DC~8GHz	1.20:1	3 ±0.4dB	F01-B0803-05	
SMA 2Watt 4dB DC~8GHz	1.20:1	4 ±0.4dB	F01-B0804-05	65
SMA 2Watt 5dB DC~8GHz	1.20:1	5 ±0.4dB	F01-B0805-05	03
SMA 2Watt 6dB DC~8GHz	1.20:1	6 ±0.4dB	F01-B0806-05	
SMA 2Watt 7dB DC~8GHz	1.20:1	7 ±0.55dB	F01-B0807-05	
SMA 2Watt 8dB DC~8GHz	1.20:1	8 ±0.55dB	F01-B0808-05	66
SMA 2Watt 9dB DC~8GHz	1.20:1	9 ±0.55dB	F01-B0809-05	00
SMA 2Watt 10dB DC~8GHz	1.20:1	10 ±0.55dB	F01-B0810-05	

Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
SMA 2Watt 11dB DC~8GHz	1.20:1	11 ±0.55dB	F01-B0811-05	
SMA 2Watt 12dB DC~8GHz	1.20:1	12 ±0.55dB	F01-B0812-05	
SMA 2Watt 13dB DC~8GHz	1.20:1	13 ±0.55dB	F01-B0813-05	
SMA 2Watt 14dB DC~8GHz	1.20:1	14 ±0.55dB	F01-B0814-05	
SMA 2Watt 15dB DC~8GHz	1.20:1	15 ±0.55dB	F01-B0815-05	
SMA 2Watt 16dB DC~8GHz	1.20:1	16 ±0.55dB	F01-B0816-05	
SMA 2Watt 17dB DC~8GHz	1.20:1	17 ±0.55dB	F01-B0817-05	66
SMA 2Watt 18dB DC~8GHz	1.20:1	18 ±0.55dB	F01-B0818-05	00
SMA 2Watt 19dB DC~8GHz	1.20:1	19 ±0.55dB	F01-B0819-05	
SMA 2Watt 20dB DC~8GHz	1.20:1	20 ±0.55dB	F01-B0820-05	
SMA 2Watt 21dB DC~8GHz	1.20:1	21 ±0.55dB	F01-B0821-05	
SMA 2Watt 22dB DC~8GHz	1.20:1	22 ±0.55dB	F01-B0822-05	
SMA 2Watt 23dB DC~8GHz	1.20:1	23 ±0.55dB	F01-B0823-05	
SMA 2Watt 24dB DC~8GHz	1.20:1	24 ±0.55dB	F01-B0824-05	
SMA 2Watt 25dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0825-05	
SMA 2Watt 26dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0826-05	
SMA 2Watt 27dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0827-05	67
SMA 2Watt 28dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0828-05	07
SMA 2Watt 29dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0829-05	
SMA 2Watt 30dB DC~8GHz	1.20:1	25 ±0.55dB	F01-B0830-05	
The second secon				

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

SMA 2Watt 1~2 dB DC~8GHz



- 2 Watt Bi-directional type
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

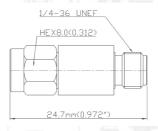
Electrical Specification

Item	Specification	
Part number	F01-B0801-05	F01-B0802-05
Frequency range	DC ~	8 GHz
Impedance (Nominal)	50Ω	
Input Power rating (max)	2 Wat	t (CW)
Attenuation accuracy	1 ±0.35 dB	2 ±0.35 dB
V.S.W.R. (max)	1.20	0:1
Operating temperature	-65°C ~	-+85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass (male), Be-Cu(female)/ Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

SMA 2Watt 3~6 dB DC~8GHz





- 2 Watt Bi-directional type
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

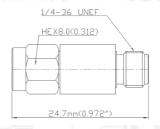
Electrical Specification

Item	Specification	
Part number	F01-B0803-05 F01-B0805-05	F01-B0804-05
Frequency range	DC ~	8 GHz
Impedance (Nominal)	50	ΩΩ
Input Power rating (max)	2 Wat	t (CW)
Attenuation accuracy	3 ±0.4 dB 5 ±0.4 dB	4 ±0.4 dB 6 ±0.4 dB
V.S.W.R. (max)	1.20	0:1
Operating temperature	-65°C ~	~ +85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass (male), Be-Cu(female)/ Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con All specifications are subject to change without notice at any time.



SMA 2Watt 7~24 dB DC~8GHz





- 2 Watt Bi-directional type
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION .

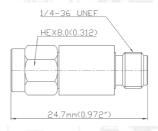
Electrical Specification

Item	Specification
Part number	F01-B0807-05 ~ F01-B0824-05 (ex, F01-B08**dB-05 / **: 07~24dB)
Frequency range	DC ~ 8 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2 Watt (CW)
Attenuation accuracy	7 ~ 24 ±0.55 dB
V.S.W.R. (max)	1.20 : 1
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass(male), Be-Cu(female)/ Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

SMA 2Watt 25~30 dB DC~8GHz





- World Best ±0.55dB Attenuation accuracy
- 2 Watt Bi-directional type
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed
- Stainless steel material
- Same day shipment
- Reverse polarity connector type available

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

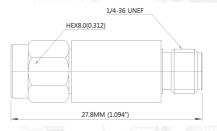
Electrical Specification

Item	Specification
Part number	F01-B0825-05 ~ F01-B0830-05 (ex, F01-B08**dB-05 / **: 25~30dB)
Frequency range	DC ~ 8 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2 Watt (CW)
Attenuation accuracy	25 ~ 30 ±0.55 dB
V.S.W.R. (max)	1.20 : 1
Operating temperature	-65°C ~ +85°C

Material specification

11770	
Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass(male), Be-Cu(female)/ Gold plating

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



SMA 2Watt DC~18GHz





- Stainless Steel material for the long life usage and reliable specification
- Outstanding flatness of Attenuation Value
- Excellent power capacity in anti-burnout
- Full data files (Test data, Outlined drawing and Product photos) are available
- Optimized for various application, such as LTE, 5G Sub-6GHz,
 5.8GHz WiFi, satellite and other Microwave performance
- 1~ 2weeks of short delivery from your valuable order
- RoHS Compliant

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

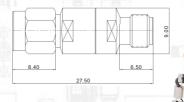
Electrical Specification

Description	V.S.W.R.(max)	Attenuation accuracy	Part number
SMA 2Watt 3dB DC~18GHz	1.35:1	3 ±1.0dB	F01-B1803-04
SMA 2Watt 5dB DC~18GHz	1.35:1	5 ±1.0dB	F01-B1805-04
SMA 2Watt 6dB DC~18GHz	1.35:1	6 ±1.0dB	F01-B1806-04
SMA 2Watt 10dB DC~18GHz	1.35:1	10 ±1.0dB	F01-B1810-04
SMA 2Watt 20dB DC~18GHz	1.35:1	20 ±1.0dB	F01-B1820-04
SMA 2Watt 30dB DC~18GHz	1.35:1	30 ±1.0dB	F01-B1830-04

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass (male), Be-Cu(Female)/ Gold plating





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.cor All specifications are subject to change without notice at any time.

SMA 5Watt 10~30dB DC~3GHz



- Telecommunication application
- Uni-directional way
- Excellent power capacity in anti-burnout.
- Reliable power cooling structure
- Small Ø29.8 heatsink diameter structure







BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

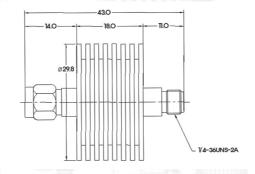
Electrical Specification

Item			
Part number	F01-C0310-04	F01-C0320-04	F01-C0330-01
Frequency range		DC ~ 3 GHz	
Input power rating (max)		5 Watt (CW)	
Attenuation accuracy	10 ±1.0dB	20 ±1.0dB	30 ±1.5dB
V.S.W.R. (max)	1.20 : 1		

Material specification

Item	Specification
Housing	Aluminum / Nickel plating
Body	Brass / Nickel plating
Connector body	Brass / Nickel plating
Coupling nut	Brass / Gold plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating
Dimension	Ø29.8*43mm

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con All specifications are subject to change without notice at any time.



2.92mm 2Watt DC~40GHz





- Stainless Steel material for the long life usage and reliable specification
- Outstanding flatness of Attenuation Value
- Excellent power capacity in anti-burnout
- Full data files (Test data, Outlined drawing and Product photos) are available
- Optimized for Various application, from LTE, 5G Sub-6GHz,
 5.8GHz WiFi, 5G, Connected car and other Microwave &
 Military performance
- RoHS Compliant

BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

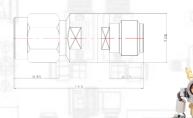
Electrical Specification

Description	V.S.W.R.(max)	Attenuation accuracy	Part number
2.92mm 2Watt 3dB DC~40GHz	1.35:1	3 ±1.0dB	F17-B4003-02
2.92mm 2Watt 5dB DC~40GHz	1.35:1	5 ±1.0dB	F17-B4005-02
2.92mm 2Watt 6dB DC~40GHz	1.35:1	6 ±1.0dB	F17-B4006-02
2.92mm 2Watt 10dB DC~40GHz	1.35:1	10 ±1.0dB	F17-B4010-02
2.92mm 2Watt 20dB DC~40GHz	1.35:1	20 ±1.0dB	F17-B4020-02
2.92mm 2Watt 30dB DC~40GHz	1.35:1	30 ±1.0dB	F17-B4030-02

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

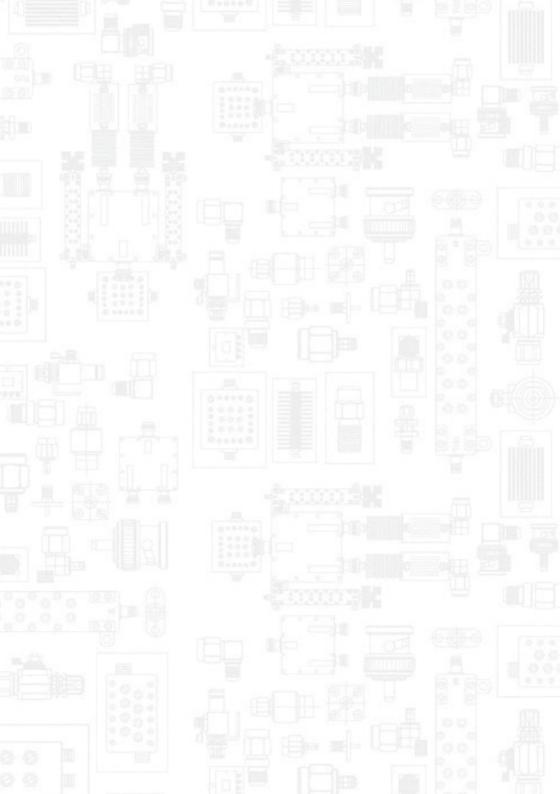
Material specification

Item	Specification
Body	Stainless steel / Passivated
Coupling nut	Stainless steel / Passivated
Center contact (Pin)	Brass(male), Be-Cu(female)/ Gold plating





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.cor
All specifications are subject to change without notice at any time.



N 2Watt DC~4GHz Attenuator



Check out the Difference!

Outstanding flatness of Attenuation Value

Excellent power capacity in anti-burnout

Full data files (Test data, Spec. Outlined drawing and Product photos) are available

Optimized for Telecommunication application such as 3G, 4G, 5G LTE

Various dB (1 ~ 40dB) of attenuators are available

Customized design available upon request

1~ 2weeks of fast delivery from your valuable order.

RoHS Compliant

		The second second		
Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
N 2Watt 1dB DC~4GHz	1.18:1	1 ±0.35dB	F04-B0401-01	73
N 2Watt 2dB DC~4GHz	1.18:1	2 ±0.35dB	F04-B0402-01	73
N 2Watt 3dB DC~4GHz	1.18:1	3 ±0.4dB	F04-B0403-01	
N 2Watt 5dB DC~4GHz	1.18:1	5 ±0.4dB	F04-B0405-01	74
N 2Watt 6dB DC~4GHz	1.18:1	6 ±0.4dB	F04-B0406-01	
N 2Watt 10dB DC~4GHz	1.18:1	10 ±0.55dB	F04-B0410-01	
N 2Watt 20dB DC~4GHz	1.18:1	20 ±0.55dB	F04-B0420-01	75
N 2Watt 30dB DC~4GHz	1.18:1	30 ±0.55dB	F04-B0430-01	

N 2Watt 1~2 dB DC~4GHz









- World Best ±0.35dB Attenuation accuracy
- 2Watt Bi-directional type
- Best performance at 3G, 4G, 5G LTE
- 2Watt full power guaranteed
- Brass with Tri-Alloy plating
- Stainless steel material is available
- Same day shipment

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

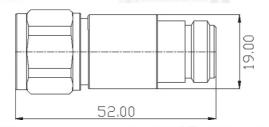
Part numberF04-B0401-01F04-B0402-01Frequency rangeDC ~ 4GHzImpedance (Nominal) $50Ω$
rioquency range
Impedance (Nominal) 50Ω
Input power rating(max) 2 Watt (CW)
Attenuation accuracy 1 ±0.35 dB 2 ±0.35 dB
V.S.W.R. (max) 1.18:1
Operating temperature -65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

- DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

N 2Watt 3, 5, 6dB DC~4GHz









- World Best ±0.4dB Attenuation accuracy
- 2Watt Bi-directional type
- Best performance at 3G, 4G, 5G LTE
- 2Watt full power guaranteed
- Brass with Tri-Alloy plating
- Stainless steel material is available
- Same day shipment

BUYIT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

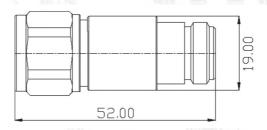
	Item	Specification		
	Part number	F04-B0403-01	F04-B0405-01	F04-B0406-0
	Frequency range	DC ~ 4 GHz		
	Impedance (Nominal)	50Ω		
	Input power rating(max)	2Watt (CW)		
	Attenuation accuracy	3 ± 0.4 dB	5 ± 0.4 dB	6 ± 0.4 dB
	V.S.W.R. (max)	1.18:1		
	Operating temperature		-65°C ~ +85°C	

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

DRAWING -





N 2Watt 10, 20, 30dB DC~4GHz









- 2Watt Bi-directional type
- Best performance at 3G, 4G and 5G LTE
- 2Watt full power guaranteed
- Brass with Tri-Alloy plating
- Stainless steel material is available
- Same day shipment

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

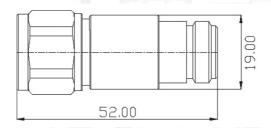
	Item	Specification		
	Part number	F04-B0410-01	F04-B0420-01	F04-B0430-0
	Frequency range	DC ~ 4 GHz		
	Impedance (Nominal)	50Ω		
	Input power rating(max)	2Watt (CW)		
	Attenuation accuracy	10 ± 0.55 dB	20 ± 0.55 dB	30 ± 0.55 dB
	V.S.W.R. (max)	1.18:1		
	Operating temperature		-65°C ~ +85°C	

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

- DRAWING





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

N 2Watt DC~8GHz Attenuator



Check out the Difference!

Outstanding flatness of Attenuation value

Excellent power capacity in anti-burnout

Full data files (Test data, Outlined drawing and Product photos) are available

Optimized for Various application, from FM Radio, 2G, 3G, 4G, 5G to WiMax

Customized design available upon request

1~ 2weeks of fast delivery from your valuable order

RoHS Compliant

Description	V.S.W.R.(max)	Attenuation accuracy	Part number	Page
N 2Watt 3dB DC~8GHz	1.22:1	3 ±0.45dB	F04-B0803-02	77
N 2Watt 5dB DC~8GHz	1.22:1	5 ±0.5dB	F04-B0805-02	
N 2Watt 6dB DC~8GHz	1.22:1	6 ±0.5dB	F04-B0806-02	78
N 2Watt 10dB DC~8GHz	1.22:1	10 ±0.5dB	F04-B0810-02	76
N 2Watt 20dB DC~8GHz	1.22:1	20 ±0.5dB	F04-B0820-02	
N 2Watt 30dB DC~8GHz	1.22:1	30 ±0.6dB	F04-B0830-02	79

N 2Watt 3dB DC~8GHz









- World Best ±0.45 dB Attenuation accuracy
- 2 Watt Bi-directional type
- Very Broad application such as LTE,
 5G Sub-6GHz and 5.8GHz WiFi
- 2Watt full power guaranteed
- Brass with Tri-Alloy plating
- Stainless steel material is available
- Same day shipment

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

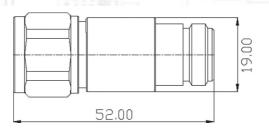
Item	Specification
Part No.	F04-B0803-02
Frequency range	DC ~ 8 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2Watt (CW)
Attenuation accuracy	3 ±0.45 dB
V.S.W.R. (max)	1.22 : 1
Operating temperature	-65°C ~ +85°C

Material specification

Item		Specification
Body		Brass / Tri-Alloy plating
Coupling r	nut	Brass / Tri-Alloy plating
Center contac	t (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

N 2Watt 5, 6, 10, 20dB DC~8GHz









- 2Watt Bi-directional type
- World Best ±0.5dB Attenuation accuracy
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed.
- Brass with Tri-Alloy plating
- Stainless steel material available
- Same day shipment

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

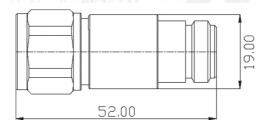
Item	Specification	
Part number	F04-B0805-02	F04-B0806-02
	F04-B0810-02	F04-B0820-02
Frequency range	DC ~ 8GHz	
Impedance (Nominal)	50Ω	
Input power rating(max)	2 Watt (CW)	
Attenuation accuracy	$5 \pm 0.5 \mathrm{dB}$	$6 \pm 0.5 \mathrm{dB}$
	$10 \pm 0.5 \mathrm{dB}$	$20 \pm 0.5 \mathrm{dB}$
V.S.W.R. (max)	1.22 : 1	
Operating temperature	-65°C ~	~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

N 2Watt 30dB DC~8GHz









- 2Watt Bi-directional type
- World Best ±0.6dB Attenuation accuracy
- Very Broad application such as LTE,
 5G Sub-6GHz, and 5.8GHz WiFi
- 2Watt full power guaranteed
- Brass with Tri-Alloy plating
- Stainless steel material available
- Same day shipment

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

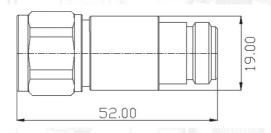
Item	Specification
Part No.	F04-B0830-02
Frequency range	DC ~ 8 GHz
Impedance (Nominal)	50Ω
Input power rating (max)	2Watt (CW)
Attenuation accuracy	30 ±0.6 dB
V.S.W.R. (max)	1.22 : 1
Operating temperature	-65°C ~ +85°C

Material specification

Item	Specification
Body	Brass / Tri-Alloy plating
Coupling nut	Brass / Tri-Alloy plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

(Data sheets which are not shown in this RF Bible are showed on SRT website; www.srtechnology.com)

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



N 5Watt DC~3GHz Attenuator



Check out the Difference!

Features

Broad application, from VHF to Telecommunication

5 Watt Uni-directional type

Reliable Attenuation value and V.S.W.R.

Excellent power capacity in anti-burnout

3 years long life warranty

Smallest size of cooling pin

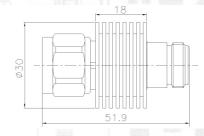
1~2 weeks of fast delivery from order



Description	V.S.W.R.(max)	Attenuation accuracy	Part number
N 5Watt 10dB DC~3GHz	1.20:1	10 ±1.0dB	F04-C0310-02
N 5Watt 20dB DC~3GHz	1.20:1	20 ±1.0dB	F04-C0320-02
N 5Watt 30dB DC~3GHz	1.20:1	30 ±1.5dB	F04-C0330-02

Material specification

Item	Specification
Heatsink	Aluminum / Nickel plating
Connector body & coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating





N 30Watt DC~3GHz Attenuator



Check out the Difference!

Features

Broad application, from VHF to Telecommunication

30 Watt Uni-directional type

Reliable Attenuation value and V.S.W.R.

Excellent power capacity in anti-burnout

3 years long life warranty

Smallest size of cooling heatsink

1~2 weeks of fast delivery from order

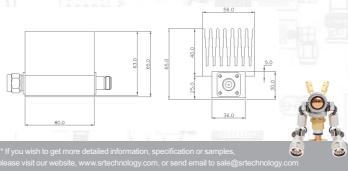


Description	V.S.W.R.(max)	Attenuation accuracy	Part number
N 30Watt 10dB DC~3GHz	1.20:1	10 ±1.0dB	F04-G0310-04
N 30Watt 20dB DC~3GHz	1.20:1	20 ±1.0dB	F04-G0320-04
N 30Watt 30dB DC~3GHz	1.20:1	30 ±1.5dB	F04-G0330-03

Material specification

Item	Specification
Housing and Heatsink	Aluminum / Nickel plating & Anodizing
Connector body & coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass(male), Beryllium Copper(female) / Gold plating

DRAWING





N 50Watt DC~3GHz Attenuator



Check out the Difference!

Features

Broad application, from VHF to Telecommunication

50 Watt Uni-directional type

Reliable Attenuation value and V.S.W.R.

Excellent power capacity in anti-burnout

3 years long life warranty

Smallest size of cooling heatsink

1~2 weeks of fast delivery from order

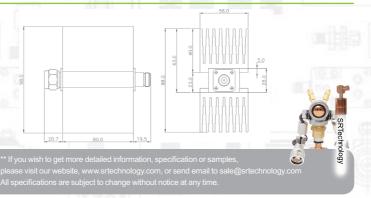


Description	V.S.W.R.(max)	Attenuation accuracy	Part number
N 50Watt 10dB DC~3GHz	1.20:1	10 ±1.0dB	F04-H0310-03
N 50Watt 20dB DC~3GHz	1.20:1	20 ±1.0dB	F04-H0320-03
N 50Watt 30dB DC~3GHz	1.20:1	30 ±1.5dB	F04-H0330-10

Material specification

Item	Specification
Housing and Heatsink	Aluminum / Nickel plating & Anodizing
Connector body & coupling nut	Brass / Nickel plating
Center contact (Pin)	Brass(male), Beryllium Copper (female) / Gold plating

DRAWING



N 100Watt DC~3GHz Attenuator



Check out the Difference!

Features

Repeater, RRH and Broadcasting equipment application

Broad Application, from VHF to Telecommunication

100 Watt Uni-directional type

Excellent power capacity in anti-burnout

Full data files (Test data, Outlined drawing and Product photos) are available

Optimized for telecommunication application

1~ 2weeks of delivery from valuable order

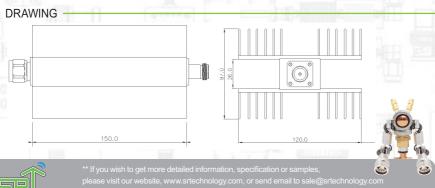
3 Years long life warranty



Description	V.S.W.R.(max)	Attenuation accuracy	Part number
N 100Watt 10dB DC~3GHz	1.20:1	10 ±1.0dB	F04-J0310-06
N 100Watt 20dB DC~3GHz	1.20:1	20 ±1.0dB	F04-J0320-04
N 100Watt 30dB DC~3GHz	1.20:1	30 ±1.5dB	F04-J0330-02

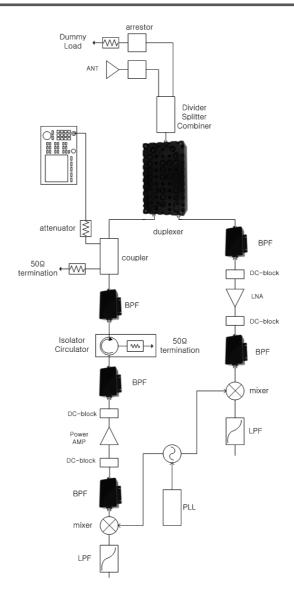
Material specification

Item		Specification
	Housing and Heatsink	Aluminum / Nickel plating & Anodizing
	Connector body & coupling nut	Brass / Nickel plating
	Center contact (Pin)	Brass(male), Beryllium Copper (female) /Gold plating



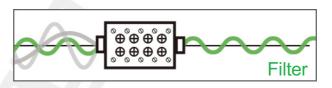


03 Filter Block Diagram









About Filter	86
Band Pass Filter	101
Band Rejection Filter	102
Duplexer	103
Combiner	104
Hybrid Combiner	105
Filter Module	106





Filter is the core product out of RF passive products.

Filter is more important than any other passive components in the repeater and the base station, even though other components are important. As the system operators all over the world use different frequencies, and there are quite a lot of signals in the air for televisions, military use, weather research and other

purposes. The most important role of the filter is to select desired signals for use. Filter is very the most applied module in RF system. There are lots of filters based on the kinds of applications. When we talk about the concept only, it does not look like hard subject to understand, but 500 pages of a book is not good enough to know about the details and every part of filter.

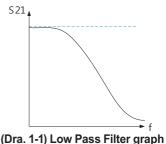
Filter carries out the same function as filter in water purifier which sifts out impurities in water. Filter gets rid of the noise and output the clean signal what I want to get. If you are well aware of S-parameter, you will easily understand the explanation below. As explained above, the filter performs to filter the frequency noise, but at the same time it also can performs to select desired frequency depending on its purpose. There is an explanation about S-parameter in RF Bible(Page 259) at the end of this book for your better understanding.

1. Filter types based on the passband characteristic.

Filter can be classified roughly into the 7 types, based on the passband characteristic.

(1) Low Pass Filter

At first, it is Low Pass Filter (Hereinafter we refer to Low Pass Filter as LPF). LPF passes the low frequency and filters the high frequency. LPF is used to get rid of ripple on DC power supply line or noise of signal line, because LPF



passes the signal from DC to the specified frequency. It is also used to remove the high frequency spurious band or harmonics. LPF combines with simple matching circuit.

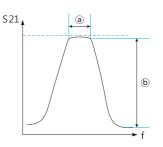
It is often used for the actual JIG and the noise components which are not filtered by the band pass filter or duplexer can be used for the better frequency characteristics using LPF.

Sometimes LPF is built in the band pass filter or duplexer to eliminate the harmonic components which are generated at integer multiple frequencies of the center frequency such as multiples of 2, 3, and 4.

However, the characteristics to eliminate the harmonic components will be improved as LPF is attached but at the same time there may be a demerit that the overall insertion loss of the filter increases. So when you require LPF for designing the filter, you need to carefully calculate the insertion loss. In addition, as LPF also occupies the space within the filter, the size and volume of the filter vary depending on the position of the filter.

(2) Band Pass Filter

Band Pass Filter (Hereinafter we refer to Band Pass Filter as BPF) is the most frequently used filter. BPF passes the bandwidth of specified frequency and suppress the other frequency. BPF, filtering out the requiring frequency, is very important in the system these days which the variety of frequency are used to be divided minutely

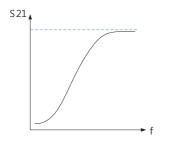


(Dra. 1-2) Band Pass Filter graph

As you can see in the BPF characteristic table(Dra. 1-2) in the above, nearby frequencies can be avoided depending on how sharp the inclination of the ⑤ section. This can be identified by the characteristic value called attenuation among filter standards. Attenuation value can be determined depending on the value of the insertion loss(S21) value by assigning a certain point (frequency) of the ⑥ section. When the attenuation value is high, it means that the inclination of the ⑥ section is sharp. Therefore correct signals can pass through not affected by signals from the nearby frequencies. But here we have a very important issue not to be overlooked. As you can see the chart in the above, when the ⑥ section becomes sharper, the ⑥ point (edge of the band) part collides and therefore the insertion loss value in the band becomes worse. Like this, there is a trade-off between Attenuation and Insertion Loss. It is a big dilemma for all of RF engineers to design effective system.

BPF is usually used at transmitter and receiver and applied at almost kinds of the RF system. Please refer to page 101, Band Pass Filter at RF Bible.

(3) High Pass Filter



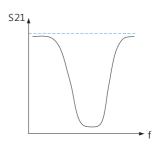
(Dra. 1-3) High Pass Filter graph

High Pass Filter (Hereinafter we refer High Pass Filter as HPF) passes the high frequency and sift out the low frequency. HPF is not quite commonly used these days. In the RF passive products, as long as the frequency is getting high, the loss of passive product is also getting high. But high frequency band with high loss is not quite easy to be passed even though low frequency pressed down when the engineer should design HPF with

(4) Band Reject Filter

passive elements.

Filter has the S21 graph as right figure on Dra. 1-4 is Band Stop Filter, Band Reject Filter, or Notch Filter. This filter passes all the frequency but suppress the frequency what you want. It is used to remove the interfering noise into in-band signal that you want to use. This characteristic is often used to test the characteristics of other frequencies rather than



(Dra. 1-4) Band Reject Filter graph

self-signals and is frequently used for terminals and test JIG. Unexpectedly, this filter is commonly used and it can be seen in Intermediate Frequency(IF).

IF is used in a super heterodyne method of communication system. When the Baseband(BB) signal which contained Audio, Video, Data and other information, is shifted to RF, the baseband signal is shifted as an intermediate step. For example BB -> IF -> RF. There is ZIF (zero – IF) communication system which does not have IF method. It is mostly used for the price or size sensitive devices. Please refer to page 102, Band Reject Filter part at this RF Bible.

(5) Duplexer.

There is a filter called duplexer. This Duplexer is a filter which is used to share the Tx and Rx signals in a single antenna. It means that BPF of the Tx band and BPF of the Rx band are tied together to be used. The important part of the main specification for the duplexer is to design it without the interference between Tx and Rx based on how sharp the isolation between the Tx band and the Rx band is made. So the isolation is a very critical characteristic of the duplexer among others. The duplexer consists of 3 ports including a port connected to the antenna, Tx port and Rx port. Please refer to page 103, Duplexer at this RF Bible.

(6) Diplexer, Multiplexer

Diplexer works in a similar way to the Duplexer. The difference is that two or more filters are attached to the Diplexer. As I mentioned before, the Duplexer uses two BPFs of Tx BPF and Rx BPF. On the other hand, the Diplexer usually uses a combination of LPF and HPF or a combination of BPFs with different frequencies. You can use the Triplexer to use three signals and you can use the multiplexer to

The main purpose of using the Diplexer or the Multiplexer is to reduce the cost for additional system establishment by sending signals with different frequencies into a single transmission cable.

combine 4 or more signals into a single path and then release them.

When you use Tx antenna and Rx antenna separately in a RF system, you need BPF filters for each antenna. You must use two BPFs although you use one antenna. However, when you use the Duplexer, you can establish the front-end only with the duplexer and one antenna. So both the space and cost for the system can be saved.

(7) Filter Module

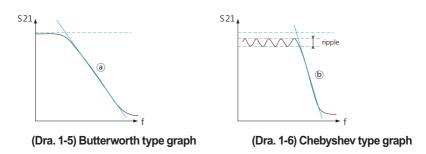
While the multiplexer is a product which combines various filters into one, Filter module is a product in which different components are installed with the filter.

The filter module has functions of the coupler, arrestor or LNA added to the filter. A coupling port is added to the filter to measure the power outputted through the filter or an arrester is added to protect the filter from overpower or surge. Please refer to

page 106, Filter Module at this RF Bible.

2. Filter types depending on the pass characteristic.

Filter can be classified according to the above 7 types based on passband characteristic, but also can be classified with the 2 types depending on the pass characteristic itself, regardless of band pass characteristic. One is Butterworth type and the other is Chebyshev type.



Left drawing on Dra. 1-5 is Butterworth type and right drawing on Dra. 1-6 is Chebyshev type.

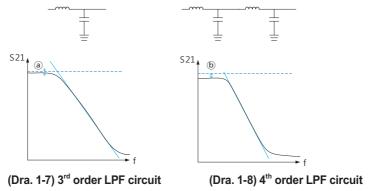
When you compare with two, the big differences are the in-band loss, ripple and skirt characteristic.

In Butterworth type, a passband range is quite flat, loss is not big and skirt characteristic is gradual. In other words, the frequency can be sifted out with small loss but the out-band signals can't be suppressed completely.

In Chebyshev type, the skirt characteristic is precipitous when it is comparing with Butterworth type, and it filters the passband out sharply. However, there is ripple in passband, and in-band insertion loss is big. There is a trade-off relationship between a good skirt characteristic and big ripple & loss.

Let's see the ripple here. Ripple is a necessary evil caused by the chebyshev design. When you look into the characteristics of the repeater, Ripples are calculated by the total sum of each ripple by each part when parts are connected. Signals also pass through the ripples which are obstructive factors. So it is required to reduce the insertion loss of each part, but it is also important to reduce the ripples so that the signals can easily pass through. Usually the ripple standard of the filter specifies 50% to 60% of the insertion loss.

In fact, it is related with the order characteristic which is composed of the filter. If order is composed a lot of passive component, the skirt characteristic is better but loss characteristic is worse. Look at the below two drawings on Dra. 1-7 and Dra. 1-8.



The left circuit on Dra. 1-7 is 3rd order LPF circuit which is composed of 1 inductor and 1 capacitor. The right circuit on Dra. 1-8 is 4th order LPF circuit which is composed of 2 left circuits. Let's see the differences while the order is changed from 2th to 4th. You can see the loss of 4th order LPF is bigger in passband, the loss of 4pcs of Reactance, above Insertion loss (Dra. 1-8), shall be bigger than the loss of 2 pcs of Reactance, above Insertion loss (Dra. 1-7). and the skirt characteristic is precipitous. You should choose key factor for designing filter whether the Insertion loss in passband is important or the precipitous skirt characteristic is important. Its principle is simple. Where are many obstructive factors in the path of the signals, the loss increases. However, the skirt characteristic needs to be sharp to minimize the nearby frequencies and interferences, therefore it is inevitable to increase the order. It is what the most of Filter engineer have thought about.

At this time, you should choose the right type to design whether we focus on the insertion loss of pass band or sharp skirt characteristic.

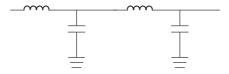
3. Filter types depending on the manufacturing method.

Filter is classified by the way of manufacturing method and material; such as LC filter, Transmission line filter, Cavity filter (Comb-Line, Inter-Digital), DR Filter (Cavity DR Filter), Ceramic Filter, Coaxial Filter (Tubular type filter), Wave Guide Filter, Saw Filter.

(1) LC Filter

LC filter is mainly used at the low frequency and low price of products. LC filter is made by the Inductor and Capacitor's arrangement on PCB. Engineers directly calculate the figures by themselves and use it. It is used at the low frequency lower than 2GHz or small RF circuits just like mobile phone. It can peform as a matching circuit behind the active devices such as amplifiers (AMP), and also eliminate the harmonic content components by materializing LPF. Nevertheless, It has big insertion loss but also has a strong points which are that engineer can calculate the value number of inductor and capacitor by himself on the design to use, and LC filter can be tuned easily. LC filter is small and price is inexpensive. L and C chips on the PCB are used and therefore they are vulnerable to the power and cannot be used in the high power system.

As above, LC filter is explained for example. As below drawing on Dra. 1-9, it is composed of L(inductor) and C(capacitor).



(Dra. 1-9) Composition of LC filter

Transmission line filter is mostly used from 3GHz to some GHz frequency ranges. Based on the frequency, the wavelength (λ) is determined. If the frequency is higher, the wavelength is shorter so that the transmission line is smaller and it is convenient for designing in small size package products. As long as the frequency is getting higher, engineers use an extremely limited lumped element because of a self resonation frequency which the characteristic of inductor and capacitor is changed. It is another reason to use transmission line filter.

Transmission line filter is made of transmission line and the patterns(open and short

stub) on PCB. Mostly, microstrip line with open stub type is preferred due to the easiness at designing and tuning. Engineers can design the characteristic what they want to make it as similar as LC filter. At the low frequency range, the microstrip line filter size could be bigger because the wavelength is longer.

As below, the 2 examples of LPF and BPF are shown.

At first, they are the pattern for the LPF.



They are BPF pattern as below. BPF is used at various applications in many parts so that their patterns are vary.



(Dra. 1-12) BPF pattern



(Dra. 1-13) BPF pattern

(2) Cavity Filter

Cavity filter and DR Filter are usually used at base station(BTS) and large repeater, and metal is its main material to be manufactured. Band pass frequency range is determined by the height of metal resonator. If the height is high, the frequency range is low. You can easily understand this by considering that the frequency and the wave length are reciprocal to each other.



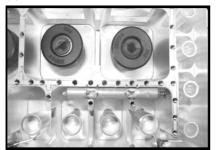
(Pic. 1-1) Cavity Filter

The environmental characteristic(temperature characteristic) may differ depending on the metal materials of the resonator. As the metals have a characteristic of thermal expansion index, the characteristic to the heat can be improved depending on the materials used for the resonator. However, the price will be increased

accordingly.

It is mostly used in below 3GHz. Cavity filter is used mostly in BTS and repeater, because of its capability to handle high power.

(3) DR Filter



(Pic. 1-2) DR Filter

DR Filter is used at BTS and repeater for PCS. As same as Cavity filter, the metal is used for the main material. Ceramic DR (Dielectric Resonator), instead of metal resonator, is used and determines the band pass frequency range. This is biggest difference between cavity filter and DR filter.

DR filter has an excellent skirt characteristic compared to the cavity filter

with respect to insertion loss, and therefore Telecommunication system operators would prefer DR filters from the PCS band where they gather close to avoid the frequency interference.

However, this DR filter is vulnerable to humidity, its price is expensive and it is also vulnerable to shock. As the DR filter is made of ceramics, it tends to absorb the moisture well although it was baked in high temperature and pressure. In addition, the DR resonator requires complicated manufacturing process while metal resonators just require simple processing and electroplating. Raw materials of ceramic DR are more expensive than those of metal resonators. DR filter could be easily broken by tiny shocks due to the characteristics of ceramics. Nevertheless, it is very popular as it has excellent electrical property compared to the cavity filter. DR filter is usually used under 3GHz. Though it could be designed at low MHz

DR filter is usually used under 3GHz. Though it could be designed at low MHz frequency range as well, the filter size should be bigger as long frequency wave and DR costs high. Due to these weaknesses, DR filter is not used in 1.5GHz below.

(4) Ceramic Filter.

Piezo Ceramic has a characteristic that it sets up a vibration when AC current is applied to it. We can make a filter resonating at a certain frequency, because AC current frequency is determined by ceramic size when it sets vibration up.

As right picture on Pic. 1-3, a square ceramic resonator is plated by silver, and

the filter is made of a numbers of resonator combined. As there is written on this chapter at the

beginning, the skirt characteristic is better when it combine a lot of resonators, but the insertion loss is getting worse. It is used IF band or FM band, because it works well during at the low frequency range(100 ~ 300MHz). However the weak points are big inserion loss and weakness of high power handling capability. It requires many workers for turning by manual work.



(Pic. 1-3) Ceramic Filter

(5) Coaxial Filter

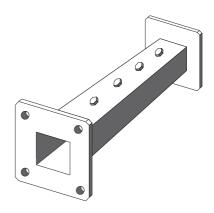


(Pic. 1-4) Coaxial Filter

Coaxial filter is generally used in Low pass Filter. It is utilizing the characteristic of coaxial cable's resonation and is put into the cable between system and antenna. Coaxial filter is used for the prevention of noise interference and filtering the side band. It looks like cable so that it can be installed between the cables.

(6) Waveguide Filter

Waveguide Filter is mostly used at the high frequency or high power application such as microwave communication or base station for the telecommunication which require KW units of high power. With adjustment of waveguide size, it filters out frequency which you do not want. It can make an effect on the filter's specification by adjusting screw on the waveguide. It is important to keep quality of surface condition and processing condition of tolerance at machining, because

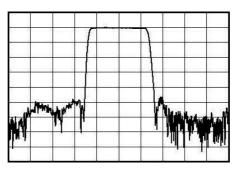


(Pic. 1-5) Waveguide Filter

these factors effect on the specification of waveguide sensitively.

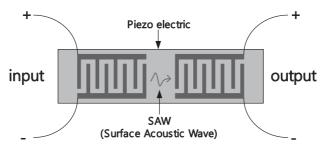
(7) Saw Filter

Saw filter is abbreviation of Surface Acoustic Wave Filter, and feature is steep keen skirt specification as like sharp blade. Comparing with LC filter and Ceramic filter, it could be made in small size and has a wonderful skirt specification so that it is used in mobile phone.



(Dra. 1-14) SAW filter graph

If comb structure of electrode is put on the piezo-material cornerwise, Surface Acoustic Wave is generated. Saw filter passes the frequency which is a similar with characteristic frequency of surface acoustic wave and sifts out other frequency.



(Dra. 1-15) SAW filter structure

4. Specifications of the filter to select

(1) Filter type selection

It is required to know filter specification to select a right LPF or BPF if you like to use it. It will be explained what kind of filters to use depending on situations. The most popular types of filters are LPF and BPF.

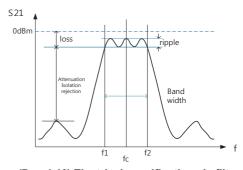
LPF is used to eliminate the high frequency noises which mainly came from the power input line or eliminate the harmonic and spurious components which are generated behind the active devices.

There is one input port and one output port in BPF. BPF let the wanted frequency band (Tx or Rx) pass through and filter the rest frequency components. In general, BPF is more popular than LPF.

(2) Electrical specifications.

The important specifications are center frequency (Fc), cut-off frequency, band width, insertion loss(S21), return loss(S11) and skirt specification.

Recently, Harmonics and PIMD (Passive Inter-Modulation Distortion) are getting focused on other key factors to filter characteristics.



(Dra. 1-16) Electrical specifications in filter

Cut-off frequency is, when the insertion loss (S21) start to drop, the frequency where drop down -3dB from the start. It is band width in BPF.

In case of BPF, the center frequency and band width are key factors to consider within passband. Let's see the above graph on Dra. 1-16.

Loss means the insertion loss in passband, and we call it as S21 in S-parameter. Insertion loss is good as low as possible, but it has a trade-off with the gentle skirt characteristic and low insertion loss. Generally speaking, filter which has low insertion loss and good skirt specification is more expensive so that we should compromise it within permissible range to save cost.

Return loss is usually referred to as S11 and when the return loss is -20dB or less which is considered excellent specification. However, some products require lower

return loss. In practices, minus is omitted to refer the return loss and therefore you need to keep in mind that the return loss is always with negative numbers.

Fc is a Center Frequency in passband. Bandwidth of BPF is that the point of -3dB is fallen S21 specification value down from its original specification. In this picture, the bandwidth is $f1 \sim f2$. As you can see the pass band in the above figure, smaller means better for the ripple. When we say that the ripple is big, it means that the deviation between the maximum value and the minimum value of the ripple for the signals which passed through BPF is big. And it does not have positive effects on the system. There is in trade-off with the skirt and ripple characteristic. The skirt characteristic needs to be moderate to reduce the ripple. In reverse, when the skirt characteristic becomes sharp, the ripple increases. So you need to make a compromise for the mutual electrical specifications to an appropriate level.

Usually, when you make an actual filter, the insertion loss value tends to be twice as big as the ripple value. So when you review the specification that you want, you need to compare the insertion loss value to the ripple value so that you can identify whether the filter is feasible to make or whether the insertion loss value or the ripple value that you want is too excessive.

While we are discussing specifications, the term skirt character continuously appears. The name comes from the look of skirts that women wear. When the skirt characteristic curve is moderate, it is hard to accurately filter the nearby noises except the correct frequency band. So it can negatively affect the functionality of the overall system.

On the other hand, when the skirt characteristic is sharp, it can select the correct frequency band only. Instead, the loss or ripple characteristics of the pass band may be bad and the price is expensive.

Filters with sharp skirt characteristic and with minimum ripple and loss are very rare to purchase and very hard to develop and therefore their price is very high. You need to determine the specification required by the filter for the overall system and, based on this specification, you need to discuss with the filter specialist for the final specification.

When you see the filter specification, you can see the Q value. The Q value is calculated by dividing the center frequency by 3dB bandwidth. Here in the (Dra 1-16), the Q value will be the divided value of fc by f2-f1. When we say that the Q value is big, it means that the bandwidth is narrow. And it means that the skirt characteristic is very sharp. So the Q value indicates how sharply the filter selects

the frequency.

The center frequency and band width are determined by the system engineer who design the system. In general, most of filters are customized products which have their specified frequency according to the application.

The attenuation, isolation and rejection mean the characteristic of suppression band. If there are in-band characteristics of filter such as S21(Loss), ripple, and bandwidth, attenuation, isolation and rejection, it shows how the filter suppress outband frequency. If this figure is big, it means the other frequencies of out-band are filtered out.

When you look into the specification required by your system or product, you see that it requests the second harmonic or the third harmonic values. It indicates the band stop characteristics at the integer multiple frequencies of the center frequency such as multiples of two. A more precise system or a system which does not want the interference of the harmonic components sometimes requests the second and the third harmonic values.

The term 'trade-off' is mentioned previously. Trade-off means that if you improve one function, the other will be less functional.

Recently, the size of the filter required by the system becomes smaller and the unit price of the product becomes lower while the specification requirements become stricter.

However, it is very hard to satisfy all the electrical properties covering attenuation, insertion loss, harmonic, group delay, PIM, coupling and others. Depending on your applications, you need to concentrate on certain essential specifications first and let others be less focused. You need to make some trade-offs.

In addition, the environmental conditions are as important as the electrical specification for the filter. Usually there are standards for the temperature, humidity, vibration, shock and other external environmental conditions, and it is very important for you to select filters which conforms to those standards as much as their electrical specifications.

Filter



Check out the Difference!

Even 1 pc of sample is pleased to be designed and customized upon request

Various filter development and OEM welcomed

Low PIM, High power handing, low insertion loss and excellent Attenuation value

Excellent temperature stability

Minimizing filter dimension with price competitiveness

Perfect product for wide range of radio microwave frequency, such as Telecommunication system, IEEE 802. 11b/g, RFID, Tetra, Wi-Fi, WiMax, Satellite and Military applications

SRTechnology's best Service for Customer

- 3 Years warranty
- Flexible payment Terms within 30 days from B/L Date
- No Minimum Order Quantity
- Convenient Door to Door shipping service
- Quick and cooperative Feedback from SRTechnology's professional sales team within 12 hours
- Raw materials are in stock to speed up the delivery
- Various product ranges according to frequency ranges, input power, connector type

Band Pass Filter



Part No.: R01-M4950-01

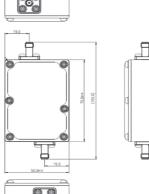
- Band pass filter for WLAN
- IP66 Rating for outdoor conditions
- Smallest size and light weight for the restricted area
- Better Ripple specification

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

A 01 20 20 4 10 2		hand the same and
Items		Specification
Frequ	ency range	4,900 ~ 5,000 MHz
Inse	tion Loss	≤ 1.0 dB
F	Ripple	≤ 0.4 dB
Attonuction	4830 ~ 4870 MHz	≥ 15 dB
Attenuation	5270 ~ 7000 MHz	≥ 20 dB
Impedance		50 Ω
Temperature range		-33 ℃ ~ +55 ℃
IP Rating		IP66
Connector Type		N Female (Jack)
Weight		< 1.0Kg
Dimensions	(WxHxD/mm)	50.0 x 70.0 x 27.0









** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Band Rejection Filter



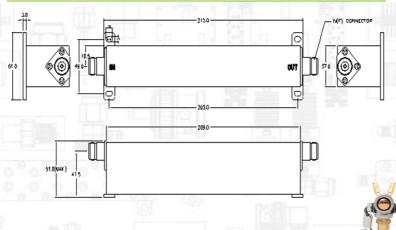
Part No.: R02-M2125-01

- 50Watt of high power application
- Band rejection band 2,115~2,135MHz with 20dB Attenuation
- Designed for the minimized width
- Focused on good insertion loss value

BUY IT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

- SPECIFICATION

Items		Specification
Frequency range	2,115 MHz ~ 2,135 MHz	-
Insertion Loss (max)	300 KHz~2,100 MHz	1.0 dB
insertion Loss (max)	2,150 MHz~3,000 MHz	1.0 dB
Return Loss (min)	300 KHz~2100 MHz	12.0 dB
rveturii Loss (miiri)	2,150 MHz~3,000 MHz	12.0 dB
Attenuation (min)	2,115 MHz ~2,135 MHz	20.0 dB
lmi	pedance	50Ω
Handling Power (max)		50Watt (Average)
Connector type		N Female (Jack)
Dimensions (WxHxD/mm)		61.0 X 51.0 X 215.0 mm [Excluding connector]





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

Duplexer



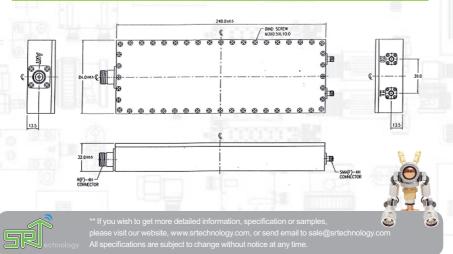
Part No.: R04-M2310-01

- Duplexer for WiFi
- 50 Watt input power for optical repeater application
- Outstanding attenuation from adjacent band to band
- Improving output efficiency of repeater by good insertion loss

BUY IT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

- SPECIFICATION

Items	Specification				
Pass Band Frequency	2,305 ~ 2,315 MHz	2,350 ~ 2,360 MHz			
Return Loss (V.S.W.R.)	20 dB min (1.22:1)	20 dB min (1.22:1)			
Insertion Loss	1.0dB max	1.0dB max			
Pass Band Ripple	0.4dB max	0.4dB max			
Attenuation	80dB min (10 ~ 2,270 MHz)	80dB min (10 ~ 2,315 MHz)			
	80dB min (2,350 ~ 6,000 MHz)	80dB min (2,395 ~ 6,000 MHz)			
Isolation	80dB min (2,350 ~ 2,360 MHz)	80dB min (2,305 ~ 2,315 MHz)			
Impedance	50Ω				
Handling Power	50 Watt (average)				
Connector(All Ports)	Com. : N Female (Jack), Other : SMA Female (Jack)				
Operating Temperature	+10°C ~ +60°C				
Dimension (WxHxD/mm)	145.0 × 50.0 × 85.0				



Combiner



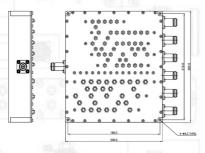
Part No.: R06-M1775-01

- Combiner for CDMA, GSM, IMT, DCS and BRS
- DAS System application
 - 6 pcs of N connector in compact size and max 4.0 Kg for light weight
- IP 67 rating for outdoor conditions

BUY IT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

SPECIFICATION

Item	ıs	Specification			
Frequency	y range	825 ~ 2,700 MHz			
Frequency band		Tx	Rx		
		825 ~ 837.5 MHz	870 ~ 880 MHz		
		885 ~ 915 MHz	935 ~ 960 MHz		
		1,710 ~ 1,785 MHz	1,805 ~ 1,880 MHz		
		1,920 ~ 1,980 MHz	2,110 ~ 2,170 MHz		
		2,300 ~ 2,400 MHz			
		2,500 ~ 2,570 MHz	2,620 ~ 2,690 MHz		
Insertion Loss		≤ 1.0 dB			
Return Loss		≥ 18 dB			
Ripple		≤ 1.0 dB			
Impedance		50 Ω			
Input Power	Average	≥ 50 Watt			
	Peak	≥ 500 Watt			
PIMD		≥ 100 dBm @ 20Watt * 2 Tone			
Temperature range		-20℃ ~ +70℃			
Connector Type		N Female (Jack)			
Weight		≤ 4.0 Kg			
Dimension (WxDxH/mm)		200.0 × 220.0 × 54.0			









If you wish to get more getained information, specification and to safe stretchnology.com

Hybrid Combiner, 4 * 4



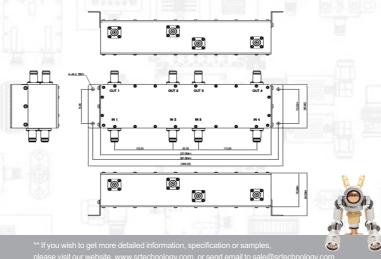
Part No.: R05-M2149-02

- Broad application from LTE 698 MHz to Wimax 3.5GHz
- 161dBc PIMD (20Watt / 2Tone) for the whole band
- IP67 rating for outdoor conditions
- 200Watt High power handing

BUYIT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

SPECIFICATION

Item	Specification		
Frequency Range	698 ~ 3,600 MHz		
RF Power	200Watt max		
Insertion Loss	7.0 dB max		
Isolation	20 dB min		
VSWR	1.3 :1 max		
PIMD	161dBc Typical [20Watt 2tone]		
Impedance	50 Ω		
Temperature range	-30℃ ~ +60℃		
IP Rating	IP67		
Connector Type	N Female (Jack)		
Dimensions (W x D x H / mm)	337.0 x 95.0 x 74.0		





Filter Module



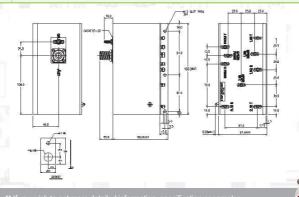
Part No.: R03-M0910-02

- One Filter Module for GSM, PCS and WCDMA
- One Antenna port for GSM, PCS and WCDMA
- All Tx port used coupler for moniting
- Arrestor inside for protecting lightning

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

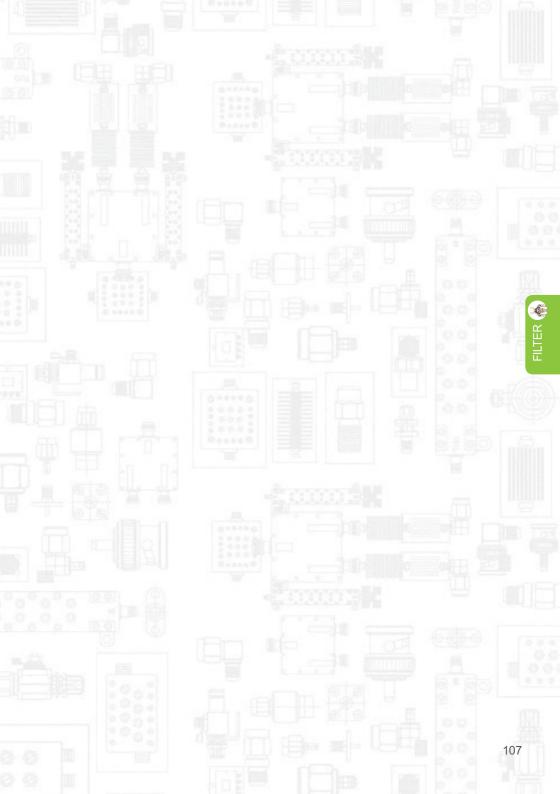
SPECIFICATION

ITEMS	Specification (900MHz Band)	Specification (1.8GHz Band)	Specification (2.1GHz Band)	
	Rx	TX	Rx	TX	Rx	TX	
Frequency Range	905 ~	950 ~	1735 ~	1830 ~	1960 ~ 1980	2150~2170	
	915MHz	960MHz	1755MHz	1850MHz	MHz	MHz	
Insertion Loss (max)	1.5dB						
Return Loss (Min.)	20.0dB						
Ripple (max)	0.8dB						
Isolation (Min.)	TX Band	RX Band	TX Band	RX Band	TX Band	RX Band	
	: 100.0dBc	: 100.0dBc	: 100.0dBc	: 100.0dBc	: 100.0dBc	: 100.0dBc	
Attenuation (Min.)	Fc±10MHz	Fc±10MHz	Fc±15MHz	Fc±15MHz	Fc±15MHz	Fc±15MHz	
	7.0dBc	7.0dBc	7.0dBc	7.0dBc	7.0dBc	7.0dBc	
	Fc±15MHz	Fc±15MHz	Fc±20MHz	Fc±20MHz	Fc±20MHz	Fc±20MHz	
	15.0dBc	15.0dBc	15.0dBc	15.0dBc	15.0dBc	15.0dBc	
	884 ~						
	894MHz:	-					
	27dBc						
3rd Harmonic (Min.)	80dBc						
Coupling Value	-	40.0±1.5dB		40.0±1.5dB		40.0±1.5dB	
Impedance	50Ω						
Temperature	-30℃ ~ 80℃						

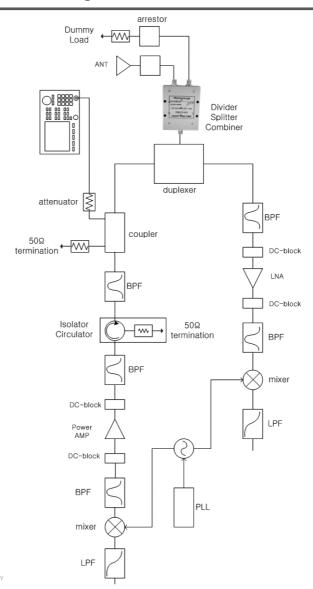




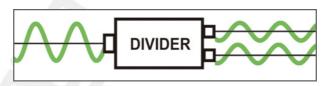
"If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



Power Divider Block Diagram







About Power Divider	110
SMA Power Divider	115
N Power Divider	125
7/16DIN Power Divider	127



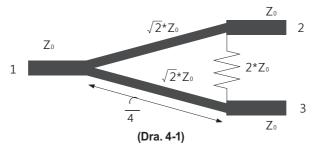


Divider is simply dividing the signals as the words.

Divider is used to divide the signals from the filter or send the divided signal to antenna.

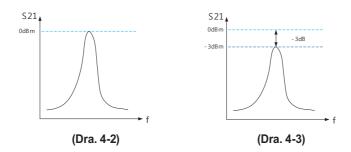
It divides the input signal to output port as a number of output port. The phase and signal in output ports are same, and only the power is divided. Therefore, it is called Power divider.

It varies a number of output ports, 2way, 3way 4way or 8way divider, based on the number of output port.



We will see the Wilkinson divider for better understanding as shown below drawing on Dra. 4-1.

Impedance is 50Ω matched in RF, if characteristic impedance is $Z0 = 50~\Omega$, the impedance of $\lambda/4$ transmission line is 70.7Ω , and the resistor which is set to get the secure the divider circuit reliability in the middle of output port, is 100Ω .



As above two drawings on Dra. 4-2 and Dra. 4-3, if the 0dBm of signal is given into the input port of power divider, -3dB of signal at each output port is supposed to get. Therefore, it is also named as -3dB power divider.

Shall we check it out about the 4way and 8way power divider?

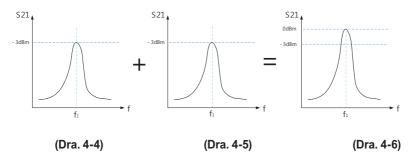
4way divider is that additional 2way divider is added at 2way divider which divided 1/2(-3dB) output power at each ports.

In short, 1/4(-6dB) of signal is output at each of 4 ports. 8way divider is as same as like dividers which are explained. Therefore, 2 way divider has typical -3dB(1/2) of insertion loss at each ports, 4 way divider has -6dB(1/4) of insertion loss at each ports and 8 way divider has -9dB(1/8) of insertion loss at each ports. So, when we talk about the insertion loss, you should think of the original insertion loss at each ports.

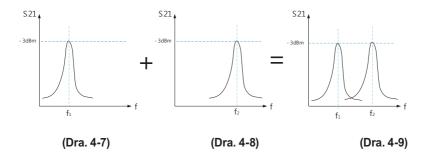
What if the impedance, one of two transmission lines, is changed in this Wilkinson power divider, what is going to happen? For example, if one transmission line is 70.7Ω and the other is 35Ω , are the same output powers at both ports?

Naturally, the more power is likely to flow into the low impedance port, and the less power is delivered to the high impedance port. The power of 70.7Ω and 35Ω would have 1:2 ratios. Ratio of output power can be adjusted by the engineer as this way at unequalled output power divider, this type is applied at in-building installation in wireless telecommunication system by integrators.

Divider is also called as splitter. They are the same products with different names. If the signal is sent to the 2 output ports and single signal comes out to the input port after 2 signals are combined, we call it as Combiner. If the two signals would have same frequency, the power is combined.



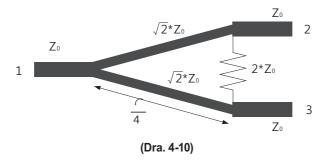
If the two input frequency are different from each other, the two signals are come out to 1 port as their frequency.



In other words, like these divider and combiner, their names can be changed based on how they work for their application. Based on their direction of input and output port, we can call them as divider or combiner..

When you choose the power divider, you should check the return loss and insertion loss as well as other RF products.

If you see the Wilkinson divider drawing as shown below on Dra. 4-10. Return loss is to be checked on S11, S22 and S33 as well, and all of value should be -20dB or less. As there are 2 output ports and the same signal, power should come out to output port, therefore S21 and S31 values should be considered. Besides, the value should be same as -3dB with a little more loss in transmission lines.



Additionally there is one more important factor.

There is the isolation between port No. 2 and No. 3. If the two output ports are not isolated each other and if divider is used as combiner, the signal from port No. 2 can across over port No. 3 when the signal is allowed to port No. 2 and 3. On the contrary, the signal from port No. 3 can across over port No. 2 as well. Normally isolation (S23, S32) should satisfy under -18dB.

Based upon this theory, a high power divider over 100Watt can be designed. Most of high power divider is used between the outdoor antenna and repeater in telecommunication system. You can see the variety of power divider at the following pages.

Power Divider



Check out the Difference!

World best Insertion loss, Isolation and V.S.W.R.

Excellent temperature stability

Perfect product for wide range of radio microwave frequency such as, Telecommunication system, IEEE 802. 11b/g, RFID, Tetra, Wi-Fi, WiMax, Satellite and Military applications

Minimized Power divider dimension with price competitiveness

Excellent Power divider design

RoHS compliant

SRTechnology's best Service for Customer

- 3 Years long life warranty
- Flexible payment Terms within 30 days from B/L Date
- No Minimum Order Quantity
- Convenient Door to Door shipping service
- Quick and cooperative Feedback from SRTechnology's professional sales team within 12 hours
- Raw materials are in stock to speed up the delivery
- 1~2 Weeks of short delivery from your valuable order
- Various product ranges with frequency ranges, input power, connector type

Power Divider SMA 2Way



Check out the Difference!

World best Insertion loss, Isolation, and V.S.W.R.

Very broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi,

Satellite and Microwave

Max 35Watt input power handing

Beautiful designed outlook

Customized design is available upon request

Item	Description			
Part Number	D01-A3004-02	D01-A3011-02	D01-A3016-01	D01-A3018-01
Frequency range	0.7~4.0GHz	0.5~6.0GHz	10 ~ 18GHz	2~18GHz
Impedance (nominal)	50Ω	50Ω	50Ω	50Ω
V.S.W.R. / Input (max)	1.30 : 1	1.55 : 1 (0.5~0.7GHz) 1.30 : 1 (0.7~6.0GHz)	1.35 : 1	1.50 : 1
V.S.W.R. / Output (max)	1.30 : 1	1.30 : 1	1.30 : 1	1.50 :1
Insertion loss (max)	0.6 dB	0.7 dB	1.0 dB	1.0 dB
Amplitude unbalance	±0.3 dB	±0.3 dB	±0.4 dB	±0.4 dB
Isolation (min)	20 dB	15 dB (0.5~0.7GHz) 20 dB (0.7~6.0GHz)	20 dB	18 dB
Phase unbalance	±2°	±2°	±5°	±5°
Input Power	35Watt (forward)	35Watt (forward)	35Watt (forward)	35Watt (forward)
Input Power	2Watt (reverse)	2Watt (reverse)	2Watt (reverse)	2Watt (reverse)
Page	116	117	118	119



^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

Power Divider SMA 2Way 0.7~4.0GHz





- World best Insertion loss, Isolation, and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Max 35Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request







BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

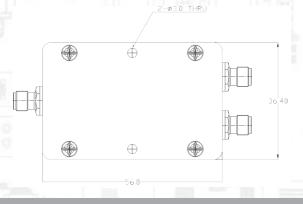
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	0.7~4.0GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.30 : 1
V.S.W.R. / Output (max)	1.30 : 1
Insertion loss (max)	0.6 dB

Item	Specification
Amplitude unbalance	±0.3 dB
Isolation (min)	20 dB
Phase unbalance	±2°
Input Power	35Watt (forward)
Input Power	2Watt (reverse)

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.cor All specifications are subject to change without notice at any time

Power Divider SMA 2Way 0.5~6.0GHz



Part No.: D01-A3011-02

- World best Insertion loss, Isolation, and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi and Microwave
- Max 35Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request







BUYIT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

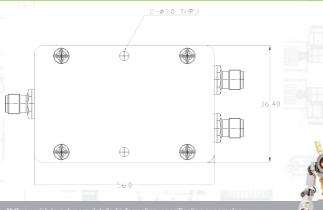
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	0.5~6.0GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.55 : 1 (0.5~0.7GHz) 1.30 : 1 (0.7~6.0GHz)
V.S.W.R. / Output (max)	1.30 : 1
Insertion loss (max)	0.7 dB

Item	Specification
Amplitude unbalance	±0.3 dB
loclation (min)	15 dB (0.5~0.7GHz)
Isolation (min)	20 dB (0.7~6.0GHz)
Phase unbalance	±2°
Input Power	35Watt (forward)
ilipat r'owei	2Watt (reverse)

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Power Divider SMA 2Way 10~18GHz



Part No.: D01-A3016-01

- World best Insertion loss, Isolation, and V.S.W.R.
- Very broad application such as Satellite and Microwave
- Max 35Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request







BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

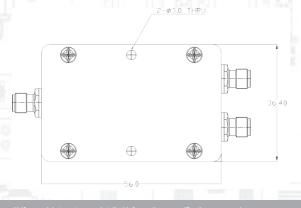
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	10 ~ 18GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.35 : 1
V.S.W.R. / Output (max)	1.30 : 1
Insertion loss (max)	1.0dB

Item	Specification
Amplitude unbalance	±0.4 dB
Isolation (min)	20 dB
Phase unbalance	±5°
Input Power	35Watt (forward)
Input Fower	2Watt (reverse)

- DRAWING





** If you wish to get more detailed information, specification or samples,

please visit our website, www.srtechnology.com, or send email to sale@srtechnology.con

All specifications are subject to change without notice at any time

Power Divider SMA 2Way 2~18GHz



Part No.: D01-A3018-01

- World best Insertion loss, Isolation, and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz,
 5.8GHz WiFi, Satellite and Microwave
- Max 35Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request







BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

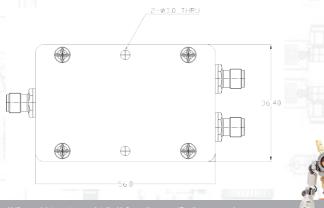
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	2 ~ 18GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.50 : 1
V.S.W.R. / Output (max)	1.50 :1
Insertion loss (max)	1.0 dB

Item	Specification
Amplitude unbalance	±0.4 dB
Isolation (min)	18 dB
Phase unbalance	±5°
Input Power	35Watt (forward)
Input Power	2Watt (reverse)

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Power Divider SMA 4Way



Check out the Difference!

World best Insertion loss, Isolation, and V.S.W.R.

Very broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi, Satellite and Microwave

Max 35Watt input power handing

Beautiful designed outlook

Customized design is available upon request

CARC SECURE DE LES ARTS		-1-53		\$18-0ml
Item	Description			
Part Number	D01-C3004-02	D01-C3011-02	D01-C3016-01	D01-C3018-01
Frequency range	0.7 ~ 4.0GHz	0.5 ~ 6.0GHz	10 ~ 18GHz	2 ~ 18GHz
Impedance (nominal)	50Ω	50Ω	50Ω	50Ω
V.S.W.R. / Input (max)	1.40 : 1	1.45 : 1 (0.5~0.7GHz) 1.40 : 1 (0.7~6.0GHz)	1.40 : 1	1.80 : 1
V.S.W.R. / Output (max)	1.35 : 1	1.35 : 1	1.35 : 1	1.80 : 1
Insertion loss (max)	0.8 dB	1.1 dB	1.5 dB	3.0 dB
Amplitude unbalance	±0.3 dB	±0.3 dB	±0.5 dB	±1.2 dB
Isolation (min)	18 dB (0.7~0.9GHz) 20 dB (0.9~4.0GHz)	10.5 dB (0.5~0.7GH) 18 dB (0.7~0.9GHz) 20 dB (0.9~6.0GHz)	20 dB	15 dB
Phase unbalance	±3°	±5°	±5°	±5°
Innut Dower	30Watt (forward)	30Watt (forward)	30Watt (forward)	30Watt (forward)
Input Power	2Watt (reverse)	2Watt (reverse)	2Watt (reverse)	2Watt (reverse)
Page	121	122	123	124

Power Divider SMA 4Way 0.7~4.0GHz



Part No.: D01-C3004-02

- World best Insertion loss, Isolation, and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Max 30Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request



BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

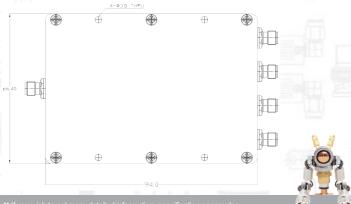
- SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	0.7~4.0 GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.40 : 1
V.S.W.R. / Output (max)	1.35 : 1
Insertion loss (max)	0.8 dB
	Frequency range Impedance (nominal) V.S.W.R. / Input (max) V.S.W.R. / Output (max)

Item	Specification
Amplitude unbalance	±0.3 dB
Isolation (min)	18 dB (0.7~0.9GHz) 20 dB (0.9~4.0GHz)
Phase unbalance	±3°
Input Power	30Watt (forward)
	2Watt (reverse)

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Power Divider SMA 4Way 0.5~6.0GHz



Part No.: D01-C3011-02

- World best Insertion loss, Isolation and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi and Microwave
- Max 30Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request



BUY IT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

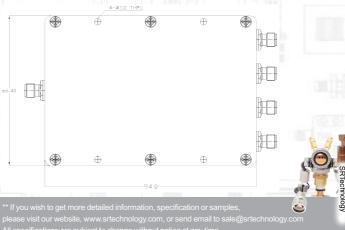
SPECIFICATION

Electrical Specification

Item	Specification	
Frequency range	0.5 ~ 6.0GHz	
Impedance (nominal)	50Ω	
V.S.W.R. / Input (max)	1.45 : 1 (0.5~0.7GHz) 1.40 : 1 (0.7~6.0GHz)	
V.S.W.R. / Output (max)	1.35 : 1	
Insertion loss (max)	1.1 dB	

Item	Specification
Amplitude unbalance	±0.3 dB
Isolation (min)	10.5 dB (0.5~0.7GH) 18 dB (0.7~0.9GHz) 20 dB (0.9~6.0GHz)
Phase unbalance	±5°
Input Power	30Watt (forward)
input Fower	2Watt (reverse)

DRAWING





Power Divider SMA 4Way 10~18GHz



Part No.: D01-C3016-01

- World best Insertion loss, Isolation and V.S.W.R.
- Very broad application such as Satellite and Microwave
- Max 30Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request



BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

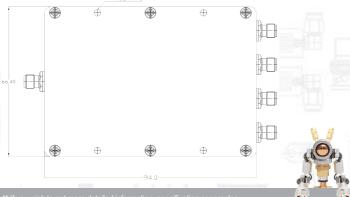
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	10 ~ 18GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.40 : 1
V.S.W.R. / Output (max)	1.35 : 1
Insertion loss (max)	1.5 dB

Item	Specification
Amplitude unbalance	±0.5 dB
Isolation (min)	20 dB
Phase unbalance	±5°
Input Power	30Watt (forward)
	2Watt (reverse)

DRAWING





"If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Power Divider SMA 4Way 2~18GHz



Part No.: D01-C3018-01

- World best Insertion loss, Isolation and V.S.W.R.
- Very broad application such as LTE, 5G Sub-6GHz, 5.8GHz WiFi, Satellite and Microwave
- Max 35Watt input power handing
- Beautiful designed outlook
- Customized design is available upon request



BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

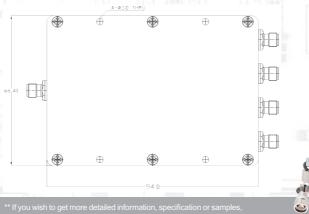
SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	2 ~ 18GHz
Impedance (nominal)	50Ω
V.S.W.R. / Input (max)	1.80 : 1
V.S.W.R. / Output (max)	1.80 : 1
Insertion loss (max)	3.0 dB

Item	Specification	
Amplitude unbalance	±1.2 dB	
Isolation (min)	15 dB	
Phase unbalance	±5°	
Input Power	30Watt (forward)	
Input Power	2Watt (reverse)	

- DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.coi
All specifications are subject to change without notice at any time

Power Divider N 2Way 698MHz~2.7GHz



Part No.: D02-A1003-02

- Best performance for Telecommunication
- PIMD 130dBc, 37dBm @ 2Tone
- Max 20Watt input power handing
- In-building application

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

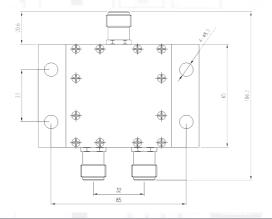
- SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	698MHz~2.7GHz
Impedance (nominal)	50Ω
V.S.W.R. (max)	1.20 : 1
Insertion loss (max)	3.5 dB
PIMD	- 130dBc (37dBm @ 2tone)

Item	Specification
Amplitude unbalance	±0.3 dB
Isolation (min)	20 dB
Phase unbalance	±2°
Input power	20Watt

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

Power Divider N 4Way 824MHz~2,655GHz



Part No.: D02-C1003-01

- Best performance for Telecommunication
- PIMD 130dBc, 2tone @ 37dBm
- Max 10Watt power handing
- In-building application

BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

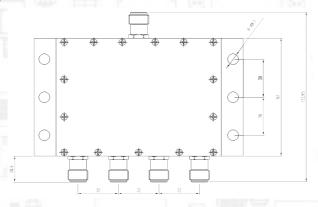
- SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	824MHz~2,655GHz
Impedance (nominal)	50Ω
V.S.W.R. (max)	1.20 : 1
Insertion loss (max)	7.0 dB
PIMD	- 130dBc (37dBm @ 2tone)

	Item	Specification	
Amplitu	de unbalance	±0.3 dB	
Isola	ation (min)	20 dB	
Phase	unbalance	±2°	
Inp	ut power	10Watt (CW)	

DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

Power Divider 7/16DIN 2Way 1.7~2.4GHz



Part No.: D03-F3X12-01

- Best performance for Telecommunication
- PIMD 150dBc, 43dBm @ 2tone
- Max 200Watt input power handing
- IP 68 of water & dust-proof for outdoor application

| BUY IT NOW!!! SRTechnology.com | ANY QUESTION? sale@srtechnology.com | The best Solution for RF Technology!

SPECIFICATION

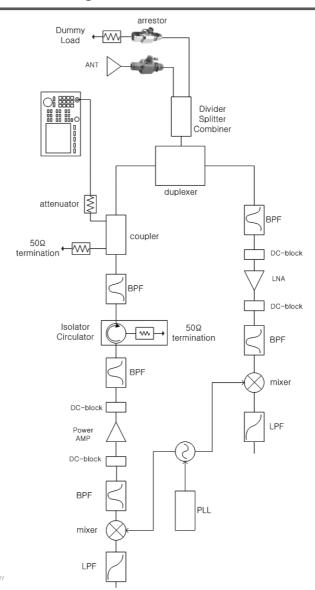
Electrical Specification

Item		Specification
Frequency range		1.7~2.4 GHz
Impedance (nominal	1)	50Ω
V.S.W.R. (max)		1.25 : 1
Insertion loss (max))	2.0 dB
Input power (max)		200 Watt
PIMD		- 150dBc (43dBm @ 2tone)
Isolation (min)		20 dB
IP rating		IP 68



** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com or send email to sale@srtechnology.com All specifications are subject to change without notice at any time

05 Arrestor Block Diagram





About Arrestor 130

N Surge Arrestor 133

7/16DIN Surge Arrestor 135





In general, a surge means a voltage which is increased 5~6% or more comparing the normal or a impulse signal upto a few thousand volt with very short time (ns, us, ms terms). For example, there is a momentary overvoltage, is occurred at power switch on/off situation or lightning. If the surge is flowed into the circuit, semi-conductor chip and the transmission lines could be

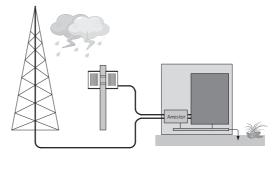
burned out. The performance of whole system is tended to be degraded, and it is caused fatal breakdown. It is quite nuisance in RF circuit.

Most of products have protection circuit, such as varistor, zenor diode or tantal, to prepare the surge occurred at connection parts with connectors. However, it is still not safe for the outdoor repeater or base station which is connected with the jumper cable from the antenna from the lightning. Moreover, the antenna is tend to draw the lightning so that the repeater and base station(BTS) is quite weak at lightning. Then the arrestor is required to protect them.

Where we should install the arrestor? If you are in system integrating business, you should pay attention. Let's see the example for the BTS.

Under the picture, the arrestor is installed ahead position to protect the green equipment and GND is connected the earth. If you look at the picture carefully, there are the power line from the power source and cable line from antenna. It means that the arrestor should be connected with all of each lines, such as power line, signal line and communication line.

Gas Discharge Tube (GDT) and $\lambda/4(\text{Air type})$ type of arrestors are used. The GDT type of arrestor is mostly used. The arrestor which is insulator (10G Ω) as close as an infinite, does not do any function as usual, but the spark gab is terminated if the momentary overvoltage surge or lightning is flowed through lines. There is



(Dra. 5-1)

the electric charge carrier in discharge area in the gas tube arrester, when the spark gab is terminated the electric charge is moved into the electron in fast. The high accelerated electrons are collided with gas molecule and the electron is separated from the gas molecule. During this procedure, the momentary surge by rapidly increased electron carrier is flowed fast.

The energy by momentary surge is rapidly flowed to earth through an effective grounding so that the equipment can be protected safely. The surge voltage is varnished and the charged electron is recombined to the gas molecule. When the gas tube arrestor is burned out, the gas tube capsule or gas tube arrestor itself should be changed for the next protection.

Surge Arrestor



Check out the Difference!

Excellent surge capability

World best V.S.W.R. and Insertion Loss

Excellent temperature stability

Perfect product for wide range of radio microwave frequency, such as Telecommunication system, IEEE 802. 11b/g, RFID, Tetra, Wi-Fi and WiMax

RoHS compliant

SRTechnology's best Service for Customer

- 3 Years long life warranty
- Flexible payment Terms within 30 days from B/L Date
- No Minimum Order Quantity
- Convenient Door to Door shipping service
- Quick and cooperative Feedback from SRTechnology's professional sales team within 12 hours
- Raw materials are in stock to speed up the delivery
- 1~2 Weeks of short delivery from your valuable order
- Various product ranges with frequency ranges, input power, connector type

Surge Arrestor, N, DC~3GHz



- Excellent and reliable surge capability
- Best selling items for various purpose
- Very Broad application such as LTE, 5G Sub-6GHz, and other telecommunication system

BUYIT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

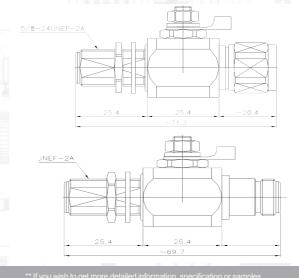
The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

Item	Specification		Item	Specification	
Part Number	G02-G0101-01	G02-G0102-01	Part Number	G02-G0101-01	G02-G0102-01
Frequency range	DC ~ 3 GHz		Surge capability (Nominal)	10KA (8Χ20μs)	
Impedance (nominal)	50Ω		Connector	N male(plug) to female(jack)	N female(jack) to female(jack)
V.S.W.R. (max)	1.20 : 1		D-110	,	,
Insertion Loss (max)	0.2 dB		RoHS	Comp	oliant

DRAWING





please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



Surge Arrestor, N, DC~6GHz



Part No.: G02-G0102-07

- Excellent and reliable surge capability
- Reliable V.S.W.R. and Insertion loss
- Very Broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Reliable surge capability

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

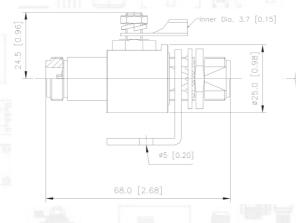
- SPECIFICATION

Electrical Specification

Item	Specification
Frequency range	DC ~ 6 GHz
Impedance (nominal)	50Ω
V.S.W.R (max)	1.35 : 1
Insertion Loss (max)	0.4 dB

Item	Specification
SURGE CAPABILITY (nominal)	5*20KA (8Χ20μs)
Connector	N female(jack) to female(jack)
RoHS	Compliant

- DRAWING





** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.cor
All specifications are subject to change without notice at any time.

Surge Arrestor, 7/16DIN λ/4, 0.8~2.7GHz



Part No.: G03-A0201-02

- Excellent and reliable surge capability
- World Best performance for V.S.W.R. and Insertion Loss
- Good PIMD 155dBc (43dBm @ 2 Tone)
- Reliable 100kA surge capability
- IP68 for water & dust-proof

BUY IT NOW!!! SRTechnology.com

ANY QUESTION? sale@srtechnology.com

The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

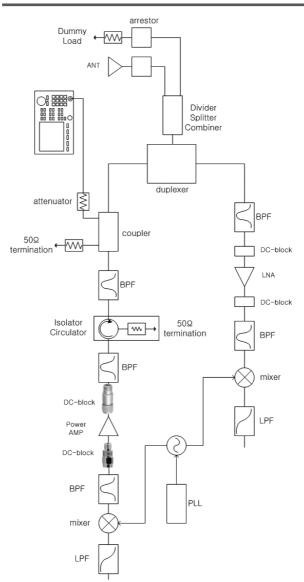
electrical Specification			
Item	Specification		
Frequency	800~2,700MHz		
V.S.W.R.	< 1.1		
Insertion loss	< 0.1dB		
Impedance	50 Ω		
PIMD	< -155dBc (+43dBm / 2tone)		
Power	3kW (avg.) , @900MHz 40kW (peak)		
Lightning surge capability	100 times @ 20ka		
Lightning surge capability test method	IEE C62.42-1991		
Lightning surge capability waveform	8/20us		
Lightning surge current	100kA		
Lightning surge current waveform	8/20us		
Throughput energy	2.0 mJ@30kA, 25.0 uJ@2kA		
Connectors	7/16Din male(plug) to 7/16DIN female(jack)		
Operating temperature	-40℃ ~+80℃		
Material & Plating	Brass / Tri Alloy plating		
Weight	685gram		
Water and dust proof	IP68		



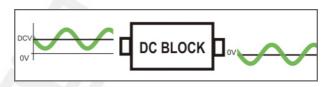
^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

All specifications are subject to change without notice at any time.

05 DC Block & Bias Tee Block Diagram







About DC Block	138
DC Block	140
Bias Tee	143





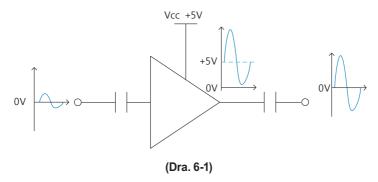
RF circuit is composed of active and passive device.

Active device generate a power and passive device does not require the power. Amplifer (AMP) is the one of the representative products in active devices.

AMP amplifies the input signal while AMP get DC power and consume a current. if the DC power from the AMP flowing into an equipment that is supposed

to get the AC signal only, the circuit will be damaged or out of order. In the worst case, high valued measuring equipment such as network analyzer will be damaged. Therefore, power which is supposed to be supplied to AMP should supply only to AMP and it should not be flowed into any device in RF circuit.

AC signal is input to AMP which is supplied DC at the same time output amplified AC signal as intended. When you monitor the input and output in AMP, Vcc Voltage +5V is biased and AC signal is created as +5V. Overall, it is + signal. Then if DC block is used proper at this situation, DC +5V is blocked out and AC signal is passed so that the amplified signal does not be affected and the circuit could be protected.



At this procedure, Capacitor blocks the DC power, so DC block is named as its functional work. As you have been seen example of AMP as above, DC block can be used any circuit which should block the DC out and pass the AC.

DC block should verify insertion loss(S21) and return loss(S11, V.S.W.R.) form DC to the working frequency .

As a circuit drawing in the AMP above, if the DC Block has a big return loss, the signal can't be flowed to the AMP, returned back from DC block. Amp may not get

the signal.

It is preferred that insertion loss will be as close as 0dB. If the DC block would have a bad insertion loss, the little survived signal through DC block will be flowed to the AMP.

There are three basic forms of DC blocks. Inner DC block have a capacitor with the center conductor, outer DC block have a capacitor with the outer conductor, and inner/outer DC block have capacitors with both the inner and outer conductors. The DC block is classified by connector type, voltage and maximum frequency range.

DC Block & Bias Tee



Check out the Difference!

World best V.S.W.R. and Insertion Loss

Perfect product for wide range of radio microwave frequency, such as Telecommunication system, IEEE 802. 11b/g, RFID, Tetra, Wi-Fi and WiMax

RoHS compliant

SRTechnology's best Service for Customer

- 3 Years long life warranty
- Flexible payment Terms within 30 days from B/L Date
- No Minimum Order Quantity
- Convenient Door to Door shipping service
- Quick and cooperative Feedback from SRTechnology's professional sales team within 12 hours
- Raw materials are in stock to speed up the delivery
- 1~2 Weeks of short delivery from your valuable order
- Various product ranges with frequency ranges, input power, connector type

DC Block - SMA type









Part No.: H01-A0006-03

- World Best V.S.W.R. and Insertion loss
- Very broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi

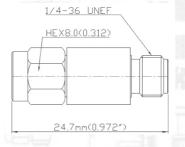
BUYIT NOW!!! SRTechnology.com ANY QUESTION? sale@srtechnology.com The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

Item	Specification	
Frequency range	DC ~ 6.0 GHz	
Impedance (nominal)	50Ω	
V.S.W.R. (max)	1.20 : 1	
Insertion loss (max)	0.4 dB	
Voltage	50V	
Connector type	SMA male(plug) - SMA female(jack)	
Center Contact (pin)	Brass(male), Beryllium copper(female) / Gold plating	
Body	SUS / Passivated	
Insulator	PTFE	
Dimension	Ф 7.8 * 20.6mm	

DRAWING







DC Block - N type









Part No.: H04-A0006-03

- World Best V.S.W.R. and Insertion loss
- Very broad application such as LTE, 5G Sub-6GHz, and 5.8GHz WiFi
- Stainless steel material is available

BUY IT NOW!!! SRTechnology.com

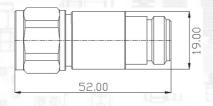
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

SPECIFICATION

Electrical Specification

Specification	
DC ~ 6.0 GHz	
50Ω	
1.20 : 1	
0.4 dB	
50V	
N male(plug) - N female(jack)	
Brass(male), Beryllium copper(female) / Gold plating	
Brass / Tri-Alloy plating	
PTFE	
Φ 13.5 * 52mm	

- DRAWING





^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.

Bias Tee, 690MHz ~ 3,600MHz



- Compliant to AISG2.0 / 3GPP
- Wide broad band frequency application for Telecommunication at 0.7~3.6GHz
- Water and Dust-proof, IP67 Rating for outdoor application
- Easy Installation and maintenance for various Antenna on the top of the tower
- Low PIM, 160dBc and Low Insertion Loss, 0.12dB Max

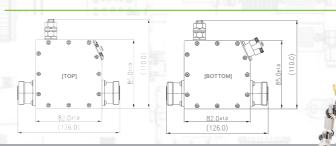
BUY IT NOW!!! SRTechnology.com
ANY QUESTION? sale@srtechnology.com
The best Solution for RF Technology!

- SPECIFICATION

Electrical Specification

Licetifical openineation			
Item	Specification		
Part Number	H05-A0004-03	H05-A0004-04	
Frequency range	690MHz ~ 3,600MHz	690MHz ~ 3,600MHz	
Impedance(nominal)	50Ω	50Ω	
Return loss	20dB (max)	20dB (max)	
Insertion loss	0.12dB (max)	0.12dB (max)	
Input power	750 Watt	750 Watt	
Lighting protection	RET port: ±5 kA, 8/20us	RET port: ±5 kA, 8/20us	
Lighting protection	ANT port: ±3 kA, 10/350us	ANT port: ±3 kA, 10/350us	
Intermodulation	< -160dBc (3rd order, 2 x 20W)	< -160dBc (3rd order, 2 x 20W)	
Modem carrier Frequency	2.176MHz	2.176MHz	
IP rating	IP 67	IP 67	
Weight	< 600g	< 600g	
Dimension	82.0×85.0×41.0 mm (without connector)	82.0×85.0×41.0 mm (without connector	
Connector	7/16DIN female / Ant. port	7/16DIN female / BTS port	
	7/16DIN female / Feeder port	7/16DIN female / Feeder port	
RoHS	Compliant	Compliant	

DRAWING





** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com All specifications are subject to change without notice at any time.

01. 2.92MM	146
02. SMA	152
03. BNC	160
04. TNC	168
05. N	174
06. 7/16DIN	180
07. MCX	186
08. MMCX	194
09. SMB	202
10. Adaptor	208
11. Cable	220
12. Cable Assembly	246



1. 2.92MM

 Gene 	ral Information······	147
 Chara 	acteristic ·····	148
 Interfa 	ace Dimensions ·····	149
	ace Dimensions in mm / inch. ·····	
 Panel 	Receptacle type ·····	150
	- 2.92mm Female 2Hole Panel Receptacle·····	150
	- 2.92mm Female 4Hole Panel Receptacle ·····	
	- 2.92mm Male 2Hole Panel Receptacle ·····	150
	- 2.92mm Male 4Hole Panel Peceptacle ·····	150



General Information

2.92mm connectors are 50 ohm precision connectors designed ot perform upto 40GHz. The outer conductor measures 2/92mm with a strong outer body wall compared to dielectric loaded interfaces of comparable by a short dielectric bead. 2.92mm connectors, but the male center pin is shortened to allow outer conductor engagement before the center contacts mate, preventing damage th the female contact tines.

The 2.92mm female 4hole connector can operate up to maximum 40GHz frequency range and the V.S.W.R. is 1.20 : 1 of excellence. The 2.92 female 4hole panel connector use 0.02 Inch (0.52mm) Lanch pin for the assembly request. Also, SRTecchnology have the expertise to build your own 2.92mm female 2hole connector, 2.92mm male 4hole connector and 2.92mm male 2hole connector so that you can setup your 2.92mm connector application with SRT team.

Application

- -Test and Measurement
- -Microwave Module
- -Rack mount Application

SRT 2.92mm connector Features

- -DC~40GHz broad application
- -VSWR 1.11:1 @40GHz, and 1.08:1@ 18GHz
- -Maximum RF Performance with any kinds of Module and equipment
- -Strict quality control for the reliable specification from production to shipment
- -2 Weeks of fast delivery
- -Any kinds of customized 2Hole or 4Hole connector RFQ are welcomed
- -RoHS compliant

1. 2.92MM

Sub Miniature Coaxial Connector



Characteristic

ELECTRICAL DATA

Impedance Frepuency range

VSWR

Working voltage

Dielectric withstanding volage

Insulation resistance Contact resistance

Insulation resistance

RF lekage

RF high potential withstanding voltage

50 ohms

0-40 GHz

1.20:1 (Max)

85 Vrms max

1000 Vrms, minimum at sea level

5000 megohms minimum

6.0 (milliohms maximum)

 $5000M\Omega$ min.

-90dB (dB minimum, tested at 2.5 GHz) 670 Vrms minimum, tested at 4 and 7 MHz

MECHANICAL RATINGS

Engagement design

Engagement/Disengagement force

Mating torque

Coupling proof torque

Coupling Nut Retention

Contact retention

Durability

MIL-STD-348. Series SMK (2.92mm)

2inch-pounds maximum

7 to 10 inch-pounds

15 inch-pounds minimum

60 pounds minimum

6 lbs. minimum axial force (captivated contacts)

500 cycles minimum

ENVIRONMENTAL RATINGS

(Meets or exceed the applicable paragraph of MIL-C-39012) -65°C to + 165°C

Temperature range

Thermal shock Corrosion

Shock Vibrartion

Moisture resistance

MIL-STD-202, Method 107, Condition B

MIL-STD-202, Method 101, Condition B

MIL-STD-202, Method 213, Condition I

MIL-STD-202, Method 204, Condition D

MIL-STD-202. Method 106

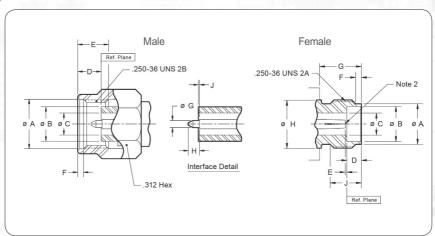
METERIAL SPECIFICATIONS

Bodies Stainless steel, passivated

Contacts Female - Beryllium copper, gold plated

Contact Support Beads: Special dielectric

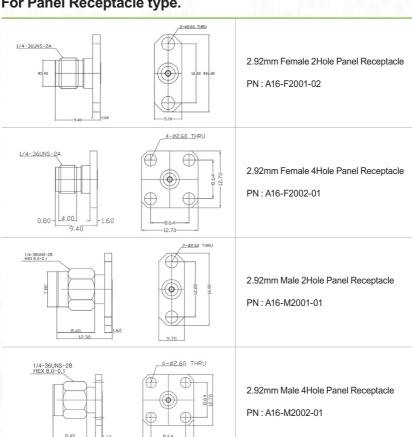
Interface Dimensions



Interface Dimensions in mm/inch

		Ma	ale		Female				
Rep.	mm		in	nch mm		m	inch		
	min.	max	min.	max	min.	max	min.	max	
1	6.48	6.73	0.255	0.265	5.23	5.44	0.206	0.214	
2	4.521	4.592	0.1780	0.1808	4.60	4.65	0.181	0.183	
3	2.908	2.934	0.1145	0.1155	2.908	2.934	0.1145	0.1155	
4	-	3.35	-	0.132	1.91	1.96	0.075	0.077	
5	3.81	4.32	0.150	0.170	0.00	0.13	0.000	0.005	
6	0.51	1.02	0.020	0.040	0.51	1.02	0.020	0.040	
7	0.0914	0.935	0.0360	0.368	5.54	-	0.218	-	
8	1.14	1.40	0.45	0.55	-	6.337	-	0.2495	
9	0.00	0.13	0.00	0.005					

For Panel Receptacle type.













2. SMA

General Information	153
Characteristic	154
Interface Dimensions	155
Interface Dimensions in mm / inch.	155
For Flexible Cable	156
- SMA Male Right Angle - RG58, RG223, RG400, LMR20	
- SMA Male - RG188, RG316	
- SMA Male - RG166, RG316	
- SMA Male - LMR100, RG316	
- SMA Male - LMR400	
- SMA Female Bulk Head - RG58. RG223, RG400, LMR2	
- SMA Female - RG188, RG316	
- SMA Female Bulk Head - RG188, RG316······	
For Semi-Flex/Semi-Rigid Cable	157
- SMA Male - SF085, SR085	157
- SMA Male - SF141, SR141	157
- SMA Female - SF047, SR047	158
- SMA Female - SF141, SR141	158
For Receptacles	158
- SMA Female 2Hole Panel Receptacle ······	158
- SMA Female 4Hole Panel Receptacle ·····	
- SMA Female Straight Side - PCB 1.0T·····	
- SMA Female Straight Side - PCB 1.6T·····	
- SMA Female Right Angle ······	
- SMA Male 4Hole Panel Receptacle	
- SMA Male Straight PCR	



General Information

SMA connector was developed in the 1960s. It has threaded coupling coax connector and can be used to up to over 18GHz frequency, depending on the type. The impedance is controlled at 50 Ohms. SMA Connector are available for Cable type and PCB Mounting type. Cable type connectors are for flexible, Semi-flexible cable, and semi-rigid cable and PCB mounting connectors are used at a printed circuit boards using both through-hole soldered and through-hole press-fit techniques, as well as surface mount types (SMD). Crimping, Clamping and Soldering techniques are used to terminate this series to cables. It is the key point of cable assembly, deciding the cable assembly performance.

There is reverse polarity (R.P.) SMA connector which reverses the gender interface. The term of "reverse polarity" means that the gender of connector's center contact is not in normal way of the polarity. For example, R.P. SMA male connector has a female center contact with male body and coupling nut. R.P. SMA connector is used in Radio Frequency Identification(RFID), Ubiquitous Sensor Network(USN), and Wireless LAN(WLAN) etc.

SMA applications include Microwave equipments, Radar, Test Equipment, Satellite and Telecommunications. Based on Mil-C-39012, CECC 22110 and IEC 60169-15, SMA connectors is one of very popular connector in the RF industries.

SRT SMA connector Features

- -Reliable V.S.W.R. specification upto 18GHz
- -Customized design and specification available
- -Brass & Stainless steel material available
- -Various SMA connector available upon application
- -RoHS compliant
- -Free samples available

2. SMA

Sub Miniature Coaxial Connector

Characteristic

ELECTRICAL DATA

Impedance

Frepuency range

Contact current

Working voltage

Contact resistance

Insulation resistance Insertion loss

RF lekage

V.S.W.R

50Ω

Semi-rigid cable: DC~18GHz

Flexible cable: DC~12.4GHz

DC 2.0A max

Semi-rigid cable: 1000V

Flexible cable: 750V Center contacts: 3.0mQ

Outer contacts: 2.5mQ

5000MO min 0.05√f(GHz)dB

≤1.15+0.02f(GHz) -60dBm min. between 2~3GHz

MECHANICAL DATA

Coupling nut torque Coupling nut retention force

Life

Contact captivation

12Ncm-140Ncm

≥ 200N

500 matings.

≥ 27N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

Shock

-65°C ~ +85°C

MIL-STD-202. Method 101. Condition B.

MIL-STD-202, Method 106

MIL-STD-202. Method 107. Condition B.

MIL-STD-202, Method 204, Condition D.

MIL-STD-202, Method 213, Condition I.

Material Data

Body

Contact

Insulator

Gasket

Brass or Stainless steel.

Brass or Bervllium Copper

PTFE

Silicone Ruber

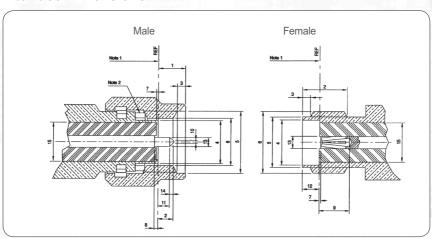
Plating Data

Body

Gold, Nickel or Passivated

Contact Gold

Interface Dimensions



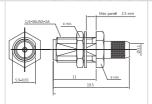
		Ma	ale		Female				
Rep.	m	mm		inch		mm		inch	
	min.	max	min.	max	min.	max	min.	max	
1		3.43		0.135					
2		2.54		0.100	4.30		0.170		
3	0.38	1.14	0.015	0.045	0.38	1.14	0.015	0.450	
4		4.59		0.1808	4.60		0.1810		
5	6.35		0.250		5.28	5.49	0.208	0.216	
6	1/4-36 UNEF-2B				1/4-36 UNEF-2A				
7		0.05		0.002	0.00	0.76	0.000	0.030	
8		0.25		0.010					
9					2.92		0.115		
10		0.38		0.015					
11	1.27		0.050						
12					1.88	1.98	0.074	0.078	
13	0.90	0.94	0.035	0.037	1.24	1.30	0.048	0.051	
14	0.38		0.015						
15	4.10		0.161		4.10		0.161		

For Flexible cable.



PN: A01-M1521-01



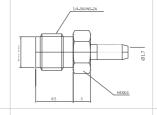


SMA Female Bulk Head Crimp

Cable : RG 58, RG223, RG400, LMR200

PN: A01-F1101-22



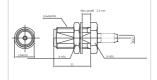


SMA Female Crimp

PN : A01-F1103-05

Cable: RG 188, RG 316





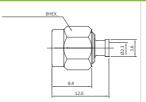
SMA Female Bulk Head Crimp

Cable: RG 188, RG 316

PN: A01-F1103-02

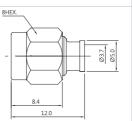
For Semi-Flex / Semi-Rigid cable





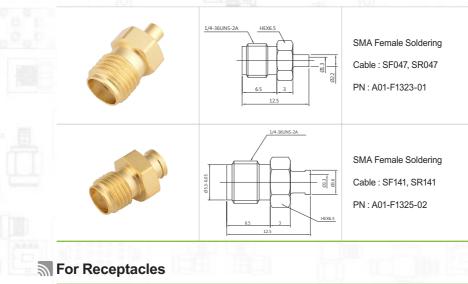
SMA Male Soldering

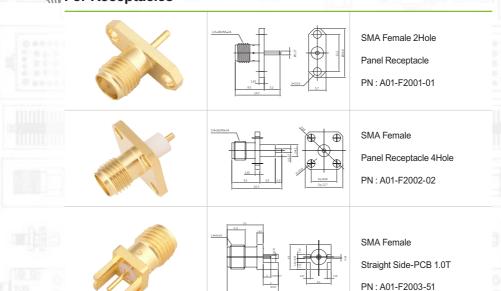
Cable : SF085, SR085 PN : A01-M1324-01



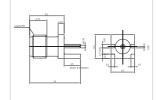
SMA Male Soldering

Cable : SF141, SR141 PN : A01-M1325-01



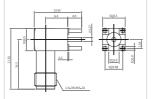






SMA Female
Straight Side-PCB 1.6T
PN : A01-F2003-54

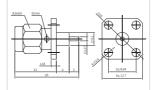




SMA Female Right Angle



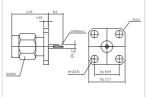




SMA Male 4Hole

Panel Receptacle
PN: A01-M2002-02



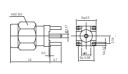


SMA Male 4Hole

Panel Receptacle

PN : A01-M2002-05





SMA Male

Straight PCB

PN: A01-M2003-02



^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

3. BNC

General Information	161
Characteristic	162
Interface Dimensions	163
Interface Dimensions in mm / inch.	163
For Flexible Cable	164
- BNC Male - RG58, RG223, RG400, LMR200	164
- BNC Male - RG58, RG223, RG400, LMR200	164
- BNC Male Right Angle - RG58, RG223, RG400, LMR200	164
- BNC Male - RG188, RG316	
- BNC Female Bulk Head - RG188, RG316	165
- BNC Female - RG58, RG223, RG400, LMR200	165
- BNC Female Bulk Head - RG 188, RG316·····	165
- BNC Male Right Angle - RG188, RG316·····	
For Semi-Flex/Semi-Rigid Cable	166
- BNC Male - SF085, SR085, RG405	166
- BNC Male - SF141, SR141, RG402	
• For Receptacles	166
- BNC Female Straight PCB	166
- BNC Female Right Angle PCB	166



General Information

BNC connector was developed in the 1940s and BNC means Bayonet Nail Concelman which was named by connector developer, Carl Concelman's name. With its bayonet coupling mechanism this connector can be used up to 4 GHz. There are two types of impedance, 50 and 75 Ω impedances. BNC connectors are available for Cable type and PCB Mounting type. Cable type connectors are for flexible, Semi-flexible cable, and semi-rigid cable and PCB mounting connectors are used at a printed circuit boards using both through-hole soldered and through-hole press-fit techniques, as well as surface mount types (SMD). Crimping, Clamping and Soldering techniques are used to terminate this series to cables. However, BNC connector is most assembled with flexible cable rather than semi-flexible or semi-rigid cables.

There is reverse polarity (R.P.) BNC connector which reverses the gender interface. The term of "reverse polarity" means that the gender of connector's center contact is not in normal way of the polarity. For example, R.P. BNC male connector has a female center contact with male body and coupling nut. R.P. BNC connector is used in Radio Frequency Identification(RFID), Ubiquitous Sensor Network(USN), and Wireless LAN(WLAN) etc.

BNC connectors are used for signal, data and video transmission applications for 75 Ohm. BNC connector is one of the low-cost connector so that BNC connectors are made from Mold for low frequency like 50Ohm or 75Ohm of 1GHz frequency.

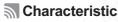
SRT BNC connector Features

- -Reliable V.S.W.R. specification upto 4GHz
- -Customized design and specification available
- -Brass & stainless steel material available
- -RoHS compliant
- -Free samples available

3. BNC



Bayonet Lock Coaxial Connector



ELECTRICAL DATA

Impedance

Frepuency range

Contact current Voltage rating

Contact resistance

Insulation resistance

Insertion loss

V.S.W.R

 50Ω . 75Ω

DC ~ 4.0GHz, DC ~ 1.0GHz

DC 3.5A max

500V rms

Center contacts: 2.0mQ

Outer contacts: 0.2mΩ

5000MΩ min.

≤ 0.3dB max at 3GHz

≤12

(Return loss better than 23.0dB)

MECHANICAL DATA

Coupling nut torque Coupling nut retention force

Contact captivation

0.07Nm min-0.25Nm max

44.5 daN

500 matings.

≥ 27N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

Shock

-65°c ~ +85°c

MIL-STD-202, Method 101, Condition B.

MIL-STD-202, Method 106

MIL-STD-202, Method 107, Condition B.

MIL-STD-202, Method 204, Condition B.

MIL-STD-202. Method 213. Condition G.

Material Data

Bodv

Contact

Insulator

Gasket

Brass.

Brass or Beryllium Copper

PTFE

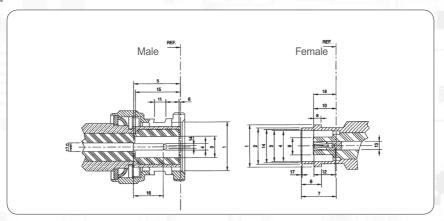
Silicone Ruber

Plating Data

Bodv Gold, Nickel Gold

Contact

Interface Dimensions



Interface Dimensions in mm/inch

		Male				Fen	11.07 0.432 0.436 9.70 0.378 0.382 8.46 0.327 0.333 8.15 0.319 0.321 5.28 0.204 0.208 8.51 0.327 0.335 2.06 0.075 0.081 4.74 0.186 5.23 0.186 0.206 0.195 2.21 0.081 0.087	
Rep.	m	ım	in	ch	m	m	inch	
	min.		min.	max	min.	max.	min.	max
1	9.78	9.91	0.385	0.390	10.97	11.07	0.432	0.436
2					9.60	9.70	0.378	0.382
3	4.83		0.190		8.31	8.46	0.327	0.333
4	1.32	1.37	0.052	0.054	8.10	8.15	0.319	0.321
5	5.33	5.84	0.210	0.230				
6	0.15		0.006		5.18	5.28	0.204	0.208
7					8.31	8.51	0.327	0.335
8					1.91	2.06	0.075	0.081
9						4.74		0.186
10					4.72	5.23	0.186	0.206
11	2.31	2.46	0.091	0.097				
12					4.95		0.195	
13					2.06	2.21	0.081	0.087
14		0.61		0.025	8.79	9.04	0.346	0.356
15	5.28	5.79	0.208	0.228				
16	1.98		0.078					
17	2.06	2.21	0.081	0.087	0.38	0.76	0.015	0.030
18					4.78	5.28	0.188	0.208

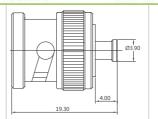
For Flexible cable





For Semi-Flex / Semi-Rigid cable



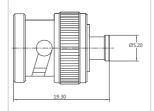


BNC Male Soldering

Cable: RG405, SF085, SR085

PN: A02-M1324-03





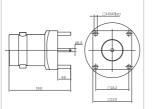
BNC Male Soldering

Cable: RG402, SF141, SR141

PN: A02-M1325-02

For Receptacles



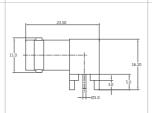


BNC Female

Straight PCB

PN: A02-F2003-03





BNC Female

Right Angle PCB

PN: A02-F2004-03



** If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com



4. TNC

General Information	169
Characteristic	170
Interface Dimensions	171
Interface Dimensions in mm / inch.	171
For Flexible Cable	172
- TNC Male - RG58, RG223, RG400, LMR200	172
- TNC Male Right Angle - RG58, RG223, RG400, LMR200	172
- TNC Male - RG188, RG316	172
- TNC Male Right Angle - RG188, RG316 ·····	172
- TNC Female Bulk Head - RG58, RG223, RG400, LMR200	172
- TNC Female - RG188, RG316·····	173
For Semi-Flex/Semi-Rigid Cable	173
- TNC Male - SF085, SR085	173
- TNC Male - SF141, SR141	
For Receptacles	173
- TNC Female Straight PCB	173
- TNC Female 4Hole Panel Receptacle	173



General Information

TNC connector was developed in the 1950s and TNC means Threaded Nail Concelman which was named by connector developer, Carl Concelman's name.

TNC connector is updated version from BNC connector with threaded mating mechanism. It used to work up to 4 GHz. There are two types of impedance, 50 and 75 Ω impedances. TNC connectors are available for Cable type and PCB Mounting type. Cable type connectors are for flexible, Semi-flexible cable, and semi-rigid cable and PCB mounting connectors are used at a printed circuit boards using both through-hole soldered and through-hole press-fit techniques, as well as surface mount types (SMD). Crimping, Clamping and Soldering techniques are used to terminate this series to cables.

There is reverse polarity (R.P.) TNC connector which reverses the gender interface. The term of "reverse polarity" means that the gender of connector's center contact is not in normal way of the polarity. For example, R.P. TNC male connector has a female center contact with male body and coupling nut. R.P. TNC connector is used in Radio Frequency Identification(RFID), Ubiquitous Sensor Network(USN), and Wireless LAN(WLAN) etc.

TNC connectors are used for signal, data and video transmission applications for 75 Ohm also, like BNC connector. Therefore, TNC connector, like BNC connector, can be made from Mold in order to lower the production cost.

SRT TNC Connector Features

- -Reliable V.S.W.R. specification upto 4GHz
- -Customized design and specification available
- -Brass & stainless steel material available
- -RoHS compliant
- -Free samples available

4. TNC



Bayonet Lock Coaxial Connector



Characteristic

ELECTRICAL DATA

Impedance

Frepuency range

Contact current Voltage rating

Contact resistance

Insulation resistance Insertion loss

VSWR

 50Ω . 75Ω

DC ~ 11GHz, DC ~ 1.0GHz

DC 3.5A max

250V rms

Center contacts: 2.0mQ

Outer contacts: 0.2mΩ

5000MΩ min.

≤ 0.18dB max at 9GHz

≤ 1.5

MECHANICAL DATA

Coupling nut torque

Life

Contact captivation

Proof torque

20Ncm-170Ncm

500 matings.

≥ 27N

Not applicable

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

Shock

-65°C ~ +85°C MIL-STD-202, Method 101, Condition B.

MIL-STD-202, Method 106

MIL-STD-202, Method 107, Condition B.

MIL-STD-202. Method 204. Condition B.

MIL-STD-202, Method 213, Condition G.

Material Data

Body

Contact

Insulator

Gasket

Brass.

Brass or Beryllium Copper

PTFE

Silicone Ruber

Plating Data

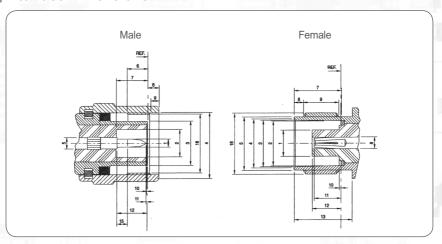
Body

Gold or Nickel

Contact

Gold

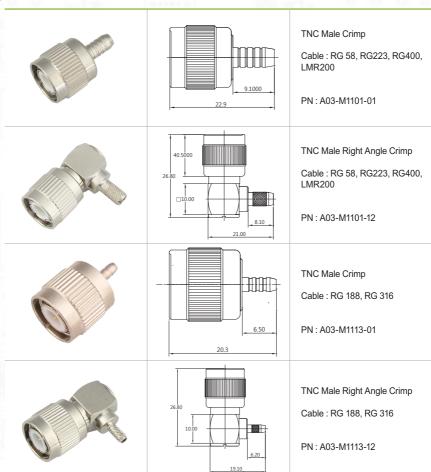
Interface Dimensions



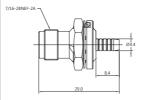
Interface Dimensions in mm/inch

	Male				Female			
Rep.	mm		inch		mm		inch	
	min.	max.	min.	max	min.	max.	min.	max
1	1.32	1.37	0.052	0.054		4.72		0.186
2	4.83		0.190		8.10	8.15	0.319	0.321
3					8.31	8.46	0.327	0.333
4	11.18		0.440		8.76	9.04	0.345	0.356
5		2.20		0.087	9.60	9.68	0.378	0.381
6	3.96		0.156			2.20		0.087
7	5.28	5.79	0.208	0.228	8.36	8.46	0.329	0.333
8		1.98		0.078	1.73	2.24	0.068	0.088
9	1.60		0.063		4.75		0.187	
10	0.15		0.006			0.15		0.006
11	0.08	1.02	0.003	0.040		4.97		0.196
12	5.35	5.84	0.210	0.230	4.72	5.23	0.186	0.206
13					10.56		0.415	
14					0.38	0.076	0.015	0.030
15	1.98		0.078					
16		7/16-28	JNEF-2B			7/16-28 (JNEF-2A	

For Flexible cable





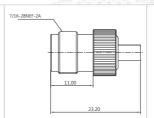


TNC Female Bulk Head Crimp

Cable : RG 58, RG223, RG400, LMR200

PN: A03-F1101-11





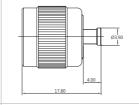
TNC Female Crimp

Cable : RG 188, RG 316

PN: A03-F1113-01

Tor Semi-Flex, Semi-Rigid cables



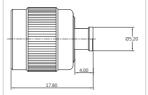


TNC Male Soldering

Cable : SF085, SR085

PN: A03-M1324-01





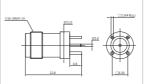
TNC Male Soldering

Cable : SF141, SR141

PN: A03-M1325-01

For Receptacles



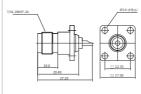


TNC Female

Straight PCB

PN: A03-F2003-01





TNC Female 4 Hole

Panel Receptacle

PN: A03-F2002-04

5. N

General Information	175
Characteristic	176
Interface Dimensions	177
Interface Dimensions in mm / inch. · · · · · · · · · · · · · · · · · · ·	177
For Semi-Flex / Semi-Rigid Cables ·····	
- N Female - SF085, SR085	
- N Female - SF141, SR141	
• For Receptacles·····	178
- N Male 4Hole Panel Receptacle ·····	178
- N Female 2Hole Panel Receptacle ·····	
- N Female 4Hole Panel Receptacle ·····	179



General Information

N connector was developed by Paul Neil in the 1940s it was named by his name.

N connector was developed for 11GHz application with water-proof application and it can be used up to 18GHz application at present. There are two types 50 and 75 Ω impedances and N connector are available for Cable type and PCB Mounting type. But mostly, N connector is used for cable assembly application and panel connector for the passive components and RF module.

In regard to the cable assembly application, there are crimping, clamping and soldering techniques are normally used to terminate this series to cables.

There is reverse polarity (R.P.) N connector which reverses the gender interface. The term of "reverse polarity" means that the gender of connector's center contact is not in normal way of the polarity. For example, R.P. N male connector has a female center contact with male body and coupling nut. R.P. N connector is used in Radio Frequency Identification(RFID), Ubiquitous Sensor Network(USN), and Wireless LAN(WLAN) etc.

N connector applications vary from frequency and input-power. You can see N connector at infrastructure application, RF passive & active components, RF module, and repeater etc.

SRT N Connector Features

- -Reliable V.S.W.R., Insertion Loss and IMD specification upto 18GHz
- -Customized design and specification available
- -Brass & stainless steel material available
- -RoHS compliant
- -Free samples available

5. N



N Coaxial Connector



Characteristic

ELECTRICAL DATA

Impedance

Frepuency range

Contact current Voltage rating

Contact resistance

Insulation resistance

Insertion loss

VSWR

RF Leakage

 50Ω . 75Ω

DC ~ 11GHz, DC ~ 1.5GHz

DC 3.5A max

1000V rms

Center contacts: 2.0mQ

Outer contacts: 0.2mΩ

5000MΩ min.

≤ 0.15dB at 9GHz

≤ 1.5

-90dBm min from 2~3GHz

MECHANICAL DATA

Coupling nut torque Coupling nut retention force

Life

Contact captivation

20Ncm-170Ncm

450N

500 matings.

≥ 27N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

Shock

-65°C ~ +85°C

MIL-STD-202, Method 101, Condition B.

MIL-STD-202, Method 106

MIL-STD-202. Method 107. Condition B.

MIL-STD-202, Method 204, Condition B.

MIL-STD-202, Method 213, Condition I.

Material Data

Bodv

Contact

Insulator

Gasket

Brass or Stainless steel.

Brass or Beryllium Copper

PTFE

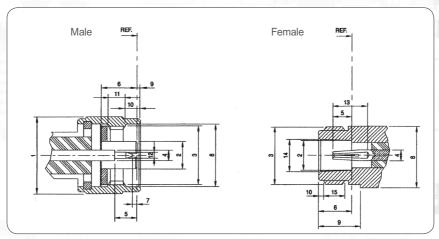
Silicone Ruber

Plating Data

Bodv Contact Nickel, Silver, Tri-alloy or Passivated

Gold or Silver

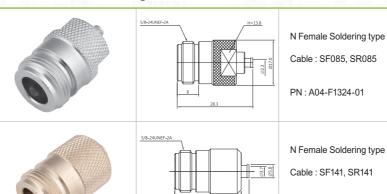
Interface Dimensions



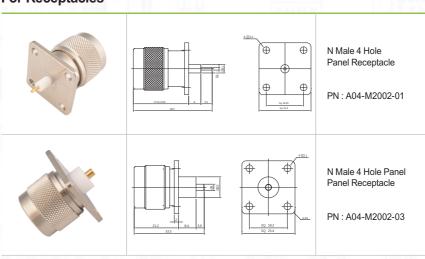
Interface Dimensions in mm/inch

	Male			Female				
Rep.	m	ım	inch		mm		inch	
	min.	max.	min.	max	min.	max.	min.	max
1		21.00		0.827				
2		8.38		0.330	8.03	8.13	0.316	0.320
3		5/8-24 L	JNEF-2B			5/8-24 L	INEF-2A	
4	3.02	3.15	0.119	0.124	3.02	3.15	0.119	0.124
5	5.33	5.84	0.210	0.230	4.75	5.26	0.187	0.207
6	10.11	10.46	0.398	0.412	9.04	9.19	0.356	0.362
7	0.08		0.003					
8	16.00		0.630			15.93		0.627
9	0.41	1.52	0.016	0.060	10.72		4.22	
10	1.01	4.27	0.158	0.168	1.19	1.96	0.47	0.077
11	4.50	5.00	0.177	0.197				
12	1.60	1.68	0.063	0.066				
13					5.33		0.210	
14					8.53	8.74	0.336	0.344
15					4.37	5.13	0.172	0.202

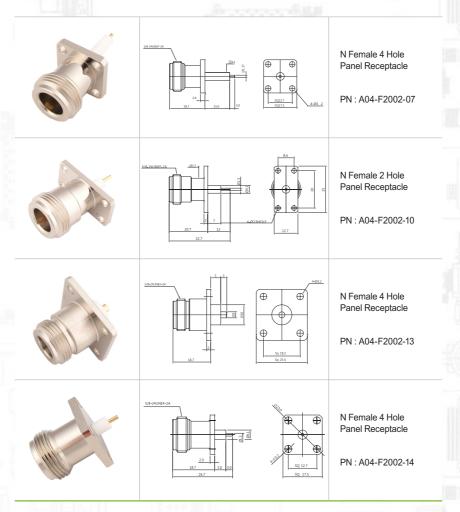
For Semi-Flex, Semi-Rigid cables.







PN: A04-F1325-01





^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com All specifications are subject to change without notice at any time.

6. 7/16DIN

General Information	181
Characteristic · · · · · · · · · · · · · · · · · · ·	182
Interface Dimensions	183
Interface Dimensions in mm / inch	183
For Jumper Cable	184
- 7/16Din Male - 1/2" Flexible ·····	184
- 7/16Din Male - 1/2" Super Flexible ······	184
- 7/16Din Male - 7/8" Flexible	184
- 7/16Din Female - 1/2" Flexible	184
- 7/16Din Female - 1/2" Super Flexible ········	184
- 7/16Din Female - 7/8" Flexible	185
For Receptacles	185
- 7/16Din Female 4Hole Panel Recentacle	

7/16DIN connectors are designed for using in communications systems with power levels about 100 Watts per channel. Deutsh Industries Norm (DIN) is an acronym for German standards that apply to 7/16DIN connectors and are gaining acceptance worldwide.

7/16DIN connectors are named from the dimension of male center contact and female inner contact. The outer dimension of male center contact is 7mm and inner dimension of outer contact is 16mm. 7/16DIN connector was developed for using over 100Watt application in system. 7/16DIN connector is 50 Ohm and 7.5 GHz frequency application. They feature high power transmission and low intermodulation distortion.

SRT 7/16DIN Connector Features

- -Reliable V.S.W.R., Insertion Loss and IMD specification upto 7.5GHz
- -Customized design and specification available
- -Brass with Tri-Alloy, nickel and silver plating available
- -RoHS compliant

6. 7/16DIN



7/16DIN Coaxial Connector



Characteristic

ELECTRICAL DATA

Impedance Frepuency range Insulation resistance Working voltage -combination system

Contact resistance

Insertion loss VSWR RF leakage

50Ω

DC ~ 7.5GHz 1000M Ω min. 2.7kV rms, 50Hz 1.0 kV rms 50Hz Center contacts: 0.4mO Outer contacts: 1.5mQ

0.05√f(GHz)dB ≤ 1.20

128dB min.

MECHANICAL DATA

Coupling nut torque Coupling nut retention force

Contact captivation

25Nm...30Nm/221 in. -ibs...260 in. -ibs

≥ 1000N/225.0 ibs 500 matings. ≥ 200N/45.0 ibs

ENVIRONMENTAL DATA

Temperature range Corrosion resistance Moisture resistance

Thermal shock Vibration Shock

-65°C ~ +85°C

MIL-STD-202. Method 101. Condition B.

MIL-STD-202, Method 106 MIL-STD-202, Method 107, Condition B. MIL-STD-202, Method 204, Condition D.

MIL-STD-202, Method 213, Condition I.

Material Data

Body

Contact Insulator

Gasket

Brass.

Brass or Beryllium Copper

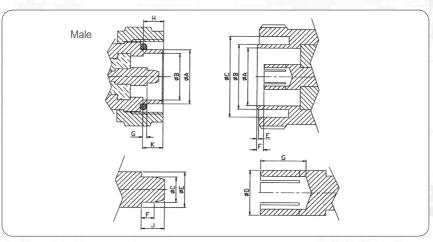
Silicone Ruber

Plating Data

Body Contact Nickel, Silver or Tri-alloy

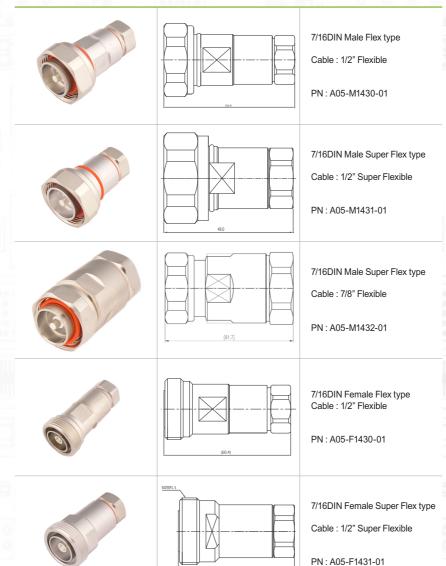
Gold, Silver

Interface Dimensions



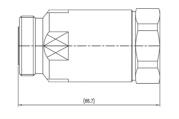
Rep.	Ma	ale	Female			
	min.	max.	min.	max		
Α	20.60	21.40	15.85	16.25		
В	18.03	18.21	-	18.50		
С	4.96	5.04	22.10	22.90		
D	15.85	16.25	-	-		
Е	-	-	0.50	0.70		
F	1.40	1.60	1.77	2.07		
G	1.47	1.77	5.00	-		
Н	7.00	8.00	8.10	-		
J	-	4.50	10.00	-		
K	7.00	9.00	-	-		

For Jumper cable



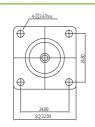
PN : A05-F1432-01

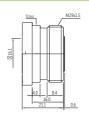




For Receptacles







7/16DIN Female 4 Hole Panel Receptacle

PN: A05-F2002-02





please visit our website, www.srtechnology.com, or send enrail to sale@srtechnology.com All specifications are subject to change without notice at any time.

7. MCX

General Information	187
Characteristic	188
Interface Dimensions	189
Interface Dimensions in mm / inch.	189
For Flexible Cable	190
- MCX Male - RG178	190
- MCX Male Right Angle - RG178·····	
- MCX Male - RG179	190
- MCX Male Right Angle - RG179·····	190
- MCX Female - RG178	190
For Semi-Flex/Semi-Rigid Cable	191
- MCX Male - SF047, SR047	191
- MCX Male Right Angle - SF047, SR047 ·····	191
- MCX Male - SF085, SR085	
- MCX Male Right Angle - SF085, SR085 ·····	191
For Receptacles	192
- MCX Female Straight PCB SMT······	192
- MCX Female Side edge PCB ······	192
- MCX Female Straight PCB	
- MCX Female Right Angle PCB	102



General Information

MCX connector was developed in the 1980s. They have the same inner contact and insulator dimension as the SMB connector but are 30% smaller. MCX is standardized in European CECC 22220.

MCX connectors use a snap-on interface and usually have a 50 Ω impedance and 75 Ω impedance. MCX connectors offer broadband capability from DC to 6GHz application with a snap-on connector design. The contact surfaces are gold-plated. A range of connectors are available , including printed circuit board and cable connectors

MCX outer diameter of the plug is approx 3.6 mm or 0.140 inch so that The MCX series provides designers with options where weight and physical space are limited

SRT MCX Connector Features

- -Reliable specification upto 6GHz
- -Customized design and Specification available
- -Various MCX connector available upon application
- -RoHS compliant
- -Free samples available

7. MCX

Sub Miniature Coaxial Connector

Characteristic

ELECTRICAL DATA

Impedance

Frepuency range Contact current

Voltage rating

Contact resistance

Insulation resistance

Insertion loss

V.S.W.R

50Ω

DC~6GHz DC 1.5A max

250V rms

Center contacts: 5.0mQ

Outer contacts: 1.0mΩ

1000MΩ min.

0.1dB max. at 1GHz

≤ 1.5

MECHANICAL DATA

Engagement force

Separation force

Life

Contact captivation

max. 25N

min. 8N - max. 20N

500 matings.

max. 10N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

-65°C ~ +85°C

MIL-STD-202, Method 101, Condition B.

MIL-STD-202, Method 106

MIL-STD-202, Method 107, Condition C.

MIL-STD-202. Method 204. Condition D.

Material Data

Body

Contact

Insulator

Gasket

Brass.

Brass or Beryllium Copper

PTFF

Silicone Ruber

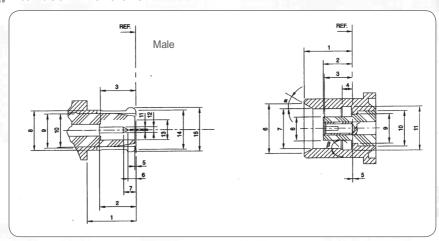
Plating Data

Body

Contact

Gold Gold

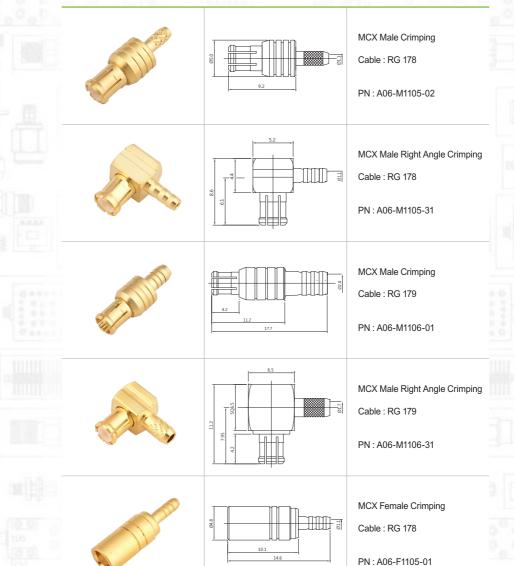
Interface Dimensions



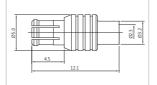
Interface Dimensions in mm/inch

	Male					Female			
Rep.	mm		inch		Rep.	mm		inch	
	min.	max.	min.	max		min.	max.	min.	max
1	4.15		0.163		1	4.00	4.12	0.157	0.162
2	2.80	3.20	0.110	0.126	2	2.60	2.80	0.102	0.110
3	2.80		0.100		3	2.30	2.80	0.090	0.110
5	0.00	0.30	0.000	0.012	4	0.75	0.85	0.029	0.033
6	0.15		0.006		5	0.00		0.000	
7		1.20		0.047	α	18°	22°	18°	22°
8		3.40		0.134	β	43°	47°	43°	47°
9	3.05 NOM.		.120 NOM.		6	3.80		0.150	
10		3.00		7	3.42	3.48	0.135	0.137	
11		0.25		0.010	8		1.98		0.780
12	0.48	0.53	0.019	0.021	9		3.00		0.118
13	2.00		0.079		10	3.05 NOM.		3.05 NOM.	
14		3.60		0.142	11	3.60	3.75	0.142	0.148
15		3.80		0.150					

For Flexible cable





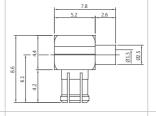


MCX Male Soldering

Cable: SF047, SR047





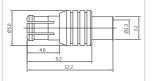


MCX Male Right Angle Soldering

Cable: SF047, SR047





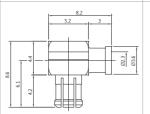


MCX Male Soldering

Cable: SF085, SR085

PN: A06-M1324-01





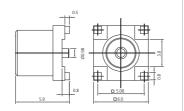
MCX Male Right Angle Soldering

Cable : SF085, SR085

PN: A06-M1324-21

For Receptacles



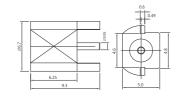


MCX Female

Straight PCB SMT

PN: A06-F2003-02



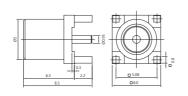


MCX Female

Side Edge PCB

PN: A06-F2003-11



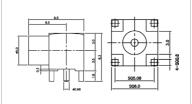


MCX Female

Straight PCB

PN: A06-F2003-07





MCX Female

Right angle PCB

PN: A06-F2003-01



^{**} If you wish to get more detailed information, specification or samples,
please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



8. MMCX

General Information	195
Characteristic	196
Interface Dimensions	197
Interface Dimensions in mm / inch.	
For Flexible Cable	198
- MMCX Male - RG178 ····	198
- MMCX Male Right Angle - RG178·····	
- MMCX Male Right Angle - RG316 ·····	198
- MMCX Female - RG178·····	198
For Semi-Flex/Semi-Rigid Cable	
- MMCX Male - SF047, SR047 ·····	199
- MMCX Male Right Angle - SF047, SR047·····	199
- MMCX Male - SF085, SR085	199
- MMCX Male Right Angle - SF085, SR085	199
- MMCX Female - SF047, SR047	
For Receptacles	200
- MMCX Female End Launch PCB·····	200
- MMCX Female Straight PCB SMT	200
- MMCX Female Right Angle PCB ·····	200



General Information

The MMCX connector was developed in the 1990's. MMCX is a micro-miniature connector series with a lock-snap mechanism allowing for 360 degrees rotation enabling flexibility in PCB layouts. MMCX connectors conform to the European CECC 22000 specification.

MMCX connectors are designed for densely populated electronic packages with size and weight limitations

The MMCX connector is a DC~6 GHz 50Ω interconnect system. Typical applications are wireless/PCS devices, telecommunications, GPS receivers, and consumer electronics. Variable range of connectors are available including surface mount, edge card, and cable connectors

SRT MMCX Connector Features

- -Reliable specification upto 6GHz
- -Customized design and specification available
- -Various MMCX connector available upon application
- -RoHS compliant
- -Free samples available

8. MMCX

Micro Miniature Coaxial Connector

Characteristic

ELECTRICAL DATA

Impedance

Frepuency range

Contact current Voltage rating

Contact resistance

Insulation resistance

V.S.W.R

50Ω

DC ~ 6GHz

DC 1.0A max 170V rms

Center contacts: 5.0mQ

Outer contacts : 2.5mΩ

1000MΩ min.

≤ 1.2 at 2GHz

MECHANICAL DATA

Engagement force

Separation force

Life

Contact captivation

max. 15N

min. 6N - max. 15N

500 matings.

max. 10N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

-65°C ~ +85°C

MIL-STD-202, Method 101, Condition B. MIL-STD-202. Method 106

MIL-STD-202, Method 107, Condition C. MIL-STD-202, Method 204, Condition D.

Material Data

Body

Brass.

Contact

Brass or Beryllium Copper PTFF

Insulator

Gasket

Silicone Ruber

Plating Data

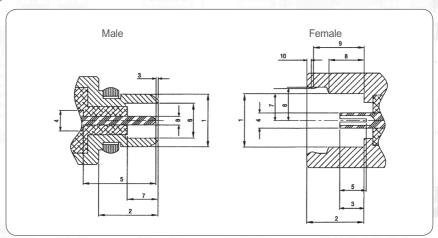
Body

Gold

Contact

Gold

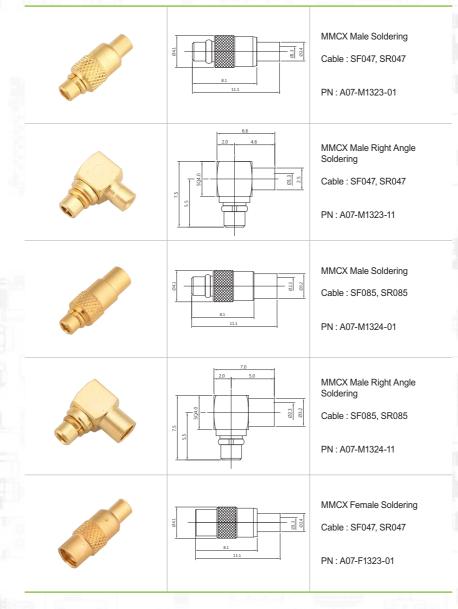
Interface Dimensions



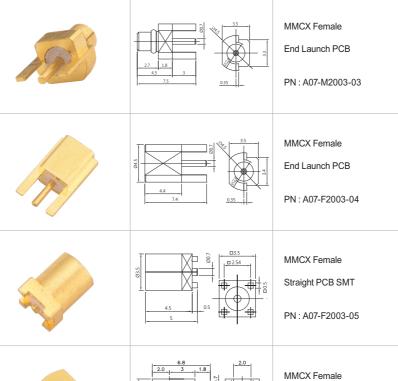
	Male					Female			
Rep.	mm		inch		Rep.	mm		inch	
	min.	max.	min.	max		min.	max.	min.	max
1		2.40		0.940	1	2.41		0.095	
2	2.70		0.016		2	2.60		0.102	
3	0.00 0.00 0.250 0			0.100	3	0.90	0.035	1.20	0.047
4	0.70/0.28 NOM					0.70/0.28 NOM			
5	3.15 0.124				5	1.40		0.055	
6	1.58	0.26	1.62	0.64	6	1.88	0.074	3.04	0.120
7	1.45		0.057		7	2.88	0.113	2.90	0.114
8	0.38	0.015	0.42	0.017	8	1.57	0.062	1.63	0.064
9					9	2.30	0.091	2.34	0.092
10					10		0.23		0.009

For Flexible cable MMCX Male Crimping Cable: RG 178 PN: A07-M1105-01 MMCX Male Right Angle Crimping Cable: RG 178 PN: A07-M1105-31 MMCX Male Right Angle Crimping Cable: RG 316 PN: A07-M1113-11 MMCX Female Crimping Cable: RG 178 PN: A07-F1105-01

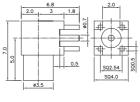
Tor Semi-Flex, Semi-Rigid cable



For Receptacles







Right Angle PCB

PN: A07-F2003-11



^{**} If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com
All specifications are subject to change without notice at any time.



9. SMB

General Information	203
Characteristic	204
Interface Dimensions	205
Interface Dimensions in mm / inch.	205
For Flexible Cable	206
- SMB Male - RG188, RG316	206
- SMB Female - RG188, RG316 ·····	206
- SMB Female Right Angle - RG188, RG316 ·····	206
For Semi-Flex/Semi-Rigid Cable	206
- SMB Male - SF085, SR085	206
- SMB Male Right Angle - SF085, SR085 ·····	207
- SMB Female - SF085, SR085	207
For Receptacles	207
- SMB Female Straight PCB	207
- SMB Female Right Angle PCB·····	207

General Information

SMB was name derived from SubMiniature B (the second subminiature design). Developed in the 1960's, the SMB is a smaller version of the SMA with snapon coupling. SMB connector conforms to the requirements of MIL-C-39012, and interface is in compliance with MIL-STD-348. It is available in 50 Ω and 75 Ω impedance, SMB provides broadband capability through 4 GHz with a snap-on connector design and could utilize die cast components on non-critical areas to provide a low-cost solution.

SMB connector mechanism is opposite comparing with other connectors so that it is could be confused on the connector mating part name. It is distinguished by shape of center contact. SMB female has a male center contact, on the contrary to this SMB male has a female center contact.

SRT SMB Connector Features

- -Reliable specification upto 4GHz
- -Customized design and Specification available
- -Various SMB connector available upon application
- -RoHS compliant
- -Free samples available

9. SMB



Subminiature Coaxial Connector



Characteristic

ELECTRICAL DATA

Impedance

Frepuency range Contact current

Voltage rating

Contact resistance

Insulation resistance

Insertion loss V.S.W.R

RF leakage

50Ω

DC~4GHz

DC 1.5A max 250V rms

Center contacts: 3.0mQ

Outer contacts: 0.5mΩ

1000MΩ min. 0.6dB max

Straight 1.3+0.04f(GHz)

Right angle 1.4+0.06f(GHz)

-55dBm min. between 2~3GHz

MECHANICAL DATA

Engagement force

Separation force

Life

Contact captivation

max. 63N

Not applicable

500 matings.

max. 15N

ENVIRONMENTAL DATA

Temperature range

Corrosion resistance

Moisture resistance

Thermal shock

Vibration

-65°C ~ +85°C

MIL-STD-202, Method 101, Condition B.

MIL-STD-202. Method 106

MIL-STD-202, Method 107, Condition B.

MIL-STD-202. Method 204. Condition D.

Material Data

Bodv

Contact

Insulator Gasket

Brass.

Brass or Beryllium Copper

PTFE

Silicone Ruber

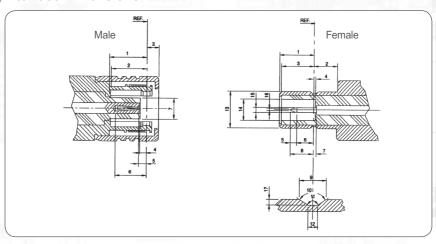
Plating Data

Bodv

Contact

Gold, Nickel Gold

Interface Dimensions



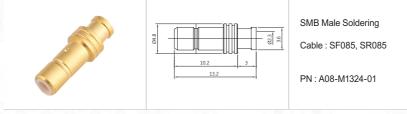
Interface Dimensions in mm/inch

	Female				Male			
Rep.	mm		inch		mm		inch	
	min.	max.	min.	max	min.	max.	min.	max
1	3.58		0.141		3.33	3.58	0.131	0.141
2	3.58		0.141		1.65		0.065	
3		1.63		0.064	0.00		0.000	
4	0.18		0.007			0.18		0.007
5	0.18	0.94	0.007	0.037	0.25		0.010	
6	2.97		0.117		1.32		0.052	
7		2.06		0.081		0.18		0.007
8						2.97		0.117
9					0.69	0.94	0.027	0.037
10					0.005	0.15	0.002	0.006
11						0.13		0.005
12					0.28	0.38	0.011	0.015
13						3.71		0.146
14					2.08		0.082	
15					0.48	0.53	0.019	0.021
16					0.25		0.090	
17					0.15	0.25	0.006	0.010

For Flexible cable



Tor Semi-Flex, Semi-Rigid cable





PN : A08-M1324-21

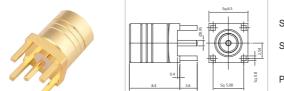


SMB Female Soldering

Cable: SF085, SR085

PN: A08-F1324-01

For Receptacles

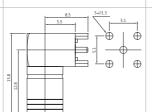


SMB Female

Straight PCB

PN: A08-F2003-01





SMB Female

Right Angle PCB

PN: A08-F2003-11



^{**} If you wish to get more detailed information, specification or samples,

please visit our website, www.srtechnology.com, or send email to sale@srtechnology.com

All specifications are subject to change without notice at any time.

10. Adaptor

SMA to SMA	209
SMA to BNC, SMB, MCX, or MMCX ······	······210
BNC to BNC	213
TNC to TNC	
• N to N	214
N to SMA, BNC, or TNC	216
• 7/16DIN to N	210

SRT Adaptor Features

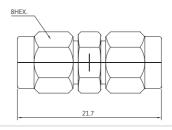
- -Various In-Series and Between Series adaptor available
- -Customized design and specification available
- -Reliable V.S.W.R. specification
- -Brass & stainless steel material available
- -RoHS compliant
- -Free samples available

10. Adaptor



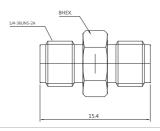
SMA male to SMA male PN: B11-A1118-03





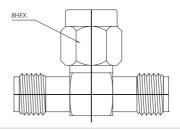
SMA female to SMA female PN: B11-A2218-10





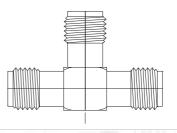
SMA female to male to female PN: B11-A2110-33





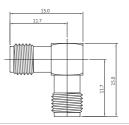
SMA female to female to female PN: B11-A2210-32









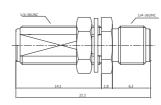


SMA female to female Bulk Head

PN: B11-A2218-12



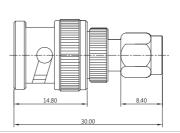




SMA to BNC, SMB, MCX, MMCX

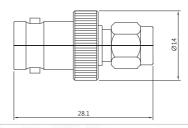
SMA male to BNC male PN: B12-A1102-01





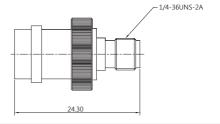
SMA male to BNC female PN: B12-A1203-01





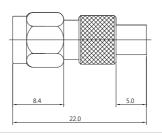
SMA female to BNC female PN: B12-A2202-01





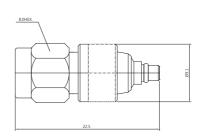
SMA male to MCX female PN: B16-A1206-02





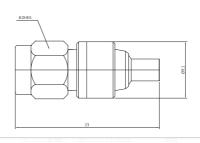
SMA male to MMCX male PN: B17-A1106-01





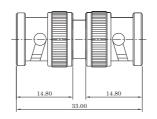
SMA male to MMCX female PN: B17-A1206-01





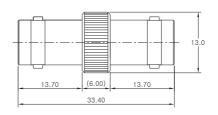
SMA female to MMCX male PN : B17-A2106-01 SMA female to MMCX female PN: B17-A2206-01 1/4-36 UNS-2A SMA male to SMB female PN: B18-A1204-01 SMA female to SMB female PN: B18-A2204-34





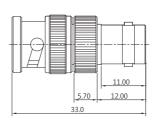
BNC female to BNC female PN: B22-A2202-01





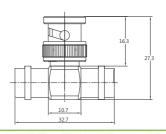
BNC male to BNC female PN: B22-A1201-01





BNC female to male to female PN: B22-A2202-04

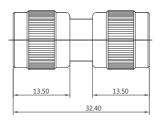




TNC to TNC

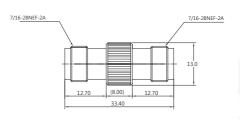
TNC male to TNC male PN: B33-A1103-02





TNC female to TNC female PN: B33-A2201-02

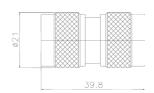




N to N

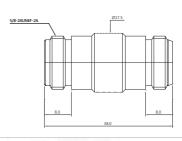
N male to N male PN : B44-A1109-02





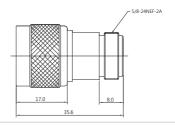
N female to N female PN: B44-A2209-02





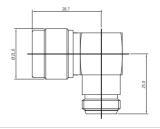
N male to N female PN: B44-A1209-02





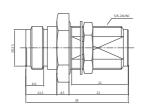
N male to N female Right Angle PN: B44-A1206-22





N female to female Bulk Head PN: B44-A2209-03

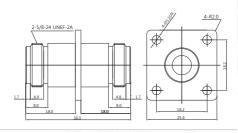






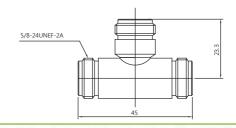
N female to female 4 Hole PN: B44-A2211-05





N female to female to female PN: B44-A2203-33



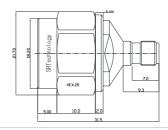




N to SMA, BNC, TNC

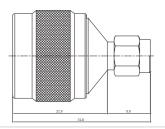
N male to SMA female PN: B41-A1218-03





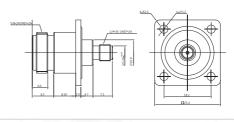
N male to SMA male PN: B41-A1109-02





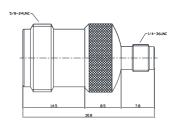
N female to SMA female 4 Hole PN: B41-A2206-12





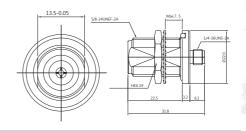
N female to SMA female PN: B41-A2209-02





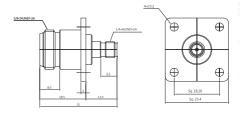
N female to SMA female Bulk Head PN: B41-A2209-11





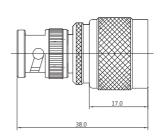
N female to SMA female 4 Hole PN: B41-A2209-13





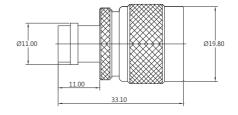
N male to BNC male PN: B42-A1103-01





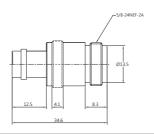
N male to BNC female PN : B42-A1203-02





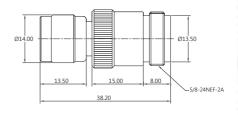
N female to BNC female PN: B42-A2203-02





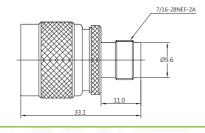
N female to TNC male PN: B34-A1203-02





N male to TNC female PN: B34-A2103-02



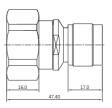




7/16DIN male to N male PN : B54-A1105-01



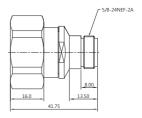




7/16DIN male to N female PN: B54-A1206-08

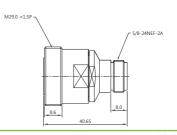






7/16DIN female to N female PN: B54-A2206-02









** If you wish to get more detailed information, specification or samples, please visit our website, www.srtechnology.com, or send email to sale@srtechnology.cor All specifications are subject to change without notice at any time.

11. Cable

 Flexib 	ble Cable	
	- RG 58	221
	- RG 59 ·····	222
	- RG 142	
	- RG 174	224
	- RG 178	225
	- RG 179	226
	- RG 214 ·····	
	- RG 223 ·····	228
	- RG 316(S)·····	
	- RG 316(D) ·····	
	- RG 400	

Semi	Rigid	Cable
OCITII	rtigiu	Cabic

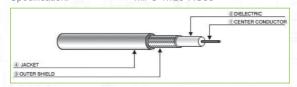
- SR 047·····	236
- SR 085	237
- SR 141 ·····	238
- SR 250	239

Semi Flexible Cable

- SF 047 ·····	
- SF 085	
- SF 141SC	242
- SF 141SC FEP	243
- SF 141SC-P	244
- SF 250	245

RG 58

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ----- Mil-C-17/28-RG58



		CONSTRUC	TION	
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	Center Conductor	TC	0.90 ± 0.02mm	Strand 19/0.182mm
2	Dielectric	PE	2.95 ± 0.15mm	SOLID
3	Outer Shield (Braid)	TC	3.45 ± 0.15mm	96% (nom.)
4	Jacket	PVC	4.95 ± 0.20mm	Black

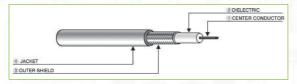
* TC : Tin Copper * PVC : Polyvinyl Chloride

* PE : PolyEthylene

	ELECTRICAL DATA	
ITEM SPECIFICATION		
Capacitance	101.0 pF/m (30.8 pF/FT)(nom.)	
Characteristic Impedance	50 ± 2Ω	
Operating Frequency	1 GHz	
Operating Temp	-40℃ ~ +85℃	
Operating Voltage	1900 vrms (max)	
RoHS Compliance	YES	
Weight	38.6 kg/km	
	100 MHz	4.8 dB/100ft (0.16 dB/M)
	200 MHz	6.7 dB/100ft (0.22 dB/M)
	400 MHz	9.7 dB/100ft (0.32 dB/M)
Maximum Attenuation	800 MHz 15.2 dB/100ft (0.50 dB/M)	
	1000 MHz	17.3 dB/100ft (0.57 dB/M)
	2000 MHz	26.2 dB/100ft (0.86 dB/M)
	5000 MHz	46.6 dB/100ft (1.53 dB/M)

RG 59

Description: RG CABLE 6.10mm (0.242 inch) / 75 Ohm Specification: ------ Mil-C-17/29-RG59



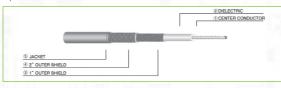
		CONSTRUC	TION	
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	Center Conductor	CS	0.58 ± 0.02mm	Strand 1/0.574mm
2	Dielectric	PE	3.60 ± 0.15mm	SOLID
3	Outer Shield	BC	4.40 ± 0.15mm	95% (nom.)
4	Jacket	PVC	6.10 ± 0.20mm	Black

* CS : Copper clad Steel * BC : Bare Copper

* PE : PolyEthylene * PVC : Polyvinyl Chloride

	ELECTRI	CAL DATA	
ITEM		SPECIFICATION	
Capacitance	67.5 pF/m (20.6	pF/FT)(nom.)	
Characteristic Impedance	75 ± 3Ω		
Operating Frequency	1 GHz		
Operating Temp	-40°C ~ +85°C		
Operating Voltage	2300 vrms (max	:)	
RoHS Compliance	YES		
Weight	52.0 kg/km		
	100 MHz	3.4 dB/100ft (0.11 dB/M)	306 Watts
	200 MHz	4.9 dB/100ft (0.16 dB/M)	199 Watts
	400 MHz	7.0 dB/100ft (0.23 dB/M)	129 Watts
Maximum Attenuation	700 MHz	9.7 dB/100ft (0.31 dB/M)	91 Watts
	1000 MHz	12.0 dB/100ft (0.39 dB/M)	73 Watts
	2000 MHz	20.4 dB/100ft (0.67 dB/M)	-
	5000 MHz	37.1 dB/100ft (1.22 dB/M)	-

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ------- Mil-C-17/128-RG400

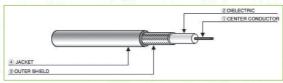


		CONSTRUCT	TION	
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	Center Conductor	SPC	0.94 ± 0.037mm	Strand 1/0.939mm
2	Dielectric	PTFE	2.95 ± 0.15mm	SOLID
3	1" Outer Shield (Braid)	SPC	3.60 ± 0.15mm	94.8% (nom.)
3	2" Outer Shield (Braid)	SPC	4.23 ± 0.15mm	93.1% (nom.)
4	Jacket(Optional)	EFP	4.95 ± 0.20mm	Brown

	ELECTF	RICAL DATA		
ITEM		SPECIFICATION		
Operating frequency	Max. 12.4 GHz			
Conductor resistance	Max. 2.06 Ω / 1	100ft (20℃)		
Dielectric resistance	Min. 1000™ .k	m (20°C)		
Test voltage	5000Vrms (1m	in)		
Velocity of propagation	Nom. 69.5%	Nom. 69.5%		
Capacitance	Max. 29.3 pF/ft	Max. 29.3 pF/ft		
Characteristic impedance	50 ± 2Ω	50 ± 2Ω		
Approx. weight	64.0 kg/km			
	50 MHz	2.7 dB/100ft (0.09 dB/M)	-	
	500 MHz	9.4 dB/100ft (0.31 dB/M)	-	
Maximum Attenuation	1000 MHz	13.8 dB/100ft (0.45 dB/M)	650 Watts	
	3000 MHz	26.6 dB/100ft (0.87 dB/M)	330 Watts	
	5000 MHz	36.6.6 dB/100ft (1.20 dB/M)	-	

RG 174

Specification: ----- Mil-C-17/119-RG174 Description: RG CABLE 2.75mm (0.108 inch) / 50 Ohm



		CONSTRUC	TION	
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	Center Conductor	BCW	0.51 ± 0.02mm	Strand 7/0.160mm
2	Dielectric	PE	1.50 ± 0.07mm	SOLID
3	Outer Shield	TC	1.95 ± 0.15mm	95% (nom.)
4	Jacket(Optional)	PVC	2.90 ± 0.12mm	Black

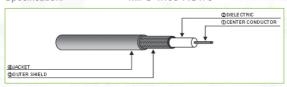
* BCW : Bare Copper clad steel Wire * TC : Tin Copper

* PE : Poly Ethylene * PVC : Polyvinyl Chloride

	ELECTRICAL	. DATA	
ITEM		SPECIFICATION	
rating frequency	Max. 1 GHz		
ctric resistance	Min. 1000™ .km (20	℃)	
voltaqe	2000Vrms (1min)		
ocity of propagation	Nom. 66%		
acitance	Max. 29.9 pF/ft		
acteristic impedance	50 ± 2Ω		
ox. weight	12.5 kg/km		
	50 MHz	6.7 dB/100ft (0.22 dB/M)	
imum Attenuation	100 MHz	10.7 dB/100ft (0.35 dB/M)	
mum Attenuation	400 MHz	26.2 dB/100ft (0.86 dB/M)	
	1000 MHz	47.2 dB/100ft (1.55 dB/M)	



Description: RG CABLE 1.80mm (0.071 inch) / 50 Ohm Specification: ----- Mil-C-17/93-RG178



CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK	
1	Center Conductor	SPCW	0.31 ± 0.02mm	Strand 7/0.102mm	
2	Dielectric	PTFE	0.84 ± 0.05mm	SOLID	
3	Outer Shield	SPC	1.30 ± 0.15mm	95% (nom.)	
4	Jacket(Optional)	FEP	1.80 ± 0.12mm	Brown	

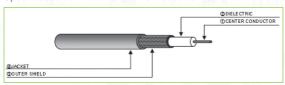
* SPCW : Silver Plated Copper clad steel Wire * SPC : Silver Plated Copper * F

ire * PTFE : Poly TetraFluorEthylene * FEP : Fluorinated Ethylene Propylene

	ELECTRICAL	DATA	
ITEM		SPECIFICATION	
Operating frequency	Max. 3 GHz		
Conductor resistance	Max. 24.45 Ω / 100	Oft (20℃)	
Dielectric resistance	Min. 1000™ .km (2	20℃)	
Test voltage	2000Vrms (1min)		
Velocity of propagation	Nom. 69.5%		
Capacitance	Max. 32 pF/ft		
Characteristic impedance	50 ± 2Ω		
Approx. weight	8.4 kg/km		
	100 MHz	16.0 dB/100ft (0.52 dB/M)	255 Watts
	200 MHz	21.6 dB/100ft (0.71 dB/M)	-
	400 MHz	33 dB/100ft (1.08 dB/M)	113 Watts
Maximum Attenuation	800 MHz	43.3 dB/100ft (1.42 dB/M)	-
	1,000 MHz	52.0 dB/100ft (1.7 dB/M)	66 Watts
	2,000 MHz	71.0 dB/100ft (2.33 dB/M)	-
	3,000 MHz	110.3 dB/100ft (3.62 dB/M)	-

RG 179

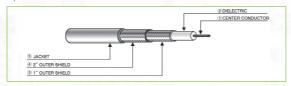
Description: RG CABLE 1.80mm (0.071 inch) / 75 Ohm Specification: ------- Mil-C-17/93-RG179



CONSTRUCTION				
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	Center Conductor	SPCW	0.31 ± 0.02mm	Strand 7/0.102mm
2	Dielectric	PTFE	1.60 ± 0.05mm	SOLID
3	Outer Shield	SPC	2.00 ± 0.15mm	94% (nom.)
4	Jacket(Optional)	FEP	2.54 ± 0.12mm	Brown

	ELECTR	RICAL DATA	
ITEM	SPECIFICATION		
Operating frequency	Max. 3 GHz		
Conductor resistance	Max. 24.45 Ω /	100ft (20℃)	
Dielectric resistance	Min. 1000™ .kr	m (20℃)	
Test voltage	2000Vrms (1mi	in)	
Velocity of propagation	Nom. 66%		
Capacitance	Max. 29.9 pF/ft		
Characteristic impedance	50 ± 2Ω		
Approx. weight	12.5 kg/km		
	100 MHz	8.2 dB/100ft (0.27 dB/M)	-
	400 MHz	17.0 dB/100ft (0.56 dB/M)	-
Maximum Attenuation	800 MHz	24.7 dB/100ft (0.81 dB/M)	-
	900 MHz	26.3 dB/100ft (0.86 dB/M)	-
	1,000 MHz	27.9 dB/100ft (0.92 dB/M)	-

Description: RG CABLE 10.79mm (0.424 inch) / 50 Ohm Specification: ------ Mil-C-17/75-RG214



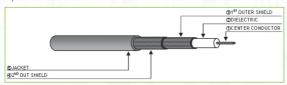
	CONSTRUCTION					
N	10	ITEM	MATERIAL	DIAMETER	REMARK	
	1	Center Conductor	SPC	2.25 ± 0.01mm	Strand 7/0.751mm	
	2	Dielectric	PE	7.25 ± 0.05mm	SOLID	
	3	1" Outer Shield	SPC	8.05 ± 0.15mm	95.7% (nom.)	
	3	2" Outer Shield	SPC	8.75 ± 0.15mm	98.0% (nom.)	
(4	Jacket(Optional)	PVC	10.79 ± 0.10mm	Black	

* SPC : Silver Plated Copper * PE : PolyEthylene * PVC : Polyvinyl Chloride

	ELECTRIC	CAL DATA		
ITEM		SPECIFICATION		
Capacitance	105.6 pF/m (32.2	105.6 pF/m (32.2 pF/FT)(nom.)		
Characteristic Impedance	50 ± 2Ω			
Operating Frequency	11 GHz			
Operating Temp	-55℃ ~ +85℃			
Operating Voltage	5000 vrms (max)	5000 vrms (max)		
RoHS Compliande	YES			
Weight	180 kg/km	180 kg/km		
	100 MHz	1.9 dB/100ft (0.06 dB/M)	907 Watts	
	200 MHz	2.7 dB/100ft (0.09 dB/M)	549 Watts	
	400 MHz	4.1 dB/100ft (0.13 dB/M)	332 Watts	
Maximum Attenuation	700 MHz	6.5 dB/100ft (0.21 dB/M)	221 Watts	
	1000 MHz	8.0 dB/100ft (0.26 dB/M)	171 Watts	
	2000 MHz	11.9 dB/100ft (0.39 dB/M)	-	
	4000 MHz	20.0 dB/100ft (0.66 dB/M)	62 Watts	

RG 223

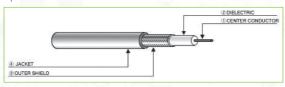
Description: RG CABLE 5.38mm (0.212 inch) / 50 Ohm Specification: ------ Mil-C-17/84-RG223



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	Center Conductor	SPC	0.89 ± 0.01mm	Strand 1/0.889mm		
2	Dielectric	PE	2.95 ± 0.05mm	SOLID		
3	1" Outer Shield	SPC	3.84 ± 0.15mm	95% (nom.)		
3	2" Outer Shield	SPC	3.90 ± 0.15mm	94% (nom.)		
4	Jacket(Optional)	PVC	5.38 ± 0.10mm	Gray		

	ELECTR	RICAL DATA		
ITEM	ITEM SPECIFICATION			
Capacitance	101.0 pF/m (0.8	101.0 pF/m (0.8 pF/FT)(nom.)		
Characteristic Impedance	50 ± 2Ω	$50 \pm 2\Omega$		
Operating Frequency	12.4 GHz	12.4 GHz		
Operating Temp	-40℃ ~+85℃	-40℃ ~ +85℃		
Operating Voltage	1900 vrms (ma	1900 vrms (max)		
RoHS Compliande	YES			
Weight	54 kg/km			
	100 MHz	4.20 dB/100ft (0.14 dB/M)	-	
	200 MHz	5.7 dB/100ft (0.19 dB/M)	-	
Maximum Attenuation	400 MHz	9.0 dB/100ft (0.30 dB/M)	-	
	700 MHz	12.2 dB/100ft (0.40 dB/M)	-	
	1000 MHz	14.8 dB/100ft (0.49 dB/M)	-	

Description: RG CABLE 2.48mm (0.098 inch) / 50 Ohm Specification: ------ Mil-C-17/113-RG316



	CONSTRUCTION						
- 1	ON	ITEM	MATERIAL	DIAMETER	REMARK		
	1	Center Conductor	SPCW	0.51 ± 0.02mm	Strand 7/0.17mm		
	2	Dielectric	PTFE	1.52 ± 0.15mm	SOLID		
	3	Outer Shield	SPC	1.98 ± 0.15mm	92.3% (nom.)		
	4	Jacket(Optional)	FEP	2.48 ± 0.20mm	Brown		

* SPCW : Silver Plated Copper clad steel Wire

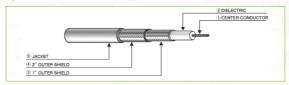
el Wire * PTFE : Poly TetraFluorEthylene * FEP : Fluorinated Ethylene Propylene

* SPC : Silver Plated Copper

ELECTRICAL DATA ITEM **SPECIFICATION** Operating frequency Max. 3 GHz Conductor resistance Max. 8.41 Ω / 100ft (20°C) Min. 1000MΩ .km (20°C) Dielectric resistance Test voltage 2000Vrms (1min) Nom. 69.5% Velocity of propagation Capacitance Max. 32 pF/ft Characteristic impedance $50 \pm 2\Omega$ Approx. weight 16.0 kg/km 100 MHz 7.7 dB/100ft (0.25 dB/M) 430 Watts 200 MHz 11.1 dB/100ft (0.36 dB/M) 400 MHz 16.0 dB/100ft (0.53 dB/M) Maximum Attenuation 219 Watts 800 MHz 23.5 dB/100ft (0.77 dB/M) 1000 MHz 26.5 dB/100ft (0.87 dB/M) 130 Watts

RG 316(D)

Description: RG CABLE 3.05mm (0.120 inch) / 50 Ohm Specification: ----- Mil-C-17/152-00001



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	Center Conductor	SPCW	0.51 ± 0.02mm	Strand 7/0.17mm		
2	Dielectric	PTFE	1.52 ± 0.15mm	SOLID		
3	1" Outer Shield (Braid)	SPC	2.00 ± 0.15mm	93% (nom.)		
3	2" Outer Shield (Braid)	SPC	2.40 ± 0.15mm	95% (nom.)		
4	Jacket(Optional)	FEP	2.90 ± 0.20mm	Brown		

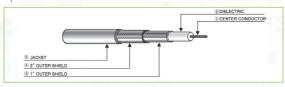
* SPCW : Silver Plated Copper clad steel Wire

ire * PTFE : Poly TetraFluorEthylene * FEP : Fluorinated Ethylene Propylene

* SPC : Silver Plated Copper

	ELECTR	ICAL DATA	
ITEM	SPECIFICATION		
Operating frequency	Max. 12.4 GHz		
Conductor resistance	Max. 8.41 Ω / 10	00ft (20℃)	
Dielectric resistance	Min. 1000™ .kr	n (20℃)	
Test voltage	2000Vrms (1min)		
Velocity of propagation	Nom. 69.5%		
Capacitance	Max. 32 pF/ft		
Characteristic impedance	50 ± 2Ω		
Approx. weight	23 kg/km		
	50 MHz	5.1 dB/100ft (0.17 dB/M)	-
	500 MHz	23.1 dB/100ft (0.76 dB/M)	-
Maximum Attenuation	1000 MHz	34.2 dB/100ft (1.12 dB/M)	130 Watts
	3000 MHz	59.0 dB/100ft (1.94 dB/M)	-
	5000 MHz	63.4 dB/100ft (2.08 dB/M)	-

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ----- Mil-C-17/128-RG400



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	Center Conductor	SPC	1.00 ± 0.02mm	Strand 19/0.203mm		
2	Dielectric	PTFE	2.95 ± 0.15mm	SOLID		
3	1" Outer Shield (Braid)	SPC	3.60 ± 0.15mm	97% (nom.)		
3	2" Outer Shield (Braid)	SPC	4.20 ± 0.15mm	94% (nom.)		
4	Jacket(Optional)	FEP	4.95 ± 0.20mm	Brown		

^{*} PTFE : Poly TetraFluorEthylene * FEP : Fluorinated Ethylene Propylene

	ELECTR	RICAL DATA			
ITEM		SPECIFICATION			
Operating frequency	Max. 12.4 GHz				
Conductor resistance	Max. 0.91 Ω / 1	00ft (20°C)			
Dielectric resistance	Min. 1000™ .kr	n (20℃)			
Test voltage	3000Vrms (1mi	3000Vrms (1min)			
Velocity of propagation	Nom. 69.5%	Nom. 69.5%			
Capacitance	Max. 32 pF/ft	Max. 32 pF/ft			
Characteristic impedance	50 ± 2Ω				
Approx. weight	64.0 kg/km				
	50 MHz	2.8 dB/100ft (0.09 dB/M)	-		
	500 MHz	9.8 dB/100ft (0.32 dB/M)	-		
Maximum Attenuation	1000 MHz	14.7 dB/100ft (0.48 dB/M)	620 Watts		
	3000 MHz	29.0 dB/100ft (0.95 dB/M)	-		
	5000 MHz	40.6 dB/100ft (1.33 dB/M)	-		

^{*} SPC : Silver Plated Copper



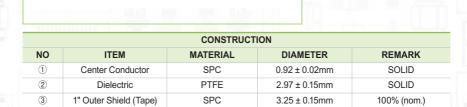
3

(4)

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ------- Mil-C-17/128-RG400

2" Outer Shield (Braid)

Jacket(Optional)



3.58 ± 0.15mm

4.14 ± 0.20mm

97% (nom.)

Blue

SPC

FEP

	ELECTR	RICAL DATA		
ITEM		SPECIFICATION		
Operating frequency	Max. 20 GHz			
Conductor resistance	Max. 0.91 Ω / 100	ft (20℃)		
Dielectric resistance	Min. 1000™ .km (2	20℃)		
Test voltage	5000Vrms (1min)	5000Vrms (1min)		
Velocity of propagation	Nom. 69.5%			
Capacitance	Max. 29.9 pF/ft			
Characteristic impedance	50 ± 2Ω			
Approx. weight	43.6 kg/km			
	400 MHz	8.0 dB/100ft (0.26 dB/M)	-	
	1000 MHz	13.0 dB/100ft (0.43 dB/M)	-	
Maximum Attenuation	3000 MHz	23.0 dB/100ft (0.75 dB/M)	-	
viaximum Attenuation	5000 MHz	30.0 dB/100ft (0.98 dB/M)	-	
	10000 MHz	45.0 dB/100ft (1.48 dB/M)	-	
	18000 MHz	64.0 dB/100ft (2.10 dB/M)	-	

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ------ Mil-C-17/128-RG400



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	Center Conductor	SPC	0.511 ± 0.02mm	SOLID		
2	Dielectric	PTFE	1.63 ± 0.15mm	SOLID		
3	1" Outer Shield (Tape)	SPC	1.8 ± 0.15mm	100% (nom.)		
3	2" Outer Shield (Braid)	SPC	2.18 ± 0.15mm	97% (nom.)		
4	Jacket(Optional)	FEP	2.64 ± 0.20mm	Blue		

* SPC : Silver Plated Copper

* PTFE : Poly TetraFluorEthylene * FEP : Fluorinated Ethylene Propylene

	ELECTRIC	CAL DATA		
ITEM		SPECIFICATION		
Operating frequency	Max. 20 GHz			
Conductor resistance				
Dielectric resistance	Min. 1000™ .km (2	20℃)		
Test voltage	5000Vrms (1min)			
Velocity of propagation	Nom. 69.5%			
Capacitance	Max. 32 pF/ft			
Characteristic impedance	50 ± 2Ω	$50 \pm 2\Omega$		
Approx. weight	19.1 kg/km			
	400 MHz	14.0 dB/100ft (0.46 dB/M)	-	
	1000 MHz	23.0 dB/100ft (0.75 dB/M)	-	
Maximum Attenuation	3000 MHz	39.0 dB/100ft (1.28 dB/M)	-	
IVIAXIITIUITI ALLEAUALION	5000 MHz	52.0 dB/100ft (1.71 dB/M)	-	
	10000 MHz	80.0 dB/100ft (2.62 dB/M)	-	
	18000 MHz	110.0 dB/100ft (3.61 dB/M)	-	

SRT 200

Description: RG CABLE 4.95mm (0.195 inch) / 50 Ohm Specification: ------ TMS LMR200 Equivalent



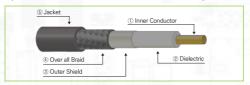
	CONSTRUCTION				
NO	ITEM	MATERIAL	DIAMETER		
1	Inner Conductor	Solid BC	0.044 IN (1.12mm)		
2	Dielectric	Foam PE	0.116 IN (2.95mm)		
3	Outer Shield	Aluminum Tape	0.121 IN (3.07mm)		
4	Overall Braid	Tinned Copper	0.144 IN (3.66mm)		
(5)	Jacket	PE	0.195 IN (4.95mm)		

* BC : Bare Copper * PE : PolyEthylene

	ELECTRICA	L DATA			
ITEM		SPECIFICATION			
Capacitance	80.3 pF/m (24.5 pF	/FT)(nom.)			
Characteristic Impedance	50 ± 2Ω				
Cutoff Frequency	39 GHz				
Operating Temp	-40℃ ~ +85℃				
Shielding effectiveness	90dB (max)				
Velocity of Propagation	83%				
Voltage Withstand	1000 Volts DC				
Jacket Spark	3000 Volts RMS				
Peak Power	2.5 kW				
RoHS Compliance	YES				
DC Resistance	Inner Conductor	5.36 (17.6) ohms/1000	ft (/km)		
	Outer Conductor	4.9 (16.1) ohms/1000f	t (/km)		
Weight		0.03 kg/m			
	50 MHz	2.6 dB/100ft (0.09 dB/M)	820 Watts		
	150 MHz	4.2 dB/100ft (0.14 dB/M)	460 Watts		
	450 MHz	6.9 dB/100ft (0.23 dB/M)	200 Watts		
Maximum Attenuation	700 MHz	8.8 dB/100ft (0.29 dB/M)	240 Watts		
	1500 MHz	13.1 dB/100ft (0.43 dB/M)	160 Watts		
	2500 MHz	17.6 dB/100ft (0.58 dB/M)	100 Watts		
	5800 MHz	25.3 dB/100ft (0.83 dB/M)	710 Watts		



Description: RG CABLE 10.28mm (0.404 inch) / 50 Ohm Specification: ------ TMS LMR400 Equivalent



CONSTRUCTION				
10	ITEM	MATERIAL	DIAMETER	
1	Inner Conductor	Solid BC	0.108 IN (2.74mm)	
2	Dielectric	Foam PE	0.285 IN (7.24mm)	
3	Outer Shield	Aluminum Tape	0.291 IN (7.39mm)	
4	Overall Braid	Tinned Copper	0.320 IN (8.13mm)	
(5)	Jacket	PE	0.405 IN (10.29mm)	

^{*} BC : Bare Copper

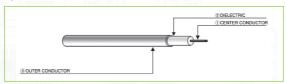
^{*} PE : PolyEthylene

	ELECTRICA	AL DATA		
ITEM		SPECIFICATION		
Capacitance	78.4 pF/m (23.9 pF/	FT)(nom.)		
Characteristic Impedance	50 ± 2Ω			
Cutoff Frequency	16.2 GHz			
Operating Temp	-40℃ ~ +85℃			
Shielding effectiveness	90dB (max)			
Velocity of Propagation	85%			
Voltage Withstand	2500 Volts DC			
Jacket Spark	8000 Volts RMS			
Peak Power	16 kW			
RoHS Compliance	YES			
DC Resistance	Inner Conductor	1.39 (4.6) ohms/1000	ft (/km)	
DC Resistance	Outer Conductor	1.65 (5.4) ohms/1000	ft (/km)	
Weight		0.1 kg/m		
	50 MHz	1.0 dB/100ft (0.03 dB/M)	2,800 Watts	
	150 MHz	1.6 dB/100ft (0.05 dB/M)	1,700 Watts	
	450 MHz	2.8 dB/100ft (0.09 dB/M)	910 Watts	
Maximum Attenuation	700 MHz	3.6 dB/100ft (0.12 dB/M)	700 Watts	
	1500 MHz	4.8 dB/100ft (0.16 dB/M)	460 Watts	
	2500 MHz	6.9 dB/100ft (0.23 dB/M)	350 Watts	
	5800 MHz	11.2 dB/100ft (0.37 dB/M)	240 Watts	

Semi Rigid Cable



Description: Copper Jacketed Semi Rigid 047 Size 50 Ohm Tin Plated Specification: ------ Mil-C-17/151



	CONSTRUCTION						
NO	ITEM	MATERIAL	DIAMETER	REMARK			
1	CENTER CONDUCTOR	SPCW	0.29 ± 0.02mm				
2	DIELECTRIC	PTFE	0.92 ± 0.03mm	SOLID			
3	OUTER SHIELD	TC	1.19 ± 0.03mm	TUBE/100% COVERAGE			

^{*} SPCW : Silver Plated Copper clad steel Wire

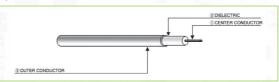
^{*} TC: Tinned Copper

	ELEC	TRICAL DATA			
ITEM		SPECIFICATION			
Operating frequency	Max. 20 GHz				
Conductor resistance	Max. 20.9 Ω / 10	00ft (20°C)			
Dielectric resistance	Min. 1000™ .kn	n (20℃)			
Test voltage	2000Vrms (1min)				
Velocity of propagation	Nom. 69.5%				
Capacitance	Max. 32 pF/ft	Max. 32 pF/ft			
Characteristic impedance	50 ± 2Ω				
Approx. weight	5.7 kg/km				
	500 MHz	23.1 dB/100ft (0.75 dB/M)	66.5 Watts		
	1,000 MHz	33.4 dB/100ft (1.09 dB/M)	47.0 Watts		
Maximum Attenuation	5,000 MHz	79.3 dB/100ft (2.60 dB/M)	21.0 Watts		
	10,000 MHz	114.5 dB/100ft (3.75 dB/M)	15.3 Watts		
	20,000 MHz	168.2 dB/100ft (5.51 dB/M)	10.5 Watts		

^{*} PTFE : Poly TetraFluorEthylene



Description: Copper Jacketed Semi Rigid 085 Size 50 Ohm Tin Plated Specification: ------ Mil-C-17/133



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPCW	0.51 ± 0.005mm	Solid type		
2	DIELECTRIC	PTFE	1.68 ± 0.03mm	SOLID		
3	OUTER SHIELD	TC	2.20 ± 0.025mm	TUBE/100% COVERAGE		

^{*} SPCW : Silver Plated Copper clad steel Wire

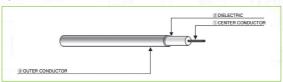
^{*} TC : Tinned Copper

	ELECTR	ICAL DATA		
ITEM		SPECIFICATION		
Operating frequency	Max. 20 GHz			
Conductor resistance	Max. 2.57 Ω / 100f	t (20℃)		
Dielectric resistance	Min. 1000™ .km (2	² 0°C)		
Test voltaqe	5000Vrms (1min)			
Velocity of propagation	Nom. 69.5%			
Capacitance	Max. 32 pF/ft			
Characteristic impedance	50 ± 2Ω			
Approx. weight	20.2 kg/km			
	500 MHz	15 dB/100ft (0.49 dB/M)	180 Watts	
	1,000 MHz	22 dB/100ft (0.72 dB/M)	130 Watts	
Maximum Attenuation	5,000 MHz	50 dB/100ft (1.64 dB/M)	54 Watts	
	10,000 MHz	80 dB/100ft (2.62 dB/M)	35 Watts	
	20,000 MHz	130 dB/100ft (4.27 dB/M)	20 Watts	

^{*} PTFE : Poly TetraFluorEthylene

SR 141

Description: Copper Jacketed Semi Rigid 141 Size 50 Ohm Tin Plated Specification: ------ Mil-C-17/130



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPCW	0.92 ± 0.005mm	Solid type		
2	DIELECTRIC	PTFE	2.98 ± 0.05mm	SOLID		
3	OUTER SHIELD	TC	3.58 ± 0.050mm	BRAID/100% COVERAGE		

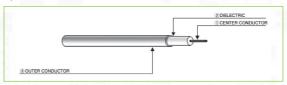
^{*} SPCW : Silver Plated Copper clad steel Wire

^{*} TC : Tinned Copper

	ELEC	CTRICAL DATA			
ITEM	SPECIFICATION				
Operating frequency	Max. 20 GHz				
Conductor resistance	Max. 2.06 Ω / 100	Oft (20°C)			
Dielectric resistance	Min. 1000™ .km	(20℃)			
Test voltaqe	5000Vrms (1min)				
Velocity of propagation	Nom. 69.5%				
Capacitance	Max. 29.9 pF/ft				
Characteristic impedance	50 ± 2Ω				
Approx. weight	46.7 kg/km				
	500 MHz	8 dB/100ft (0.26 dB/M)	600 Watts		
	1,000 MHz	12 dB/100ft (0.39 dB/M)	450 Watts		
Maximum Attenuation	5,000 MHz	29 dB/100ft (0.95 dB/M)	180 Watts		
	10,000 MHz	45 dB/100ft (1.48 dB/M)	120 Watts		
	20,000 MHz	70 dB/100ft (2.3 dB/M)	70 Watts		

^{*} PTFE : Poly TetraFluorEthylene

Description: Copper Jacketed Semi Rigid 250 Size 50 Ohm Tin Plated Specification: ----- Mil-C-17/129



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPCW	1.63 ± 0.03mm	Solid type		
2	DIELECTRIC	PTFE	5.31 ± 0.06mm	SOLID		
3	OUTER SHIELD	TC, BC, TA	6.35 ± 0.051mm	TUBE/100% COVERAGE		

* SPCW : Silver Plated Copper clad steel Wire

* PTFE : Poly TetraFluorEthylene

* BC : Bare Copper Tube (-C)

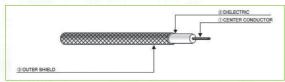
* TC : Tinned Copper (-TC)

* TA : Tinned Aluminum Tube (-TA)

ELECTRICAL DATA				
ITEM		SPECIFICATION		
Operating frequency	Max. 18 GHz			
Conductor resistance	Max. 2.257 Ω / 100	Oft (20℃)		
Dielectric resistance	Min. 1000™ .km (2	20℃)		
Test voltage	7500Vrms (1min)			
Velocity of propagation	Nom. 69.5%	Nom. 69.5%		
Capacitance	Max. 29.6 pF/ft	Max. 29.6 pF/ft		
Characteristic impedance	50 ± 2Ω			
Approx. weight	147.0 kg/km(C, TC) / 88.5kg/km(TA)		
	500 MHz	4.5 dB/100ft (0.15 dB/M)	962 Watts	
	1,000 MHz	7.5 dB/100ft (0.25 dB/M)	661 Watts	
Maximum Attenuation	5,000 MHz	22 dB/100ft (0.72 dB/M)	265 Watts	
	10,000 MHz	33 dB/100ft (1.08 dB/M)	174 Watts	
	20,000 MHz	48 dB/100ft (1.57 dB/M)	100 Watts	

Semi Flexible Cable





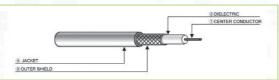
	CONSTRUCTION						
NO	ITEM	MATERIAL	DIAMETER	REMARK			
1	CENTER CONDUCTOR	SPCW	0.29 ± 0.005mm				
2	DIELECTRIC	PTFE	0.92 ± 0.05mm	SOLID			
3	OUTER SHIELD	TC	1.19 ± 0.05mm	Braid/100% COVERAGE			

^{*} SPCW : Silver Plated Copper clad steel Wire

^{*} TC: Tinned Copper

	FLEO	EDICAL DATA			
ELECTRICAL DATA					
ITEM		SPECIFICATION			
Operating frequency	Max. 20 GHz				
Conductor resistance	Max. 20.9 Ω / 10	00ft (20℃)			
Dielectric resistance	Min. 1000™ .km	n (20℃)			
Test voltage	2000Vrms (1mir	2000Vrms (1min)			
Velocity of propagation	Nom. 69.5%				
Capacitance	Max. 32 pF/ft				
Characteristic impedance	50 ± 2Ω				
Approx. weight	5.7 kg/km				
	500 MHz	23.1 dB/100ft (0.75 dB/M)	17.7 Watts		
	1,000 MHz	33.4 dB/100ft (1.09 dB/M)	11.9 Watts		
Maximum Attenuation	5,000 MHz	79.3 dB/100ft (2.60 dB/M)	5.1 Watts		
	10,000 MHz	114.5 dB/100ft (3.75 dB/M)	3.5 Watts		
	20,000 MHz	168.2 dB/100ft (5.51 dB/M)	-		

^{*} PTFE : Poly TetraFluorEthylene



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPC	0.54 ± 0.005mm			
2	DIELECTRIC	PTFE	1.68 ± 0.05mm	SOLID		
3	OUTER SHIELD	TC	2.18 ± 0.025mm	Braid/100% COVERAGE		
4	Jacket(Optional)	PVC/FEP	2.78 ± 0.02mm	Black/Blue/Clear/Red		

* SPCW : Silver Plated Copper clad steel Wire

* PTFE : Poly TetraFluorEthylene

* TC: Tinned Copper

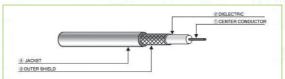
* PVC : Ployvinyl Chloride

* FEP : Fluorinated Ethylene Propylene

	ELECTI	RICAL DATA			
ITEM	EM SPECIFICATION				
Operating frequency	Max. 20 GHz				
Conductor resistance	Max. 2.57 Ω / 100f	t (20℃)			
Dielectric resistance	Min. 1000 ^{MΩ} .km (2	20℃)			
Test voltage	5000Vrms (1min)				
Velocity of propagation	Nom. 69.5%				
Capacitance	Max. 32 pF/ft				
Characteristic impedance	50 ± 2Ω				
Approx. weight	16.0 kg/km				
	500 MHz	15 dB/100ft (0.49 dB/M)	37.4 Watts		
	1,000 MHz	22. dB/100ft (0.72 dB/M)	25.2 Watts		
Maximum Attenuation	5,000 MHz	50 dB/100ft (1.64 dB/M)	10.8 Watts		
	10,000 MHz	80 dB/100ft (2.62 dB/M)	7.4 Watts		
	20,000 MHz	130 dB/100ft (4.27 dB/M)	-		

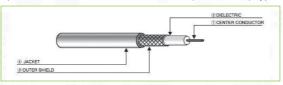
SF 141SC

Description: Unjacketed Semi Flexible (Hand Formable) 141 Size Specification: ------ RG402 (Mil-C-17/130) Type



	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPC	0.92 ± 0.013mm	SOLID		
2	DIELECTRIC	PTFE	2.98 ± 0.050mm	SOLID		
3	OUTER SHIELD	TC	3.58 ± 0.050mm	Braid/100% COVERAGE		

	ELECTF	RICAL DATA		
ITEM		SPECIFICATION		
Operating frequency	Max. 20 GHz			
Conductor resistance				
Dielectric resistance	Min. 1000™ .km (2	20℃)		
Test voltage	5000Vrms (1min)	5000Vrms (1min)		
Velocity of propagation	Nom. 69.5%			
Capacitance	Max. 29.9 pF/ft			
Characteristic impedance	50 ± 2Ω			
Approx. weight	36.0 kg/km			
	500 MHz	8 dB/100ft (0.26 dB/M)	600 Watts	
	1,000 MHz	12. dB/100ft (0.39 dB/M)	450 Watts	
Maximum Attenuation	5,000 MHz	29 dB/100ft (0.95 dB/M)	180 Watts	
	10,000 MHz	45 dB/100ft (1.48 dB/M)	120 Watts	
	20,000 MHz	70 dB/100ft (2.30 dB/M)	70 Watts	

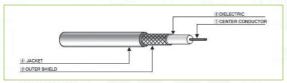


	CONSTRUCTION					
NO	ITEM	MATERIAL	DIAMETER	REMARK		
1	CENTER CONDUCTOR	SPC	0.92 ± 0.013mm	SOLID		
2	DIELECTRIC	PTFE	2.98 ± 0.050mm	SOLID		
3	OUTER SHIELD	TC	3.58 ± 0.050mm	Braid/100% COVERAGE		
4	Jacket	FEP	4.58 ± 0.50mm	Blue		

ELECTRICAL DATA				
ITEM		SPECIFICATION		
Operating frequency	Max. 20 GHz			
Conductor resistance				
Dielectric resistance	Min. 1000 ^{MΩ} .km (2	0℃)		
Test voltage	5000Vrms (1min)			
Velocity of propagation	Nom. 69.5%			
Capacitance	Max. 29.9 pF/ft			
Characteristic impedance	50 ± 2Ω			
Approx. weight	45.0 kg/km			
	500 MHz	8 dB/100ft (0.26 dB/M)	600 Watts	
	1,000 MHz	12. dB/100ft (0.39 dB/M)	450 Watts	
Maximum Attenuation	5,000 MHz	29 dB/100ft (0.95 dB/M)	180 Watts	
	10,000 MHz	45 dB/100ft (1.48 dB/M)	120 Watts	
	20,000 MHz	70 dB/100ft (2.30 dB/M)	70 Watts	

SF 141SC-P

Description: Unjacketed Semi Flexible (Hand Formable) 141 Size 75 Ohm Tin Plated Specification: ------ RG402 (Mil-C-17/130) Type

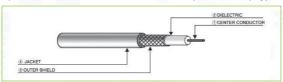


CONSTRUCTION				
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	CENTER CONDUCTOR	SPC	0.92 ± 0.012mm	
2	DIELECTRIC	PTFE	2.98 ± 0.038mm	SOLID
3	OUTER SHIELD	TC	3.58 ± 0.050mm	Braid/100% COVERAGE
4	Jacket(Optional)	PVC/FEP	4.58 ± 0.400mm	Clear

	ELECT	RICAL DATA	
ITEM	SPECIFICATION		
Operating frequency	Max. 20 GHz		
Conductor resistance			
Dielectric resistance	Min. 1000 ^{MΩ} .km (20°C)		
Test voltage	5000Vrms (1min)		
Velocity of propagation	Nom. 69.5%		
Capacitance	Max. 29.9 pF/ft		
Characteristic impedance	50 ± 2Ω		
Approx. weight	45 kg/km		
	500 MHz	8 dB/100ft (0.26 dB/M)	600 Watts
	1,000 MHz	12. dB/100ft (0.39 dB/M)	450 Watts
Maximum Attenuation	5,000 MHz	29 dB/100ft (0.95 dB/M)	180 Watts
	10,000 MHz	45 dB/100ft (1.48 dB/M)	120 Watts
	20,000 MHz	70 dB/100ft (2.30 dB/M)	70 Watts



Description: Unjacketed Semi Flexible (Hand Formable) 250 Size Specification: ------ RG401 (Mil-C-17/129) Type



CONSTRUCTION				
NO	ITEM	MATERIAL	DIAMETER	REMARK
1	CENTER CONDUCTOR	SPC	1.67 ± 0.03mm	
2	DIELECTRIC	PTFE	5.31 ± 0.06mm	SOLID
3	OUTER SHIELD	TC	6.30 ± 0.051mm	Braid/100% COVERAGE
4	Jacket(Optional)	PVC/PE	7.10 ± 0.51mm	Black/Blue/Clear/Red

	ELECT	RICAL DATA	
ITEM	SPECIFICATION		
Operating frequency	Max. 18 GHz		
Conductor resistance	Max. 0.257 Ω / 100ft (20°C)		
Dielectric resistance	Min. 1000 ^M Ω .km (20°C)		
Test voltage	7500Vrms (1min) Nom. 69.5%		
Velocity of propagation			
Capacitance	Max. 29.9 pF/ft		
Characteristic impedance	$50 \pm 2\Omega$		
Approx. weight	114.0 kg/km		
	500 MHz	4 dB/100ft (0.15 dB/M)	242.4 Watts
	1,000 MHz	7.5 dB/100ft (0.25 dB/M)	181 Watts
Maximum Attenuation	5,000 MHz	16 dB/100ft (0.52 dB/M)	72.7 Watts
	10,000 MHz	33.0 dB/100ft (1.08 dB/M)	47.5 Watts
	18,000 MHz	48 dB/100ft (1.57 dB/M)	-

12. Cable Assembly

General Information	246
Flexible Cable Assembly	248
Semi Rigid Cable Assembly · · · · · · · · · · · · · · · · · · ·	249
SemiFlexible Cable Assembly	250

General Information

If you would design and test RF system, the cable assembly is one of the main products. The cable assembly is used to connect between a transmitter-receiver and Antenna or to connect an equipment which is for the testing RF circuit and system.

When you would choose the right cable assembly, there are some key points that you would consider.

The first one is the working frequency in your system or test application. There are the number of cable assemblies so that the you would choose the right cable assembly matching with your application. Also the power capability in frequency is another point to be considered. The power capability is different from every frequency. Then you can also check a impedance, insertion loss (S21), and the working frequency of connectors.

For example, I am going to ask you the 10 m of cable assembly in RF system requiring 100Watt in WCDMA application. In general, N connector work till 11GHz (currently N connector is also working to DC \sim 18GHz) and WCDMA is basically 2.1GHz frequency range. The insertion loss for the LMR 200 cable in 2.1GHz is - 0.5dB / m and the total insertion loss is - 5dB. When you would measure the insertion loss for the cable assembly which connected with 2 pcs of N connector at both ends, the cable assembly is acceptable if the insertion loss is about - 5.5dB. Also the power at 2.1GHz is 130 Watt. Then you can use the LMR 200 cable assembly with N connectors in your test application.

However, if you would wish to use the better insertion loss - 5dB comparing

with the power, other cable option is LMR 400. A insertion loss is - 0.2dB / meter in 2.1GHz and the whole insertion loss is - 2dB. The LMR400 insertion loss is more 2 times better than LMR 200. Like this, you can check the insertion loss per your working frequency. For your information, the insertion loss is proportional to the cable diameter. As long as the diameter is bigger, the contact surface is likely to be larger so that the insertion loss is better in high diameter of cable.

If the system require more high power, such as 200Watt, which options should we consider?

Of course, the LMR200 cable can't handle the 200Watt at 2.1GHz so that other cable, like LMR 400 or LMR 600, should be considered. If the cable can't handle the power, the cable itself will be burned due to the high power so that the system connected with cable is like to be damaged also.

The LMR 400 cable is 0.1 Kg/m (0.068 lb/ft) and LMR 200 cable is 0.3 Kg/m (0.022 lb/ft). LMR 400 is about 3 times heavier than LMR 200. It is hard for engineers or workers who connect and install the heavy cable in system.

Generally, the return loss in cable should be very lower and is low when you measure it. Mostly, it does not over 26dB, different from the cable and length.

Since there are a lot of particular conditions for you to check, such as, frequency, cable diameter, insertion loss, power and connector, you can rely on the cable assembly specialist in SRTechnology. You can get the reliable answer in your optimum system.

Flexible cable Assembly



- Various RG cable assembly available (RG 58, RG 316, RG 223, RG 400, RG 402, and RG 405 cable, LMR 200, and LMR 400)
- Various coaxial connector assembly available (SMC, SMB, SMA, MCX, MMCX, BNC, TNC, N, and 7/16DIN)
- DC ~ 18GHz application.
- No Minimum Order Quantity.
- 1 week of Delivery date.
- RoHS Compliant and MSDS certified.



- Various Semi-Rigid cable assembly available (SR047, SR085, SR141 and SR250 cable)
- Various coaxial connector assembly available (SMC, SMB, SMA, MCX, MMCX, BNC, TNC, N, and 7/16DIN)
- DC ~ 18GHz application.
- Cable Assembly Bending available.
- No Minimum Order Quantity.
- 1 week of Delivery date.
- RoHS Compliant and MSDS certified.

01. 50Ω and Impedance matching	254
02. dB, dBm, dBc, dBi	258
03. Watt and dBm	260
04. S-parameter	261
05. V.S.W.R	264
06. λ/ 4 Transmission line	265
07. Metal conductivity Chart	267
08. Permittivity table	268
09. Material specification	271
10. IP Rating	272



RF Basic & Data

01. 50Ω and Impedance matching

It is easily noticed " 50Ω Impedance" in the RF circuit and products. You also see "Impedance Matching" frequently. At this time, Let's find it out what do mean " $50~\Omega$ Impedance" and "Impedance Matching".

You need to know what the impedance is before understanding the impedance matching. Impedance can be simply referred to as resistivity in the context of RF. So why do we use the term 'impedance' instead of 'resistivity' in RF environment?

There is a reason for this

From the point of RF, as the frequency increases, it reaches a certain level at which capacitors cannot be called capacitors and inductors cannot be called inductors.

The frequency at this level is called self-resonation frequency (SRF). When the frequency reaches higher than SRF, capacitors can no longer function as capacitors but as inductors. In reverse, inductors can no longer function as inductors but as capacitors.

Why does it happen?

It's because all circuits include parasitic parameters.

A Capacitor has a structure in which two conductors are separated by a dielectric. The length of the dielectric is not a problem at low frequency but it becomes a problem as the frequency increases causing the wave length to be similar to the length of the conductors. It means that the inductance due to the length of the conductors appears as the frequency increases.

On the contrary, an inductor has a coil shape in which wires are wound into a coil. As the frequency increases, there will come capacitance between the gaps from the each tracks wound.

So what happens to the resistor?

The resistor cannot also be itself anymore. As the frequency increases, three devices of R, L and C coexist in a single resistor chip by the appearance of the inductance and the capacitance.

As the frequency increases, parasitic parameters must appear due to structural problems.

Please refer to the following formula regarding the impedance:

$$Z = R + \frac{1}{j\omega C} + j\omega L : \omega = 2\pi f$$

The R device of the resistor itself is an invariable regardless of the frequency increase.

As C is positioned in the denominator, it is in inverse proportion to the frequency. So the impedance decreases as the frequency increases.

As frequency increases, L increases because it is directly proportional to frequency.

For the resistor in RF environment, C and L increases to the extent that they cannot be ignored and therefore C and L also included in the resistor by using the additional term 'impedance' as R cannot solely represent the resistor.

So what happens when C and L do not exist or are too small?

Z will be close to R in their values. When the parasitic parameters of C and L are small or becomes lost, it means that it will not be affected by the frequency any longer.

At this time, we can say that the impedance matching is done when Z and R are equal to 50Ω .

Of all occasion, why 50 Ω is?

 $50~\Omega~(\Omega)$ is the standard in all of RF circuit and products. When we make any of RF products, we establish the standard that the input and output should be $50~\Omega$. Why it is decided $50~\Omega$ of all things?

The impedance which can well deliver the electric power of electromagnetic waves is 33Ω , instead of 50Ω , and the impedance which is the smallest distortion of signal waveform is 75Ω , instead of 50Ω .

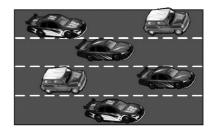
 50Ω is simply determined to calculate the middle impedance value of $33~\Omega$ which deliver the electric power efficiently and 75Ω which is the smallest distortion of signal waveform. At present, most of RF engineers and RF companies in the world design and develop the RF products as 50Ω as the standard, except the special circumstance.

 75Ω is usually applied on the cable when you will assemble the cable of TV Antenna with TV set. Most of cable in the broadcasting and cable TV is based on 75Ω . It is because the delivery of video and audio signal without any of distortion is rather important than the delivery of power in TV signal. Therefore, 50Ω impedance is used at RF systems and 75Ω impedance is used at TV Broadcasting.

Impedance is simply regarded as the resistant component in RF.

If impedance value is high, it means that there is large electric resistant component. To put it plainly, you can think one-way of the two-lane road on the traffic jam. The narrow lane (big resistance) makes the flow of cars (the delivery of signal) slow. It means big impedance. On the contrary to this, if the same number of cars drive the four-lane road at the same on the traffic jammed road, the broad lane(small resistance) make the flow of cars (the delivery of signal) more smooth. It means small impedance.

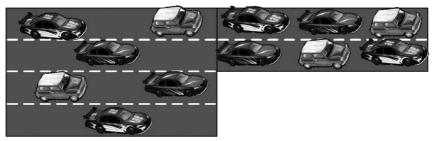




(Dra. 7-1)

Now, let's connect a RF transmitter and an Antenna by cable. Output impedance of transmitter is 50Ω an Input impedance of Antenna is 50Ω . But if the connected cable between them has 75Ω impedance, how will it turn out?

If 50Ω and 75Ω are connected with each other, it means that the one-way 4-lane road is connected with one-way 2-lane road. It makes the bottleneck state. The cars which run smoothly will be clogged with traffic.

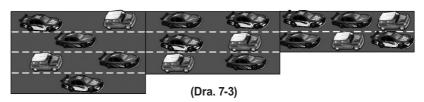


(Dra. 7-2)

Let's think about points of view that in RF. When the signal coming from RF circuit is connected to the cable, there is a strong reflection (heavy traffic) due to the wrong impedance matching (the bottle-neck). The wrong impedance matching is supposed to make a strong reflection when the RF signal is transmitted to the antenna from the cable.

In the end, the most of signal will not be transmitted to the antenna.

What makes this situation if the one-way 3-lane road will be built between the one-way 4-lane road and one-way 2-lane road? The bottle-neck situation will be better when the 1-lane road is disappeared step by step than the disappearance of 2-lane road at once. This example that the one-way 3-lane road will make better traffic situation between 4-lane road and 2-lane road is what we called, Impedance matching in RF.



Of course, the best solution is building the 4-lane road for all of roads. If output of circuit impedance is 50Ω , the input & output of cable impedance is 50Ω , and the antenna input impedance is 50Ω , the most of the signal with a very little return loss will be transmitted to the antenna. When there is a 75Ω cable only for the TV broadcasting, the circuit of 62.5Ω impedance is put into between the location of cable & circuit and the location of cable & antenna. Then there will be a much less reflection rather than the reflection when the signal will be transmitted between 50Ω and 75Ω directly. It is called the

matching circuit and matching phase.

These 2 things are the basic concept of impedance matching.

At first, the input and output impedance are 50Ω when we design new products. (All new road should be built as a 4-lane).

Second, the matching circuit is put into the middle when there is wrong impedance between the two products(circuits). (If we should build the 3-lane road between the different lane roads, the transition section should be built during this area in order to relieve the congestion.)

02. dB, dBM, dBc, dBi

They are the confusing terms for the beginner. It is better to understand the each meaning clearly at this stage.

(1) dB

dB is called "decibel" in audio parts, but we call "dB" in the RF parts. We often ask "what is the gain value on the power amplifier?", and we answer "It is 20dB" instead of 20 decibel.

dB is not the measured value from the test but it is the 10log(X) which a measured value (X) converted to. For example, if the test value is 10V and 1,000V, the dB scale values converted are 10dB and 30dB. "dB" does not mean any special thing, but it means that the initial testing values are converted to log scale value. You can say the difference between two values is 990V but also you can say 20dB. Like this case, "dB" is the relative terms to express the different scale value. We can get more time to understand the "dB" at later when we will deal with S-parameter.

(2) dBm

dBm is the terms of unit to get the scale value, different from dB. dBm is the scale value that mW unit of power is converted to the log scale. The mobile communication cell phone deals with the small power, due to the battery life. Rx power signal from the repeater and Tx power signal from cell phone are less than 1Watt. Therefore, we are dealing with mW unit of power, instead of Watt unit, and the mW unit converted to the log scale is dBm . Like the dB, dBm is the $10\log(x)$ which a measured value (X) converted to.

1mW = 0 dBm 10mW = 10 dBm 100mW = 20 dBm 1,000mW = 1W = 30 dBm 100,000mW = 100W = 50 dBm 10,000,000mW = 10Kw = 70 dBm

Now you can see the above, the large number of mW and W value are changed to the dBm, and dBm is very convenient way to read and see them. Actually, in RF circuits, we commonly have used the dBm, converted from the power, in order to get the gain from the power amplifer or reliable calculation from the loss in other passive components.

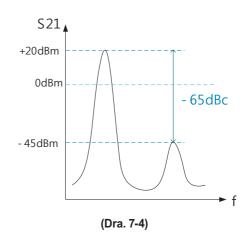
For other example, let's say, there is the power amplifer which has 20dB gain. If the input power is 1mW, what is the output power? It is not easy to answer it. As you see, 1mW is 0 dBm so the output power goes to +20dBm (= 0dBm + 20dB). Therefore, the output power is 100mW.

In addition, if filter and power splitter are connected with power amplifer and their loss is $-5 \, \text{dB}$, the output power will be $+15 \, \text{dBm}$ (= $+20 \, \text{dBm} - 5 \, \text{dB}$). If 2 power amplifers which have 20 dB gain are cascade connection, it goes 40 dB gain (= $20 \, \text{dB} + 20 \, \text{dB}$). In other words, dBm is the absolute-value of the power and dB is the easy term to use the variation of the value.

(3) dBc

There are always the center frequency (fc), noise and undesirable signal around RF circuit. dBc is the relative size difference between the power of center frequency and the power of undesirable signal.

For example, let's suppose that there is a +20dBm output power system at the signal of 1GHz as center frequency. According to the system



design, the output power at 1.1GHz, nearby center frequency, could be less. If the power is –45dBm at 1.1GHz, the power difference between the center frequency 1.0 GHz and adjacent frequency 1.1GHz is -65 dBc because "-45dBm – 20dBm = -65dBc".

If the power of center frequency is -20dBm and the power of adjacent frequency is -80dBm, the difference of power is -60dBc. "-" mark means that the power of adjacent frequency is lower comparing with the power of center frequency.

Generally speaking, the power of harmonic and the adjacent channel are less than the power of center frequency so that dBc terms comes with "-" mark. In other words, dBc is mostly "-" value, we use dBc without "-" mark in field customarily. As it is shown at Dra. 7-4, if the measured value is -65dBc, we customarily say "The difference is 65dB". It means "-" mark and "c" behind dB are omitted.

(4) dBi

It is often used for the expression of gain value at antenna. dBi means the directional gain of antenna compared with the ideal isotropic antenna.

In case of Antenna, the gain, like +5 dBi, is tended to get "+" value. It means, compared with isotropic Antenna, that the directivity is superb. In other words, if the directivity is bigger, the output signal can be radiated to the intended directions but the beam width will be narrow. The big directivity means the much signal can be radiated to far away with the focused direction.

03. Watt and dBm

In RF circuit design and measurement, we express in dBm and watt for the Power. dBm is the absolute value of log unit for the mW(1/1000W). dBm = 10*log(X).

It will be practical at your working if you remember some values as under.

0dBm = 1mW

10dBm = 10mW

20dBm = 100mW

30dBm =1W

40dBm=10W

47dBm = 50W

50dBm = 100W

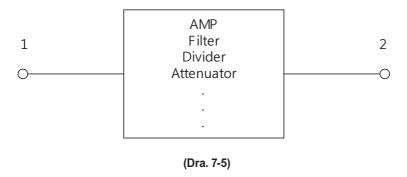
mW	dBm
0.000	-35
0.001	-30
0.003	-25
0.100	-20
0.032	-15
0.100	-10
0.316	-5
1.000	0
1.259	1
1.585	2
1.995	3
2.512	4
3.162	5
3.981	6
5.012	7
6.310	8
7.943	9
10.000	10
12.589	11
15.849	12
19.953	13
25.119	14
31.623	15
39.811	16
50.119	17
63.096	18
79.433	19
100.000	20
316.228	25
1,000(1W)	30
10,000(10W)	40
20,000(20W)	43
50,000(50W)	47
100,000(100W)	50
200,000(200W)	53
300,000(300W)	54.8

(Cha. 1-1)

04. S-parameter

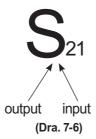
In the number of RF circuits and products, you will always see the S11 and S21 in active and passive products. This means S-parameter and it is shortly regarded as the output power contrast with input power.

If output power is bigger than input power, this circuit can be seen to have the gain, if the input power is smaller than the output power, the circuit can be seen to have the loss. There are input port and output port in 2 ports circuit. Normally input is called as No. 1 port and output is No. 2 port.



S11 means that the signal comes out to the input port, contrast to the signal goes for input port. In other words, it is the reflected power at the input port. We call it as reflection loss. If the S11 is big value, it means the reflection loss is big. In general, the lower value of -20dB is regarded as the standard. If 100 signals are input, less than 1 signal is reflected back. It is just the minimum qualification of RF circuit and device. S11 is very similar concept of V.S.W.R. which will be explained in the next chapter.

S-parameter which the signal comes out to the output port contrast with the signal goes to the input port is S21 instead of S12. This concept is crucial.



S-parameter in small numbers means output port and input port in order. Therefore, S12means the signal difference between entering into the output port and coming out to the input port.

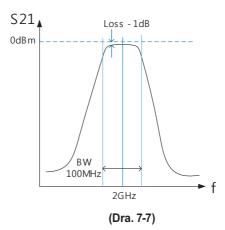
At power amplifer, S21 means gain value. When we say S21 = +20dB at power amplifer, the gain is 20dB. If -10dBm of power enter into the input port of the amplifer, +10dBm of power comes out to the output port.

The opposite way, S21 means "Insertion loss" for the circuit and device getting the loss of input power. S21 = -10dB means that the loss is -10dB at the circuit or device. If -10dBm enter into the input port, -20dBm of power will be come out to the output. The "+" and "-" mark is considered as the gain and the loss.

At this stage, you may have this question, "As far I know the data which is shown at Network analyzer is S-parameter, but is not this measuring value?"

Once again, S-parameter is not the measuring value. We can check again the data and graph at Network analyzer.

It is the band pass filter(BPF), 2GHz as center frequency and 100MHz as band width. When we check the S21 at Network Analyzer, S21 is measured – 1dB. Yes, it is measured.



Now, what are means of S_{21} , -1dB?

If the signal of 0dBm at 2GHz is entered into the input of BPF, the signal of -1dBm at 2GHz is come out at output. If the signal of -10dBm at 2GHz will be entered into the input, the signal of -11dBm at 2GHz will be come out at the end.

The -1dB at S_{21} means the comparatively reduced value of -1dB signal is supposed to come out to the output port whether any power of signal enter into the input port.

05. V.S.W.R.

V.S.W.R. is abbreviation of Voltage Standing Wave Ratio. V.S.W.R. is the fixed wave that is formed when the progress wave and returned wave are combined, in case that a wave proceeds to a certain direction and the wave is returned in some place. In ideal situation if returning value does not exist, V.S.W.R. is 1. However, as long as the returning value is larger and larger, VSWR will be grown toward infinity.

In case that return Loss is 1/100, in other expression S11 = -20dB, V.S.W.R. is 1.222 :1. VSWR and S11 mean return loss, but they are just different from the way of calculating and demonstrating. If you would ask me why you would use V.S.W.R., instead of S11, I would say that it is due to the difference from everyone's familiarity. If you are familiar with S11, you can say S11. If you are accustom yourself to say V.S.W.R., you would say V.S.W.R.

As the below table, you can see the conversion table for the V.S.W.R. and Return loss. You also can see the insertion loss chart with the return loss change. If you combine the reflected power and transmitted power, it always comes to 100%. As long as the reflected power is higher, the transmitted power is lower as natural way.

Return Loss	VSWR	Isertion Loss	Power	Power
S11 (dB)	(X:1)	S21 (dB)	Reflected(%)	Transmitted(%)
-1.0	17.391	-6.87	79.43	20.57
-1.5	11.610	-5.35	70.79	29.21
-2.0	8.724	-4.33	63.10	36.90
-2.5	6.997	-3.59	56.23	43.77
-3.0	5.858	-3.02	50.12	49.88
-3.5	5.030	-2.57	44.67	55.33
-4.0	4.419	-2.20	39.81	60.19
-4.5	3.946	-1.90	35.48	64.52
-5.0	3.570	-1.65	31.62	68.38
-6.0	3.010	-1.26	25.12	74.88
-7.0	2.615	-0.97	19.95	80.05
-8.0	2.323	-0.75	15.85	84.15
-9.0	2.100	-0.58	12.59	87.41
-10.0	1.925	-0.46	10.00	90.00
-15.0	1.433	-0.14	3.16	96.84
-20.0	1.222	-0.04	1.00	99.00
-25.0	1.119	-0.01	0.32	99.68
-30.0	1.065	0.00	0.10	99.90
-35.5	1.034	0.00	0.03	99.97
-40.0	1.020	0.00	0.01	99.99

(Cha. 1-2)

06. λ/4 Transmission line

When you would study the power divider and directional coupler in this book, you will see $\lambda/4$ Transmission line from time to time. There is also a transmission line filter in different types of filter products. The transmission line theory is applied to the $\lambda/4$ Transmission line filter as well.

We will look into the $\lambda/4$ Transmission line at this chapter.

 $\lambda/4$ Transmission line is very important theory in RF. The transmission line in RF means the transmission line for coaxial cable, microstrip line, strip line, CPW (Coplanar Waveguide), and Wave guide. $\lambda/4$ Transmission line is not a part of cable type.

 λ /4 Transmission line, as you see the λ /4 Transmission line theory, commonly is applied to all transmission lines. λ /4 Transmission line is especially applied in the microstrip line and CPW structure.

 λ /4 Transmission line means the transmission line which length is just λ /4. Isn't it easy and simple?

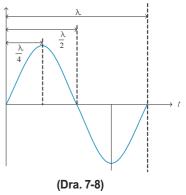
In this part, λ is wave length and wave length is a length of cycle in AC signal.

You can calculate the wave length at this formula ($\lambda = \frac{\circ}{+}$). [C is the velocity of light and f is working frequency]. Let's calculate the wave length (λ) at 1GHz frequency. 1GHz = 1*10°Hz. When we substitute the meter unit of the velocity of light and Hz unit of frequency to $\lambda = \frac{\circ}{+}$, we can get the 0.3m. In other words, the wave length of 1 GHz frequency is 30cm and the λ /4 is 7.5cm. Let's see what does the 7.5cm of length mean at the 1GHz in circuit.

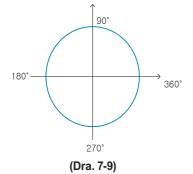
The graph on Dra. 7-8 is shown the frequency in time domain. The blue line of sine graph is a wave length (λ). Like the above calculation result, one cycle at 1GHz frequency finish 30cm passed.

Please look at the cycle!

If the signal will proceed along $\lambda/4$ (7.5cm) length, the phase reaches at the maximum position. If the signal will proceed along λ



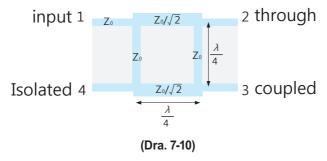
/2(15cm) length, the phase get into "-" area. If the signal will proceed along 3λ /4(22.5cm) length, the phase get into the maximum position of "-" area. If the signal will proceed



along $\lambda \mbox{(30cm)}$ length, the phase return back to the original position.

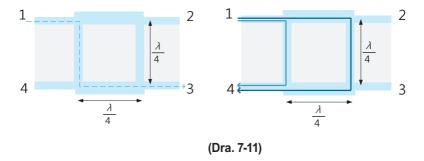
Let's check the left drawing on Dra. 7-9. The blue circle is the change of phase. At the 90° position, the phase reach at the maximum in this circle and phase will go through from + area to – area at 180°. At 270° position, phase will get the – maximum and return back to original position at 360° position.

Then, what does the 90° mean at the transmission line? Here is the Hybrid coupler, for example.



You can get the full explanation for the coupler at coupler chapter in this book so that we can check out the meaning of phase at this time.

If the signal will be input at port No. 1, the signal will proceed along the $\lambda/4$ length at port No. 2. When it is compared the signal from the input, the signal would have 90° of phase difference. The signal output to the port No. 3 would have 2 * λ /4 (180°) of phase difference, because the signal goes through the branch line as the picture is showed. Now you can see why there is 90° of phase difference between port No. 2 and port No. 3.



Let's check the output signal for port No 4.

If the input signal from port No. 1 will arrive at port No.4, there are 2 ways like the above right picture. At first, the blue line signal would have λ /4 phase difference due to pass through only 1 branch line. The next red line signal would have 3 * λ /4 phase difference due to pass 3 of λ /4 transmission lines. As we check the content in the wave length, λ /4 would have the maximum phase difference at + area and 3 * λ /4 would have the minimum phase minimum at – area.

When the two signals meet at one port, the two signals are terminated by each other. It is the reason that port No. 4 is isolated.

The input and output in λ /4 transmission lines will have 90° of phase difference. It can be designed a variety of circuits with this λ /4 applications. For example, there is a Rat race coupler, what we call Ring Coupler.

We hope you understand about λ /4 transmission line theory, because λ /4 transmission line theory is applied to many kinds of transmission line such as microstrip line and wave guide.

07. Metal conductivity Chart.

The conductivity is a level of movement of charge in conductor. In other words, conductivity is a degree of how the electricity flows well in conductor.

Conductivity is a reciprocal of electric resistance in conductor. If the conductivity is bigger, it means that the electric resistance is little in this metal. In general, the conductivity is larger if the purity of material quality is higher and if the content of impurity is increased, the conductivity is lower.

You can see the conductivity of typical material as below chart.

Material	Conductivity (mhos/m)
Silver	6.17 x 107
Copper	5.80 x 107
Gold	4.10 x 107
Chromium	3.85 x 107
Aluminum	3.82 x 107
Tungsten	1.82 x 107
Zinc	1.67 x 107
Brass	1.50 x 107
Nickel	1.45 x 107
Iron	1.03 x 107
Bronze	1.00 x 107
Platinum	9.52 x 106
Solder	7.00 x 106
Lead	4.56 x 106
Germanium	2.20 x 106
Steel (silicon)	2.00 x 106
Steel (stainless)	1.10 x 106
Mercury	1.04 x 106
Nichrome	1.00 x 106
Graphite	7 .00x 104
Silicon	1.20 x 103
Water (sea)	3~5
	t

(Cha. 1-3)

08. Permittivity table

The dielectric is non-conductor. Let's look into the word "Die electric". It means electric is dead.

Permittivity is the ratio of electrostatic capacity, storable amount of electric charge, that dielectric is put into a condenser and that none is put into a condenser. The value of electrostatic capacity is always bigger than 1. The Permittivity of vacuum is 1, and the permittivity of the air is 1.000335, but it could be differ from the amount of moisture in the air.

It is important to understand the characteristic that the figure of permittivity means. You should understand what does the permittivity 2.1 means and what has been changed if the permittivity would get higher upto 4.6.

The high figure of permittivity means that the characteristic of an electric conductor rather than the characteristic of non conductor is bigger. What does it mean?

The electrostatic capacity, which the dielectric is put into the condenser is larger than none is put into the condenser, means the dielectric have more electric charge. It is more electrified rather than the vacuum status.

However, it will be different from DC and AC. In the high permittivity, DC is flowed well and AC is hard to flow. Why indeed?

If the permittivity of dielectric is high, it makes the wavelength of electromagnetic wave to be shortened and it is likely that the dielectric works like preventing the flow of energy. But if you make a circuit for a certain frequency and you will design the high permittivity of dielectric as a substrate, it is possible to make smaller size of circuit, because the length of wave is shortened.

In the coaxial connector dielectric, the PTFE which permittivity is 2.1, is commonly used. The wavelength of PTFE is shorter than that of the air because the permittivity of PTFE is bigger than the permittivity of the air. It makes the size of connector become smaller. However, the cut-off frequency in use is lower as well.

When the air is designed as dielectric, it means there is vacuum space between outer conductor and inner conductor. Therefore, no one use the air as dielectric. But, there are some connectors applying as near permittivity as the air, such as APC-3.5, what is called 3.5mm, and K connector, what is called 2.92mm. Their cut-off frequency are 40GHz and 50GHz.

As below, you can see the permittivity table for your further reference. In the each cell, the above figure is the dielectric constant (ratio of permittivity), comparing with the permittivity of vacuum 1.

When you talk about the permittivity in the field, it is told as the dielectric constant. As you can see the figure of 2.1 and 4.6, they are also the dielectric constant. Now, let's see what material have the dielectric constant.

Material	Temperature	Frequency		
iviateriai	remperature	300 Mhz	3 Ghz	10 Ghz
FR4			4.6 0.0004	
Silicon				11.9 0.0476
Gallium arsenide (GaAs)	22			13 0.078
Teflon		2.1 0.0003	2.1 0.0003	2.08 0.0008
Polystylene (sheet stock)	25	5.75 0.0805		5.51 0.085
Polyethylene (pure)	24		2.25 0.0007	2.25 0.0009
Ceramic			5.6 0.02296	
Porcelain (Wet process)	25	5.75 0.0805		5.51 0.085

Porcelain (Dry process)	25	5.02 0.049		4.74 0.074
Pyranol 1478	26	4.5 0.17	3.8 0.88	
Quartz, fused	25	0.17	3.78 0.00023	3.78 0.0004
Resin No. 90S	25		2.54	2.53
Rubber, pale crepe (Hevea)	25		0.016 2.15	0.0145
Sealing wax (Red Empress)	25		0.0065 3.09	
Gutta-Percha	25	2.45	0.038	2.38
		0.0275	0.0145 2.57	0.012 2.57
Lucite HM-119	23		0.0126	0.0082 7.12
Mycalex 400 (mica, glass)	25	4.24	4	0.0235
Neoprene compund (38% GN)	24	0.27	0.135 3.03	0.105
Nylon 66	25		0.039	
Nylon 610			2.84 0.03408	
Paper (Royalgray)	25	2.75 0.18	2.7 0.15	2.62 0.105
Paraffin 123degree ASTM	25		2.25 0.00045	2.24 0.0005
Plexiglass	27	2.66 0.165	2.6 0.015	2.59 0.0175
Amber (fossil resin)	25	2.6 0.0223	2.6 0.0234	
Bakelite (no filler)	24		3.64 0.19	3.52 0.13
Beewax (white)	23		2.35 0.012	2.35 0.0113
Carbon tetrachloride	25	2.17 0.0003	2.17 0.0008	2.17 0.0035
Ethyl alcohol (absolute)	25	22.3	6.5 1.65	1.7
Fiberglass BK 174 (laminated)	24	4.54 0.1	4.4 0.13	4.37 0.16
Glass, phosphate (2% iron oxide)	25	5.23 0.013	5.17 0.024	5 0.021
Glass, lead-barium	25	6.69	0.024	6.64
Glass, Pyrex		0.013	4.82	0.047
Shellac, natural XL (3.5% wax)	28		0.026028 2.86	
Styrofoam 103.7	25		0.073 1.03	1.03
-	25		0.0001 3.62	0.00015 3.58
Sulfur, sublimed			0.00015 2.16	0.00055 2.16
Vaseline	25		0.0014	0.0022 9.5
Alumina (99.5%)				0.00285 6.4
Berylla				0.00192
Titiana (D-100)			0.51	96 0.096
Rexolite 1422			2.54 0.001219	

09. Material specification

It is provided most of materials which are applied in coaxial connector and other RF products from the below chart such as body, inner contact and heat sink. In regard to the inner contact in connector, the electric resistance and the coefficient of elasticity should be regarded as big points.

Especially for the coefficient of elasticity, it is important in female connector center contact because the female contact hold the male contact with a certain tension.

Heat Conductivity and coefficient of heat expansion are also important factors for engineers to design the heat sink and high power handling products.

	Gold (Au)	Silver (Ag)	Copper (Cu)	Aluminum (AI)	Brass	"UNS C36000 (free-cutting Brass)"	"UNS C17000 (Beryllium copper)"
Atomic number	79	47	29	13			
Density	19.32 g/cc	10.491 g/cc	7.764 g/cc	2.6989 g/cc	7.60 - 8.75 g/cc	8.49 g/cc	8.26 g/cc
Tensile strength	120 MPa	140 MPa	210 Mpa		159 - 896 MPa	338 - 469 MPa	483 - 810 MPa
Elastic modulus	77.2 GPa	76.0 GPa	110 GPa	68.0 GPa	97.0 - 115 GPa	97.0 GPa	115 GPa
Modulus of transverse elasticity		27.8 Gpa	46.0 Gpa	25.0 GPa	35.0 - 44.0 GPa	37.0 Gpa	50.0 GPa
Electric resistance	0.00000220 ohm-cm	0.00000155 ohm- cm	0.00000170 ohm-cm	0.00000270 ohm-cm			
Magnetic susceptibility	-0.000000142	2.00E-07	-8.00E-08	6.00E-07			
Thermal conduction rate	301 W/m-K	419 W/m-K	385 Win-K 357 Win-K @Temperature 727 °C 398 Win-K @Temperature 20.0 °C 401 Wim-K @Temperature 0.000 °C 483 Win-K @Temperature -173 °C 10500 Wim-K @Temperature -253 °C 19600 Wim-K @Temperature -263 °C 19600 Win-K	210 W/m-K	26.0 - 159 W/m-K	115 W/m-K	118 W/m-K
Melting point	1064.43 °C	961.93 °C	1083.2 - 1083.6 °C	660.37 °C	820 - 1030 °C	885 - 900 °C	865 - 980 °C
Coefficient of thermal expansion	15.2 µm/m-°C @Temperature 500°C 16.7 µm/m-°C	19.6 µm/m-°C @Temperature 20.0-100°C 19.9 µm/m-°C @Temperature 250°C 20.6 µm/m-°C @Temperature 500°C 22.4 µm/m-°C @Temperature 900°C	20.2 µm/m-°C @Temperature 500°C 24.8 µm/m-°C	300°C 27.4 μm/m-°C @Temperature 20.0 -	18.7 - 26.0 µm/m-°C	20.5 µm/m-°C @Temperature 20.0 - 300°C	16.7 µm/m-°C @Temperature 20.0 - 100°C 17.3 µm/m-°C @Temperature 20.0 - 200°C 17.8 µm/m-°C @Temperature 68.0 - 392°F

Alloying constituent	Antimony, Sb Copper, Cu Iron, Fe Lead, Pb Other Phosphorous, P Silicon, SiGrade Tin, Sn Zinc, Zn	Copper, Cu Iron, Fe Lead, Pb Other Zinc, Zn	Beryllium, Be Co + Ni Co + Ni + Fe Copper, Cu
----------------------	--------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------	--------------------------------------------------------

(Cha. 1-5)

10. IP Rating

The IP Rating (or International Protection Rating, sometimes also interpreted as Ingress Protection Rating) consists of the letters IP followed by two digits and an optional letter. As defined in international standard IEC 60529, it classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures. The standard goal is to provide users more detailed information than vague marketing terms such as "waterproof".

The IP rating has two numbers:

IP First number: protection from solid objects or materials

IP Second number: protection from liquids(water)

Two numbers after IP are represented by the two level of protection. The first number represents the first protection, and the second number represents the send protection. "X" can used for one of the numbers if there is only one class of protection, i.e. IP2X, IP6.

IP 68

First Protection (The protection degree against ingress of solid objects)

Number	Protection degree	Testing condition
0		No protection against contact and ingress of objects
1		Any large surface of a human body, such hand, but no protection against deliberate contact with a body part. Protected against solid objects over 50mm.
2		Protected from personal fingers and any other objects over 80mm. Protected against solid objects over 12.5mm.
3		Protected against solid objects over 2.5mm.
4		Protected against solid objects over 1.0mm.
5		Limited protection against dust ingress.
6		Totally protected against dust ingress.

(Cha. 1-6)

Second Protection (The protection degree against harmful ingress of water)

Number	Protection degree	Testing condition
0		No protection.
1		Protected against vertically 200mm height with 3~5mm falling rainfalls during 10 minutes
2		Protection against direct sprays of water up to 15o from the 200mm vertical height with 3~5mm falling rainfalls during 10 minutes
3		Protected against sprays of water from any direction, even if the case is disposed up to 60 o from the 200mm vertical height with 10L falling rainfalls in 10 minutes.
4		Protected against splash water from the 300~500mm height with 10L/minutes rainfalls of any direction.
5		Protected against 30HP pressure water jets with 100L/minute speed from 3m of any direction in 3 minutes.
6		Protected against 100kP pressure water jets with 100L/ minute speed from 3m of any direction in 3 minutes
7	,,	Protected against the effect of immersion between 15 cm and 1 m in 30 minutes.
6		Protected against long, durable periods of immersion in water

(Cha. 1-7)

01. Acceptance of Order	276
02. Price	276
03. Terms of Payment	277
04. EX Work. Point	277
05. Change Order and Cancellations	277
06. Delivery	277
07. Quality Assurance	278
08. Warranty	278
09. Product Changes	278
10. Returned Material	278
11. Return Address	279
12. Termination	279
13. Assignment	279
14. General	279



Terms & Conditions

All sales and quotations are subject to SRTechnology Corporate ("SRT")'s standard terms and conditions as stated herein, unless otherwise specifically stated, as hereunder.

1. Acceptance of Order

Orders received by Post mail, email(sale@srtechnology.com) or fax(+82 2-6280-9333) will be accepted and initially processed pending receipt of confirming purchase order. Orders accepted and processed by SRT may not be cancelled by Customer. Receipt of confirming purchase order is required no later than 7 days from initial authorization to proceed. This acceptance is expressly conditional on Customer's assent to the terms set out here in lieu of those in customer's purchase order.

2. Price

All prices are in United States Dollars and are subject to change without notice prior to acceptance unless otherwise specifically stated. Prices will be as specified by SRT and will be applicable for the period specified in SRT's quotation. Prices are subject to change in the event of a change in SRT's costs or other circumstances beyond SRT's reasonable control. Prices exclude any sales, impositions, use, property or any other taxes imposed by any government authority. Such taxes will be added when applicable. The prices quoted exclude export or special packing or any compliance testing such as special environmental, vibration, life cycle, extreme temperature test, etc. unless otherwise specified. Prices are exclusive of other charges: international shipping cost, broker's fees, bank fees, consular fees, document fees and import duties, such charges will be added when applicable.

3. Terms of Payment

All payments must be in USD, and Euro. All purchase orders and payments are based on prepaid payment, unless SRT and Customer agree other payment terms. Each shipment shall be considered a separate and independent transaction, and payment therefore shall be made accordingly. Payment from outside South Korea, Orders will not be accepted until the payments have been received in full and Purchase Order (PO) has been received. You can wire the payment to our bank. We will contact you with the total amount,

4. EX Work. Point

Unless otherwise specified, all orders are based on EX Work, SRT, Seoul, South Korea. SRT may suggest other safe and reliable shipping method to the Customer. Based on the customer's consent, SRT can quote other shipping cost. All shipments will normally be made by Federal Express, DHL, UPS, Express Mail or Air Freight. Unless otherwise specified by the Customer, SRT will exercise his own discretion as to method of shipment. Damage in shipment should be handled by the Customer directly with the carrier.

5. Change Order and Cancellations

Change orders are considered to be in effect after both the Customer and SRT have reached a mutual agreement as to the effect of the change on price, delivery, or other conditions of the order. Cancellation of any accepted orders can be made only with the SRT's written consent thereto and upon such terms as will satisfy all costs incurred by the SRT and its proportionate profit on work completed. SRT will attempt to progress any cancellation promptly. Items scheduled for production and shipment within three (3) days of the receipt of Customer's notice of cancellation or rescheduling may not be terminated or rescheduled and must be accepted and paid for at the agreed upon prices.

6. Delivery

Delivery is based on the prevailing conditions at the time of quotation or orders.

Agreements as to delivery are subject to contingencies of fire, accident or cause of delay beyond the control of SRT.

7. Quality Assurance

SRTechnology Corporate is ISO 9001:2008 certified company. Certified by International Industrial Certification Co. Ltd., Certificate No. JK-15017.

8. Warranty

This warranty is the extent of the obligation or liability assumed by SRT with respect to its products and no other warranty or guarantee is either expressed or implied. SRT warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. This warranty is the extent of the obligation or liability assumed by SRT, with respect to products, and no other warranty or guarantee is either expressed or implied.

9. Product Changes

SRT reserves all rights of manufacture under its patents, copyrights, and trade secrets, including the right to make modifications to existing components and equipment specifications without prior notice.

10. Returned Material

All returned items are inspected upon receipt for quantity, physical condition and electrical specifications. All claims for shortage must be made within tenth (10) days of date of shipment from SRT's facility. Title to goods passes to the customer upon delivery to carrier, and risk of loss or damage shall thereafter rest with the customer. The customer must make claims for damage or loss while material is in transit. Returned products will not be accepted without a Return Material Authorization (RMA) number. This number may be obtained by calling or sending email to our quality assurance department. Freight charges for returned material are the responsibility of the customer. In addition, an evaluation fee will be charged to the customer to cover inspection

and testing cost for any item returned by the customer, that is found to be within specifications and/or otherwise deemed to be within the terms of the original purchase.

11. Return Address

SRTechnology Corporate

614 (Guro-dong, E-space), 36 Digital-ro 27-gil, Guro-gu, Seoul, 08381, South Korea

Tel: +82-2-866-9003 Fax: +82-2-6280-9333

Email: sale@srtechnology.com

12. Termination

In the event either party defaults in the performance of any material obligation and fails to cure such default within sixty days after receipt of written notice from the other party, then the non-defaulting party may terminate its performance and cancel this Agreement. Upon such termination, the terminating party may terminate any outstanding orders placed hereunder and cease all performance.

13. Assignment

Customer may not assign this Agreement, or any interest or right herein without the prior written consent of SRT.

14. General

The Terms and Conditions may not be modified or cancelled without SRT's written agreement. The Terms and Conditions will be governed by and construed in accordance with the laws of South Korea.



PN List Index

PN	Page
A01-F1101-22	157
A01-F1103-02	157
A01-F1103-05	157
A01-F1323-01	158
A01-F1325-02	158
A01-F2001-01	158
A01-F2002-02	158
A01-F2003-51	158
A01-F2003-54	159
A01-F2004-19	159
A01-M1101-27	156
A01-M1113-02	156
A01-M1113-14	156
A01-M1324-01	157
A01-M1325-01	157
A01-M1515-01	156
A01-M1521-01	156
A01-M2002-02	159
A01-M2002-05	159
A01-M2003-02	159
A02-F1101-05	165
A02-F1101-04	165
A02-F1113-14	165
A02-F2003-03	166
A02-F2004-03	166
A02-M1101-01	164
A02-M1101-05	164
A02-M1101-11	164
A02-M1113-01	164
A02-M1113-07	164
A02-M1113-13	165
A02-M1324-03	166
A02-M1325-02	166
A03-F2002-04	173
A03-F2003-01	173
A03-F1101-11	172
A03-F1113-01	173

	_
PN	Page
A03-M1101-01	172
A03-M1101-12	172
A03-M1113-01	172
A03-M1113-12	172
A03-M1324-01	173
A03-M1325-01	173
A04-F1324-01	178
A04-F1325-01	178
A04-F2002-07	179
A04-F2002-10	179
A04-F2002-13	179
A04-F2002-14	179
A04-M2002-01	178
A04-M2002-03	178
A05-F1430-01	184
A05-F1431-01	184
A05-F1432-01	185
A05-F2002-02	185
A05-M1430-01	184
A05-M1431-01	184
A05-M1432-01	184
A06-F1105-01	190
A06-F2003-02	192
A06-F2003-07	192
A06-F2004-01	192
A06-M1105-02	190
A06-M1105-31	190
A06-M1106-01	190
A06-M1106-31	190
A06-M1323-01	191
A06-M1323-21	191
A06-M1324-01	191
A06-M1324-21	191
A07-F1105-01	198
A07-F1323-01	199
A07-F2003-04	200
A07-F2003-05	200
A07-F2003-11	200
A07-M1105-01	198

PN	Page	PN	Page
A07-M1105-31	198	B33-A1103-02	214
A07-M1113-11	198	B33-A2201-02	214
A07-M1323-01	199	B34-A1203-02	218
A07-M1323-11	199	B34-A2103-02	218
A07-M1324-01	199	B41-A1109-02	216
A07-M1324-11	199	B41-A1218-03	216
A07-M2003-03	200	B41-A2206-12	216
A08-F1113-01	206	B41-A2209-02	217
A08-F1113-11	206	B41-A2209-11	217
A08-F1324-01	207	B41-A2209-13	217
A08-F2003-01	207	B42-A1103-01	217
A08-F2003-11	207	B42-A1203-02	218
A08-M1113-01	206	B42-A2203-02	218
A08-M1324-01	206	B44-A1109-02	214
A08-M1324-21	207	B44-A1206-22	215
A16-F2001-02	150	B44-A1209-02	215
A16-F2002-01	150	B44-A2203-33	216
A16-M2001-01	150	B44-A2209-02	214
A16-M2002-01	150	B44-A2209-03	215
B11-A1118-03	209	B44-A2211-05	215
B11-A2110-33	209	B54-A1105-01	219
B11-A2210-32	209	B54-A1206-08	219
B11-A2212-11	210	B54-A2206-02	219
B11-A2218-10	209	D01-A3004-02	116
B11-A2218-12	210	D01-A3011-02	117
B12-A1102-01	210	D01-A3016-01	118
B12-A1203-01	210	D01-A3018-01	119
B12-A2202-01	211	D01-C3004-02	121
B16-A1206-02	211	D01-C3011-02	122
B17-A1106-01	211	D01-C3016-01	123
B17-A1206-01	211	D01-C3018-01	124
B17-A2106-01	212	D02-A1003-02	125
B17-A2206-01	212	D02- C1003-01	126
B18-A1204-01	212	D03-F3X12-01	127
B18-A2204-34	212	E01-A0106-01	21
B22-A1102-01	213	E01-A0118-02	22
B22-A1201-01	213	E01-A0206-02	23
B22-A2202-01	213	E01-A0218-03	24
B22-A2202-04	213	E01-A0506-02	25

PN	Page	PN	Page
E01-A0518-01	26	F01-B0423-03	60
E04-A0206-01	29	F01-B0424-03	60
E04-A0218-05	30	F01-B0425-03	61
E04-A0506-04	31	F01-B0426-03	61
E04-A0518-03	32	F01-B0427-03	61
E04-A1004-04	33	F01-B0428-03	61
E04-A3004-07	34	F01-B0429-03	61
E04-A5004-08	35	F01-B0430-03	61
E04-A5006-02	36	F01-B0801-05	64
E04-H1003-11	37	F01-B0802-05	64
E05-A0208-01	39	F01-B0803-05	65
E05-A3004-02	40	F01-B0804-05	65
E05-A5004-01	41	F01-B0805-05	65
E05-H1003-04	42	F01-B0806-05	65
E02-A0103-01	45	F01-B0807-05	66
E02-A0203-01	46	F01-B0808-05	66
E03-A0206-01	47	F01-B0809-05	66
F01-B0401-03	58	F01-B0810-05	66
F01-B0402-03	58	F01-B0811-05	66
F01-B0403-03	59	F01-B0812-05	66
F01-B0404-03	59	F01-B0813-05	66
F01-B0405-03	59	F01-B0814-05	66
F01-B0406-03	59	F01-B0815-05	66
F01-B0407-03	60	F01-B0816-05	66
F01-B0408-03	60	F01-B0817-05	66
F01-B0409-03	60	F01-B0818-05	66
F01-B0410-03	60	F01-B0819-05	66
F01-B0411-03	60	F01-B0820-05	66
F01-B0412-03	60	F01-B0821-05	66
F01-B0413-03	60	F01-B0822-05	66
F01-B0414-03	60	F01-B0823-05	66
F01-B0415-03	60	F01-B0824-05	66
F01-B0416-03	60	F01-B0825-05	67
F01-B0417-03	60	F01-B0826-05	67
F01-B0418-03	60	F01-B0827-05	67
F01-B0419-03	60	F01-B0828-05	67
F01-B0420-03	60	F01-B0829-05	67
F01-B0421-03	60	F01-B0830-05	67
F01-B0422-03	60	F01-B1803-04	68

PN	Page
F01-B1805-04	68
F01-B1806-04	68
F01-B1810-04	68
F01-B1820-04	68
F01-B1830-04	68
F01-C0310-04	69
F01-C0320-04	69
F01-C0330-01	69
F17-B4003-02	70
F17-B4005-02	70
F17-B4006-02	70
F17-B4010-02	70
F17-B4020-02	70
F17-B4030-02	70
F04-B0401-01	72
F04-B0402-01	72
F04-B0403-01	73
F04-B0405-01	73
F04-B0406-01	73
F04-B0410-01	74
F04-B0420-01	74
F04-B0430-01	74
F04-B0803-02	76
F04-B0805-02	77
F04-B0806-02	77
F04-B0810-02	77
F04-B0820-02	77
F04-B0830-02	78
F04-C0310-02	79
F04-C0320-02	79
F04-C0330-02	79
F04-G0310-04	80
F04-G0320-04	80
F04-G0330-03	80
F04-H0310-03	81
F04-H0320-03	81
F04-H0330-10	81
F04-J0310-06	82
F04-J0320-04	82

PN	Page
F04-J0330-02	82
G02-G0101-01	133
G02-G0102-01	133
G02-G0102-07	134
G03-A0201-02	135
H01-A0006-03	141
H04-A0006-03	142
H05-A0004-03	143
H05-A0004-04	143
R01-M4950-01	101
R02-M2125-01	102
R03-M0910-02	106
R04-M2310-01	103
R06-M1775-01	104
R05-M2149-02	105



SRTechnology Introduction

01. Company Information

SRTechnology specializes in designing and manufacturing passive devices. SRT's team has years of experience assisting customers worldwide with their RF and microwave component requirements. R&D is our highest priority, resulting in superior products at fair prices.

02. Our Mission

We accomplish this by:

- · Supplying our customers with high-quality products, on time
- Working closely with customers to optimize their project outcomes
- Offering highly reliable products at competitive prices

03. Why SRTechnology?

- · SRT puts customer satisfaction first
- SRT has two decades of experience supplying high-performance, high-reliability products
- SRT has supplied thousands of components to defense and commercial markets
- SRT has hundreds of standard designs that can be quickly and easily modified to suit your requirements
- SRT has a 3-year product warranty
- SRT offers quick-turn production capability
- SRT stocks large product quantities on the shelf for immediate delivery
- SRT is ISO 9001-certified
- SRT employs an efficient Customer Relationship Management system

04. SRTechnology Corporate Features

- ISO 9001 certified
- · 3 Year's Product Warranty
- Effective Intranet System.
- Fully accumulated product, Production, R&D experience information.
- Over 20 years experienced Production and R&D engineers.
- Usefully Operating to CRM (Customer Relationship Management)
- Operating SMART OFFICE MOBILE OFFICE.

05. Company Structures

5-1. Sales Team

Our sales executives and managers pride themselves on building longterm and mutually-beneficial relationships by listening and responding to the changing needs of their professional customers. They share their expertise with customers, providing them with solutions that can help them increase their competitive edge and other processes that result in better parts and greater productivity.

We sincerely hope to listen your opinion and solve out problem together. Please send me your RFQ or any question to below emails;

- 1) Question for Overseas? : sale@srtechnology.com
- 2) Any other questions? : support@srtechnology.com

Now you can see our Sales Team advantages as below;

Sales Team advantages

- Providing RF Solution with full market and product Knowledge.
- Fastest feedback with 24 hours.
- HSLP Policy (High Spec Low Price)
- Unbelievable price for mass production.
- Convenience Door to Door service (Upto 65% discounted Fedex shipping

cost)

5-2. R&D Team

It is this investment, together with our ability to recruit the most talented and creative scientists that will ensure we maintain a close link between our R&D activities and the development work carried out directly by our divisions. This interaction is key in ensuring the rapid transfer of technology to support the continued development of innovative new products and services for our customers. SRT Engineers are pleased to share our product information with Customer's application and assure that SRT engineers can suggest you the qualified product with best RF Solution.

Now you can see our R&D Team advantages as below;

R&D Team advantages

- Over 20 years accumulated RF experience.
- Specialized R&D Product team
- R&D Team No 1 for Coaxial connectors.
- R&D Team No 2 for Cable Assembly.
- R&D Team No 3 for RF Passive components
- R&D Team No 4 for RF Module production.
- Fastest R&D samples for new project.
- Perfect product development as based on RF Theory and Application in the field
- Capable of developing products upto 20GHz Application.
- Perfect support for Specification data

5-3. Production Team

As a company that specializes in RF coaxial connectors and passive component manufacturing, we are constantly implementing new software and production systems that offer a higher level of precision. Our ongoing investment in new technology results in improved accuracy and a wider range of RF component sizes and features.

Now you can see our Production Team advantages as below;

Production Team advantages

- ISO 9001 Certified production team
- 100% qualified products shipped to Customers.
- Shipped with Test data.
- Various Product ranges

(From Coaxial connectors To Passive Components)

- Production Team No 1 for Coaxial connectors.
- Production Team No 2 for Cable Assembly.
- Production Team No 3 for RF Passive components
- Production Team No 4 for RF Module production.
- No Minimum Quantity.
- 1~2 weeks of Fast Delivery from the PO.
- · Cleanly and Safely packed.





SRTechnology Corporate

614 (Guro-dong, E-space), 36 Digital-ro 27-gil, Guro-gu, Seoul, 08381, South Korea

Tel: +82-2-866-9003 Fax: +82-2-6280-9333

Email: sale@srtechnology.com