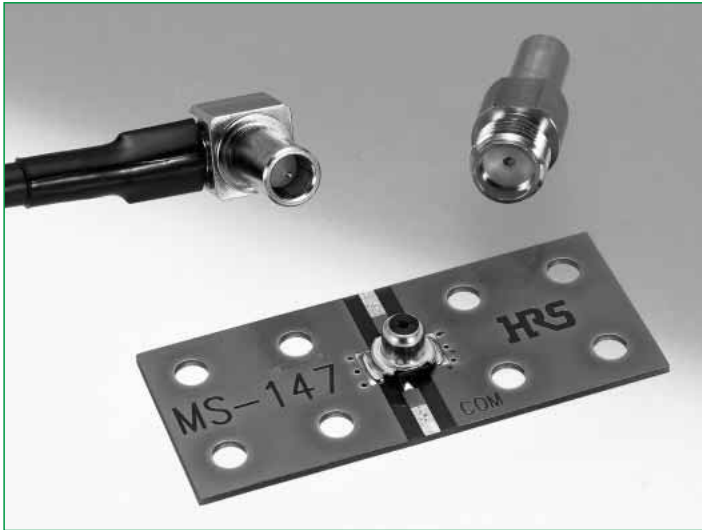


Interface RF Connector with Switch, 3.9mm High, DC to 6GHz

MS-147 Series



■ Outline

The ultra-small MS-147 coaxial switch series was developed for the portable terminal interface and for inspection of microwave boards (substrates) (DC – 6GHz) used at high frequencies.

To respond to the development of portable terminal technologies and popularization of high-frequency applications – up to 6GHz – this switch features low loss, low profile, and light weight.

The switch circuit is designed so that the NC terminal is connected to the C terminal without a plug mated. Mating with a plug opens this connection.

Vertical mounting structure allows the switch to be placed near the antenna of the portable terminal and used to inspect output and switch to an external antenna.

■ Features

1. Low insertion loss

Insertion loss is as low as:
Typically, 0.08dB at 1GHz
Typically, 0.1dB at 2GHz

2. Space saving

External dimensions are 5.8mm x 5.4mm. Saves installation space.

3. Low profile

Switch height is 3.9mm.

4. Light weight

Switch weight is 0.11g

5. Long life

The switch is guaranteed for up to 12,000 mechanical operations.

6. Auto insertable

Available in embossed tape-and-reel auto-insertable format

7. Wide application range

Operating frequency from DC to 6GHz.

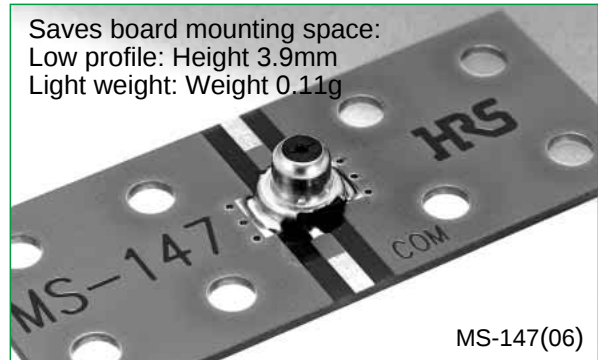
8. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

9. Self-alignment

The eccentricity for plug mating is $\pm 0.5\text{mm}$.

Saves board mounting space:
Low profile: Height 3.9mm
Light weight: Weight 0.11g



MS-147(06)



MS-147-C(LP)-1

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89

Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81

Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47

Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35

Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

■Product Specifications

	Not mated with the plug	Mated (MS-147-HRMJ-1)
Operating temperature range	−30℃ ~ +85℃	−10℃ ~ +65℃
Power rating	4 W	4 W
Frequency range	DC ~ 6 GHz	DC ~ 6 GHz
Insertion loss	0.15dB Max. (DC ~ 2GHz) 0.2dB Max. (2GHz ~ 3GHz) 0.4dB Max. (3GHz ~ 6GHz)	0.2dB max. (DC ~ 2GHz) 0.3dB max. (2GHz ~ 2.5GHz) 0.4dB max. (2.5GHz ~ 3GHz) 0.8dB max. (3GHz ~ 6GHz)
Isolation	25dB min. (DC ~ 1GHz) 20dB min. (1GHz ~ 3GHz) 14dB min. (3GHz ~ 6GHz)	
V.S.W.R.	1.2 Max. (DC ~ 3GHz) 1.5 Max. (3GHz ~ 6GHz)	1.25 max. (DC ~ 2GHz) 1.3 max. (2GHz ~ 2.5GHz) 1.4 max. (2.5GHz ~ 3GHz) 1.9 max. (3GHz ~ 6GHz)

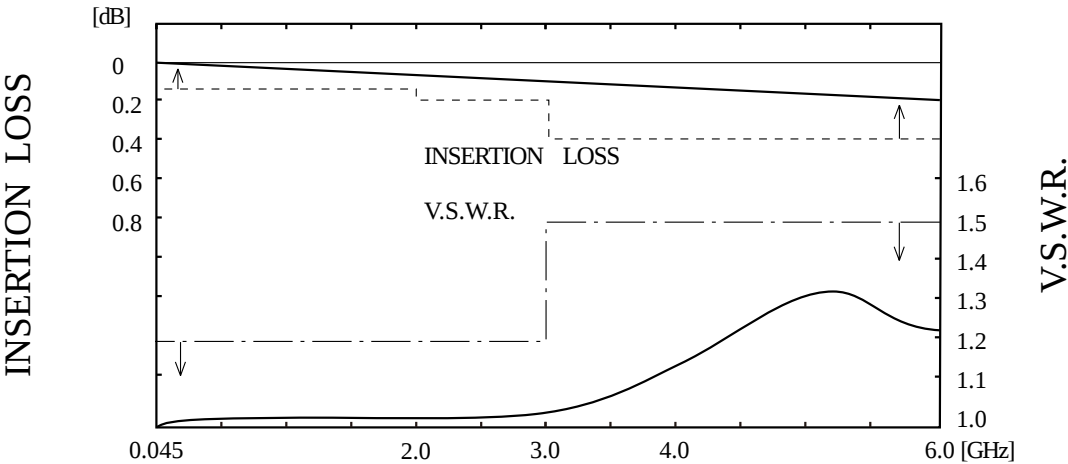
Item	Standard	Conditions
1.Contact resistance	Center 75m ohms max. Outer 50m ohms max.	100mA max.
2.Insulation resistance	1,000M ohms or more	100V DC
3.Withstanding voltage	No flashover or insulation breakdown	100V AC / one minute
4. Vibration	No electrical discontinuity for 10μs Min.	Frequency of 10 to 55 Hz, overall amplitude of 1.5 mm for 2 hours in each of 3 directions
5. Shock		Acceleration of 490 m/s ² , sine half-wave waveform, 3 cycles in each of the 3 axis
6.Humidity	Contact resistance: Center 100m ohms max. Outer 75m ohms max. Insulation resistance 10M ohms min.	96 hours at temperature of 40℃ and humidity of 90% to 95%
7.Temperature cycle		Temperature : −55℃ → +15℃ to +35℃ → 85℃ → +15℃ to +35℃ Time:30 → 5 max. → 30 → 5 max. 100 cycles
8.Salt spray	Contact resistance: Center 100m ohms max. Outer 75m ohms max. No excessive corrosion	Exposed to 5% salt water solution for 48 hours(at +35℃)
9.Durability (Insertion/withdrawal)	Contact resistance: Center 100m ohms max. Outer 75m ohms max.	12,000 cycles

■Materials

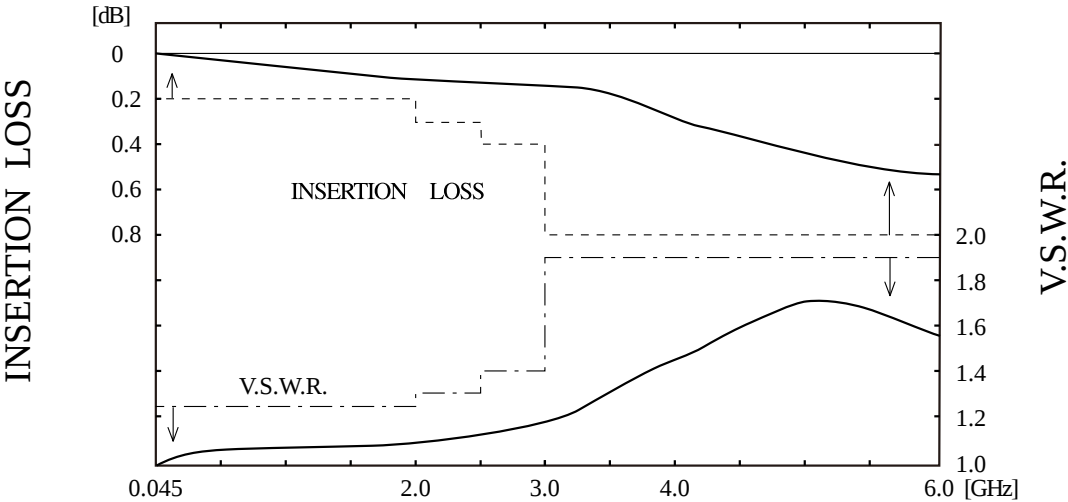
Part	Material	Finish	Remarks
Shell	Phosphor bronze	Gold plating	_____
Insulator	Polyamide resin	_____	UL94HB
Common terminal	Beryllium copper	Gold plating	_____
Board circuit side (N.C) terminal	Beryllium copper	Gold plating	_____

Typical Data

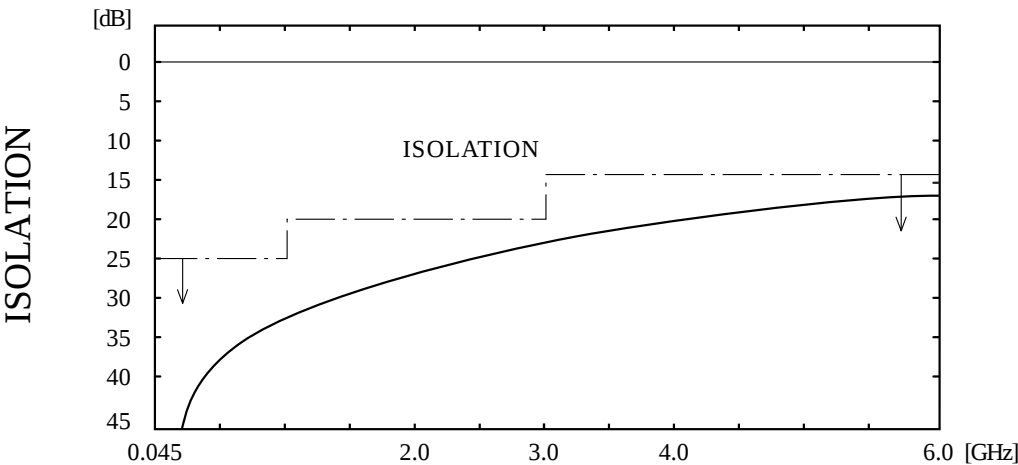
●NORMALLY CLOSED (N.C)~ (Not mated with the plug)



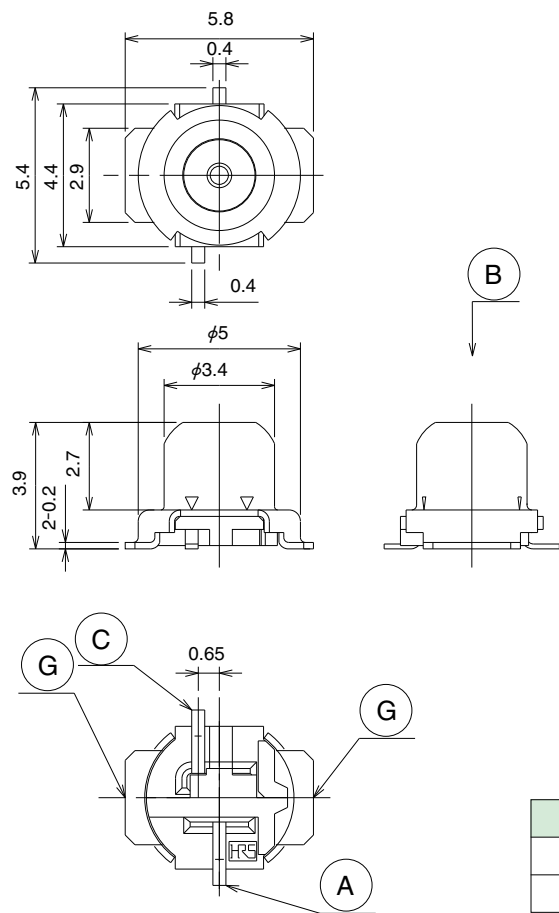
●OPEN (N.O)~ (Mated with the plug)



●ISOLATION

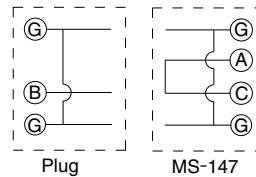


■Receptacle

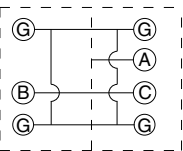


■Circuit diagram

Not mated with the plug
(N.C)

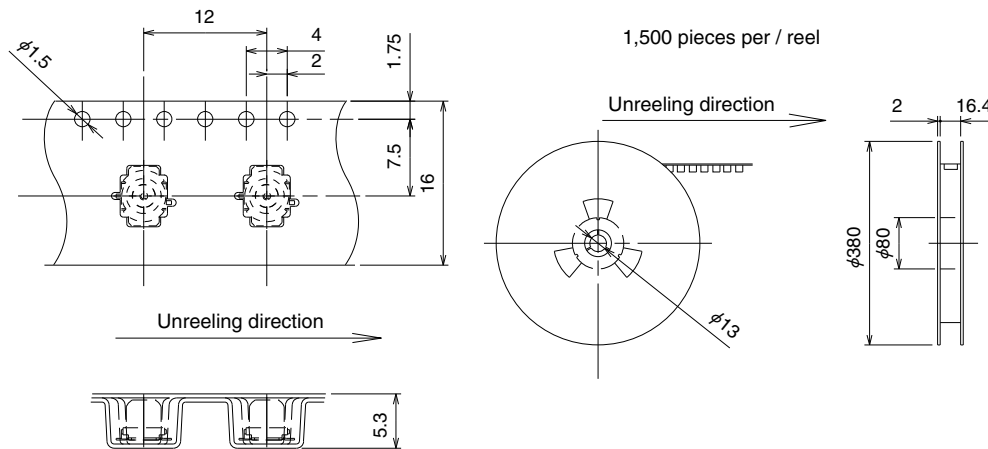


Mated with the plug
(N.O)

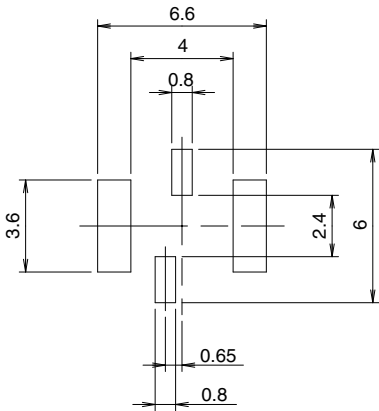


Part Number	HRS No.	Packaging	RoHS
MS-147(06)	CL358-0150-5-06	1,500 pieces / reel	YES
MS-147(01)	CL358-0150-5-01	50 pieces	

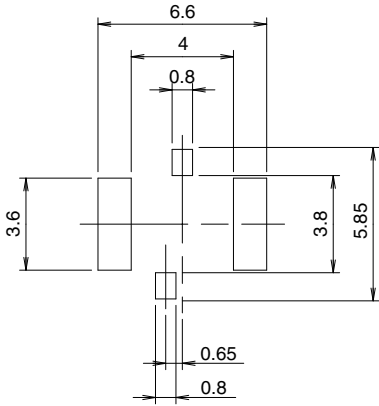
■Embossed Carrier Tape Dimensions



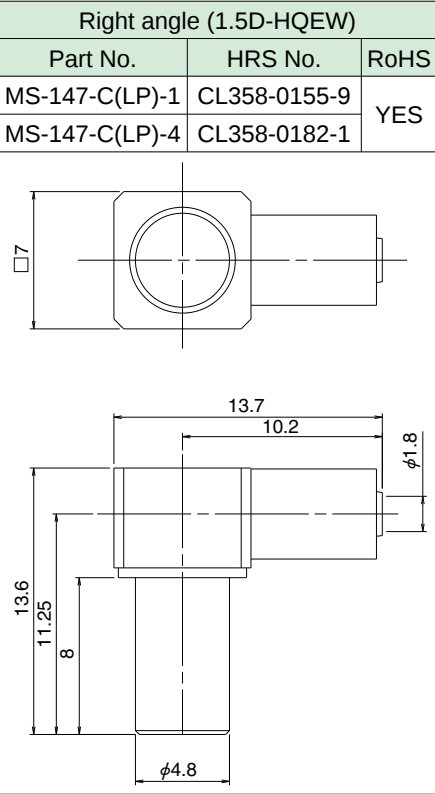
◆PCB Mounting pattern



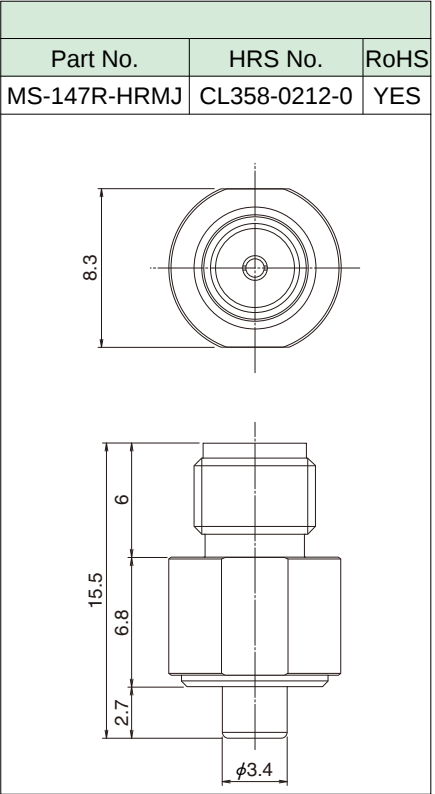
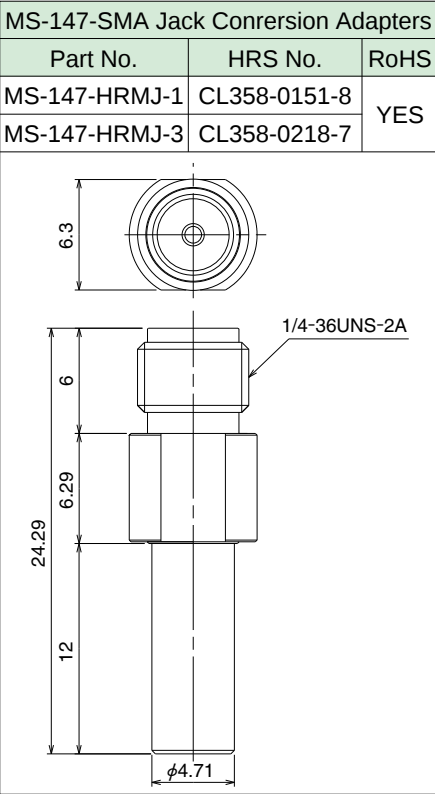
◆Metal mask dimensions



■Plug

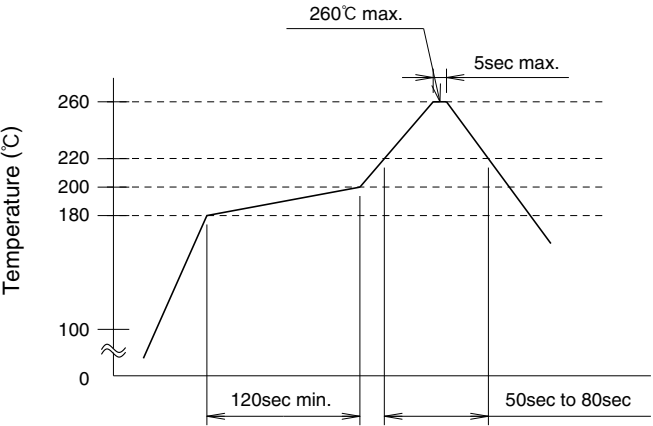


■SMA Conersion Adapters



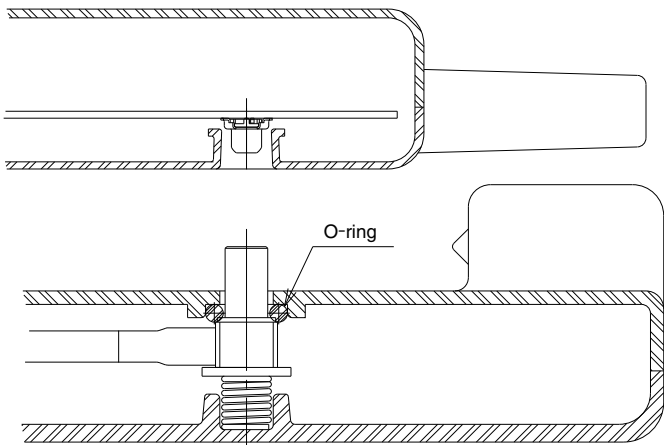
◆Recommended Temperature Profile

●Using Typical Solder Paste



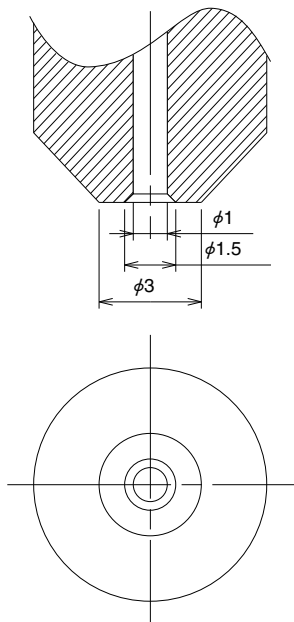
① Max. temperature	: 260°C
② Duration of peak temperature	: 5sec max.
③ Base peak temperature	: 240°C ~ 255°C
④ 220°C or over	: 50sec to 80sec.
⑤ 180°C to 200°C	: 60sec to 120sec.

◆Example of Application



Note: Mounting example

■Recommended Nozzle Dimensions

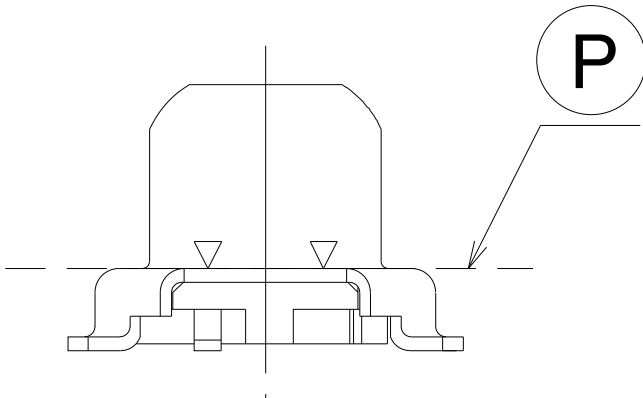


■Precautions

1. Plugs

Part No.	Use	Effective mating length
MS-147-C(LP)-1	Plug harness type	0.87mm
MS-147-C(LP)-4	Plug harness type	0.87mm
MS-147-HRMJ-1	SMA conversion adapter	0.87mm
MS-147-HRMJ-3	SMA conversion adapter	0.87mm

2. Not washable.
3. Design the mounting holes with sufficient clearance to protect the switch from being subjected to excessive force should the board be dropped.
4. For RF interface application for portable terminals, cover the plug entry with a rubber cap to keep dust out when no plug is inserted.
5. Be sure to fully insert the plug until it contacts part P.



Interface RF Connector with Switch, built-in interlock, DC to 3GHz

MS-151NB Series



■Features

1. Confirmation of complete connection

Built-in interlock feature confirms fully mated condition with a "click" sensation.

2. Non-directional connection

The connector can be mated in any position on a 360° axis and can rotate within the same when in use, allowing routing of the connected cable in any direction.

3. High durability

Guaranteed 5000 insertion/removal cycles.

4. Space-saving

The external dimensions of the board-mounted receptacle (5.0 mm high, 6.5 mm wide, 7.0 mm deep) makes it ideal for use in small devices.

5. Board placement with automatic equipment

Packaged on tape-and-reel. Also available with a vacuum pick-up cap over each switch.

6. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

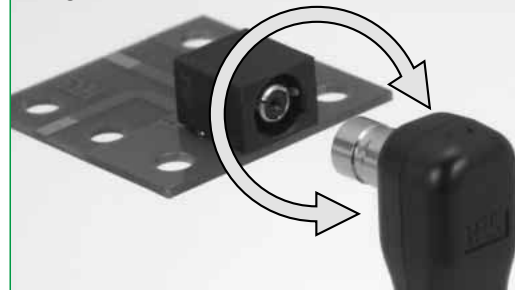
■Applications

GPS terminals, wireless LAN modules, notebook computers, PDA, and other high frequency equipment.

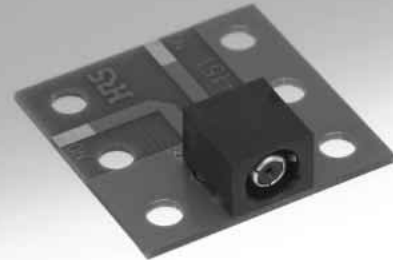
■Overview

Designed for end user applications requiring re-direction of transmission from internal built-in antenna to the external antenna. Small size, lightweight and high reliability makes it ideal for use in 2.4 GHz band wireless LAN applications.

Plug can be rotated after full insertion.



●Receptacle



MS-151NB

●Plug



MS-151-C(LP)

●SMA Conversion Adapter For Receptacle: MS-151NB



MS151P-HRMJ

●SMA Conversion Adapter For Plug: MS-151-C(LP)



MS151J-HRMJ

■Product Specifications

Frequency range	DC to 3GHz		
Operating temperature range	-40℃ to +85℃		
Power rating	4W		
		N.C	N.O
V.S.W.R.	DC to 1 GHz	1.2 max.	
	1 GHz to 2 GHz	1.4 max.	
	2 GHz to 3 GHz	1.7 max.	
Insertion loss	DC to 1 GHz	0.2dB max.	0.3dB max.
	1 GHz to 2 GHz	0.4dB max.	0.5dB max.
	2 GHz to 3 GHz	0.6dB max.	1.0dB max.
Isolation loss	DC to 1 GHz	————	20dB min.
	1 GHz to 2 GHz	————	18dB min.
	2 GHz to 3 GHz	————	12dB min.

Item	Specification	Conditions
1. Contact resistance	50 m ohms max.	100 mA
2. Insulation resistance	1000 M ohms min.	100 V DC
3. Withstanding voltage	No flashover or insulation breakdown	100 V AC / 1 minute
4. Vibration	No electrical discontinuity of 10 μs or more	Frequency: 10 to 500 Hz, single amplitude of 0.75 mm, acceleration of 98 m/s2 for 2 hours in each of the 3 directions
5. Shock		Acceleration of 490 m/s², 11 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis
6. Temperature cycle	Contact resistance: 100 m ohms max. Insulation resistance: 10 M ohms min.	Temperature: -55℃ → +15℃ to +35℃ → +85℃ → +15℃ to +35℃ Time: 30 → 5 max. → 30 → 5 max.(Minutes) 100 cycles
7. Humidity (Steady state)		96 hours at temperature of 40℃ and humidity of 90%
8. Salt spray	Contact resistance: 100 m ohms max. No corrosions	5% salt water solution, 48 hours (at 35℃)
9. Insertion/Withdrawal forces	Insertion force: 1~10N Withdrawal force: 3~15N	With corresponding connector
10. Durability (insertion/ withdrawal)	Contact resistance: 100 m ohms max.	5000 cycles

■Materials

Receptacle MS-151NB

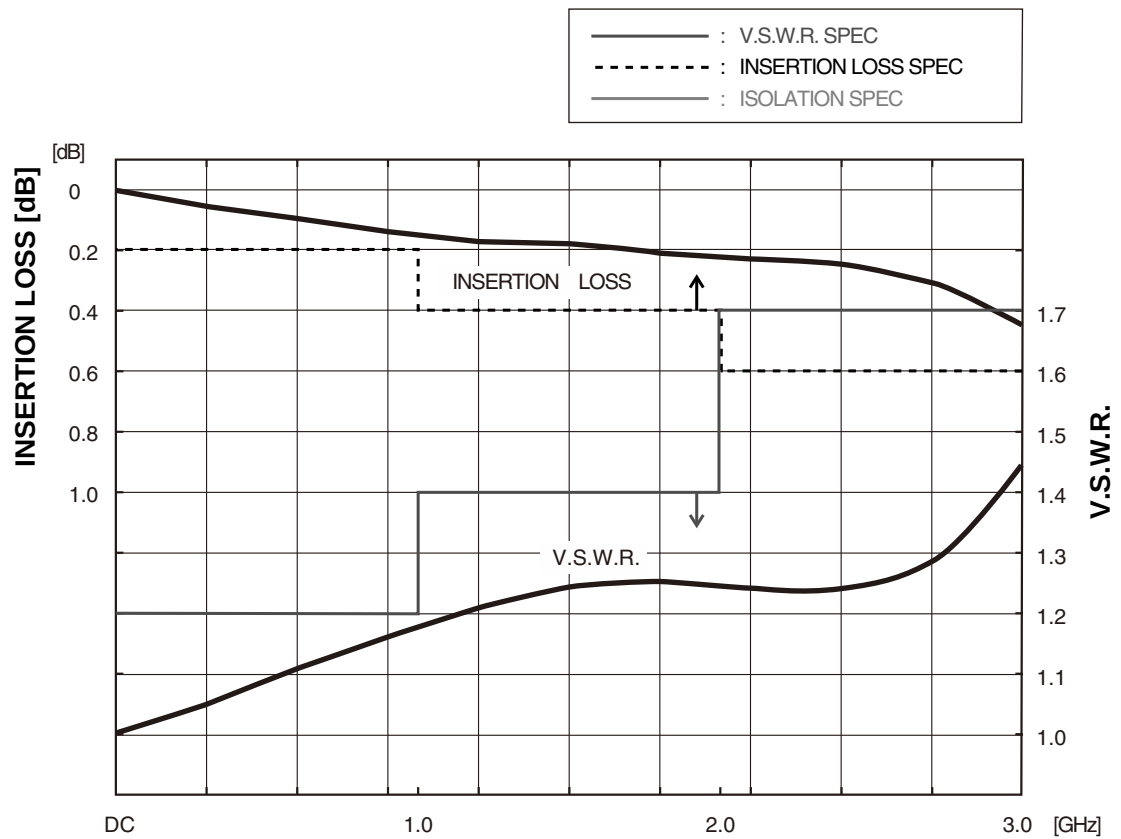
Part	Material	Finish
Insulator	Polyamide (UL94V0)	————
Lock mating section	Stainless steel	Nickel plating (Termination area: Gold-lead plated)
Outer conductor shell	Phosphor bronze	Nickel plating (Termination area: Gold-lead plated)
Contact A	Phosphor bronze	Gold plating
Contact C	Beryllium copper	Gold plating

Plug MS-151-C(LP)

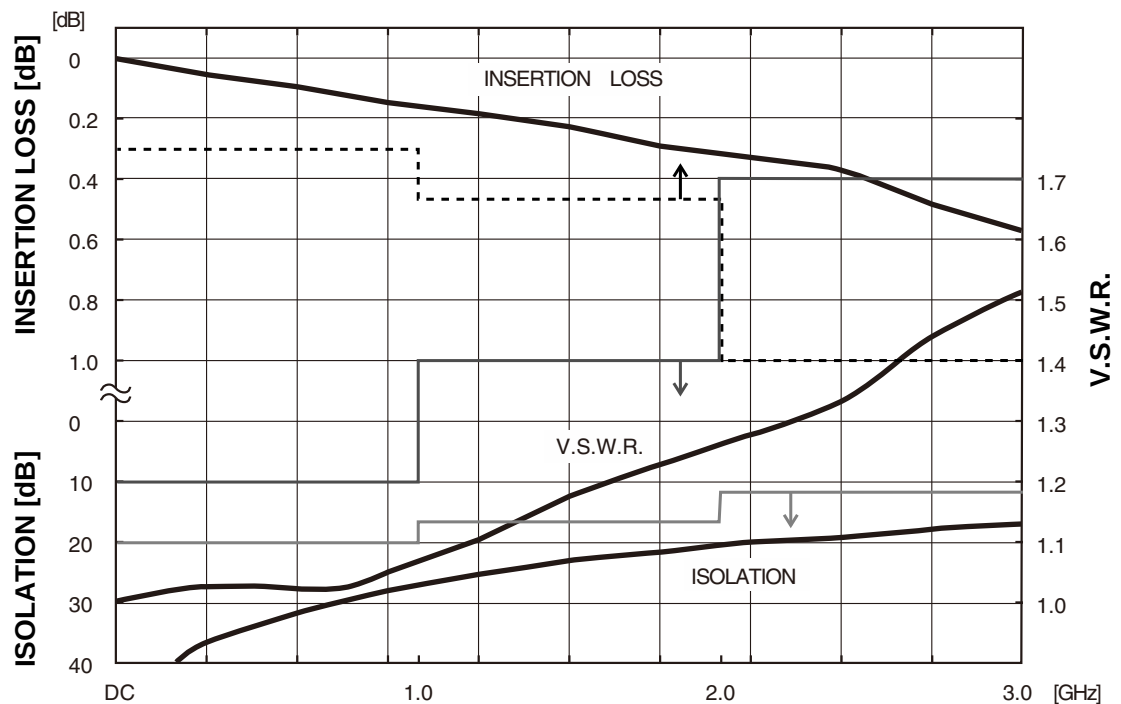
Part	Material	Finish
Cover A	PC	————
Cover B	PC	————
Ring	Stainless steel	Nickel plating
Outer conductor shell	Phosphor bronze	Nickel plating
Inner contact	Phosphor bronze	Gold plating
Insulator	Polyamide (UL 94-HB)	————
Ferrule	Stainless steel	————
Crimp metal fitting	Brass	Nickel plating
Bushing	Polyester	————

◆ Typical data

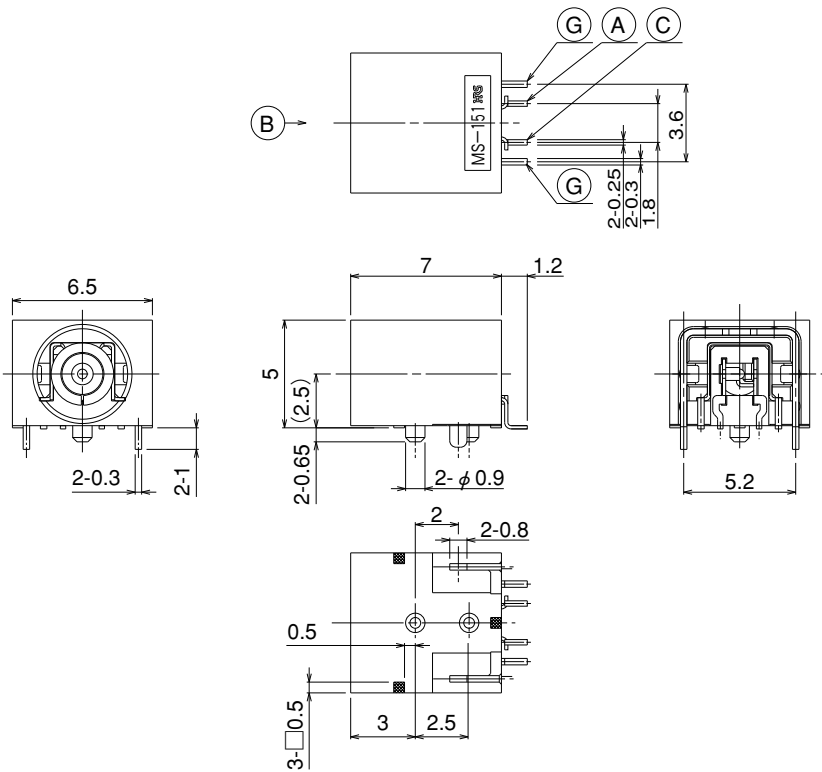
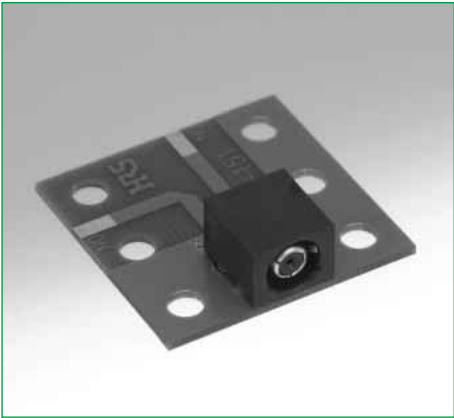
● NORMALLY CLOSED(N.C) ~ (Not mated with the plug)



● OPEN(N.O) ~ (Mated with the plug)



■Receptacle

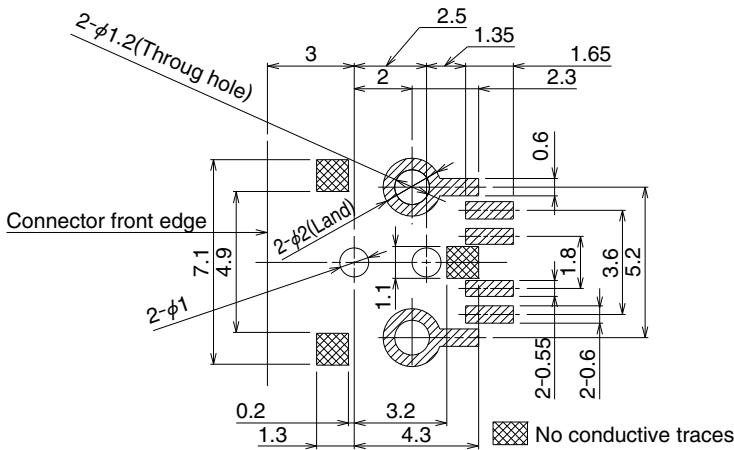


Part Number	HRS No.	Packaging	RoHS
MS-151NB	358-0215-9	1,000 pieces per reel	YES
MS-151NB(01)	358-0215-9-01	100 pieces	

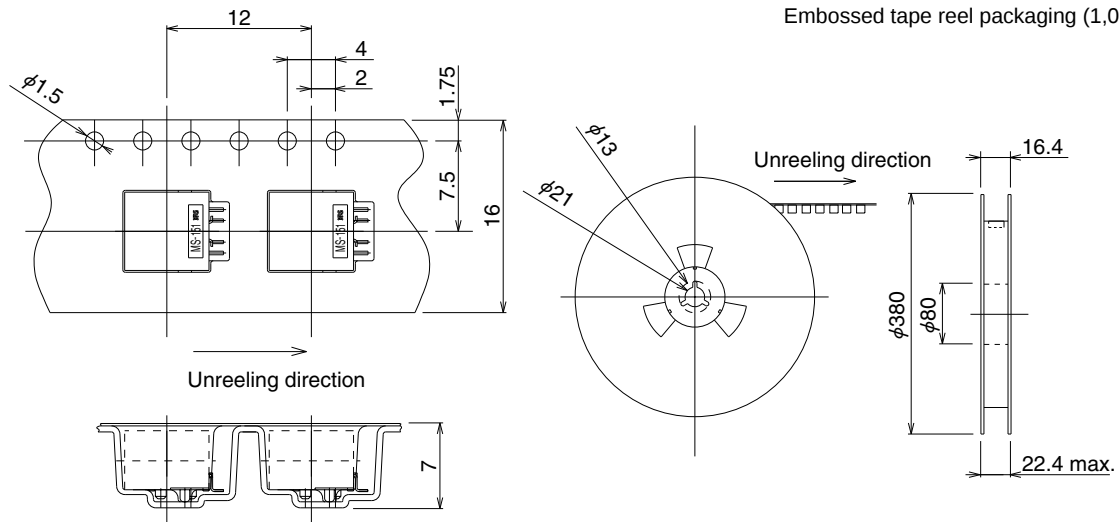
◆Circuit diagram



◆PCB mounting pattern

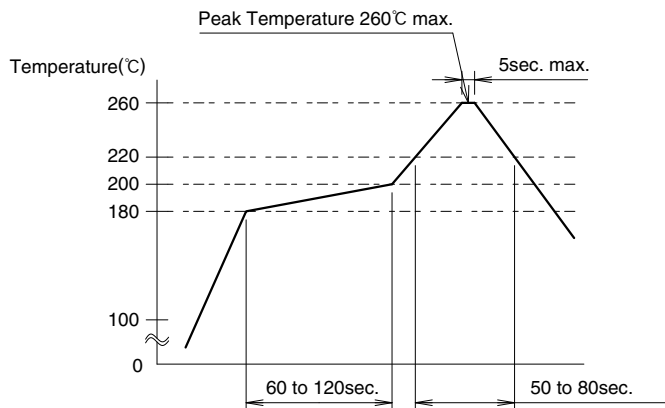


◆Packaging Specifications



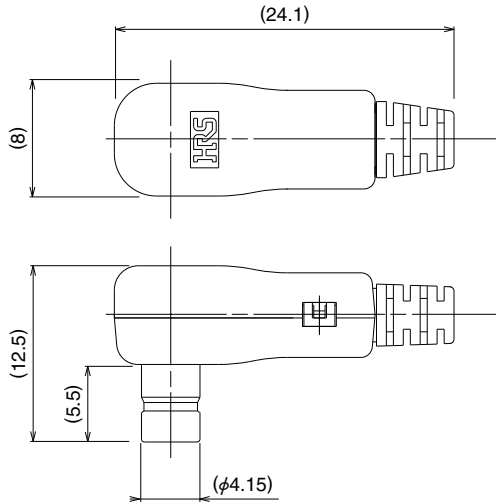
◆Recommended Temperature Profile

Using Lead-free solder paste



Maximum temperature	: 260°C
Peak temperature	: 240°C to 255°C
Peak temperature duration	: 5 sec. Max.
200°C min.	: 50 to 80 sec.
150°C to 160°C	: 60 to 120sec.

■Plug

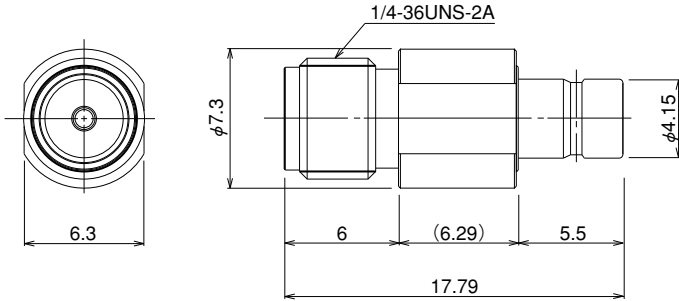


Part Number	HRS No.	Packaging	Applicable cable	RoHS
MS-151-C(LP)	358-0160-9	1	1.5DS-QEHV(TA)	YES

Termination fixture: MS-151/CF-MD, MS-151/SO-MD, MS-151/BE-MP and MS-151/CK-MP
Please contact your Hirose Electric representative for information.

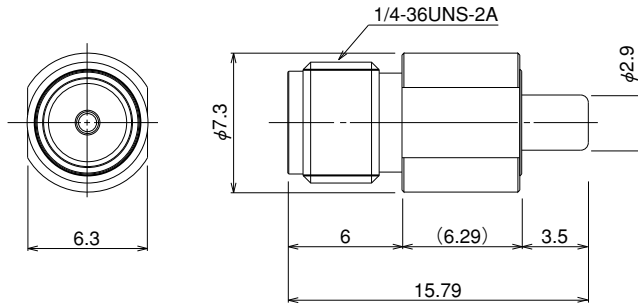
■SMA Conversion adaptors

●For Receptacle: MS-151NB



Part Number	HRS No.	Packaging	RoHS
MS151P-HRMJ	355-0089-7	1	YES

●For Plug: MS-151-C(LP)

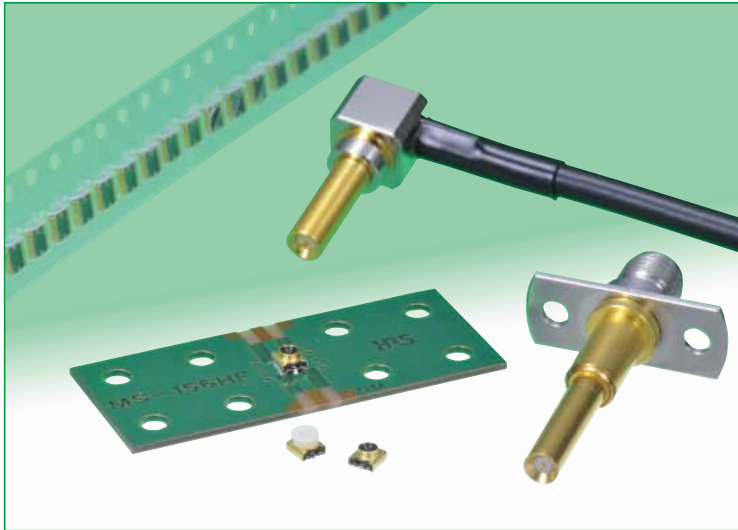


Part Number	HRS No.	Packaging	RoHS
MS151J-HRMJ	355-0088-4	1	YES

Subminiature Coaxial Switch 1.6 mm High, DC to 6 GHz

MS-156HF Series

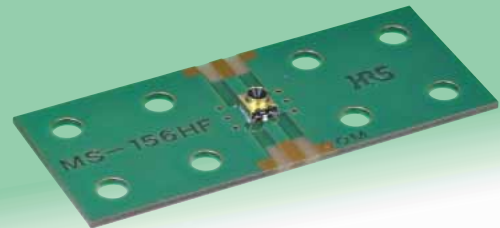
Halogen Free



Overview

Developed for inspection of high frequency circuits used in portable terminals. Verification of the circuit performance is accomplished by simply inserting the external plug in the board mounted receptacle. This action re-directs the circuit from normal condition to the plug side. Removing the plug restores circuit to its normal condition.

Space-saving design
Low profile -1.6 mm protrusion above the board.
Lightweight -0.025 g. total weight.



MS-156HF

Features

1. Low insertion loss

0.1 dB typical at 6 GHz (not mated with the plug).

2. Space-saving design

2.7 mm x 2.7 mm occupied board space.

3. Low profile

1.6 mm protrusion above the board.

4. Lightweight

0.025 g. total weight (without vacuum cap).

5. Durability

100 mating/unmating cycles, with corresponding plug.

6. Performs over a wide frequency range

Applicable frequencies range over a wide band, from DC to 6 GHz.

7. Solder wicking prevention

Nickel plating barrier on the contacts prevents solder compound intrusion (wicking) into the contact engagement areas.

8. Board placement with automatic equipment

Packaged on tape-and-reel. Also available with a vacuum pick-up cap over each switch.

9. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

10. Halogen Free

Chlorine, and bromine are not used in the receptacles.

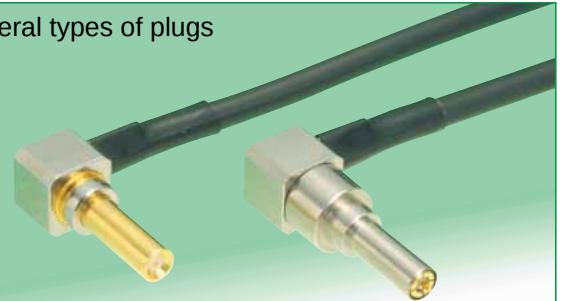
*Definition according to IEC 61249-2-21.

Br 900 ppm max., Cl 900 ppm max., and Br + Cl 1500 ppm max.

Applications

Portable terminals, ETC, notebook computers (Bluetooth), wireless LAN, POS terminals, GPS terminals, PDA, and any small devices requiring verification of antenna/circuit performance.

Several types of plugs



Several types of SMA conversion adapters



Adapter for plug inspection



■Specifications

	Not mated with the plug	Mated (MS-156-HRMJ-3)
Operating temperature range	-40℃ to +85℃	-40℃ to +85℃
Rated power	2W	2W
Frequency range	DC to 6GHz	DC to 6GHz
Insertion loss	0.1 dB max. (DC to 2.5GHz) 0.15 dB max. (2.5GHz to 6.0GHz)	0.5 dB max. (DC to 3.0GHz) 1.2 dB max. (3.0GHz to 6.0GHz)
Isolation	20 dB max. (DC to 2.0GHz) 15 dB max. (2.0GHz to 4.0GHz) 13 dB max. (4.0GHz to 6.0GHz)	
V.S.W.R	1.2 max. (DC to 2.5GHz) 1.3 max. (2.5GHz to 6.0GHz)	1.4 max. (DC to 3.0GHz) 1.8 max. (3.0GHz to 6.0GHz)

Item	Specification	Conditions
1. Contact resistance	100 mΩ max.	100 mA max.
2. Insulation resistance	1000 MΩ min.	100 V DC
3. Withstanding voltage	No flashover or insulation breakdown	100 V AC / 1 minute
4. Vibration	No electrical discontinuity of 1 μs or more	Frequency:10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 axis.
5. Shock		Acceleration of 490 m/s², 6 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis
6. Temperature cycle	Contact resistance: 100 mΩ max. Insulation resistance: 10 MΩ min.	Temperature: -55℃ → +5℃ to +35℃ → +85℃ → +5℃ to +35℃ Time: 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 100 cycles
7. High temperature exposure	Contact resistance: 100 mΩ max. Insulation resistance: 10 MΩ min.	96 hours at 85℃
8. Low temperature exposure	Contact resistance: 100 mΩ max. Insulation resistance: 10 MΩ min.	96 hours at -55℃
9. Humidity	Contact resistance: 100 mΩ max. Insulation resistance: 10 MΩ min.	96 hours at 40±2℃, and humidity of 90 to 95%
10. Durability (mating/un-mating, with corresponding plug)	Contact resistance: 100 mΩ max.	100 cycles

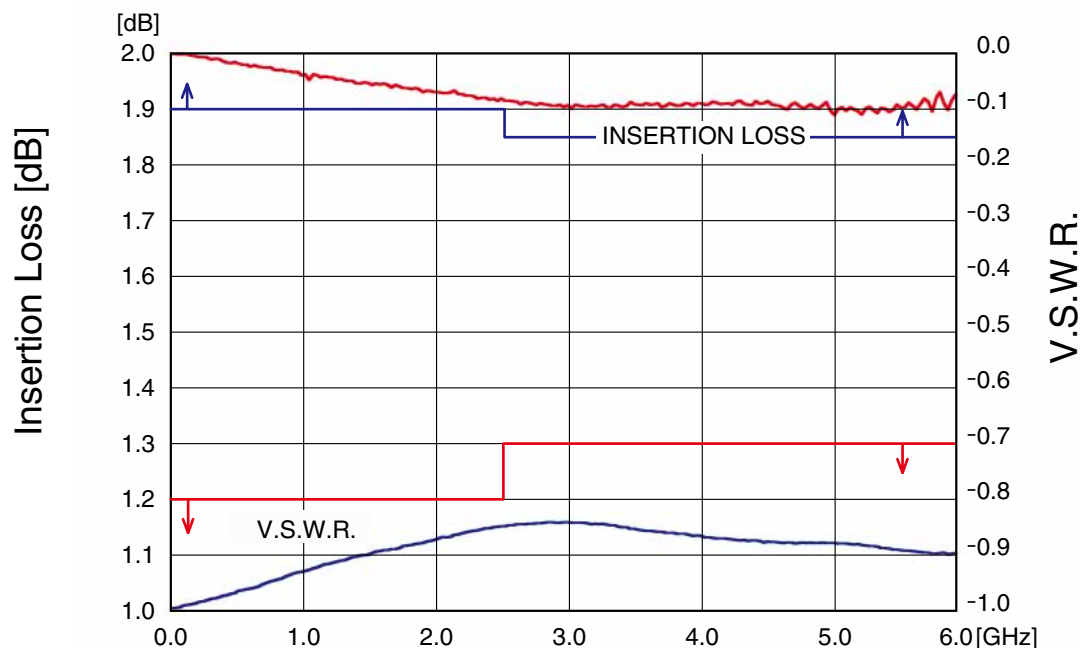
■Materials

Part	Material	Finish	Remarks
Shell	Phosphor bronze	Gold plated	_____
Insulator	6T Nylon	_____	UL94HB
Common terminal	Beryllium copper	Selective gold plated	_____
Antenna terminal	Phosphor bronze	Selective gold plated	_____

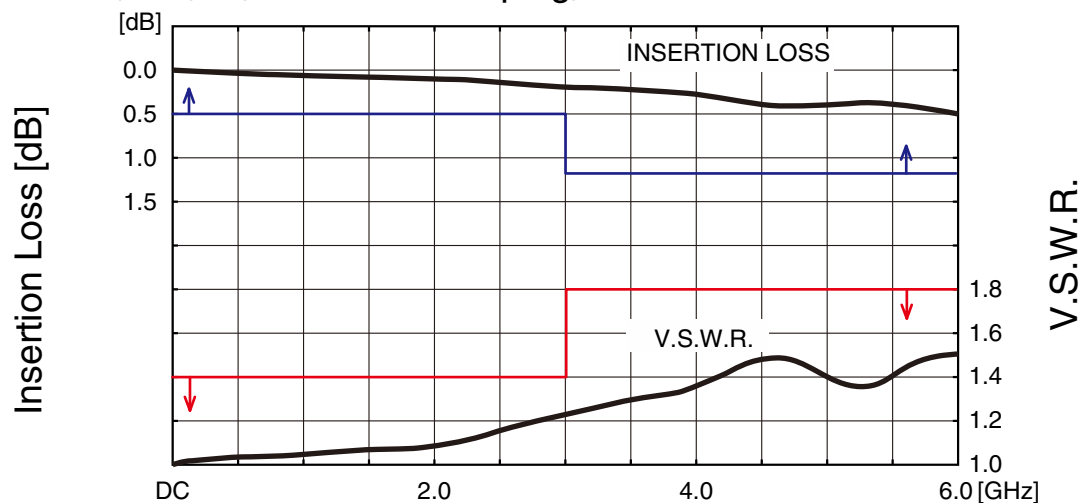
Oct.1.2023 Copyright 2023 HIROSE ELECTRIC CO., LTD. All Rights Reserved.

◆Typical Data

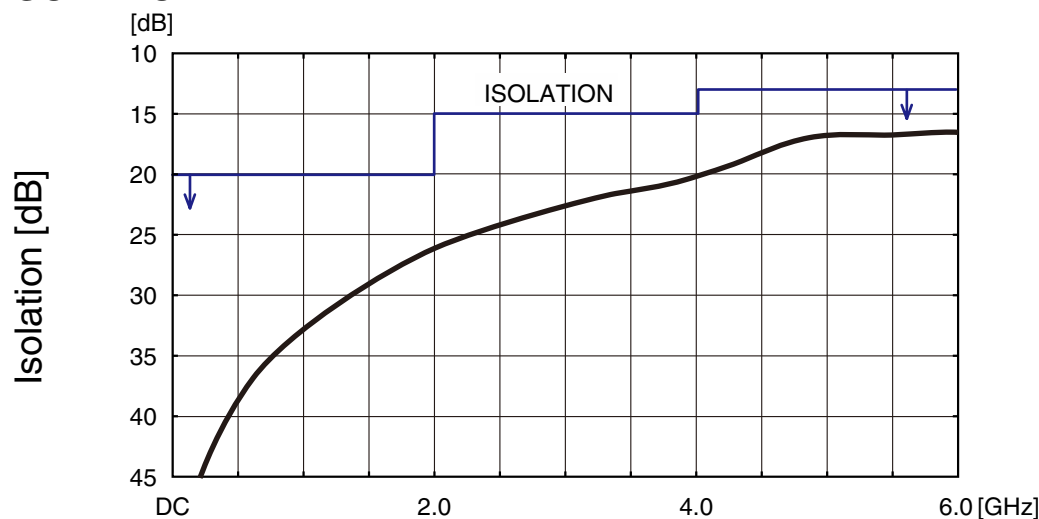
●NORMALLY CLOSED(N.C)~(Not mated with the plug)



●OPEN(N.O)~(Mated with the plug)



●ISOLATION

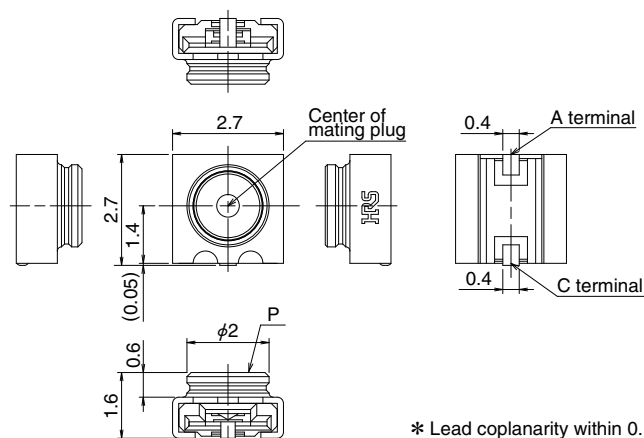


■Receptacle

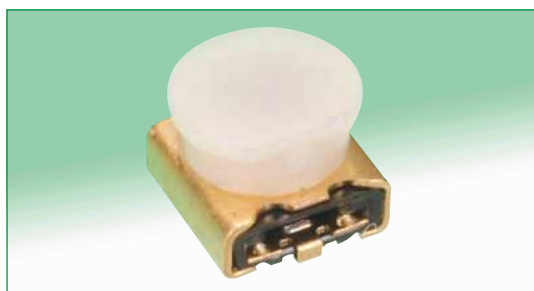
●Without vacuum pick-up cap



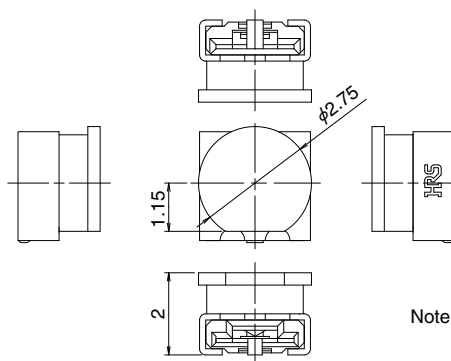
Part Number	CL No.	Packaging
MS-156HF	358-0238-4	10,000 pieces/reel
MS-156HF(01)	358-0238-4-01	100 pieces/bag
MS-156HF(20)	358-0238-4-20	2,000 pieces/reel



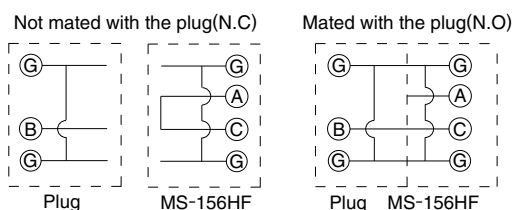
●With vacuum pick-up cap



Part Number	CL No.	Packaging
MS-156HF(02)	358-0238-4-02	8,500 pieces/reel
MS-156HF(22)	358-0238-4-22	1,500 pieces/reel

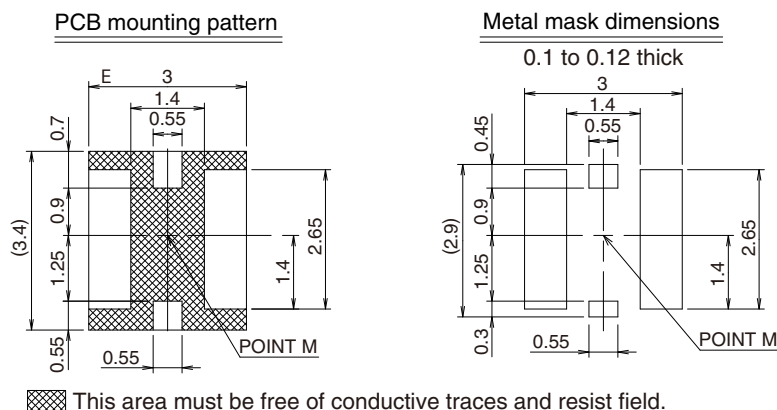


◆Circuit diagram



◆PCB mounting pattern and metal mask dimensions

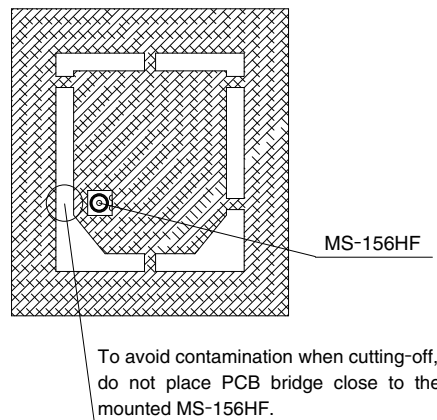
- * Request drawing of the specific part for exact dimensions and tolerances.
- * Specified dimensions must be followed to assure correct board placement and performance.



◆Precautions

1. This product is intended to be used for circuit inspection only. Consult us if any other application is considered.
2. Cross-hatched area shown on the PCB mounting pattern must be free of any conductive traces. Placing conductive traces in this area may affect performance and will void product warranties. When the bottom surface of the product (i.e., the  shaded area of the specified land dimensions diagram on the previous page) has been processed with a substrate copper trace and resist processing, Hirose Electric will not be able to warrant the product.
3. Do not use hand soldering for mounting of MS-156HF.
Doing so could result in solder and flux wicking to the contact areas.
4. Exercise caution as not to allow any debris to enter the board mounted MS-156HF when cutting PCB.

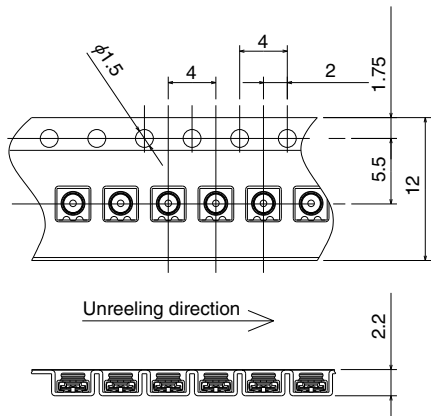
Recommended Mounting of MS-156HF coaxial switch
on the PCB during the manufacturing process



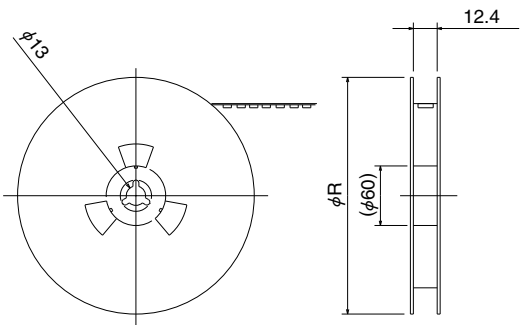
5. Do not use the washing process.
6. Please refrain from using the product in environments specifically affected by excessive vibration, shock, dust, high humidity, gases, very high temperatures and very low temperatures such as outdoor equipment. It might cause degradation or destruction of the product. Even if it endures during a short time, long time qualification is not guaranteed.
7. For use of this product, be sure to put contact area of plug on position P(P4 full view) perpendicularly.
8. Plugs can be roughly classified to two types.
 - For mass production line automatic check (Press down type)
 - For manual check (With retentive lock) : Unable to be used at production line.
9. When automatic inspections are to be performed during the manufacturing operations, request the MS-156 plug connector manual for examples of implementation.

◆Packaging Specifications

●Without vacuum cap

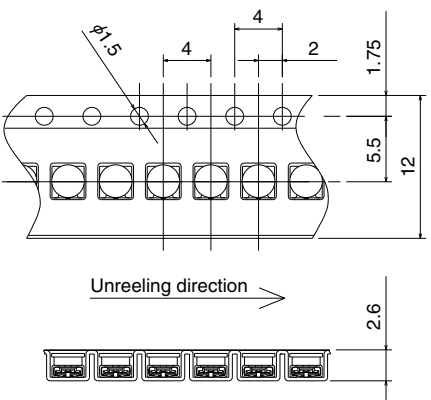


●Reel dimensions

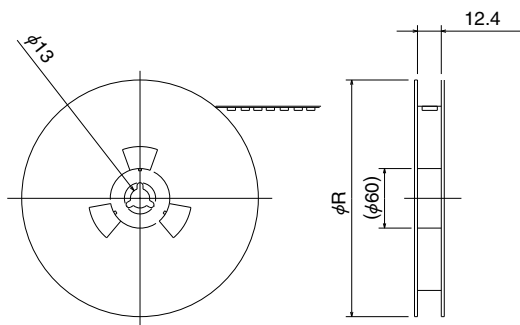


Part Number	Reel Size	Packaging
MS-156HF	R = $\phi 380\text{mm}$	10,000 pieces/reel
MS-156HF(20)	R = $\phi 180\text{mm}$	2,000 pieces/reel

●With vacuum cap

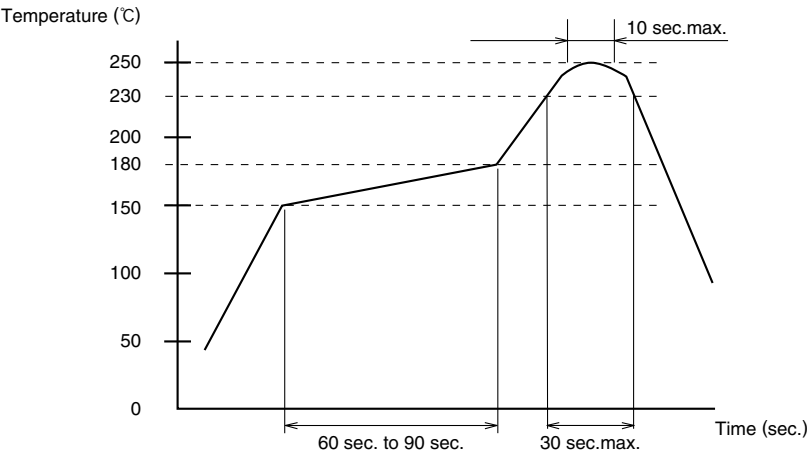


●Reel dimensions



Part Number	Reel Size	Packaging
MS-156HF(02)	R = $\phi 380\text{mm}$	8,500 pieces/reel
MS-156HF(22)	R = $\phi 180\text{mm}$	1,500 pieces/reel

◆Recommended Temperature Profile



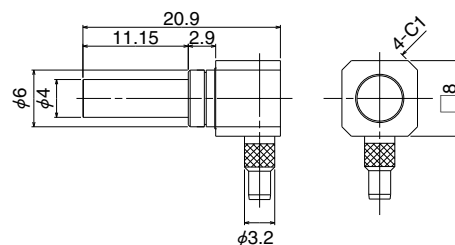
Using Lead-free Solder paste

① Maximum temperature	: 250°C
② Peak temperature	: 240°C to 250°C
③ Peak temperature time	: 10 sec. max.
④ 230°C min.	: 30 sec. max.
⑤ 150°C to 180°C	: 60 sec. to 90 sec.

Metal mask thickness : 0.1 to 0.12 mm
Reflow cycles : 2 cycles

■ Plugs

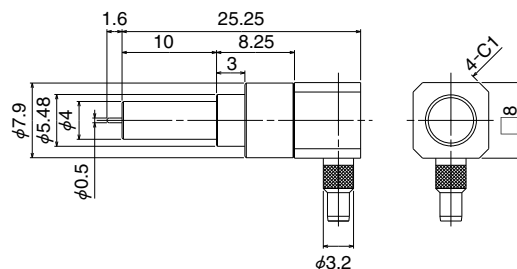
● Press down, right angle



Part Number	CL No.	Durability
MS-156-C(LP)-1	358-0173-0	10,000 Times

Applicable cable: 1.5D-HQEW, 1.5D-QEW (Fujikura Ltd.)

● Simplified lock, right angle

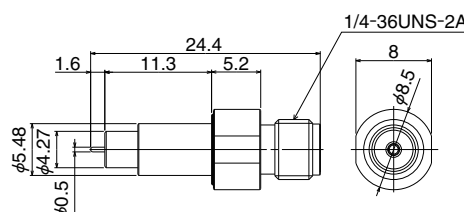


Part Number	CL No.	Durability
MS-156-C(LP)-2	358-0174-3	500 Times

Applicable cable: 1.5D-HQEW, 1.5D-QEW (Fujikura Ltd.)

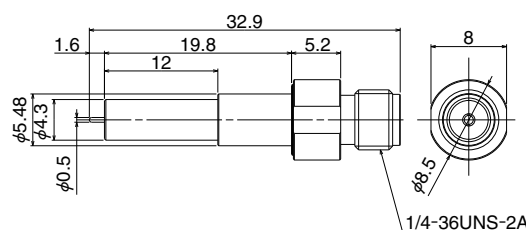
■ SMA Conversion Adapters

● Simplified lock, straight, short



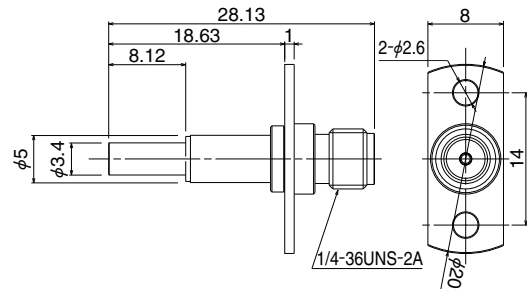
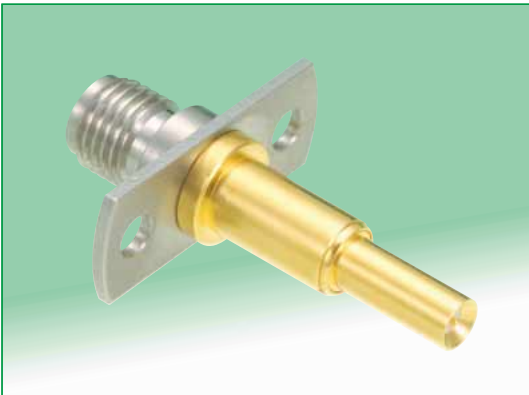
Part Number	CL No.	Durability
MS-156-HRMJ-2	358-0170-2	500 Times

● Simplified lock, straight, long



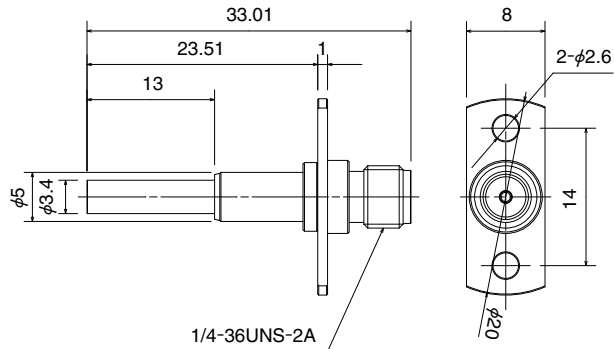
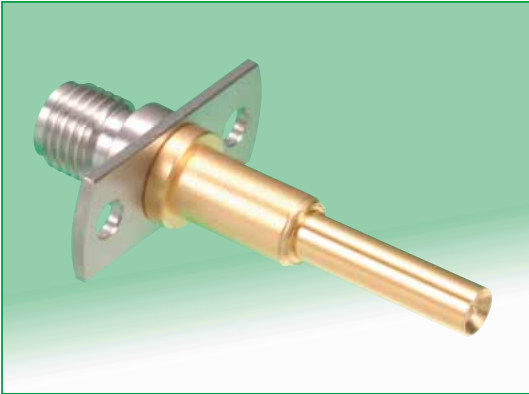
Part Number	CL No.	Durability
MS-156-HRMJ-5	358-0177-1	500 Times

●Press down, with flange, short



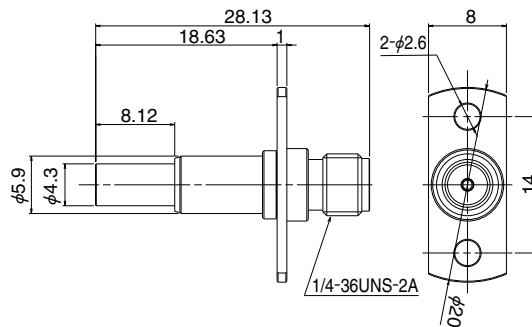
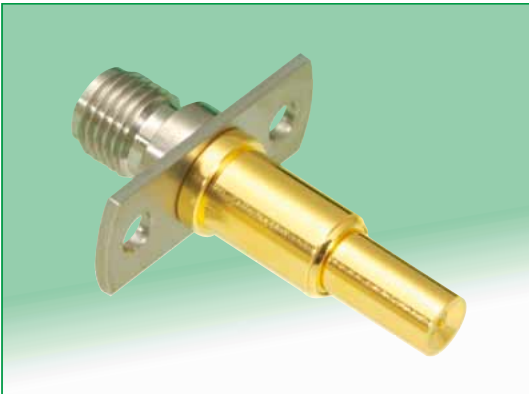
Part Number	CL No.	Durability
MS-156-HRMJ-3	358-0171-5	10,000 Times

●Press down, with flange, long



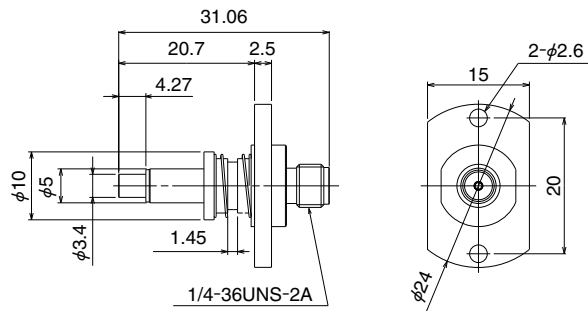
Part Number	CL No.	Durability
MS-156-HRMJ-14	358-0198-1	10,000 Times

●Press down, with flange
(Increased self alignment)



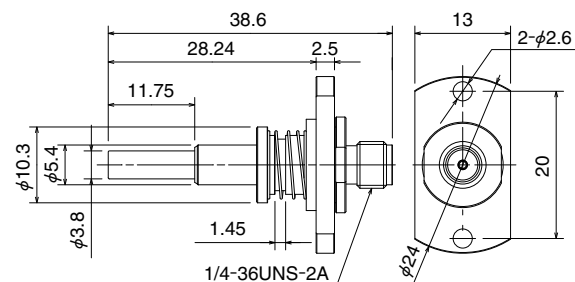
Part Number	CL No.	Durability
MS-156-HRMJ-6	358-0181-9	10,000 Times

●Floating



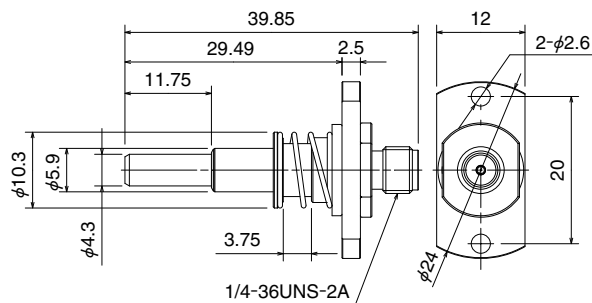
Part Number	CL No.	Durability
MS-156-HRMJ-9	358-0180-6	10,000 Times

● Floating (Self-Pressing)



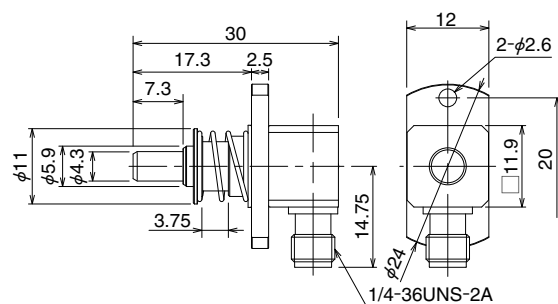
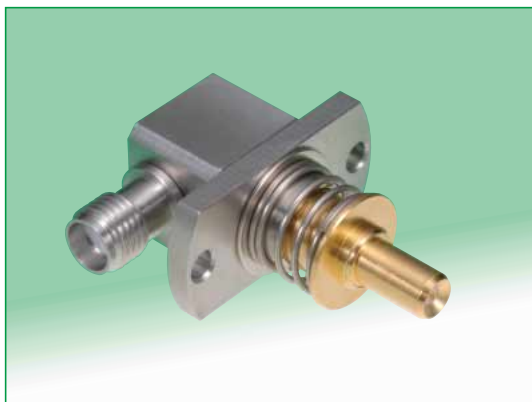
Part Number	CL No.	Durability
MS-156-HRMJ-10	358-0194-0	10,000 Times

● Floating (Self-Pressing)



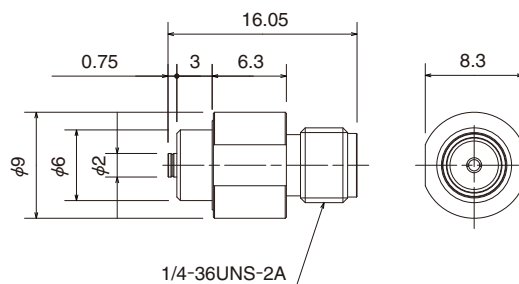
Part Number	CL No.	Durability
MS-156-HRMJ-12	358-0196-6	10,000 Times

● Floating (Self-Pressing)



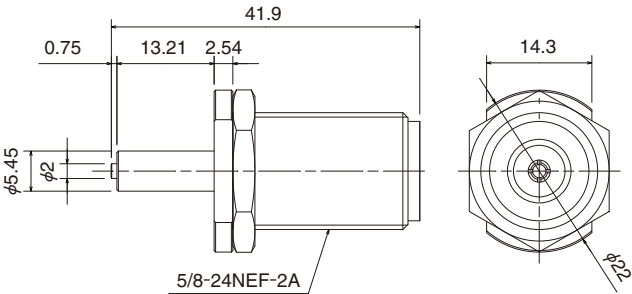
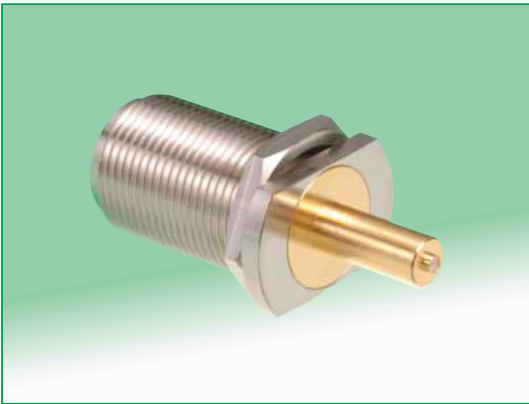
Part Number	CL No.	Durability
MS-156LP-HRMJ-4	358-0205-5	10,000 Times

● Adapter for plug inspection



Part Number	CL No.	Durability
MS-156R-HRMJ-1	358-0188-8	500 Times

●Adapter for plug inspection



Part Number	CL No.	Durability
MS-156R-NJ-1	358-0176-9	500 Times

MS-162B Series

Compact Interface Coaxial Switch



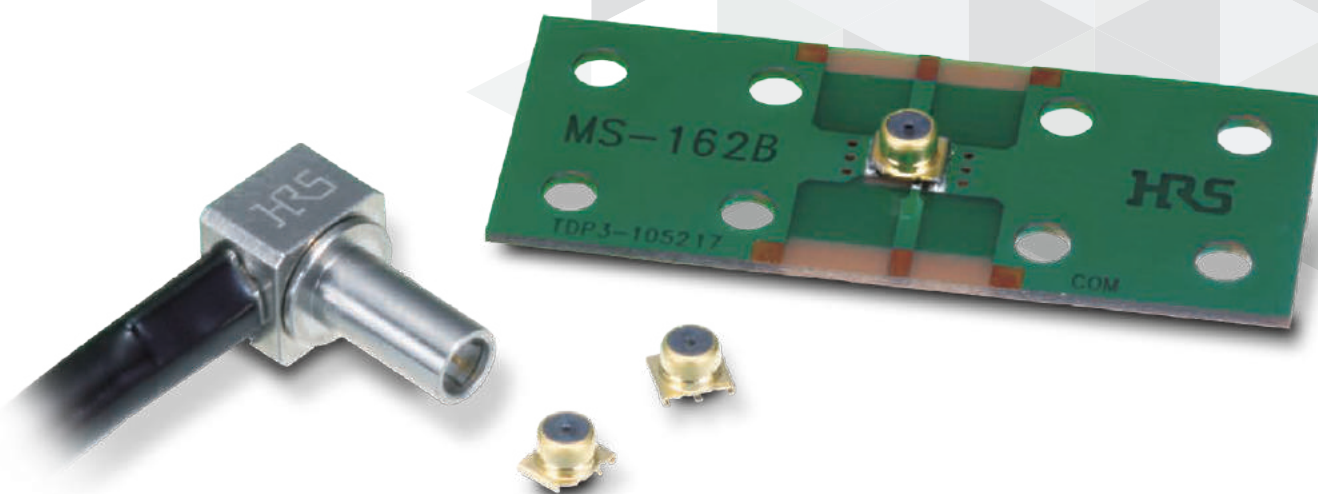
Coax Switch



Compact



RF



Overview

The MS-162B Series is a coaxial switch for cellphone interfaces. It can also be used for circuit testing on microwave boards (DC to 10GHz). When the plug is not mated, the common contact and board circuit (NC) connect to form a circuit. The vertical type is used for mobile devices and can be installed near the antenna for output inspection, switching to an external antenna, etc.

Features

1. Wide Frequency Range (DC to 10GHz)

Frequency range from DC to 10GHz.

2. Low Insertion Loss

When Unmated

DC-2GHz 0.2dB Max.

2-3GHz 0.3dB Max.

3-6GHz 0.5dB Max.

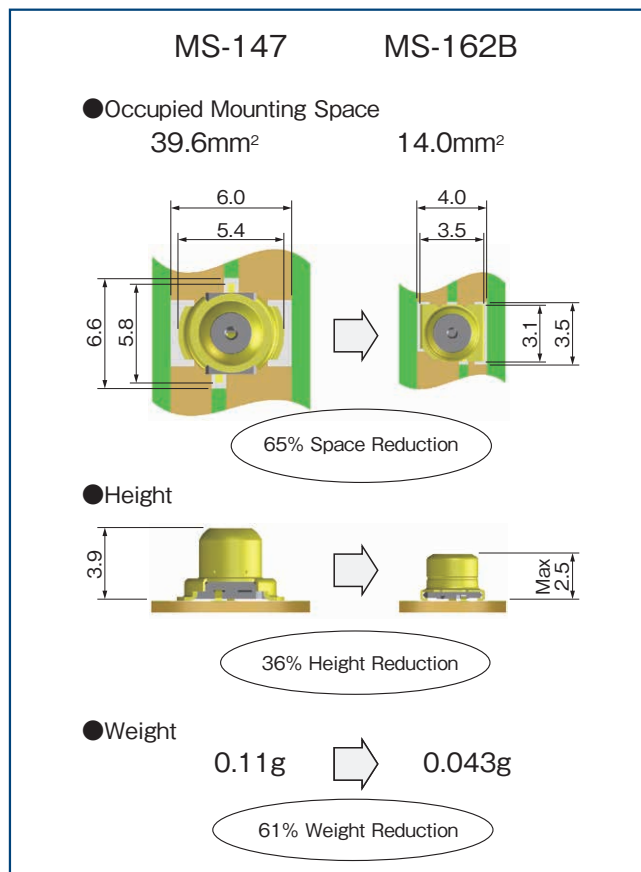
6-10GHz 0.7dB Max.

3. Space-saving, Low Profile

Size : 3.5mmx3.5mm (nominal)

Height : 2.5mm Max.

Weight : 0.043g



4. Long Product Life

The number of guaranteed mating cycles is 12,000 cycles.

5. Pick & Place Mounting

Tape-and-reel packaging for compatibility with automatic mounting.

6. Self-Alignment

The self-alignment range of the plug during mating is $\pm 0.5\text{mm}$.

7. Beryllium, Halogen-free

All materials and substances used to produce this receptacle comply with Halogen and Beryllium-free standards.

*As defined by IEC61249-2-21

Br-900 ppm maximum, Cl-900 ppm maximum,
Cl+Br combined-1,500 ppm maximum.

Product Specifications

Items	Normally Closed	Normally Open
Operating Temperature	-40 to +85°C	
Rated Voltage	4W	
Frequency	DC-10 GHz	
Voltage Standing Wave Ratio	1.2 Max. (DC-3GHz) 1.5 Max. (3-6GHz) 1.7 Max. (6-10GHz)	1.2 Max. (DC-3GHz) 1.6 Max. (3-6GHz) 1.7 Max. (6-10GHz)
Insertion Loss	0.15 dB Max. (DC-2GHz) 0.2 dB Max. (2-3GHz) 0.4 dB Max. (3-6GHz) 0.7 dB Max. (6-10GHz)	0.2 dB Max. (DC-2GHz) 0.3 dB Max. (2-3GHz) 0.5 dB Max. (3-6GHz) 0.7 dB Max. (6-10GHz)
Isolation Loss	—	25 dB Min. (DC-1GHz) 20 dB Min. (1-3GHz) 14 dB Min. (3-6GHz) 12 dB Min. (6-10GHz)

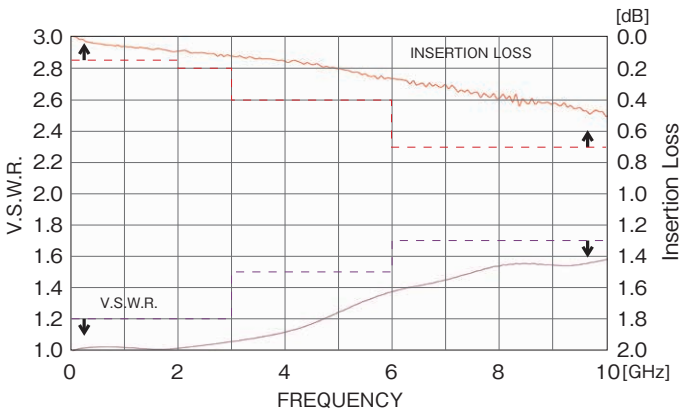
Item	Standard	Conditions
Contact Resistance	100m Ω Max.	Measured at 100mA Max.
Insulation Resistance	1000M Ω Min.	Measured at 100V DC
Withstanding Voltage	No flashover or insulation breakdown	100V AC for 1 min.
Vibration Resistance	No electrical discontinuity of 1 μs or more	Frequency 10-55Hz, Single Amplitude 0.75mm, 10 cycles in 3 directions, total 30 cycles
Shock Resistance	No electrical discontinuity of 1 μs or more	Acceleration of 490m/s ² , Half -sine Wave, 3 Directions, 3 times, 18 times total
Temperature Cycles	Contact Resistance : 100m Ω Max. Insulation Resistance : 10M Ω Min.	Temperature : -55 → +15 to +35 → +85 → +15 to +35°C Time : 30 → 2 to 3 → 30 → 2 to 3(Min.) 100 cycles
Heat Resistance	Contact Resistance : 100m Ω Max. Insulation Resistance : 10M Ω Min.	Left for 96 hours at 85°C
Cold Resistance	Contact Resistance : 100m Ω Max. Insulation Resistance : 10M Ω Min.	Left for 96 hours at -55°C
Humidity Resistance	Contact Resistance : 100m Ω Max. Insulation Resistance : 10M Ω Min.	Left for 96 hours at 40°C and 90 to 95% RH
Mating Durability	Contact Resistance : 100m Ω Max.	12,000 cycles

Materials/Finish

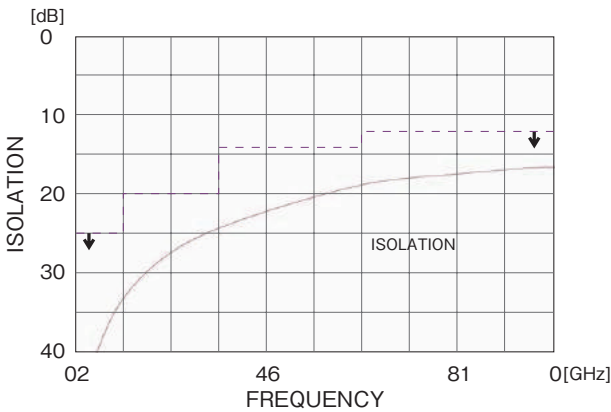
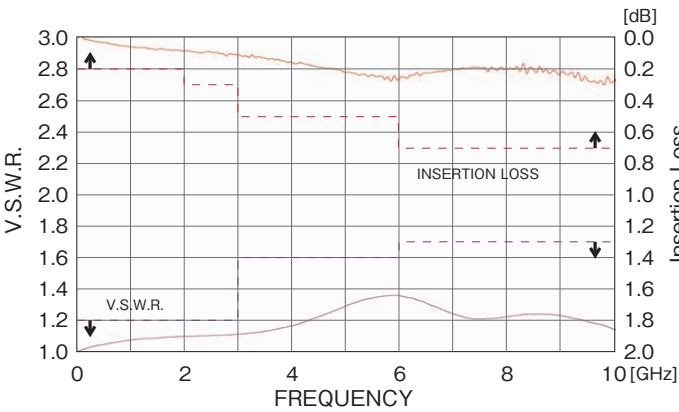
Component	Materials	Finish	UL Standard
Shell	Brass	Gold Plated	-
Insulator	LCP	-	UL94V-0
Common Contact	Copper Alloy	Partially Gold Plated	-
Antenna Contact	Phosphor Bronze	Partially Gold Plated	-

High Frequency Performance (Typical)

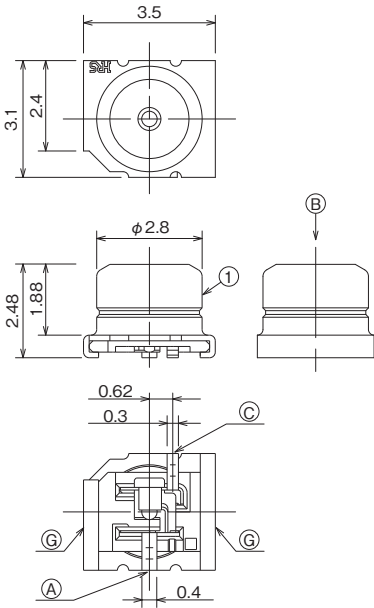
● Normally Closed (Unmated)



● Normally Open (Mated)

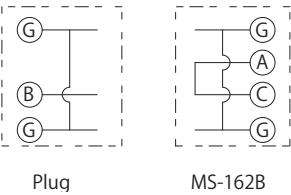


Receptacle

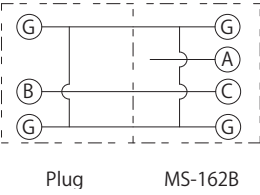


●Circuit Diagram

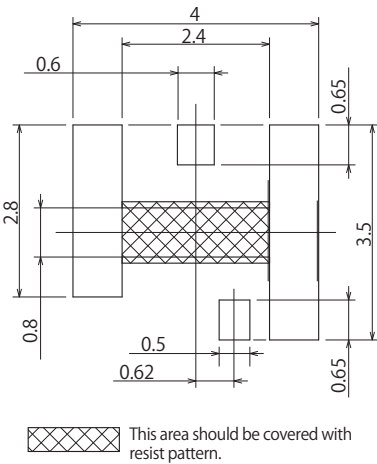
[Not Mated with Plug]



[Mated with Plug]

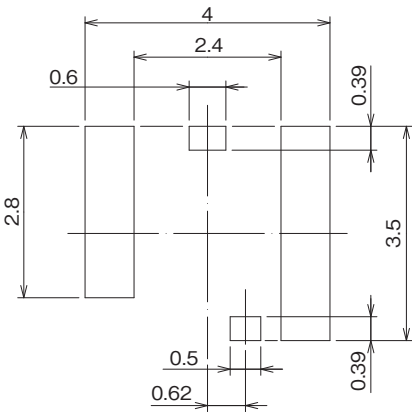


●Specified Land Pattern Dimensions



 This area should be covered with resist pattern.

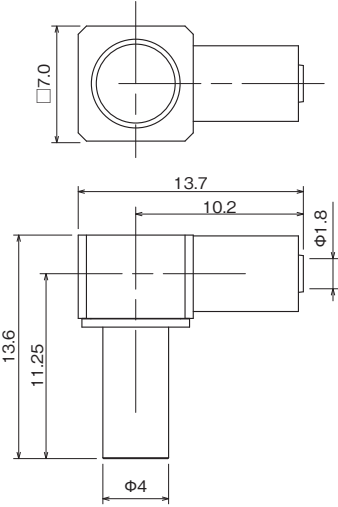
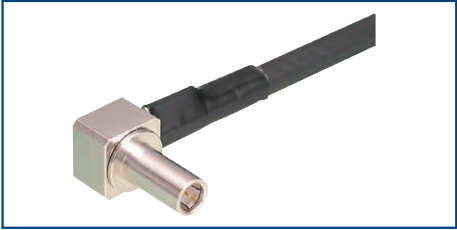
●Specified Metal Mask Dimensions



Note : Specified Metal Mask Thickness t=0.12mm

Part No.	HRS No.	Purchase Unit
MS-162B	CL0358-0343-9-00	3,000pcs per reel

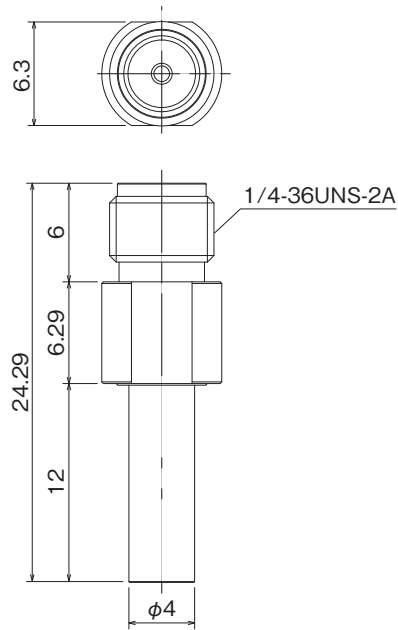
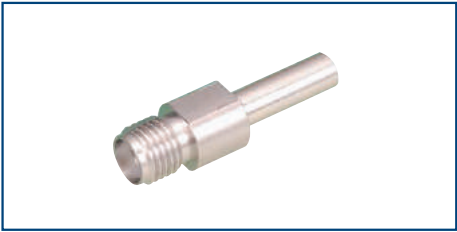
Plug



Part No.	HRS No.	Purchase Unit	Remarks
MS-162-C(LP)-1	CL0358-0222-4-00	20pcs per bag	Cable Assembly Compatible L-shaped Type

Note : Applicable Cable : 1.5D-HQEW, 1.5D-QEW (Fujikura Ltd.)
Cable Termination Tool : For Outer Conductor: HT3030/PO-P-2-T, Cover Setting Tool: UM-T-1

SMA Conversion Adapter



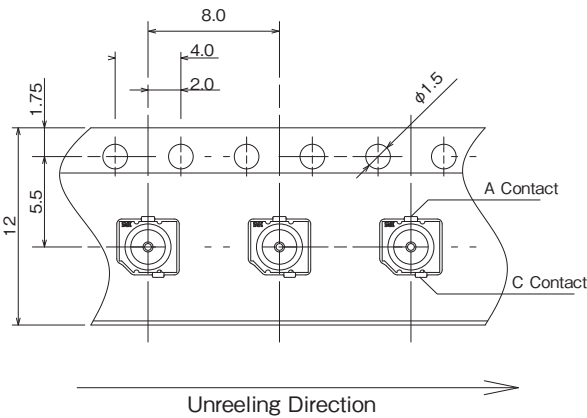
Part No.	HRS No.	Friction Lock	Purchase Unit	Remarks
MS-162-HRMJ-1	CL0358-0210-5-00	—	50pcs per tray	MS-162B to SMA Jack Conversion Adapter
MS-162-HRMJ-H1	CL0358-0221-1-00	○		

Packaging Specifications

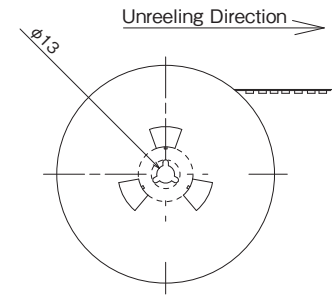
IEC 60286-3 / JIS C 0806 Compliant

Receptacle

● Embossed Carrier Tape Dimensions

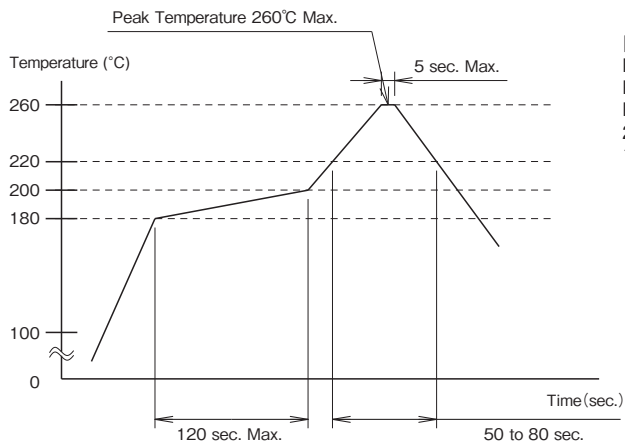


● Reel Dimensions



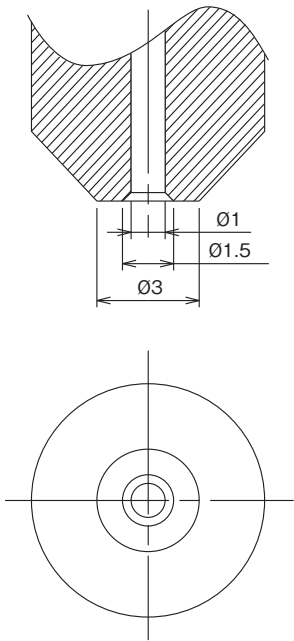
Recommended Temperature Profile

●Lead-free Solder Temperature Profile



[Conditions]
Maximum Temperature : 260°C Max.
Peak Temperature Time : 5 sec. Max.
Peak Temperature : 240 to 255°C
220°C Min : 50 to 80 sec.
180 to 200°C : 120 sec. Max.

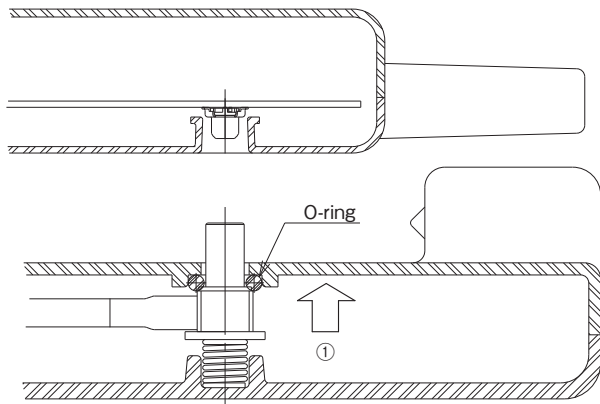
Recommended Nozzle Dimensions



Application Example

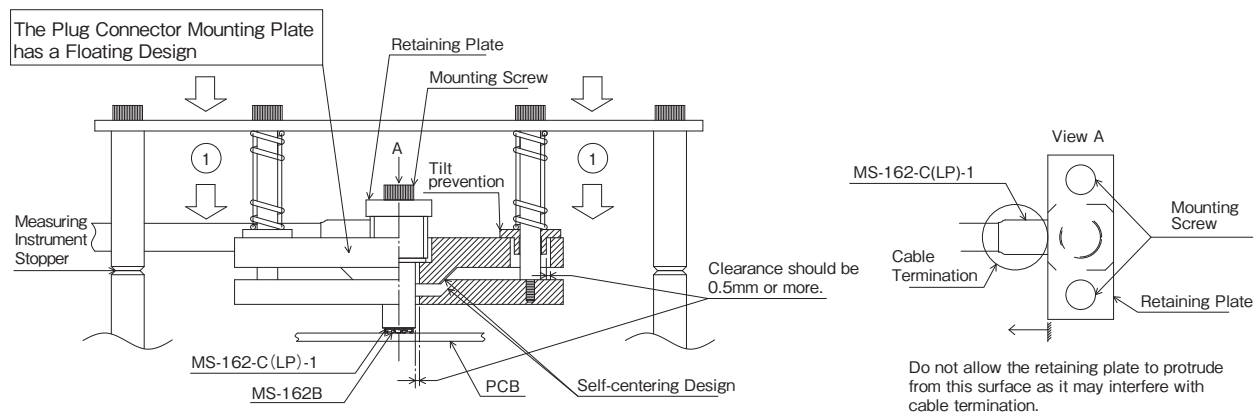
●Used as Interface

Note : This figure shows an example of mounting. Please provide a floating design or design that presses by spring. After plug mating the total load ① should be 10 to 15N.



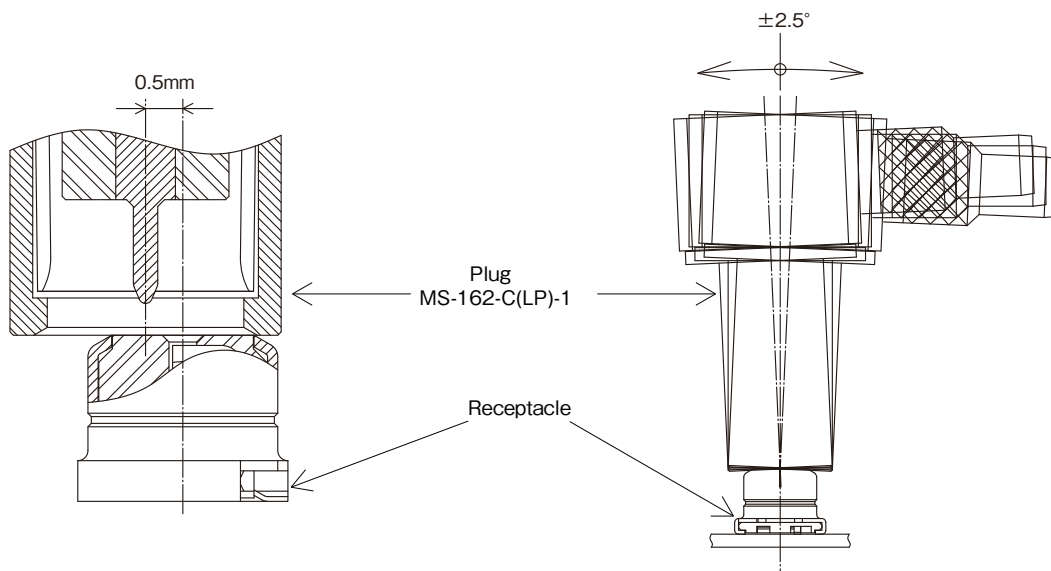
●Usage in Testing Fixture

Note : This figure shows an example of mounting. Please provide a floating design or design that presses by spring. After plug mating the total load ① should be 10 to 15N.



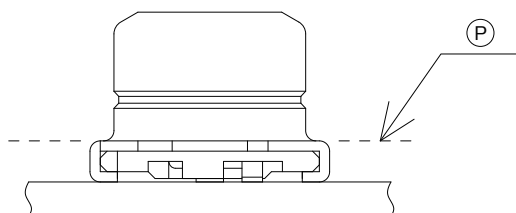
[Self-Alignment Range and Angle During Mating]

Note : This is the self-alignment range until it is guided by the receptacle and the tapered portion of the plug. During mating, a floating mechanism is needed to push the plug vertically using springs.



Precautions

1. This product cannot be washed.
2. During design, make sure that the product will not be subjected to force from the panel when dropped while mounted to the board.
3. Do not mount with manual solder. There is a risk of solder flux and wicking in the contact areas.
4. When using a heat gun, hot plate, etc., please keep use within 10 seconds at 260°C or less. If usage exceeds the above conditions, the plastic may melt and deform.
5. Refrain from using land patterns or metal mask dimensions other than those specified by Hirose as it may result in solder flux and wicking that may result in product failure.
6. Refrain from using this product in environments of dust, high humidity, gas, extremely high and low temperatures.
7. When using this product as an RF interface for mobile devices, secure a rubber cap to prevent dust from entering when the plug is not mated.
8. Before use make sure the plug is fully inserted to the (P) surface as shown below.



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