

## KMS-560A Series

## Miniature RF Switch for Automotive



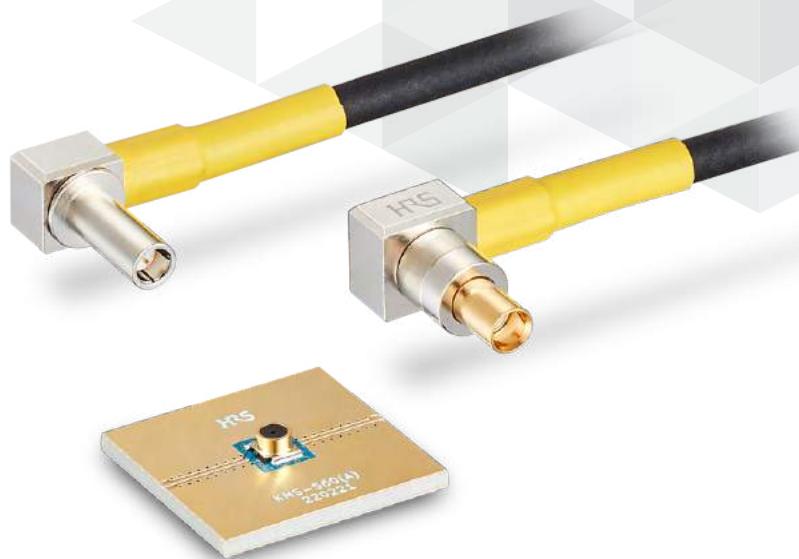
Coax Switch



6 GHz



Automotive



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  
Владimir (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

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## Overview

The KMS-560A series is a miniature RF switch developed for the inspection and measurement of high-frequency automotive circuits up to 6GHz. The compact design simplifies RF circuit inspection during manufacturing.

Circuit performance can be verified by simply inserting the external plug into the board-mounted receptacle. This action re-directs the circuit from normal condition to the plug side. Removing the plug restores the circuit to its normal condition.

## Features

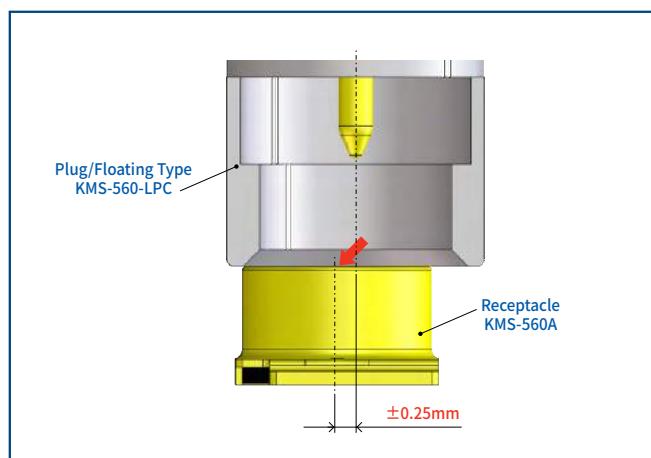
### 1. High Frequency: DC to 6GHz

### 2. Contact Design Prevents Dust Intrusion

With Hirose's double-bending design, any dust particles do not affect the stability/reliability of the contacts.

### 3. Wide Self-Alignment Range

The plug guide allows for a smooth and stable mating operation



### 4. High Heat Resistance: 105°C

### 5. Suitable for Automotive Applications including Telematics, Infotainment and Antenna.

### 6. Beryllium Free, Halogen Free

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

\*Definition according to IEC 61249-2-21. Br 900ppm Max., Cl 900ppm Max., and Br + Cl 1500ppm Max.

## Product Specifications

Operating Temperature (Note 1)		-40 to +105°C
Rated Power		4W
Frequency Range		DC to 6GHz
V.S.W.R.	Unmated Condition	1.5 Max. (DC to 6GHz)
	Mated Condition (Note 2)	
Insertion Loss	Unmated Condition	1.4dB Max. (DC to 6GHz)
	Mated Condition (Note 2)	
Isolation (Note 2)		10dB Min. (DC to 6GHz)

Note 1 : Includes the temperature rise due to current flow.

Note 2 : Measured in the mated condition with KMS560LP-SMAJ-L100.

Items	Specifications	Conditions
Contact Resistance	Center : 100mΩ Max. Outer : 50mΩ Max.	1mA AC Max. (or 1KHz)
Insulation Resistance	100MΩ Min.	500V DC
Withstanding Voltage	No insulation breakdown	500V AC for 1 min.
Mating Durability	Contact Resistance : Center : 100mΩ Max. Outer : 50mΩ Max.	100 times
Vibration Resistance	No electrical discontinuity of 1μs or more Contact Resistance : Center : 100mΩ Max. Outer : 50mΩ Max.	Frequency 10 to 500Hz, acceleration of 49m/s <sup>2</sup> , amplitude of 0.7mm, in 3 axis directions for 11 min. Test for 24 hours in total
Shock Resistance	No damage, crack or looseness of parts	Acceleration : 980m/s <sup>2</sup> , duration : 6ms, sine halfwave, Test 10 times in 3 axial directions
Temperature Cycles	Contact Resistance : Center : 100mΩ Max. Outer : 50mΩ Max. Insulation Resistance : 10MΩ Min.	Temperature : -40±2 → +15 to +35 → +105±2 → +15 to +35°C Time : 30 → 5 → 30 → 5 min. 1,000 cycles
Damp Heat Cycles	No damage, crack or looseness of parts	Left at temperature of 25°C±2°C and humidity of 65% for 25 hours
Dry Heat	Contact Resistance : Center : 100mΩ Max. Outer : 50mΩ Max. Insulation Resistance : 10MΩ Min. No damage, crack or looseness of parts	Left at temperature of 105±2°C for 1,000 hours
Humidity Resistance	Contact Resistance : Center : 100mΩ Max. Outer : 50mΩ Max. Insulation Resistance : 10MΩ Min. No damage, crack or looseness of parts No evidence of corrosion which affects to operation of connector	Left at temperature of 85±2°C and humidity of 85% for 1,000 hours

Note : Please refer to the specification sheet for details.

## Materials / Finish

Component	Material	Color / Finish	Remarks
Shell	Brass	Gold Plated over Nickel Underplating	-
Insulator	Polyamide	Black	UL94HB
Common Contact	Titanium Copper	Gold Plated over Nickel Underplating	-
Antenna Contact	Phosphor Bronze	Gold Plated over Nickel Underplating	-

## Product Number Structure

Refer to the chart below when determining the product specifications from the product number.  
Please select from the product numbers listed in this catalog when placing orders.

### ● Receptacle

**KMS-560 A (800)**

① ② ③

① Series Name	KMS-560	③ Specifications	(800): Standard, Emboss tape packaging (3,000pcs/reel)
② Applications	A : For Automotive, Consumer, and Other Applications		

### ● Measurement Plug

**KMS560 LP # - SMAJ - L100 (800)**

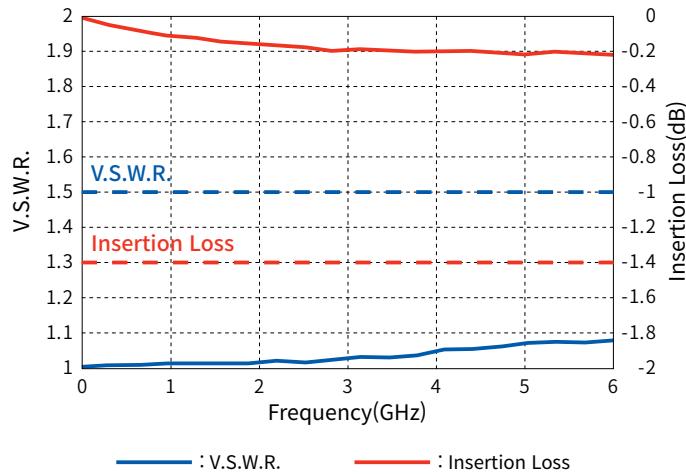
① ② ③ ④ ⑤ ⑥

① Series Name	KMS-560	④ SMA Connector (Note)	SMAJ : SMA Jack Connection
② Plug Type	LP : Right Angle Plug	⑤ Cable Length (Note)	L100 : 100mm
③ Mating Type	None : Friction Locking Type C : Floating Type	⑥ Specifications	(800) : Standard (1pc/bag)

Note : Cable length customizing and change to SMA plug type are available. Please contact Hirose representative.

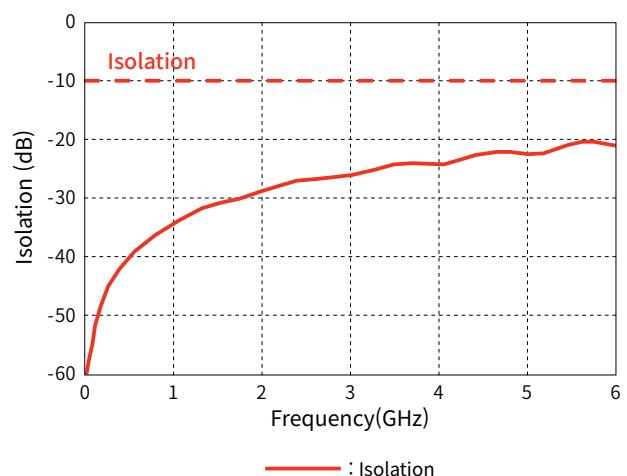
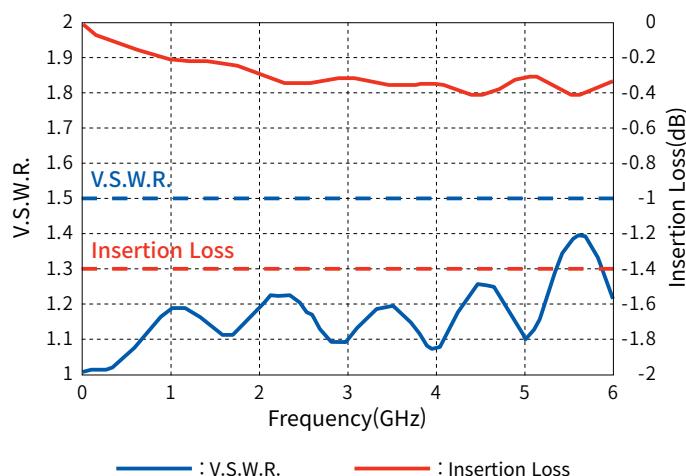
## High Frequency Performance (Typical Data)

- Normally Closed (Not Mated with the plug)



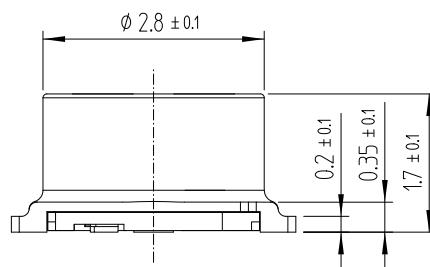
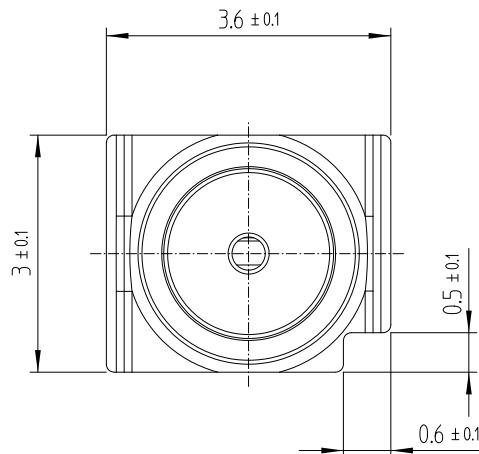
\*The characteristics of the evaluation board and SMA connector are excluded.

- Normally Open (Mated with the plug)



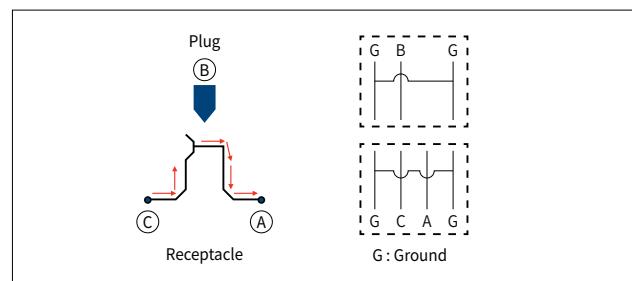
\*The characteristics of the evaluation board and SMA connector are excluded.

## Receptacle

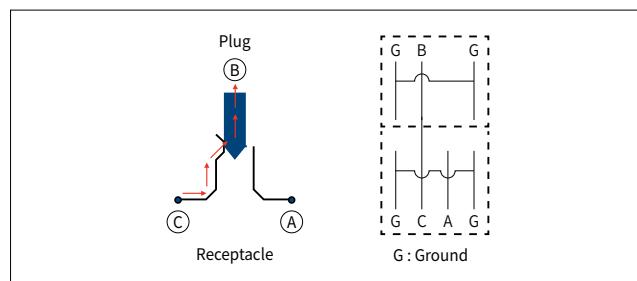


### ● Circuit Diagram

Not mated with the plug (N.C.)

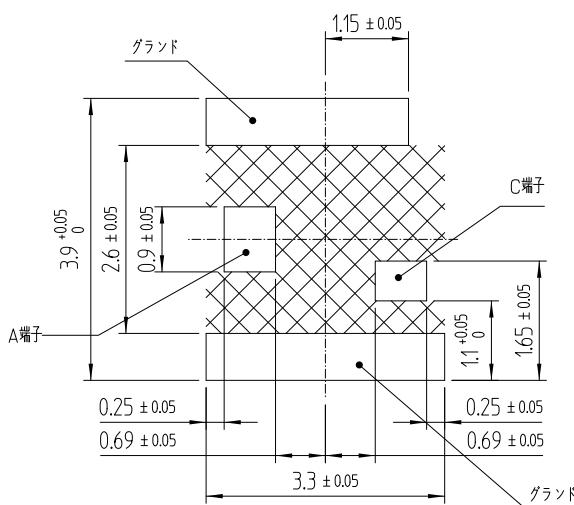


Mated with the plug (N.O.)



### ● Recommended Land Pattern & Metal Mask Layout

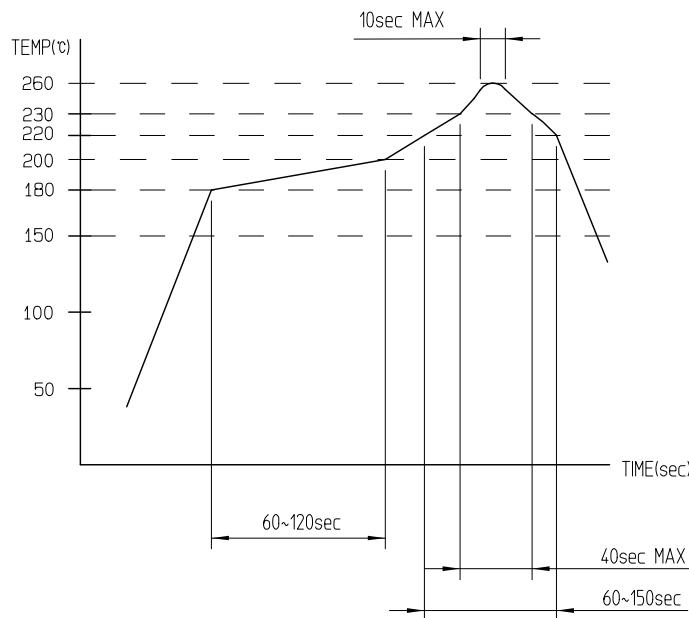
\*Recommended metal mask thickness: 0.1mm Max.



□ : No copper layer or solder resist on PCB surface

Part No.	HRS No.	Purchase Unit
KMS-560A(800)	CL0480-0903-0-00	3,000pcs per reel

## Recommended Solder Temperature Profile



### [Conditions]

Peak Temperature : 260°C Max. within 10 seconds.

230°C Min. : 40 seconds Max.

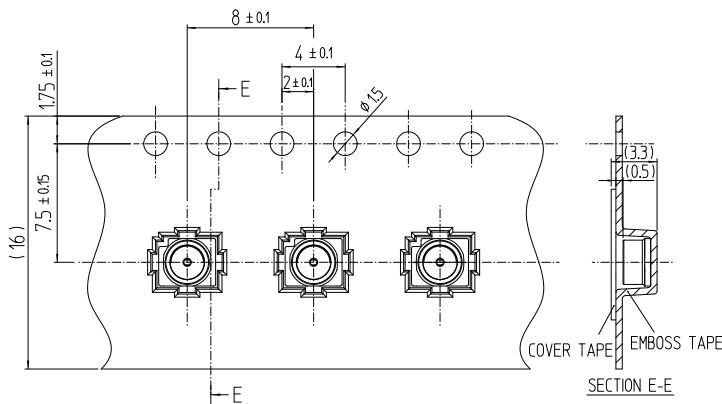
220°C Min. : 60-150 seconds

180 to 200°C:60-120 seconds

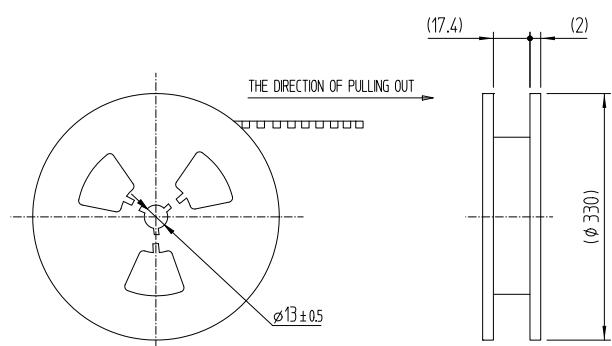
Reflow Cycle : 2 cycles Max.

## Packaging Specifications

### ● Embossed Tape Dimensions

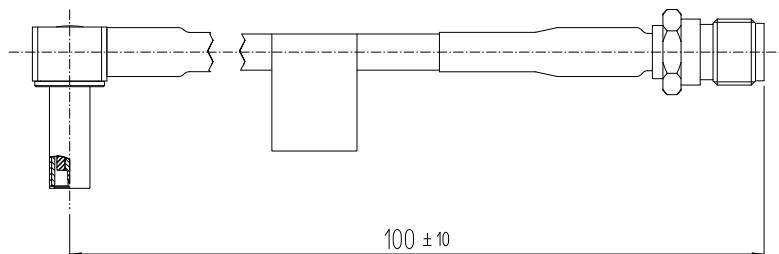


### ● Reel Dimensions



## Measurement Plug

### ● Non-Floating Type (Friction Lock)



Part No.	HRS No.	Mating Durability (Note 1)	Applicable Cable	Purchase Unit
KMS560LP-SMAJ-L100(800)	CL0480-9904-0-00	1,000 cycles	1.5D-HQEWF (Fujikura Ltd.)	1pc per bag

Note 1: This mating durability only applies to this specific plug, not for Receptacle combination.

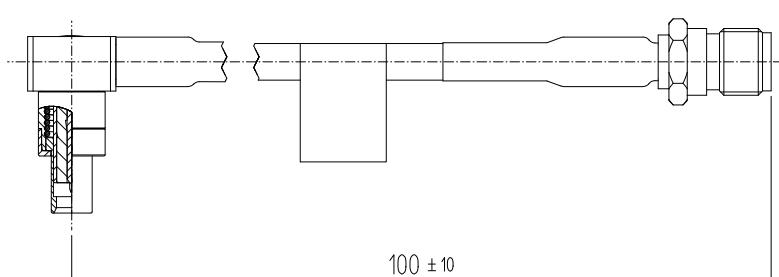
Note 2: Plugs are only for performance measurement during trial evaluation or for inspection during production process purposes.

Note 3: This plug has a friction lock mechanism to keep the plug connected with the receptacle without foreign assistance.

However, avoid pulling on the cable and make sure the plug is vertical to the receptacle before use.

Note 4: Cable length customizing and change to SMA plug type are available. Please contact Hirose representative.

### ● Floating Type



Part No.	HRS No.	Mating Durability (Note 1)	Applicable Cable	Purchase Unit
KMS560LPC-SMAJ-L100(800)	CL0480-9905-0-00	5,000 cycles	1.5D-HQEWF (Fujikura Ltd.)	1pc per bag

Note 1: This mating durability only applies to this specific plug, not for Receptacle combination.

Note 2: Plugs are only for performance measurement during trial evaluation or for inspection during production process purposes.

Note 3: Cable length customizing and change to SMA plug type are available. Please contact Hirose representative.

## MS-156C Series

# 1.35mm Height, Coaxial Switch for Ultra Small Size Inspection



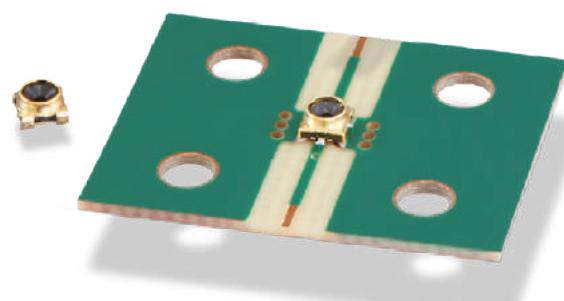
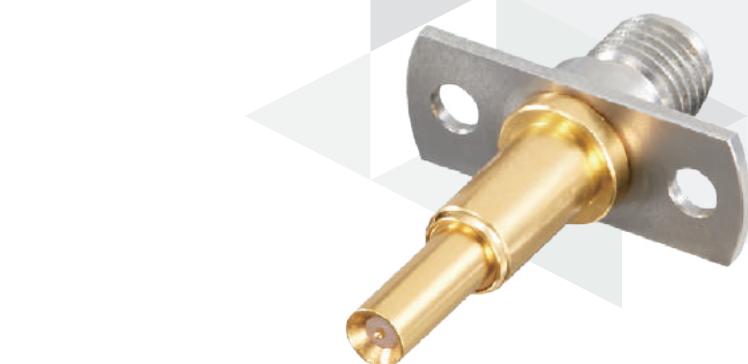
Coax Switch



Compact



RF



## Overview

MS-156C series is ultra small coaxial switch developed for inspection of microwave circuits used for portable terminals circuits and high frequency circuits.

It supports high-density substrate mounting by small size equipment, and supports over a wide frequency range up to 11GHz. Also, you can easily perform circuit tests while in small size.

In the unplugged state, common contact and antenna contact are connected to form circuit.

By mating the plug, the antenna contact switches to the plug side circuit.

Some conventional MS-156HF plugs can be used for the plug connector.

## Features

### 1. Low Insertion Loss

Unmated State

0.15dB Max. (0 to 2.5GHz)

0.2dB Max. (2.5GHz to 6.0GHz)

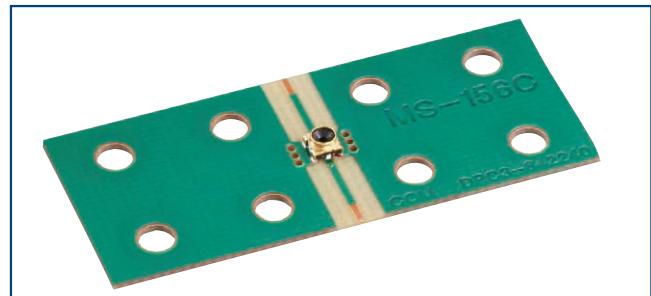
0.4dB Max. (6.0GHz to 11.0GHz)

### 2. Low Profile, and Space-Saving

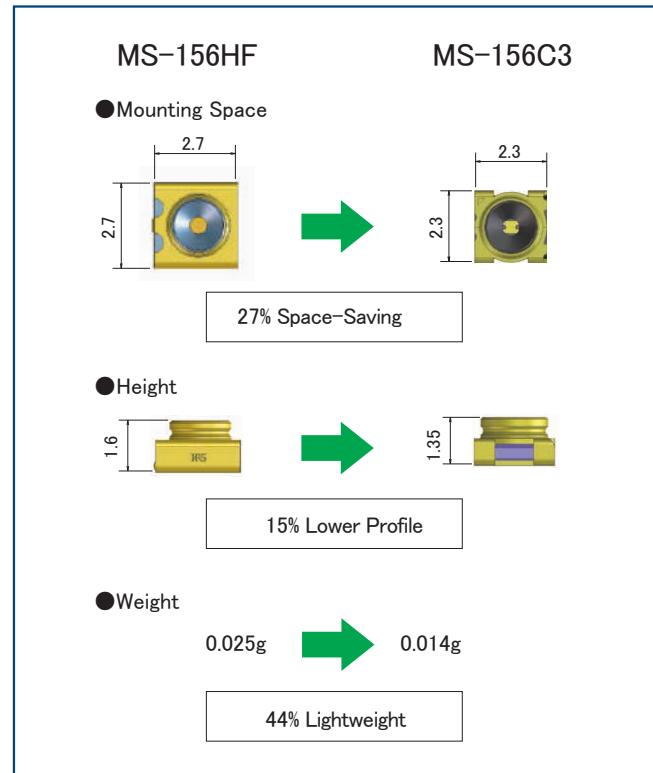
Height : 1.35mm (Nominal)

Size : 2.3mm×2.3mm (Nominal)

Weight : 0.014g



Space-Saving The Substrate Mounting Area



Comparison with Our Conventional Item MS-156HF

### 3. Performs Over a Wide Frequency Range

Applicable frequencies range over a wide band, from 0 to 11GHz.

### 4. Corresponding to Automatic Mounting

It supports pick & place mounting with embossed tape.

### 5. Halogen-free, RoHS2 Compliant

The receptacle and plug do not contain chlorine or bromine above the standard value.

\* As defined by IEC 61249-2-21

Br : 900ppm Max., Cl : 900ppm Max., Br+Cl : 1500ppm Max.

## Product Specifications

	Unmated	Mated (MS-156-HRMJ-3A)
Operating Temperature	-40°C to +85°C	-40°C to +85°C
Rated Power	2W	2W
Frequency Range	0 to 11.0GHz	0 to 8.0GHz
V.S.W.R.	1.2 or less (0 to 2.5GHz) 1.3 or less (2.5GHz to 6.0GHz) 1.5 or less (6.0GHz to 11.0GHz)	1.4 or less (0 to 3.0GHz) 1.8 or less (3.0GHz to 8.0GHz)
Insertion Loss	0.15dB or less (0 to 2.5GHz) 0.20dB or less (2.5GHz to 6.0GHz) 0.40dB or less (6.0GHz to 11.0GHz)	0.5dB or less (0 to 3.0GHz) 0.8dB or less (3.0GHz to 6.0GHz) 0.9dB or less (6.0GHz to 8.0GHz)
Reverse Loss	20dB (0 to 3.0GHz) 15dB (3.0GHz to 6.0GHz) 12dB (6.0GHz to 11.0GHz)	

Item	Standards	Condition
Contact Resistance	Center 100mΩ Max. External 100mΩ Max.	Measured at 100mA Max.
Insulation Resistance	1,000MΩ Min.	Measured at 100V DC
Withstanding Voltage	No insulation breakdown	100V AC for 1 min.
Vibration Resistance	No electrical discontinuity of 1μs or more	Frequency 10 to 55Hz, Half amplitude 0.75mm 3 Axial direction 1 oct/min., 10 cycles each, Total 30 cycles
Shock Resistance	No electrical discontinuity of 1μs or more	Acceleration 490 m/s <sup>2</sup> 3 directions at half-sine wave 3 times each, for a Total of 18 times
Temperature Cycle	Contact Resistance: 100mΩ Max. Insulation Resistance: 10MΩ Min.	Temperature: -55 to +5 to +35 → +85 → +5 to +35°C Time: 30 → within 5 min. → 30 → within 5 min. 50 cycles
Heat Resistance	Contact Resistance: 100mΩ Max. Insulation Resistance: 10MΩ Min.	96 hours at temperature of +85°C
Cold Resistance	Contact Resistance: 100mΩ Max. Insulation Resistance: 10MΩ Min.	96 hours at temperature of -55°C
Humidity Resistance	Contact Resistance: 100mΩ Max. Insulation Resistance: 10MΩ Min.	Temperature +40 ± 2°C, humidity 90 to 95%, after 96 hours
Mating Durability	Contact Resistance: 100mΩ Max.	100 times

Note : Information contained in this catalog represents general requirements for this Series.

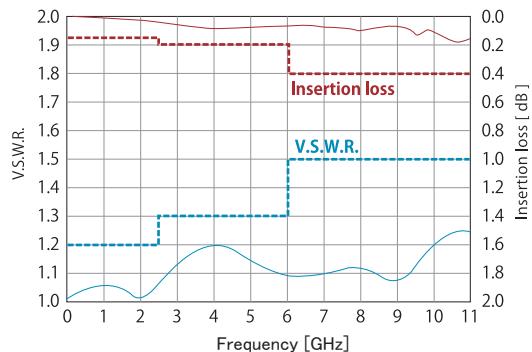
Contact us for the drawings and specifications for a specific part number shown.

## Materials / Finish

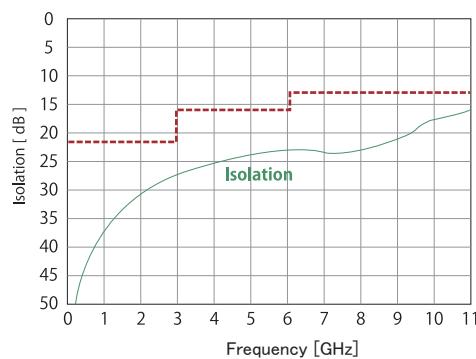
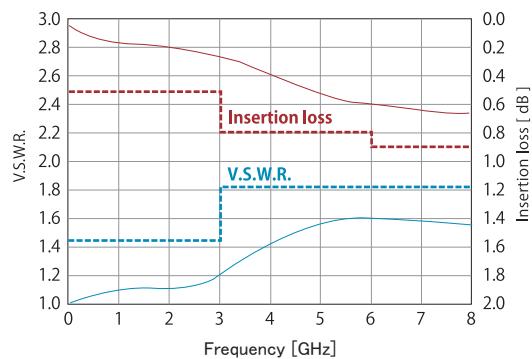
Component	Material	Finish	UL Standard
Shell	Phosphorous Bronze	Gold Plating	-
Insulator	6T Nylon	-	UL94HB
Common Contact	Copper Alloy	Partial Gold Plating	-
Antenna Contact	Phosphorous Bronze	Partial Gold Plating	-

## Frequency Characteristics (TYPICAL)

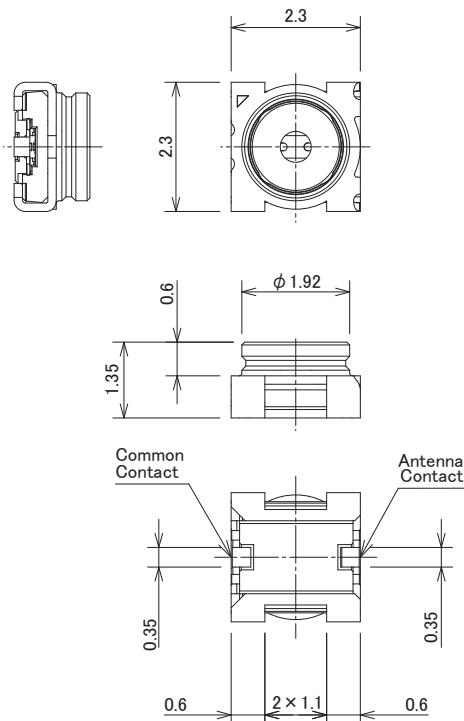
### ● NORMALLY CLOSED (Unmated)



### ● NORMALLY OPEN (Mated)

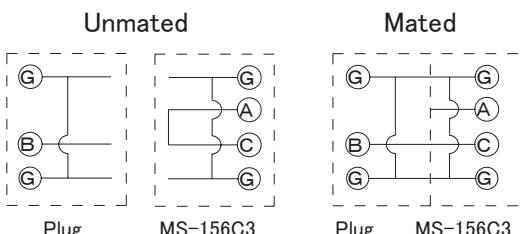


## Receptacle

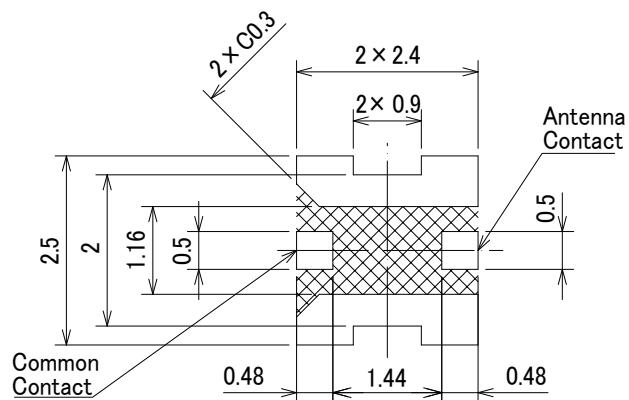


Part No.	HRS No.	Purchase Unit
MS-156C3	CL0358-0340-0-00	10,000pcs per reel
MS-156C3(20)	CL0358-0340-0-20	2,000pcs per reel

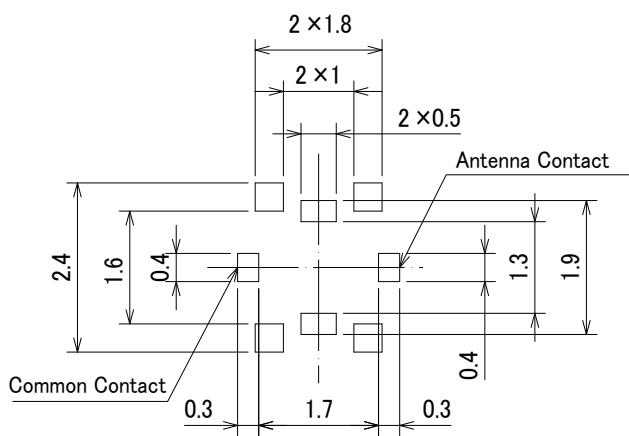
### Circuit Diagram



### PCB Mounting Pattern Dimensions



### Metal Mask Dimensions (Thickness : 0.1mm)



Note 1 : Do not mounting this product using PCB patterns or metal mask dimensions other than the ones specified.

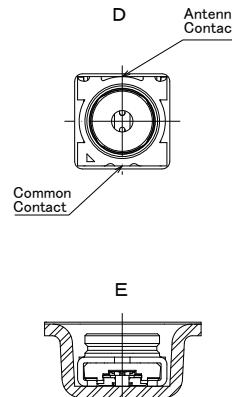
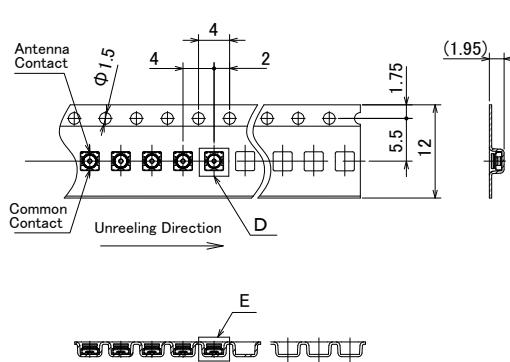
It may result in a product malfunction due to solder and/or flux wicking.

Note 2 : Cross-hatched area shown on the PCB mounting pattern must be free of any conductive traces.

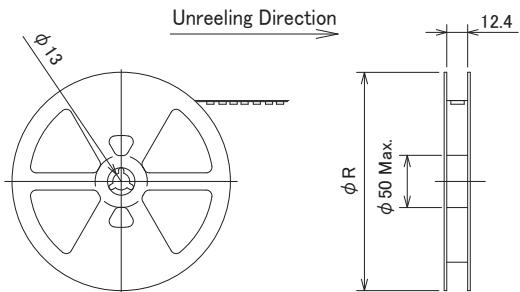
Placing conductive traces in this area may affect performance and will void product warranties.

## Packaging Specifications

### Embossed Carrier Tape Dimensions



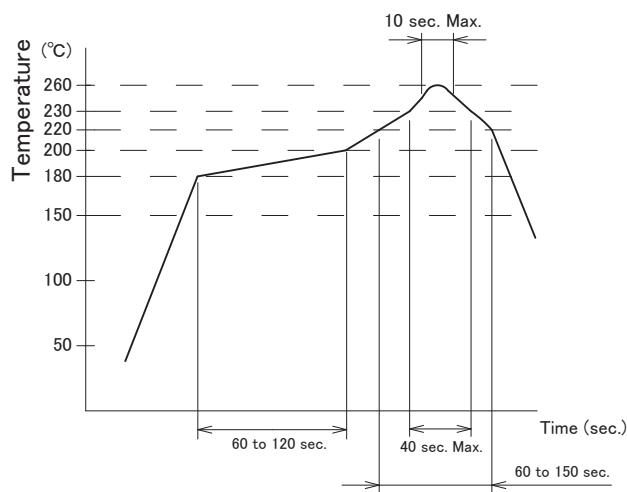
### Reel Dimensions



Part No.	Reel Outer Diameter R	Purchase Unit
MS-156C3	Φ 380	10,000pcs per reel
MS-156C3(20)	Φ 180	2,000pcs per reel

## Recommended Temperature Profile

### ● Recommended Conditions for Using Lead-Free Solder

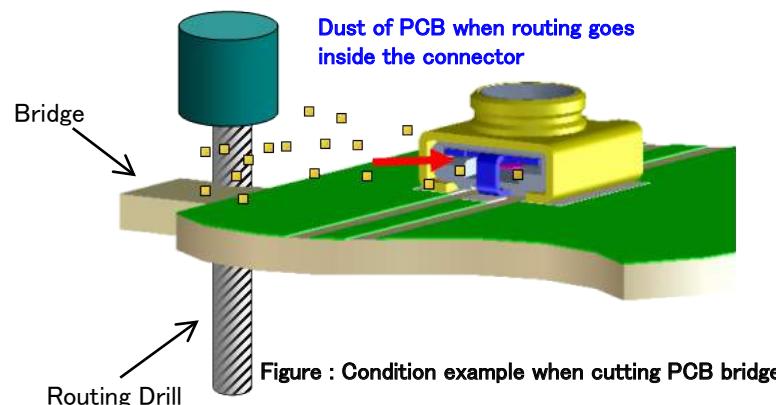
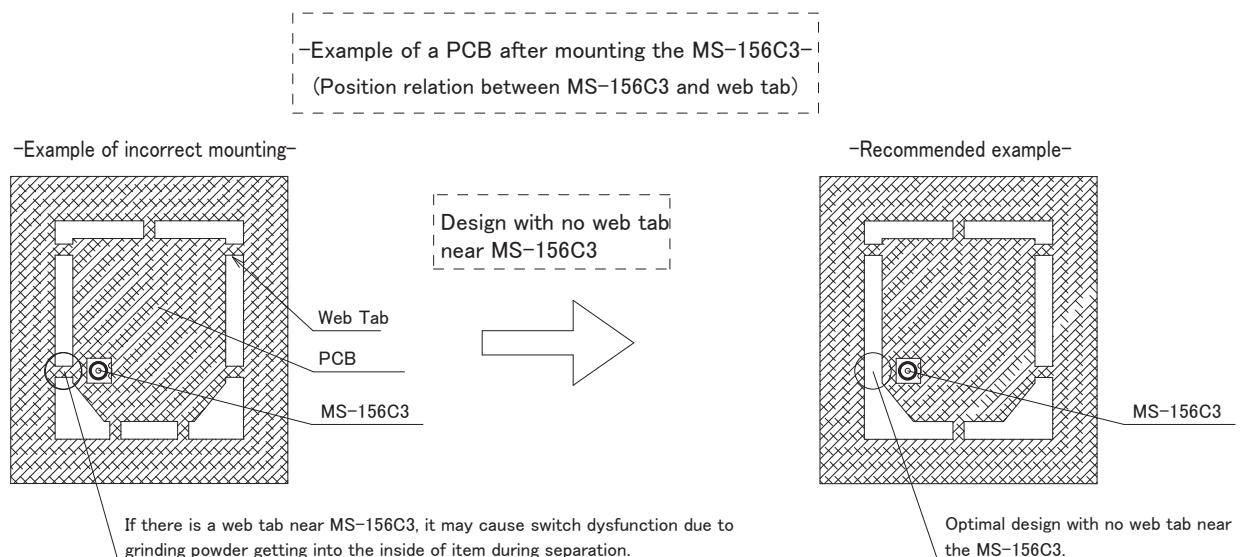


Max Temperature	260°C
Peak Temperature Time	10 sec. Max.
230°C or higher	40 sec. Max.
220°C or higher	60 to 150 sec.
180 to 200°C	60 to 120 sec.

Metal Mask Thickness : t=0.1mm  
Number of Reflow : 2 times Max.

## Precautions

1. Do not mount this product using PCB patterns or metal mask dimensions other than the ones specified. It may result in a product malfunction due to solder and/or flux wicking.
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.
3. Do not use hand soldering for mounting of MS-156C3. Doing so could result in solder and flux wicking to the contact areas.
4. If the substrate after MS-156C3 mounting is to be cut off by a router, etc., the web tab should be designed away from MS-156C3 because it may cause item dysfunction due to grinding powder. Also, make sure to suck out the scraping powder so that it does not scatter during the process.



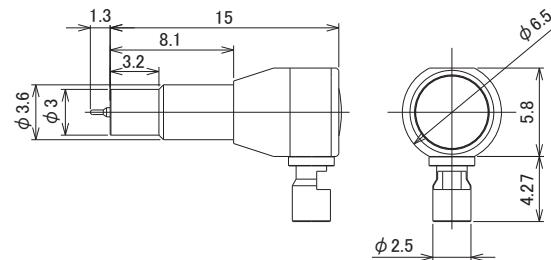
5. This product is intended for use only in testing the circuit. It cannot be used as an interface.
6. Do not use the product in special environments such as dust, high humidity, gas, very high temperature or very low temperature.
7. Plugs can be roughly classified to two types.
  - For mass production line automatic check (Press down type)
  - For manual check (With retentive lock) : Unable to be used at production line.
8. Do not use the washing process.
9. Please use a design in which the device housing does not exert pressure or force on the MS-156C in the event that the finished device is accidentally dropped.
10. Do not apply heat (heat gun or hot plate) over 260°C for more than 10 seconds. Exceeding this thermal limit could cause the resin to melt and cause deformation.
11. When automatic inspections are to be performed during the manufacturing operations, request the MS-156 plug connector manual for examples of implementation.

## ■ Plug

Order this plug from Cable Assembly Specifications.

Consult your our company sales representative for information on L-length, single-sided coaxial connectors.

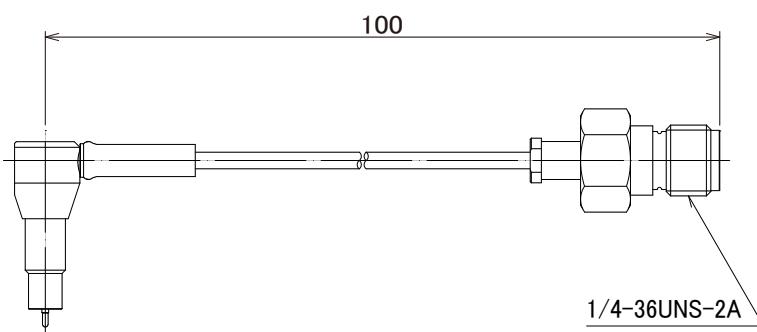
### ● Simplified Lock (Short Type, For Trial Production)



Part No.	HRS No.
MS-156-088LP-H1	CL0358-0268-5-00

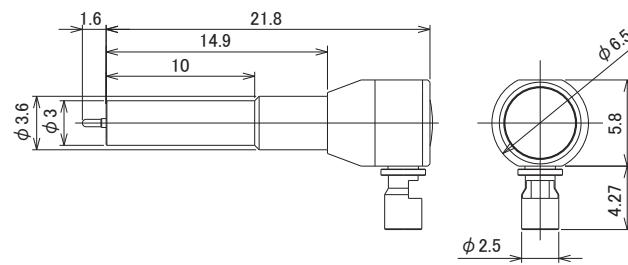
Note 1 : An lock mechanism is provided to enable mating and retention with MS-156C3. Keep the mating vertical before use.

Note 2 : This item is delivered by harness, so please order it from the following Item. Also, please consult us about cable length, installation connector change, etc.



Part No.	HRS No.	Purchase Unit
MS156LH1-HRMJ-088V100A	CL0362-0222-3-01	1pc per bag

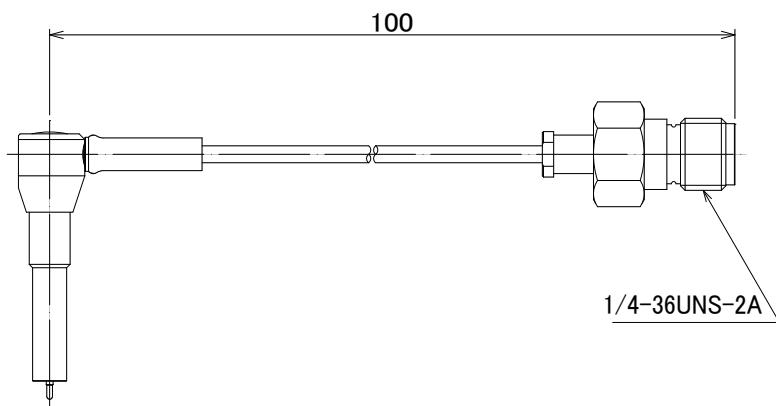
● Simplified Lock (Long Type, For Trial Production)



Part No.	HRS No.
MS-156-088LP-H2	CL0358-0275-0-00

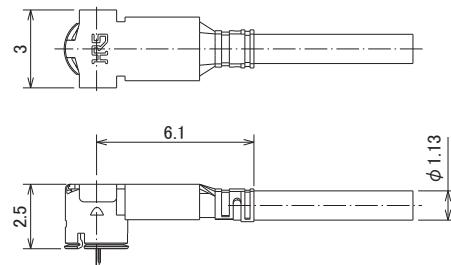
Note 1 : An lock mechanism is provided to enable mating and retention with MS-156C3. Keep the mating vertical before use.

Note 2 : This Item is delivered by harness, so please order it from the following Item. Also, please consult us about cable length, installation connector change, etc.



Part No.	HRS No.	Purchase Unit
MS156LH2-HRMJ-088V100	CL0362-0017-0-01	1pc per bag

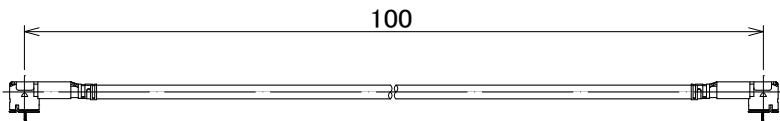
● Simplified Lock (Antenna Connection Type)



Part No.	HRS No.
MS-156C-LP-068	CL0358-0276-3-00

Note 1 : An lock mechanism is provided to enable mating and retention with MS-156C3.

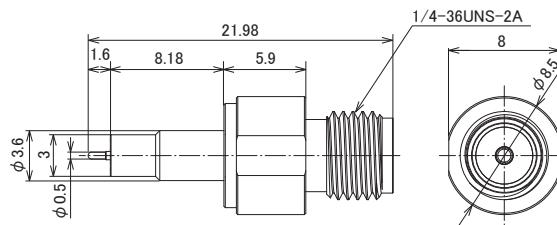
Note 2 : This Item is delivered by harness, so please order it from the following Item. Also, please consult us about cable length, installation connector change, etc.



Part No.	HRS No.	Purchase Unit
MS156CLP-2LP-068N1T100	CL0362-0912-1-01	1pc per bag

## ■ SMA Conversion Adapter

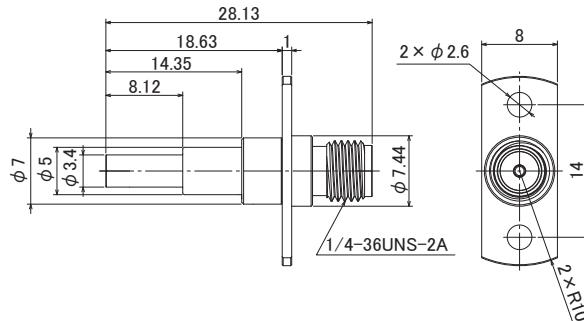
### ● Simplified Lock (For Trial Production)



Part No.	HRS No.	Purchase Unit
MS-156-HRMJ-H1	CL0358-0290-4-00	20pcs per bag

Note : An lock mechanism is provided to enable mating and retention with MS-156C3. Keep the mating vertical before use.

### ● Press Down Type with Flange (For Mass Production)

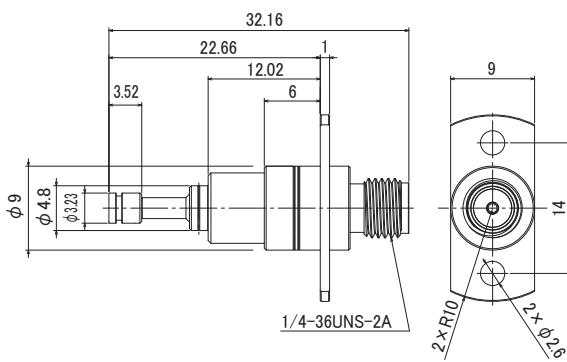


Part No.	HRS No.	Purchase Unit
MS-156-HRMJ-3A	CL0358-0325-7-00	20pcs per bag

Note 1 : Mating MS-156C3 vertically with 6 to 10N.

Note 2 : Proving jig need to equipped with floating capability and spring feature.

### ● Floating Type (For Mass Production)



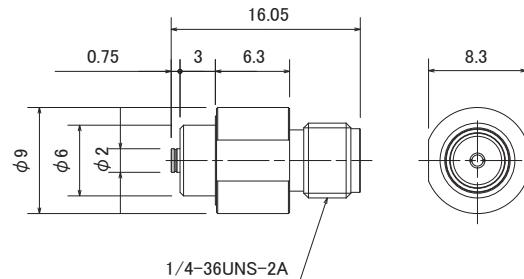
Part No.	HRS No.	Purchase Unit
MS-156-HRMJ-F6	CL0358-0352-0-00	20pcs per bag

Note : Mating vertically with MS-156C3 and use within the specified stroke (1mm to 2mm).

## ■ Plug Measuring Adapter

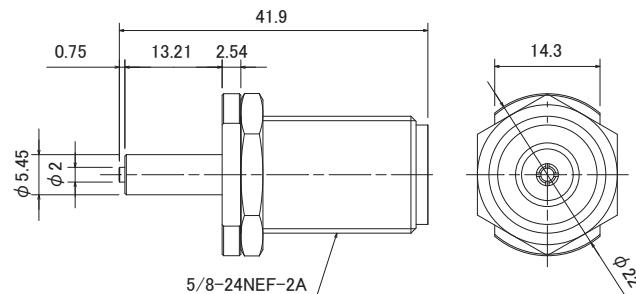
This adapter is used to measure plugs for MS-156C3.

### ● SMA Conversion Type



Part No.	HRS No.	Purchase Unit
MS-156R-HRMJ-1	CL0358-0188-8-00	20pcs per bag

### ● N Conversion Type



Part No.	HRS No.	Purchase Unit
MS-156R-NJ-1	CL0358-0176-9-00	10pcs per box

## While Taking into Consideration

Specifications mentioned in this catalog are reference values.

When considering to order or use this product, please review the Drawing and Product Specifications sheets.

Use an appropriate cable when using the connector in combination with cables.

If considering usage of a non-specified cable, please contact your sales representative.

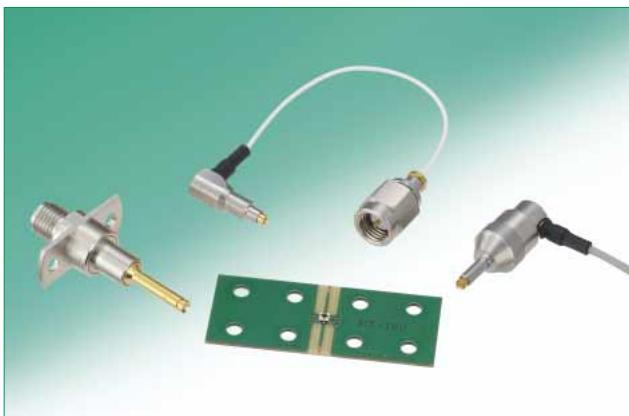
If assembly process is done by jigs & tools which are not identified by Hirose, the warranty of the product may be affected.

If considering usage for below mentioned applications, please contact your sales representative.

In cases where the application will demand a high level of reliability, such as automotive, medical instruments, public infrastructure, aerospace/defense etc. Hirose must review before assurance of reliability can be given.

# Subminiature Coaxial Switch 0.85mm High, DC to 11GHz

## MS-180 Series



### ■Features

#### 1. Performs over a wide frequency range

Applicable frequencies range over a wide bandwidth, from DC to 11GHz.

#### 2. Low insertion loss

0.1 dB Max. up to 3GHz (not mated with the probe).  
0.2 dB Max. up to 6GHz (not mated with the probe).  
0.3 dB Max. up to 11GHz (not mated with the probe).

#### 3. Space-saving and low profile design

0.85mm high above the board.  
1.8mm x 1.8mm board space occupation.

#### 4. Minimized Keep Out area and inspection port on chassis

Thanks to thinner probing tip in 2.24mm outer diameter, customer are able to achieve better space saving design.

#### 5. Automatic board placement

Packaged on tape-and-reel the receptacles can be placed with vacuum nozzles of the automatic placement equipment.

#### 6. Beryllium Free, 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.

### ■Overview

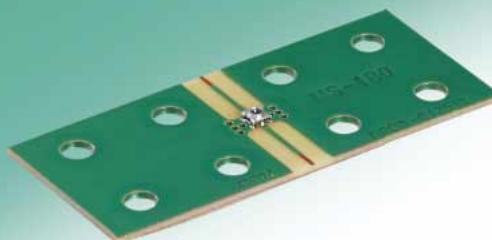
MS-180 series is the subminiature coaxial connectors with switch, developed for inspecting the RF module functionality and high frequency circuits. It can be used to mount on high density board of miniaturized devices and multiband frequency. It supports high frequency bands up to 11GHz. Enable secure and easy inspection of circuits. 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.

Plug side is smaller than the previous model and occupies less space in customer's design.

#### Space saving design

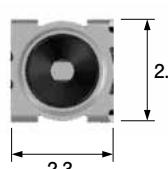
0.85mm above the board

1.8×1.8mm on the board

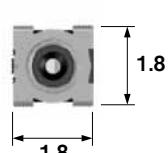


#### ●PCB occupation

MS-156C

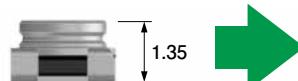


MS-180



38.7% smaller

#### ●Height



37% lower

#### ●Weight

0.016g

0.007g

56.3% lighter

## ■Product Specifications

	Not mated with the probe	Mated with the probe (MS-180-HRMJ-3)
Frequency range	DC to 11GHz	DC to 8GHz
V.S.W.R.	1.2 max. (DC to 3.0GHz)	1.2 max. (DC to 3.0GHz)
	1.3 max. (3.0GHz to 6.0GHz)	1.3 max. (3.0 to 8.0GHz)
	1.4 max. (6.0GHz to 11.0GHz)	
Insertion loss	0.1dB max. (DC to 3.0GHz)	0.3dB max. (DC to 3.0GHz)
	0.2dB max. (3.0GHz to 6.0GHz)	0.5dB max. (3.0GHz to 6.0GHz)
	0.3dB max. (6.0GHz to 11.0GHz)	0.6dB max. (6.0GHz to 8.0GHz)
Isolation	25dB min. (DC to 3.0GHz)	
	20dB min. (3.0GHz to 6.0GHz)	
	12dB min. (6.0GHz to 11.0GHz)	
Operating temperature range	-40°C to +85°C	
Rated power	2W	

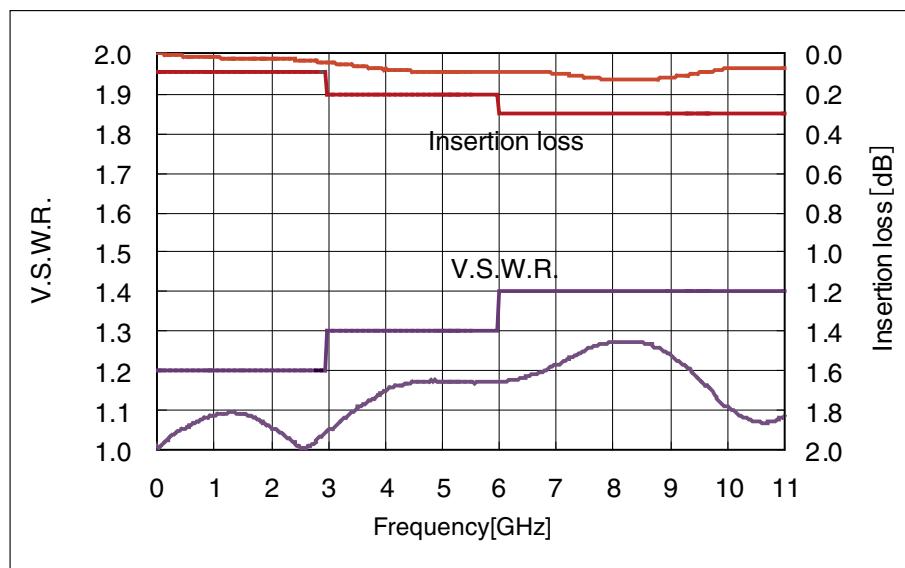
Item	Specification	Conditions
1. Contact resistance	100mΩ max.	100mA max.
2. Insulation resistance	1000MΩ min.	100V DC
3. Withstanding voltage	No flashover or insulation breakdown	100V AC / 1 minute
4. Vibration	No electrical discontinuity of 1μs or more	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis
5. Shock	No electrical discontinuity of 1μs or more	Acceleration of 490m/s <sup>2</sup> , 11ms duration, sine halfwave, 3 cycles in each of the 3 axis, 18 times in total.
6. Temperature cycle	Contact resistance : 100mΩ max. Insulation resistance : 10MΩ min.	Temperature : -55°C → +15°C → +35°C → +85°C → +15°C to +35°C Time : 30 → 2 to 3 → 30 → 2 to 3 minutes 100 cycles
7. High temperature exposure	Contact resistance : 100mΩ max. Insulation resistance : 10MΩ min.	96 hours at 85°C
8. Low temperature exposure	Contact resistance : 100mΩ max. Insulation resistance : 10MΩ min.	96 hours at -55°C
9. Humidity (Steady state)	Contact resistance : 100mΩ max. Insulation resistance : 10MΩ min.	96 hours at 40±2°C and humidity of 90 to 95%
10. Durability	Contact resistance : 100mΩ max.	100 cycles

## ■Materials / Finish

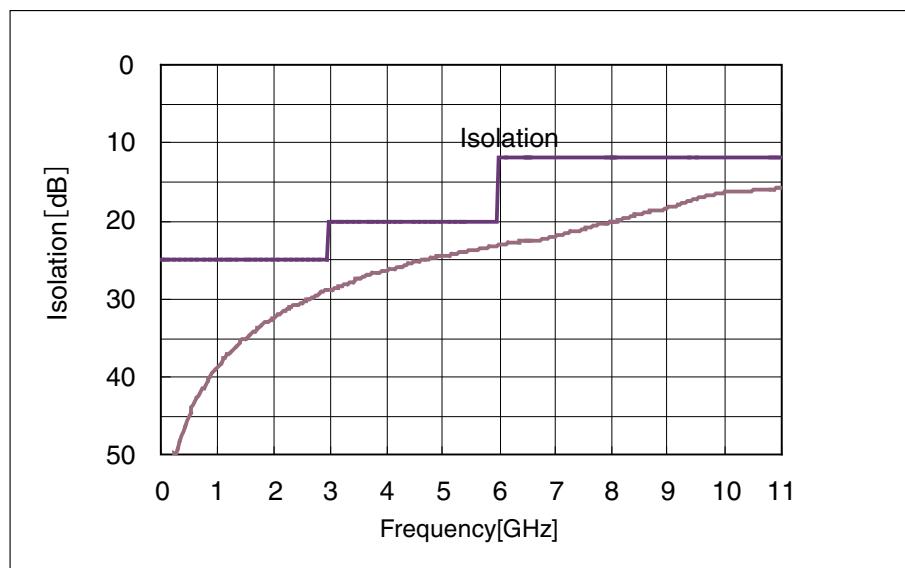
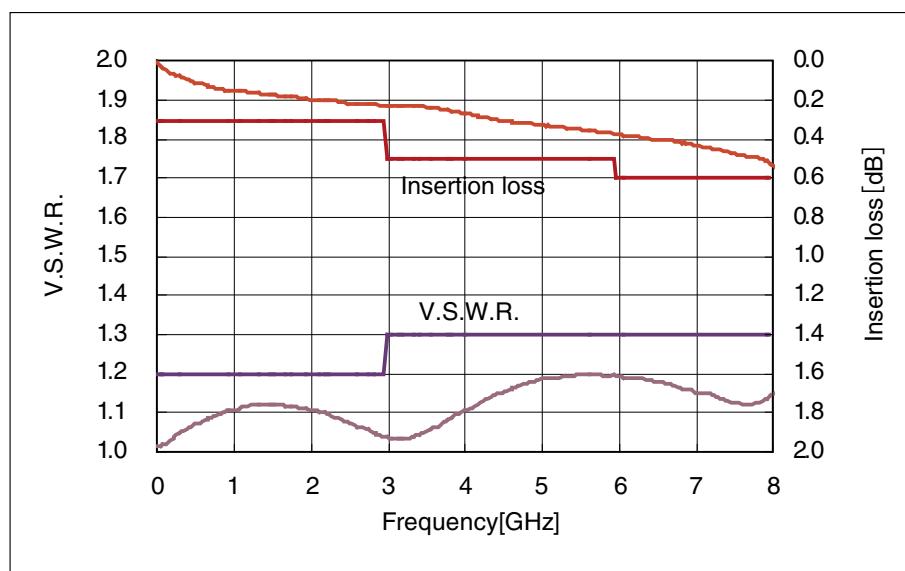
Part	Material	Finish	Remarks
Shell	Brass	Partially gold plated	—
Insulator	LCP	—	UL94V-0
C CONTACT	Copper alloy	Partially gold plated	—
A CONTACT	Copper alloy	Partially gold plated	—

## ◆Typical Data

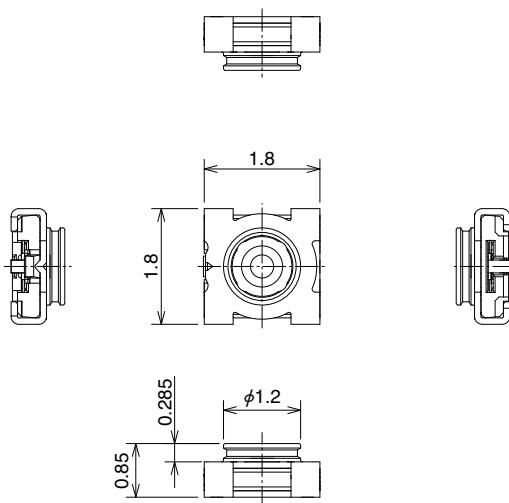
### ●NORMALLY CLOSED(Not Mated with the probe)



### ●NORMALLY OPEN(Mated with the probe)

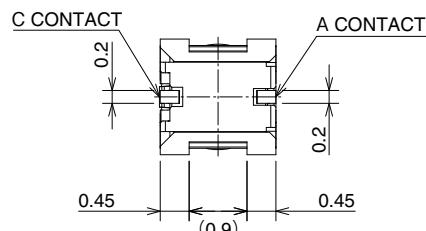
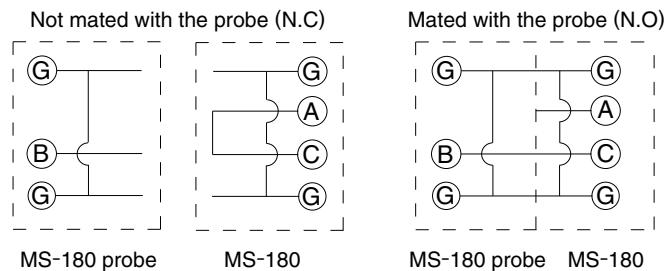


## ■ Receptacle

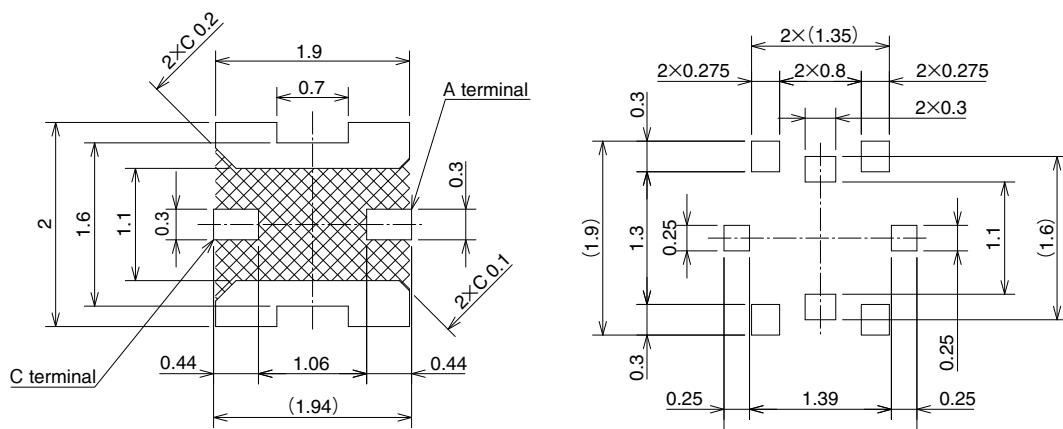


Part No.	HRS No.	Packaging
MS-180	358-0265-7	15,000 pcs/reel
MS-180(20)	358-0265-7 20	3,000 pcs/reel

## ■ Circuit diagram



## ◆ PCB Footprint and Metal Stencil mask Dimensions

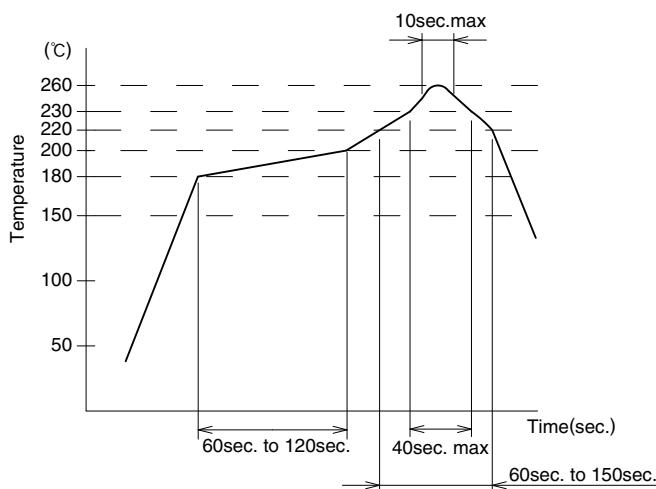


 : This area must be free of conductive traces and solder resist on top layer.

Note. • Do not reflow the product other than using specified PCB footprint and metal stencil dimensions. Otherwise it may cause solder and/or flux wicking affecting the product performance.

• Do not use hand soldering for mounting of MS-180, since it could result in solder and flux wicking to the contact areas.

## ◆Recommended Temperature Profile

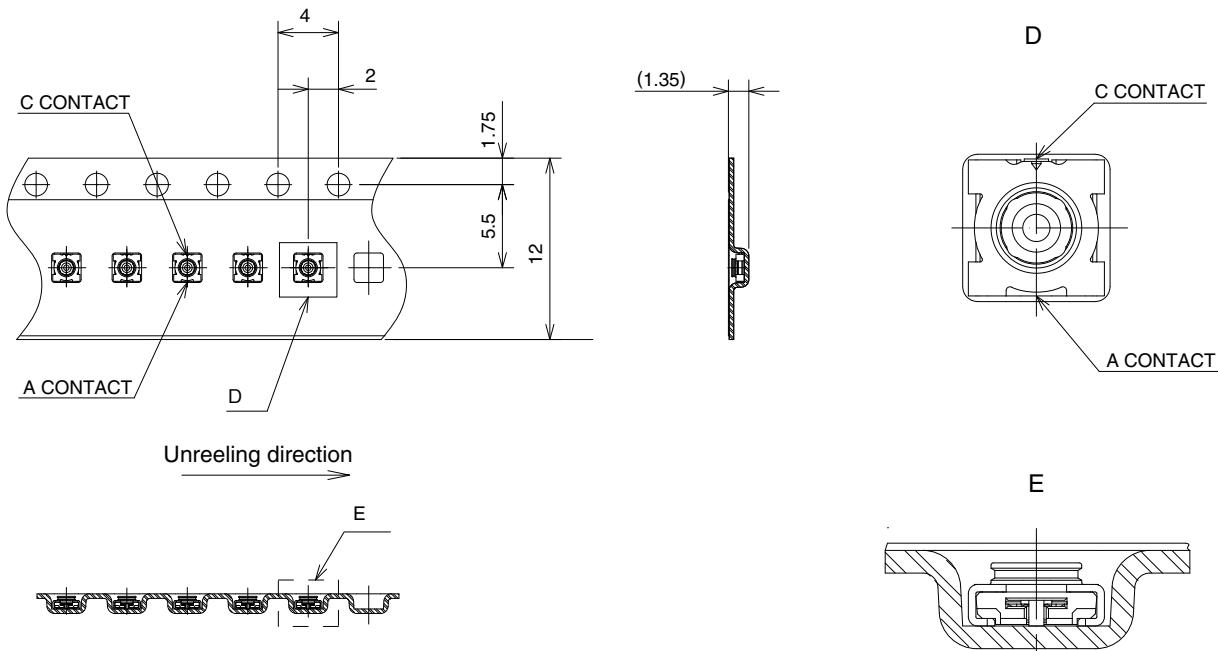


Using Lead-free Solder paste

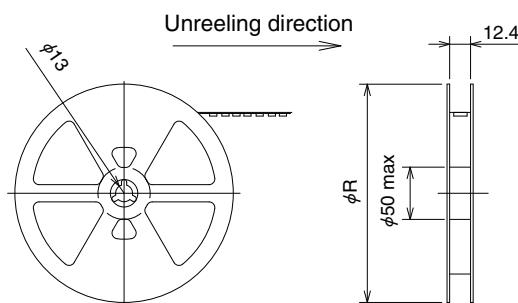
① Maximum temperature	: 260°C
② Peak temperature time	: 10 sec. max.
③ 230°C min.	: 40 sec. max.
④ 220°C min.	: 60 sec. to 150 sec.
⑤ 180°C to 200°C	: 60 sec. to 120 sec.

Metal mask thickness : 0.1 mm  
Reflow cycles : 2 cycles

## ◆Packaging Specifications



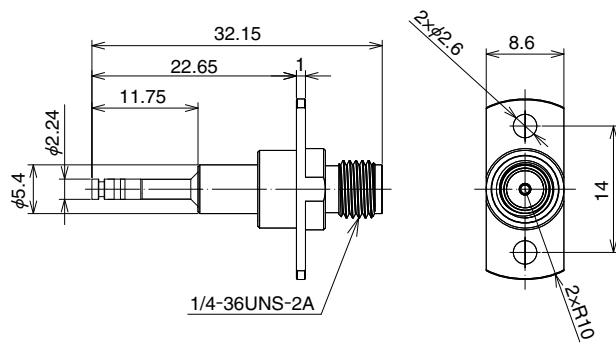
Reel dimensions



Part No.	Reel size	Packaging
MS-180	$\phi 380$ mm	15,000 pcs/reel
MS-180(20)	$\phi 180$ mm	3,000 pcs/reel

## ■Measurement probe

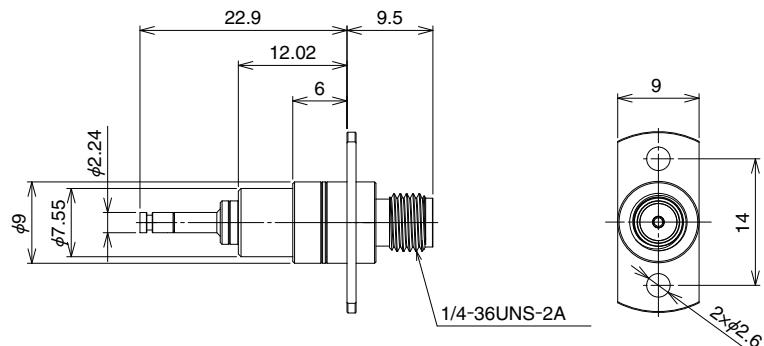
### ●Fixed probing tip (for mass production lines) SMA connection



- Mating MS-180 vertically with 6 to 8N.
- This durability only applies to this specific probe.
- Proving jig need to equipped with floating capability and spring feature.

Part No.	HRS No.	Durability
MS-180-HRMJ-3	358-0318-1	10,000 cycles

### ●Fixed flange with floated probing tip (for mass production lines) SMA connection

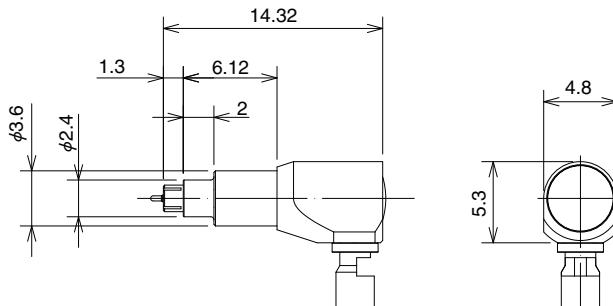


- The probe should mate vertically with the receptacle.
- Always use the probe within the specified stroke length.
- This durability only applies to this specific probe.

Part No.	HRS No.	Durability
MS-180-HRMJ-F6	358-0346-7	10,000 cycles

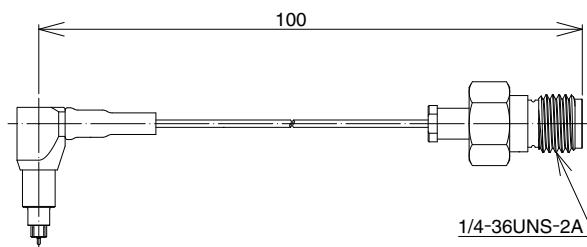
### ●Probe with simple lock (for lab use)

**MS-180-040LP-H3**



Part No.	HRS No.	Durability
MS-180-040LP-H3	358-0319-4	500 cycles

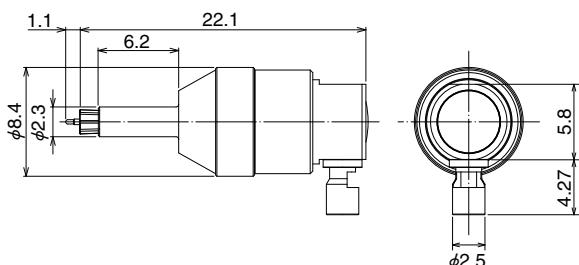
- This probe has simple lock mechanism to keep the probe connect with the receptacle without foreign assistance. However the following must be ensured : the probe must be vertical to the receptacle / the cable on the probe cannot be pulled.
- This durability only applies to this specific probe.
- This product is sold as a complete assembly (probe with cable) ; please make your selection from the product shown on the right. Customization is available for cable lengths and the connection to the measurement equipment side. please contact your local Hirose Sales Representative.



Part No.	HRS No.	Durability
MS180LH3-HRMJ-040V100	362-0224-9 01	500 cycles

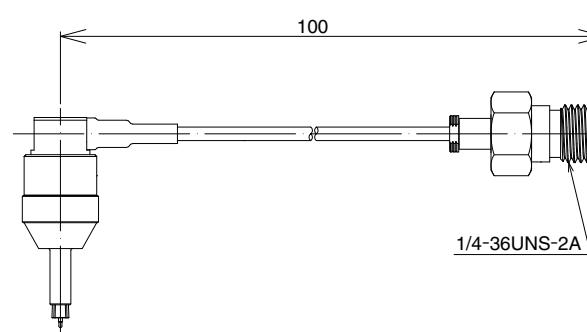
### ●Probe with complete Lock (for lab use)

**MS-180-088LP-H1**



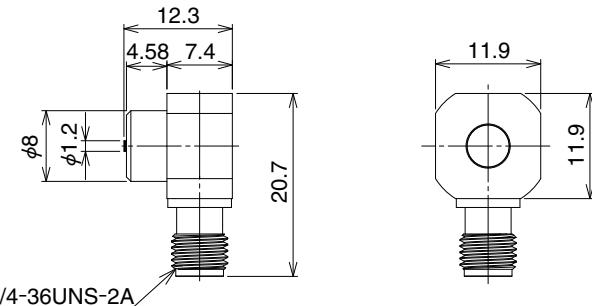
Part No.	HRS No.	Durability
MS-180-088LP-H1	358-0269-8	500 cycles

- This probe has locking feature to stay engaged with MS-180 once it is mated. it has to be vertical to maintain the engagement.
- This durability only applies to this specific probe.
- This product is sold as a complete assembly (probe with cable) ; please make your selection from the product shown on the right. Customization is available for cable lengths and the connection to the measurement equipment side. please contact your local Hirose Sales Representative.



Part No.	HRS No.	Durability
MS180LH1-HRMJ-088V100	362-0223-6 01	500 cycles

## ■SMA conversion adapter for probe



- For measurement RF Performance of MS-180 probe.
- For electrical calibration at probe mating face.

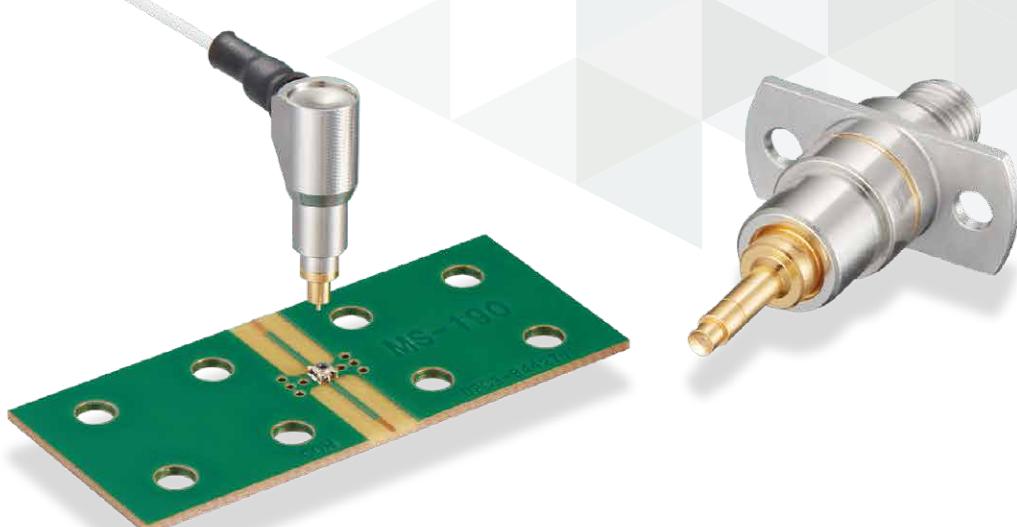
Part No.	HRS No.	Durability
MS-180LR-HRMJ-1	358-0304-7	500 cycles

## ◆Precautions

1. Do not use the washing process.
2. This product is intended to be used for circuit inspection only. Consult us if any other application is considered.
3. Do not use lab use probe for mass production line.
4. Do not use hand soldering for mounting of MS-180, since it could result in solder and flux wicking to the contact areas.
5. When using a heat gun, hot plate, or similar methods for mounting receptacle on PCB, limit the temperature to 260°C apply for 10 seconds max.
6. Do not reflow the product other than using specified PCB footprint and metal stencil dimensions.  
Otherwise it may cause solder and/or flux wicking affecting the product performance.
7. Avoid using the product in dusty, mixed gases and any other environment which is outside of the specified range in spec sheet.
8. Do not allow any particles to enter the board mounted receptacle when cutting PCB.

MS-190 Series

# DC to 11GHz, 0.68mm Height, Ultra Compact Coaxial Switch Connector



Coax Switch



Compact



RF

## Overview

The MS-190 Series is an ultra compact coaxial switch connector, developed for inspecting RF module functionality and high frequency circuits.

The MS-190 Series supports high frequency up to 11GHz for high density board mounting in compact communication terminals such as smartphones and wearable devices.

It allows secure and easy circuit inspection.

## Features

### 1. Wide Frequency Range

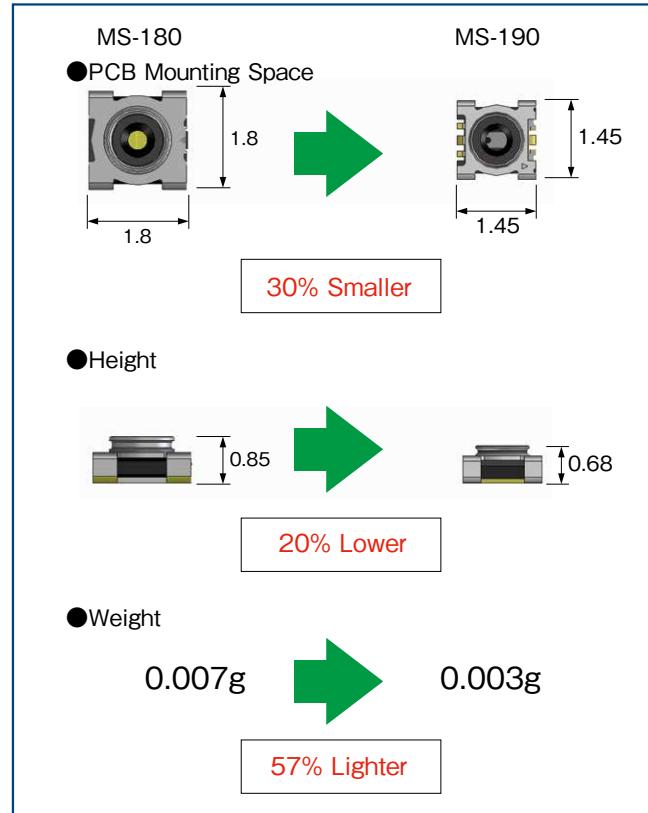
Wide frequency range from DC to 11GHz (when not mated).

### 2. Low Insertion Loss

When Unmated:  
DC-3GHz 0.1dB Max.  
3-6GHz 0.2dB Max.  
6-11GHz 0.3dB Max.

### 3. Space-saving, Low Profile

Height Above Board: 0.68mm  
Size: 1.45mmx1.45mm (nominal)  
Weight: 0.003g



Compared to HRS's existing MS-180 products.

## 4. High Contact Reliability

Independent 2-point contact ensures high contact reliability.

## 5. Overmolding Technology Prevents Dust Intrusion and Flux Wicking

The overmold design prevents gaps between the contact and housing which may result in dust intrusion and flux wicking.

## 6. Pick & Place Mounting

Packaged on tape-and-reel for automated mounting.

## 7. Beryllium Free, Halogen Free

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

\*Definition according to IEC 61249-2-21.

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

## Product Specifications

Operating Temperature	-40 to +85°C			
Rated Power	2W			
Frequency Range	DC to 11GHz Not Mated with Probe		DC to 6GHz Mated with Probe (MS-190-HRMJ-F6)	
V.S.W.R.	DC to 3.0GHz	1.2 Max.	DC to 3.0GHz	1.3 Max.
	3.0 to 6.0GHz	1.3 Max.	3.0 to 8.0GHz	1.7 Max.
	6.0 to 11.0GHz	1.4 Max.		
Insertion Loss	DC to 3.0GHz	0.1dB Max.	DC to 3.0GHz	0.5dB Max.
	3.0 to 6.0GHz	0.2dB Max.	3.0 to 6.0GHz	0.7dB Max.
	6.0 to 11.0GHz	0.3dB Max.		
Isolation	DC to 3.0GHz	25dB Min.		
	3.0 to 6.0GHz	20dB Min.		
	6.0 to 11.0GHz	12dB Min.		

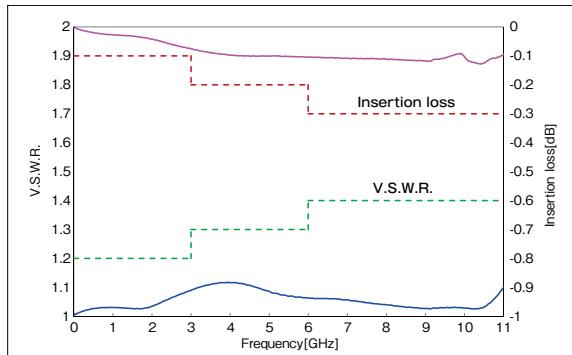
Item	Specifications	Conditions
Contact Resistance	100mΩ Max.	100mA Max.
Insulation Resistance	1000MΩ Min.	100V DC
Withstanding Voltage	No flashover or insulation breakdown	100V AC for 1 min.
Vibration Resistance	No electrical discontinuity of 1 μs or more	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis
Shock Resistance	No electrical discontinuity of 1 μs or more	Acceleration of 490m/s <sup>2</sup> , 11ms duration, sine halfwave, 3 cycles in each of the 3 axis.
Temperature Cycle	Contact Resistance : 100mΩ Max. Insulation Resistance : 10MΩ Min.	Temperature : -55 → +15 to +35 → +85 → +15 to +35°C Time : 30 → 2 to 3 → 30 → 2 to 3 minutes 100 cycles
Heat Resistance	Contact Resistance : 100mΩ Max. Insulation Resistance : 10MΩ Min.	96 hours at 85°C
Cold Resistance	Contact Resistance : 100mΩ Max. Insulation Resistance : 10MΩ Min.	96 hours at -55°C
Humidity Resistance (Steady State)	Contact Resistance : 100mΩ Max. Insulation Resistance : 10MΩ Min.	96 hours at 40±2°C and humidity of 90 to 95%
Mating Durability	Contact Resistance : 100mΩ Max.	100 cycles

## Materials / Finish

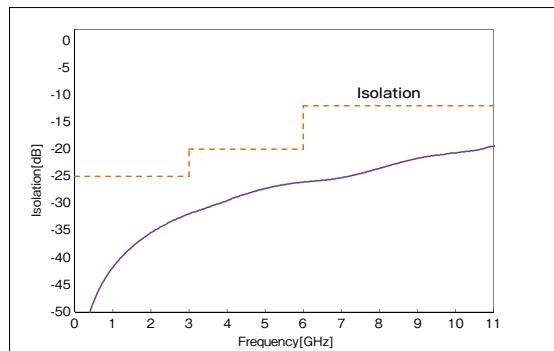
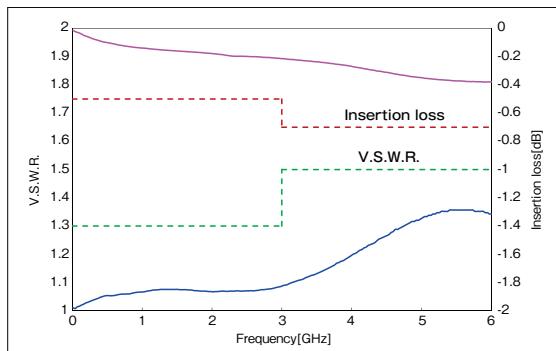
Part	Materials	Finish	Remarks
Shell	Phosphor Bronze	Partially Gold Plated	-
Insulator	LCP	-	UL94V-0
Common Contact	Copper Alloy	Partially Gold Plated	-
Antenna Contact	Copper Alloy	Partially Gold Plated	-

## High Frequency Performance (Typical)

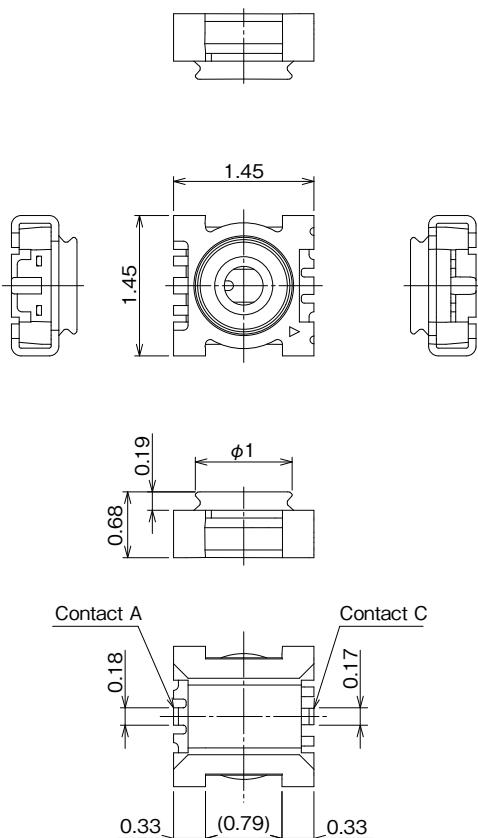
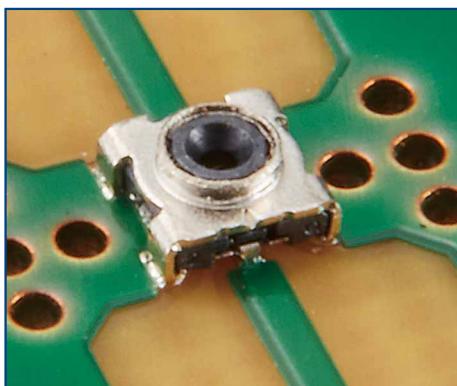
### ● Normally Closed (Not Mated with Probe)



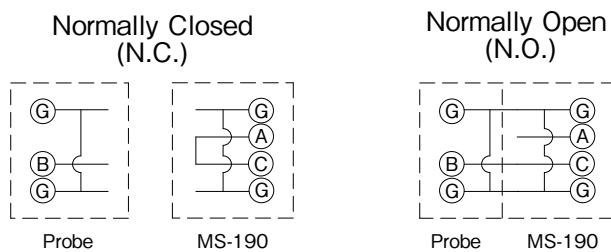
### ● Normally Open (Mated with Probe)



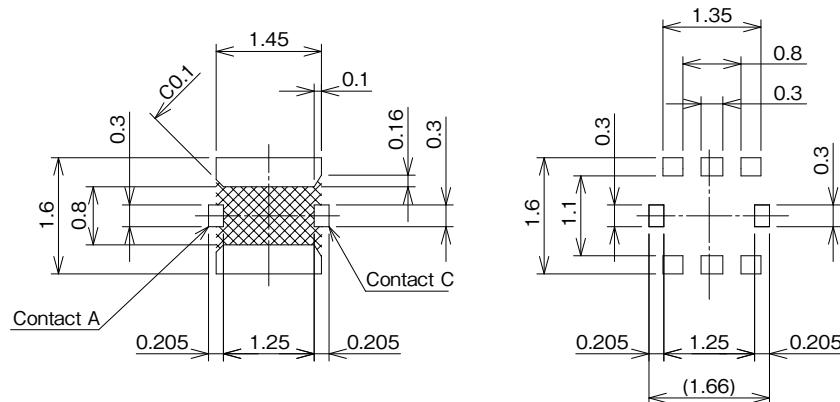
## Receptacle



## Circuit Diagram



## Specified Land Pattern and Metal Mask Dimensions



■ This area must be free of conductive traces and solder resist on the top layer.

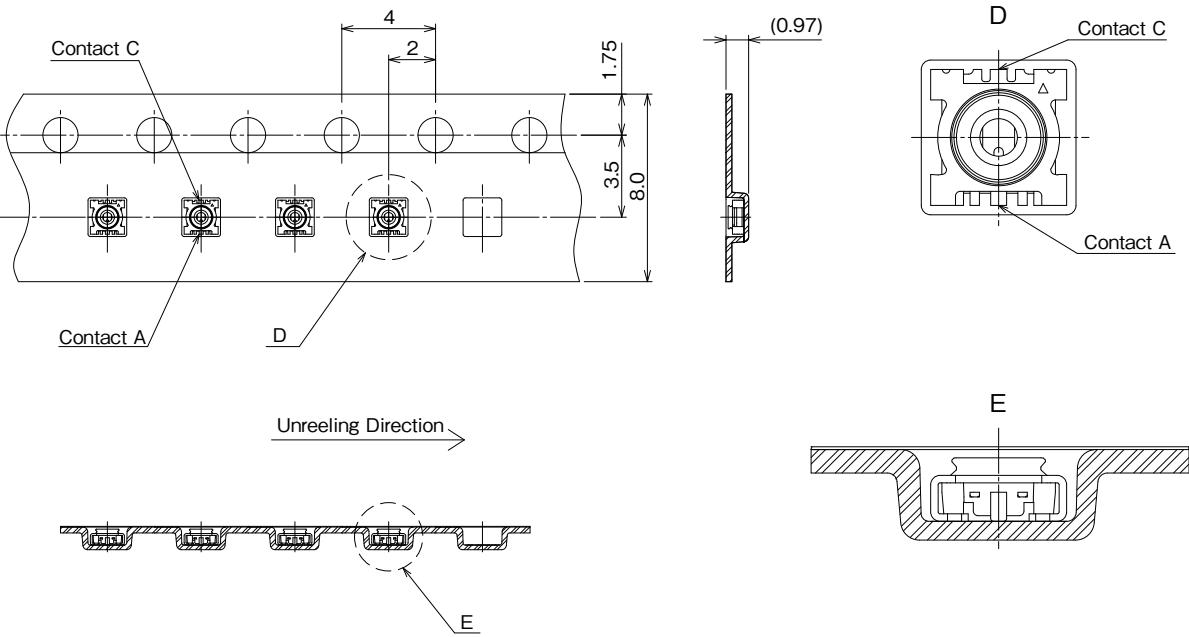
Note 1 : Do not reflow the product using a land pattern or metal mask dimensions other than those specified.

Doing so may cause solder and/or flux wicking affecting the product performance.

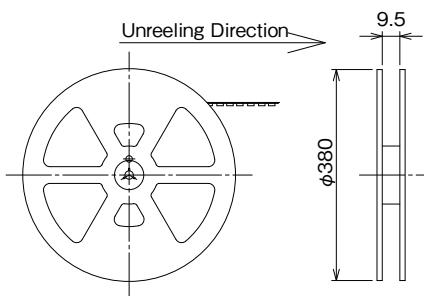
Note 2 : Do not manual solder when mounting MS-190, as it could result in solder and flux wicking to the contact areas.

Part No.	HRS No.	Pachase Unit
MS-190	CL0358-0354-5-00	20,000pcs per reel

## Packaging Specifications

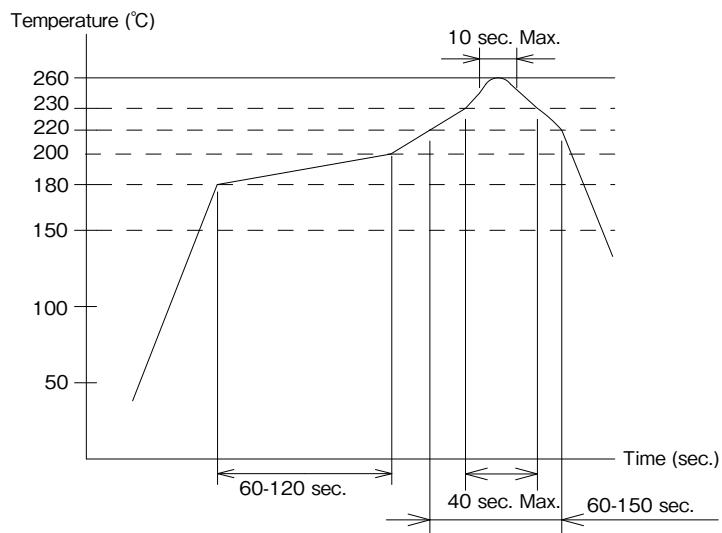


### ● Reel Dimensions



## Recommended Temperature Profile

### ● Using Lead-free Solder Paste



#### [Conditions]

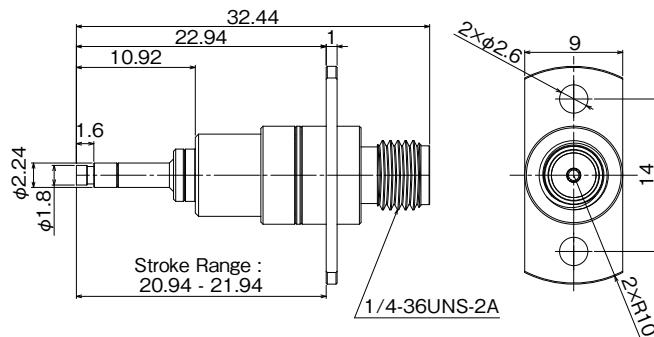
Maximum Temperature : 260°C  
Peak Temperature Time : 10 sec. Max.  
230°C Min. : 40 sec. Max.  
220°C Min. : 60-150 sec.  
180 to 200°C : 60-120 sec.

Metal Mask Thickness : 0.1mm  
Reflow Cycles : 2 cycles

## Measurement / Inspection Probe

### ■ Fixed Flange with Floated Probing Tip (for Mass Production Lines)

- SMA Conversion Adapter



Part No.	HRS No.	Mating Durability	Purchase Unit
MS-190-HRMJ-F6	CL0358-0007-0-00	1 million cycles	1pc per bag

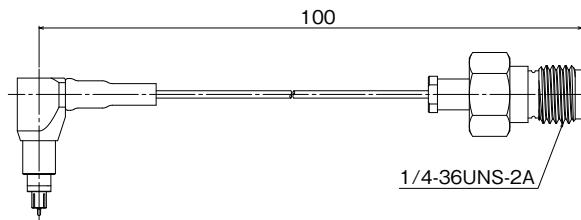
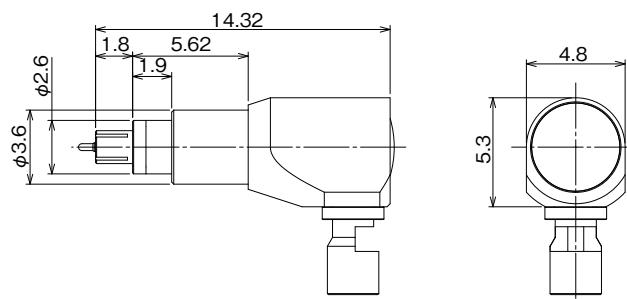
Note 1 : The probe should mate vertically with the receptacle.

Always use the probe within the specified stroke length.

Note 2 : This mating durability only applies to this specific probe.

### ■ Probe with Friction Lock (For Testing)

- MS-190-040LP-H1



Part No.	HRS No.	Mating Durability	Purchase Unit
MS190LH1-HRMJ-040V100	CL0358-0016-0-01	500 cycles	1pc per bag

Note 1 : This probe has a friction lock mechanism to keep the probe connected with the receptacle without foreign assistance. However, avoid pulling on the cable and make sure the probe is vertical to the receptacle before use.

Note 2 : This mating durability only applies to this specific probe.

Note 3 : Please order using the above Part No. as it will be delivered as a complete assembly (probe with cable). Please contact a Hirose Sales Representative for customization of cable lengths and the attached connector.

## 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. This product is intended to be used for circuit inspection only.
4. Do not use the friction lock probe for mass production lines.
5. Do not perform manual solder for mounting of MS-190, since it could result in solder and flux wicking to the contact areas.
6. When using a heat gun, hot plate, or similar methods for mounting the receptacle on, please keep use within 10 seconds at 260°C or less. If usage exceeds the above conditions, the plastic may melt and deform.
7. Refrain from using land patterns or metal mask dimensions other than those specified by Hirose as it may result in solder flux and wicking causing product failure.
8. Refrain from using this product in environments of dust, high humidity, gas, and extremely high and low temperatures outside of the range listed in the specification sheet.
9. When cutting the PCB after mounting MS-190 with a router, etc., design the bridge to be away further away from MS-190. Suck up shavings in order to prevent contact failure resulting from debris entering the contact portion of the connector.

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