DC to 6GHz Ultra-Small Coaxial Switch

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 highfrequency 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: 0.15dB(or less)(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 embossey tape-and-reel auto-insertable

7. Wide application range

Operating frequency from DC to 6GHz.

8. Prevention of flux float-off

Switch structure prevents flux float-off.

9. Self-alignment

The eccentricity for plug mating is ± 0.5 mm.

■Application

* Wireless communication (Bluetooth, IEEE 802.11)

* Machines

(Portable terminal, notebook PC, ETC, POS terminal, GPS terminal PDA, etc.)

* Also suitable for other high-frequency machines.







■Product Specifications

| | Not mated with the plug | Mared (MS-147-HRMJ-1) | |
|-----------------------------|---|---|--|
| Operating temperature range | −30°C ~ +85°C | –10°C ~ +65°C | |
| 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) | |

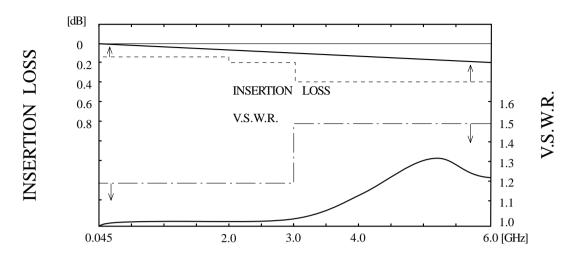
| Item | Standard | Conditions | |
|-------------------------------------|--|---|--|
| 1.Contact resistance | Center 75m ohms max. | 100mA max. | |
| | Outer 50m ohms max. | Tooma max. | |
| 2.Insulation resistance | 1,000M ohms or more | 100V DC | |
| 3.Withstanding voltage | No flashover or insulation breakdown | 100V AC / one minute | |
| 4. Vibration | No cleatrical discontinuity for 10 vo Min | Frequency of 10 to 55 Hz, overall amplitude of 1.5 mm for 2 hours in each of 3 directions | |
| 5. Shock | No electrical discontinuity for 10μ s Min. | Acceleration of 490 m/s², sine half-wave waveform, 3 cycles in each of the 3 axis | |
| 6.Humidity | Contact resistance: Center 100m ohms max. Outer 75m ohms max. | 96 hours at temperature of 40°C and humidity of 90% to 95% | |
| 7.Temperature cycle | Insulation resistance 10M ohms min. | Temperature : $-55^{\circ}\text{C} \rightarrow +5^{\circ}\text{C}$ to $+35^{\circ}\text{C} \rightarrow 85^{\circ}\text{C} \rightarrow +5^{\circ}\text{C}$ to 35°C Time:30 \rightarrow 15 max. \rightarrow 30 \rightarrow 15 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 | |
| 9.Durability (Insertion/withdrawal) | Contact resistance: Center 100m ohms max. Outer 75m ohms max. | 12,000 cycles | |

■Materials

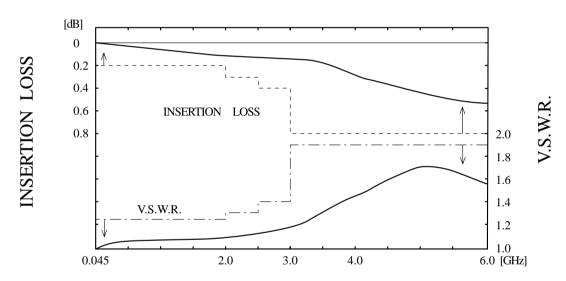
| Part | Material | Finish | Remarks |
|-----------------------------------|-----------------|--------------|---------|
| Shell | Phosphor bronze | Gold plating | |
| Insulator | Polyamide resin | | UL94HB |
| Common terminal | Berylium copper | Gold plating | |
| Board circuit side (N.C) terminal |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

■Typical Data

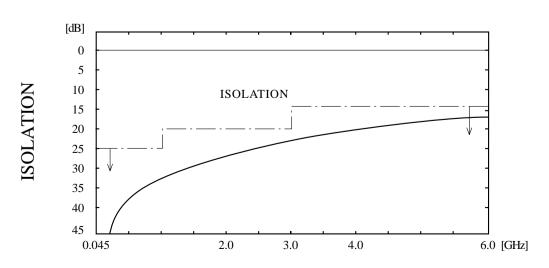
●NORMALLY CLOSED (N.C)~ (Not mated with the plug)



●OPEN (N.O)~ (Mated with the plug)

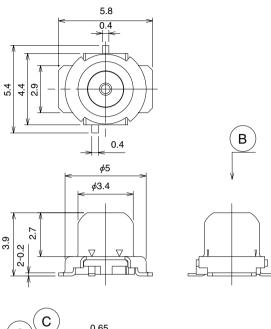


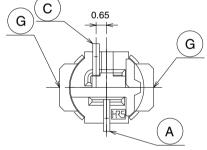
OISOLATION



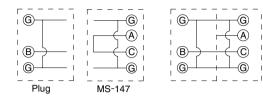
■Receptacle

Product No. MS-147 (06) 1,500 pieces per reel

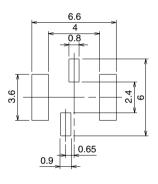




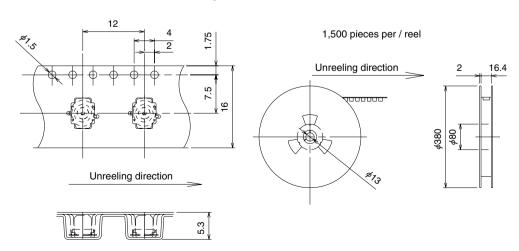
■Circuit diagram



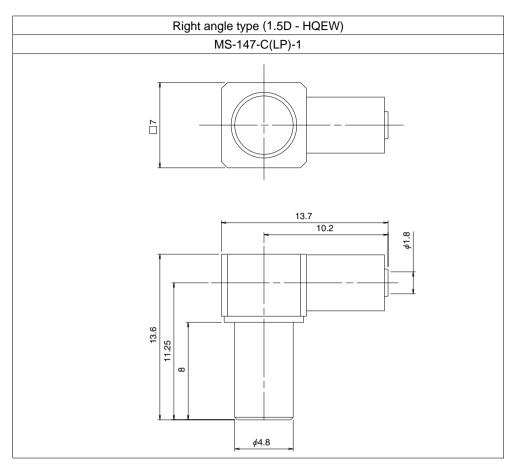
■PCB Mounting Pattern



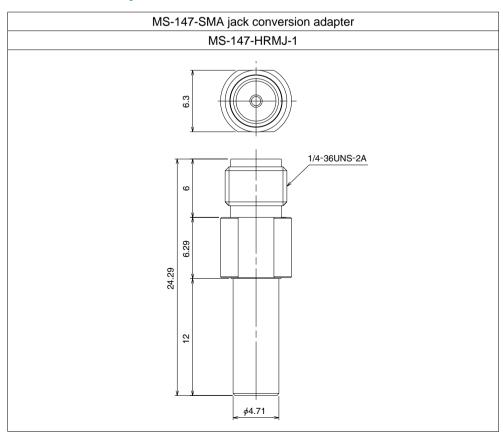
■Embossed Carrier Tape Dimensions



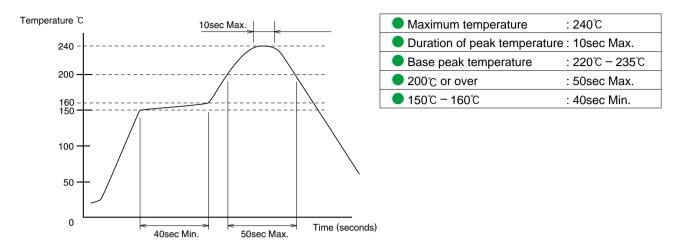
■Plug



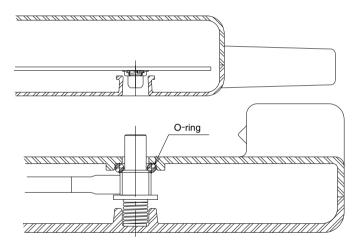
■SMA conversion adapter



■Recommended Temperature Profile

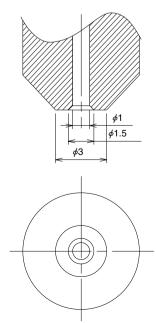


■Example of Application



Note: Mounting example

■Recommended Nozzle Dimensions



■Precautions

1. Compatible with the following plugs.

MS-147-C(LP)-1 : Plug harness type

(Effective mating length: 0.87mm min.)

MS-147-HRMJ-1 : SMA conversion adapter

(Effective mating length: 0.87mm min.)

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.

