Subminiature Coaxial Switch 1.35mm High, DC to 11GHz
MS-156C Series

Features
1. Low insertion loss
   - 0.15 dB MAX (DC to 2.5GHz)
   - 0.2 dB MAX (2.5GHz to 6GHz)
   - 0.4 dB MAX (6GHz to 11GHz)
   (NORMALLY CLOSED)

2. Space-saving design
   2.3mm x 2.3mm occupied board space.

3. Low profile
   1.35mm high above the board.

4. Lightweight
   0.014g. total weight

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 11GHz.

7. Board placement with automatic equipment
   Packaged on tape-and-reel.

8. Halogen Free, Beryllium 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
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: 1.35mm protrusion above the board.
Lightweight: 0.014g. total weight.

Comparison with our conventional type

<table>
<thead>
<tr>
<th></th>
<th>Conventional type</th>
<th>MS-156C3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Footprint</strong></td>
<td>2.7</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>1.6</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>0.025g</td>
<td>0.014g</td>
</tr>
</tbody>
</table>

27% saving of space
15% lower profile
44% lighter weight
### Product Specifications

<table>
<thead>
<tr>
<th>Operating temperature range</th>
<th>Unmated</th>
<th>Mated with MS-156-HRMJ-3 plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.35mm High, DC to 11GHz</td>
<td>1.35mm High, DC to 11GHz</td>
<td></td>
</tr>
<tr>
<td>V.S.W.R.</td>
<td>1.4 max. (DC to 3.0GHz)</td>
<td></td>
</tr>
<tr>
<td>Insertion loss</td>
<td>0.5dB max. (DC to 3.0GHz)</td>
<td></td>
</tr>
<tr>
<td>Isolation</td>
<td>20dB min. (DC to 3.0GHz)</td>
<td></td>
</tr>
</tbody>
</table>

#### Item Specification Conditions

1. Contact resistance: 100mΩ max. 100mΩ 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, 2 hours in each of the 3 axis.
5. Shock: Acceleration of 490m/s², 6ms duration, sine half-wave waveform, 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 to +5°C to +35°C to +85°C to +35°C Time: 30 → 5 max. → 30 → 5 max. (Minutes) 50 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: Contact resistance: 100mΩ max. Insulation resistance: 10MΩ min. 96 hours at 40±2°C, and humidity of 90 to 95%
10. Durability (mating/un-mating, with corresponding plug) Contact resistance: 100mΩ max. 100 cycles

Note 1: 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

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Finish</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell</td>
<td>Phosphor bronze</td>
<td>Gold plated</td>
<td></td>
</tr>
<tr>
<td>Insulator</td>
<td>6T Nylon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common terminal</td>
<td>Cu-Ni-Si alloy</td>
<td>Selective gold plated</td>
<td>UL94HB</td>
</tr>
<tr>
<td>Antenna terminal</td>
<td>Phosphor bronze</td>
<td>Selective gold plated</td>
<td></td>
</tr>
</tbody>
</table>
Typical Data

- NORMALLY CLOSED (N.C)

- NORMALLY OPEN (N.O)

- ISOLATION
MS-156C3 Series ● Subminiature Coaxial Switch 1.35mm High, DC to 11GHz

**Receptacle**

![Receptacle Image]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-156C3</td>
<td>358-0346-0</td>
<td>10,000 pcs/reel</td>
</tr>
<tr>
<td>MS-156C3(20)</td>
<td>358-0346-0 20</td>
<td>2,000 pcs/reel</td>
</tr>
</tbody>
</table>

**Circuit diagram**

![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.

![PCB Mounting Pattern]

![Metal Mask Dimensions]

This area must be free of conductive traces and resist field.
**Precautions**

1. Mounting this product using PCB patterns or metal mask dimensions other than the ones specified, 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. 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-156C3.
   - 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-156C when cutting PCB.

![Example of a PCB after mounting the MS-156C3](image)

- Example of incorrect mounting -
- Recommended example -

- Design with no web tab near MS-156C3

If the MS-156C3 is mounted too close to a web tab, there is a possibility that fine powder residue generated during depaneling could infiltrate the MS-156C3 switch and cause damage.

5. This product is intended for use only in testing the circuit. It cannot be used as an interface.
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. Plugs can be roughly classified into 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.
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## Packing Specifications

**● MS-156C3**

### Part Dimensions

- **A terminal**
- **C terminal**

Unreeling direction

### Packing Specifications

- **Part No.**
  - MS-156C3
  - MS-156C3(20)

- **Reel Size**
  - R = 380mm
  - R = 180mm

- **Packing**
  - 10,000 pcs/reel
  - 2,000 pcs/reel

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## Recommended Temperature Profile

### Using Lead-free Solder paste

- **Maximum temperature**: 260°C
- **Peak temperature time**: 10 sec. max.
- **230°C min.**: 40 sec. max.
- **220°C min.**: 60 sec. to 150 sec.
- **180°C to 200°C**: 60 sec. to 120 sec.
- **Metal mask thickness**: 0.1 mm
- **Reflow cycles**: 2 cycles

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### Graph

- **Temperature (°C)**
  - Minimum: 50
  - Maximum: 260

- **Time (sec.)**
  - Minimum: 60 sec. to 120 sec.
  - Maximum: 60 sec. to 150 sec.
**MS-156C Series plugs and adapters**

- **Cable harness type**
  - Press down, right angle type
    - Needs a test fixture with a floating mechanism for installation.
    - MS-156-C(LP)-1
  - Simplified lock, right angle type
    - For evaluation
      - Cannot be used for automated inspection process.
    - MS-156-088LP-H1
    - MS-156-088LP-H2
  - For antenna type
    - Cannot be used for circuit inspection.
    - MS-156C-LP-068

- **SMA conversion Adapters**
  - Simplified lock type
    - For evaluation
      - Cannot be used for automated inspection process.
    - MS-156-HRMJ-H1
  - Press down type
    - Needs a test fixture with a floating mechanism for installation.
    - MS-156-HRMJ-3
    - MS-156-HRMJ-14
  - Right angle type
    - MS-156LP-HRMJ-8
  - Floating (self-pressing)
    - Built-in, spring loaded push-down mechanism
      - Stroke length controlled by fixture.
    - MS-156-HRMJ-10
    - MS-156-HRMJ-12
    - MS-156-HRMJ-29

- **Adapter for plug inspection**
  - SMA Conversion Adapter
    - MS-156R-HRMJ-1
  - N Conversion Adapter
    - MS-156R-NJ-1

When automatic inspections are to be performed during the manufacturing operations, request the instruction manual titled “MS-156 Plug Connector” which includes examples of actual use.
MS-156C Series Subminiature Coaxial Switch 1.35mm High, DC to 11GHz

Plugs

Press down, right angle

Simplified lock, right angle, short

Simplified lock, right angle, long

Simplified lock, right angle, for antenna

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Durability</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-156C(LP)-1</td>
<td>358-0173-0</td>
<td>10,000 Times</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable cable: 1.5D-HQE, 1.5D-QE (Fujikura Ltd.)</td>
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<td></td>
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</tbody>
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</thead>
<tbody>
<tr>
<td>MS-156-088LP-H1</td>
<td>358-0268-5</td>
<td>500 Times</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable cable: DFS111-UL1979 (Junkosha Ltd.)</td>
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<th>Part No.</th>
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</tr>
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<tbody>
<tr>
<td>MS-156-088LP-H2</td>
<td>358-0275-0</td>
<td>500 Times</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable cable: DFS111-UL1979 (Junkosha Ltd.)</td>
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<tbody>
<tr>
<td>MS-156C-LP-068</td>
<td>358-0276-3</td>
<td>30 Times</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable cable: RF-MF50161 (Nissei Electric Co., Ltd.)</td>
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<td></td>
</tr>
</tbody>
</table>

Please contact Hirose Sales Representative for cable length and cable end treatment.
SMA Conversion Adapters

- Simplified lock

- Press down, with flange, short

- Press down, with flange, long

- Press down, with flange, right angle

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</tr>
</thead>
<tbody>
<tr>
<td>MS-156-HRMJ-H1</td>
<td>358-0290-4</td>
<td>500 Times</td>
</tr>
<tr>
<td>MS-156-HRMJ-3</td>
<td>358-0171-5</td>
<td>10,000 Times</td>
</tr>
<tr>
<td>MS-156-HRMJ-14</td>
<td>358-0198-1</td>
<td>10,000 Times</td>
</tr>
<tr>
<td>MS-156LP-HRMJ-8</td>
<td>358-0289-5</td>
<td>100,000 Times</td>
</tr>
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MS-156 Series Subminiature Coaxial Switch 1.35mm High, DC to 11GHz

- Floating (Self-Pressing)

- Floating (Self-Pressing)

- Floating (Self-Pressing)

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<tbody>
<tr>
<td>MS-156-HRMJ-10</td>
<td>358-0194-0</td>
<td>10,000 Times</td>
</tr>
<tr>
<td>MS-156-HRMJ-12</td>
<td>358-0196-6</td>
<td>10,000 Times</td>
</tr>
<tr>
<td>MS-156-HRMJ-29</td>
<td>358-0295-8</td>
<td>200,000 Times</td>
</tr>
</tbody>
</table>

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**Adapter for plug inspection**

**SMA Conversion Adapter**

- **Part No.** MS-156R-HRMJ-1
- **HRS No.** 358-0188-8
- **Durability** 500 Times

**N Conversion Adapter**

- **Part No.** MS-156R-NJ-1
- **HRS No.** 358-0176-9
- **Durability** 500 Times