



**THE DATASHEET OF  
W.FL-R-SMT-1(10)**



# Ultra Small Surface Mount Coaxial Connectors 1.4mm or 1.65mm Mated Height

## W.FL Series

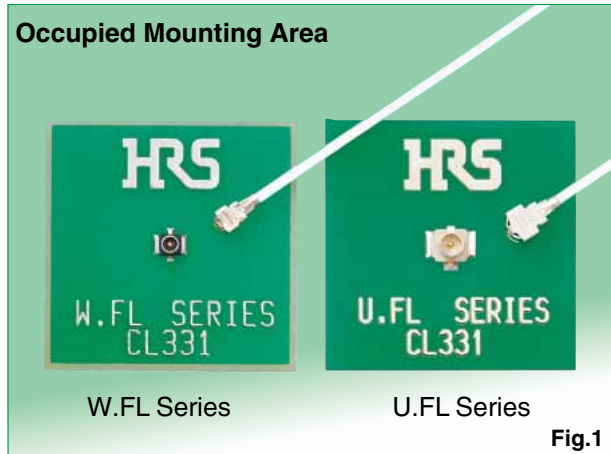
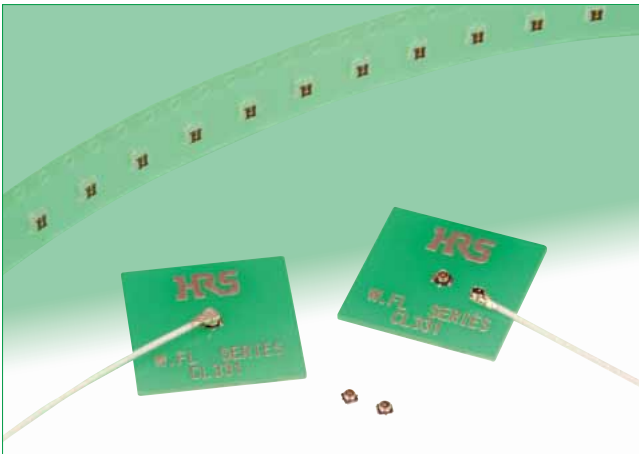


Fig.1

### ■ Features

#### 1. Nominal mated height of 1.4mm or 1.65mm (Max. 1.55 or 1.85mm)(Fig.2)

#### 2. Small board footprint

The W.FL Series is about 55% smaller than our U.FL Series connector and only uses 3.4mm<sup>2</sup> of PCB space. The PCB layout for the W.FL Series is the same as for W.FL2 and X.FL Series.

Note: This product is not compatible with W.FL2 Series and X.FL Series. (Fig.1)

#### 3. Extremely light weight

Receptacle: 5.6 mg

Right-angle plug: 18.6 mg(040), 28.2mg(062)

#### 4. Frequency range up to 6 GHz

DC to 3 GHz : V.S.W.R. of 1.3 max.

3 GHz to 6 GHz: V.S.W.R. of 1.4 max.

#### 5. Automatic board placement

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

#### 6. Plugs are terminated with ultra-fine coaxial (fluorinated resin insulated) cable

The use of ultra-fine coaxial (fluorinated resin insulated) cables on these connectors offer the ability to complete connections in small, confined spaces with a smooth, easy operation.

#### 7. Simple connector mating / unmating

Use of the available mating/un-mating tools assures correct connection/disconnection of the plug and receptacle.

#### 8. Halogen-free\*(Receptacle, Plug(HF type))

\*As defined by IEC61249-2-21

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

### Mated height comparison

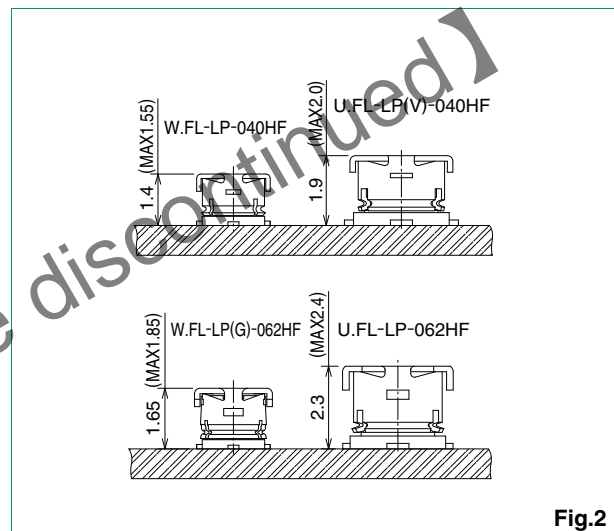


Fig.2

### W. FL Plug and Receptacle

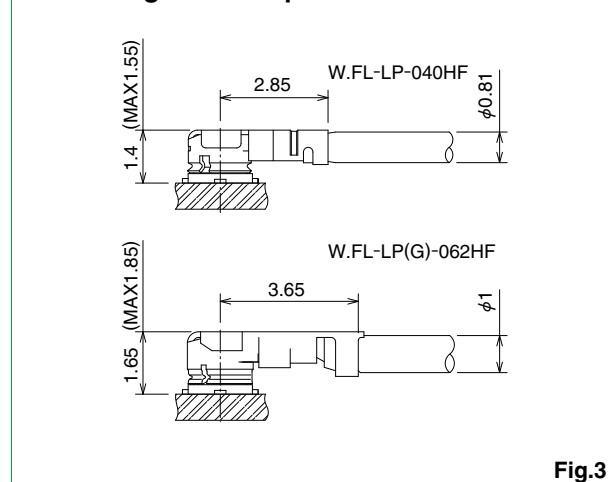
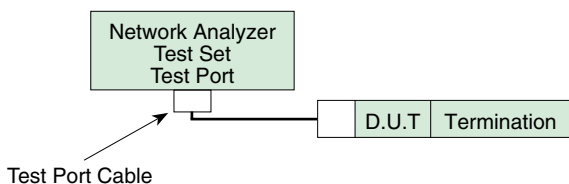


Fig.3

## Specifications

| Rating                   | Nominal characteristic impedance                        | 50Ω         | Operating temperature range | -40°C to +90°C<br>(90% RH max.) |
|--------------------------|---|-------------|-----------------------------|---------------------------------|
|                          | Frequency range   | DC to 6 GHz | Storage temperature range   | -30°C to +70°C<br>(90% RH max.) |
| Item                     | Specification   |             | Conditions                  |                                 |
| 1. Contact resistance    | Center contact : 20mΩ max.<br>Outer contact : 10mΩ max. |             | 10mA max.                   |                                 |
| 2. Insulation resistance | 500MΩ min.  |             | 100V DC                     |                                 |
| 3. Withstanding voltage  | No flashover or insulation breakdown                    |             | 200V AC / 1 minute          |                                 |
| 4. V.S.W.R.*             | 1.3 Max.<br>1.4 Max.                                    |             | Up to 3 GHz<br>3 to 6 GHz   |                                 |

\*V.S.W.R. Measurement System  
Measured as shown on the block diagram below.



Note1 : Measurement way of a W.FL Cable assembly (plug)  
W.FL Cable assembly (plug) is measured with SMA conversion adapters mated with W.FL plugs at both ends of a 100cm coaxial cable harness

Note2 : Measurement way of a W.FL receptacle  
W.FL receptacle, which is mounted on a 50Ω glass epoxy board, is measured with a SMA conversion adapter.

## Materials / Finish

### ●Plug – right angle

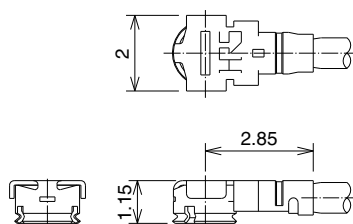
| Part                  | Material        | Finish / Remarks                     |
|-----------------------|-----------------|--------------------------------------|
| Shell                 | Phosphor bronze | Silver plated                        |
| Female center contact | Phosphor bronze | Gold plated                          |
| Insulator             | PBT             | Color : Gray, UL94V HB(040HF, 062HF) |

### ●Receptacle

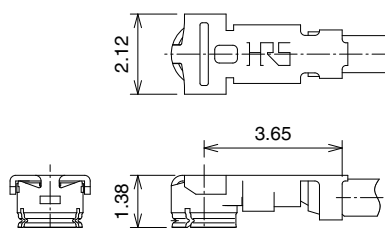
| Part                | Material        | Finish / Remarks       |
|---------------------|-----------------|------------------------|
| Shell               | Phosphor bronze | Silver plated          |
| Insulator           | LCP             | Color : Black, UL94V-0 |
| Male center contact | Brass           | Gold plated            |

## Cable Assembly(Plug)

W.FL-LP-040HF(06) (Applicable cable : outer diameter 0.81)

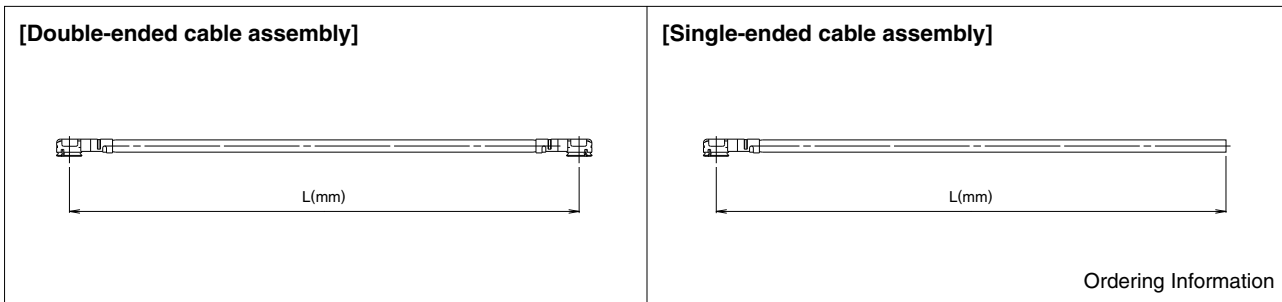


W.FL-LP-062HF(06) (Applicable cable : outer diameter 0.95)



[Plugs can be ordered only as terminated cable assemblies.]

## ◆How to Specify Cable Assembly



### ●Ordering Information

Used plug : W.FL-LP-040HF(06) (Dia. 0.81)

#### Double-Ended

**W.FL - 2LP HF6 - 04N [ ] TV - A - L**

①      ②      ③      ④      ⑤      ⑥      ⑦

#### Single-Ended

**W.FL - LP HF6 - 04N [ ] TV - A - L**

①      ②      ③      ④      ⑤      ⑥      ⑦

|                           |  |
|---------------------------|--|
| ① Series name             | W.FL                                       |
| ② Assembly type           | LP : Single ended<br>2LP : Double ended    |
| ③ Environmental compliant | HF6 : Halogen-free                         |
| ④ Cable type              | 04N : 0.81mm dia. ultra-fine coaxial cable |
| ⑤ Cable Color             | 1 : White<br>2 : Black                     |
| ⑥ Cable outer conductor   | TV : Tin plated braided wire               |
| ⑦ Total length(mm)        | Length(L)                                  |

Used plug: W.FL-LP(G)-062HF(06) (Dia. 0.95)

#### Double-Ended

**W.FL - 2LPG HF6 - 062N [ ] D - A - L**

①      ②      ③      ④      ⑤      ⑥      ⑦

#### Single-Ended

**W.FL - LPG HF6 - 062N [ ] D - A - L**

①      ②      ③      ④      ⑤      ⑥      ⑦

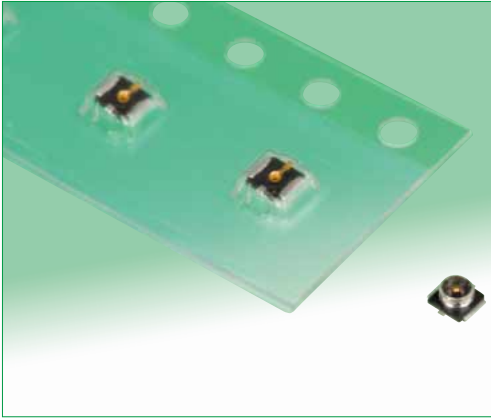
|                           |   |
|---------------------------|---|
| ① Series name             | W.FL  |
| ② Assembly type           | LPG : Single ended<br>2LPG : Double ended       |
| ③ Environmental compliant | HF6 : Halogen-free                              |
| ④ Cable type              | 062N : 0.95mm dia. ultra-fine coaxial cable     |
| ⑤ Cable Color             | 1 : Gray<br>2 : Black<br>3 : White              |
| ⑥ Cable outer conductor   | D : Copper tape + Outer tin plated braided wire |
| ⑦ Total length(mm)        | Length(L)                                       |

### ●Standard tolerances for (L)

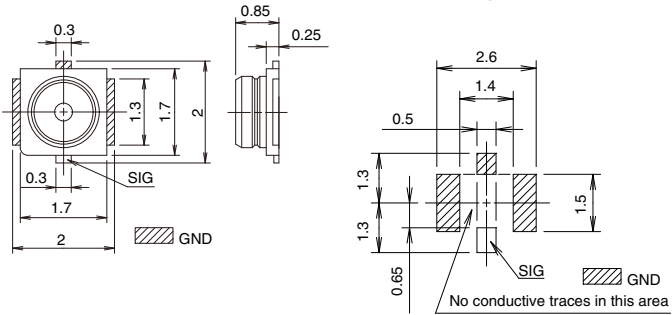
| (L)mm              | Standard tolerance(mm) |
|--------------------|------------------------|
| *L=35 to 200       | ±4                     |
| L=200 to 500       | ±8                     |
| L=500 to 1000      | ±12                    |
| L=Longer than 1000 | ±1.5% of (L)           |

Note : Minimum available length(L) is 35mm.

**Receptacle**



**Recommended PCB mounting pattern**



Note : The land pattern is the same as that of the X.FL, W.FL2 series connectors.

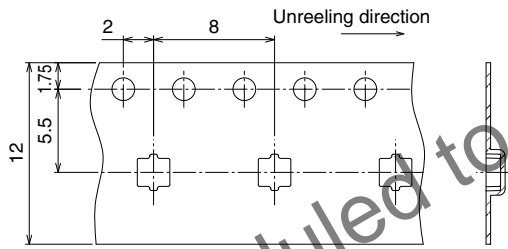
All dimensions : mm

| Part No.         | HRS No.       | Packaging              |
|------------------|---------------|------------------------|
| W.FL-R-SMT-1(60) | 331-0482-6 60 | Reel (5,000 pcs/reel)  |
| W.FL-R-SMT-1(80) | 331-0482-6 80 | Reel (10,000 pcs/reel) |

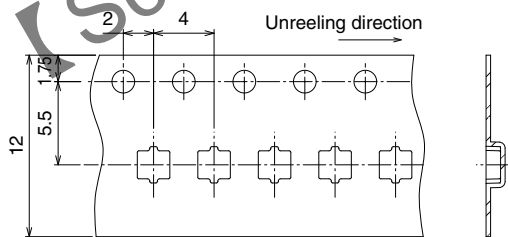
**Embossed Carrier Tape Dimensions(IEC 60286-3 compliant)**

**Embossed Carrier Tape Dimensions**

(W.FL-R-SMT-1(60) 8mm pitch)

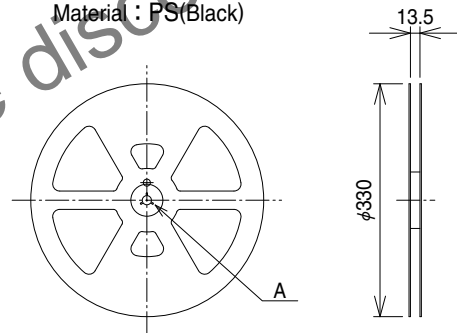


(W.FL-R-SMT-1(80) 4mm pitch)

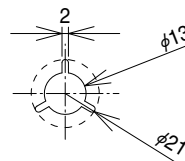


**Reel Dimensions**

Material : PS(Black)



A(SCALE FREE)



Scheduled to be discontinued

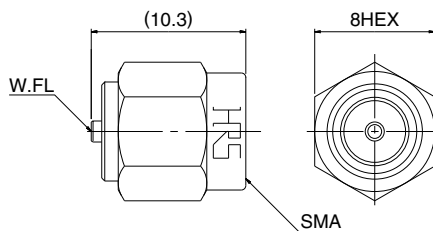
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## ■ Conversion Adapters

### ● SMA Conversion Adapter (W.FL side jack – SMA side plug)



Note : Used for performance measurements only.  
The W.FL mating side has lower retention force than the regular product when mated to the corresponding part.

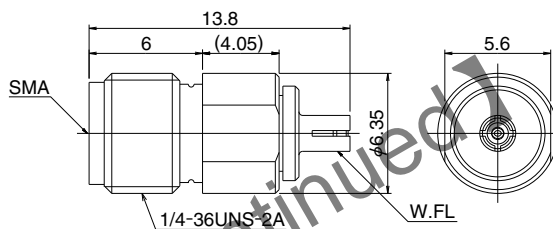


| Part No.       | HRS No.       | Packaging |
|----------------|---------------|-----------|
| HRMP-W.FLJ(40) | 311-0367-3 40 | 1         |

### ● SMA Conversion Adapter (W.FL side plug – SMA side jack)

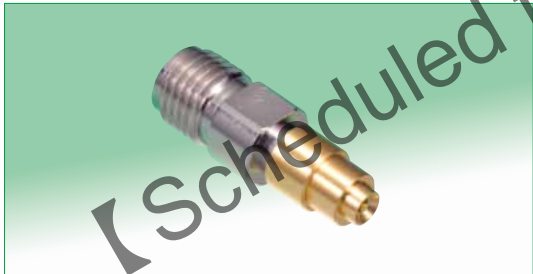


Note : Used for performance measurements only.  
The W.FL mating side has lower retention force than the regular product when mated to the corresponding part.

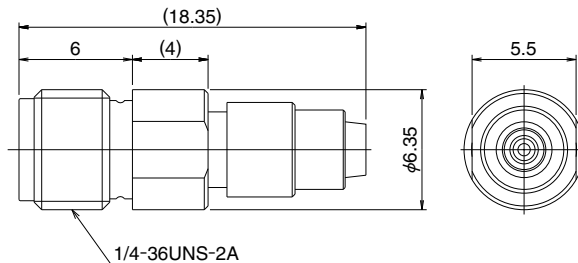


| Part No.       | HRS No.       | Packaging |
|----------------|---------------|-----------|
| HRMJ-W.FLP(40) | 311-0368-6 40 | 1         |

### ● SMA Conversion Adapter



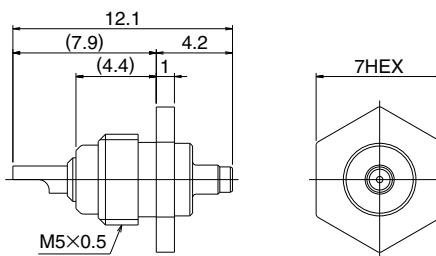
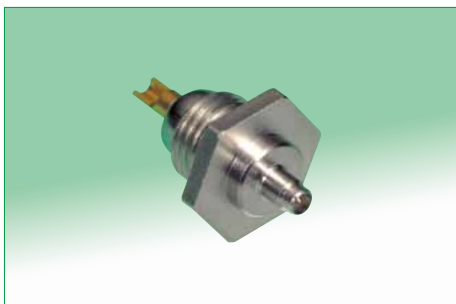
Note : When mating with corresponding part (W.FL-R-SMT-1) it must be pressed down and held to make complete connection.



| Part No.           | HRS No.       | Packaging |
|--------------------|---------------|-----------|
| HRMJ-W.FLP-ST1(40) | 311-0386-8 40 | 1         |

### ■ Receptacle Inspection Adapter

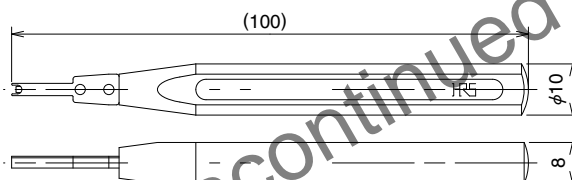
Used for inspecting the performance parameters of the cable assembly.



| Part No. | HRS No.    | Packaging |
|----------|------------|-----------|
| W.FL-R-1 | 331-0483-9 | 1         |

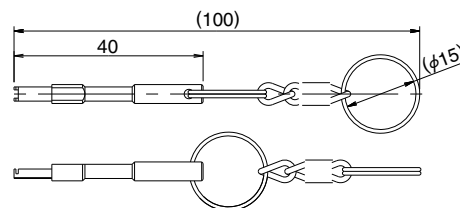
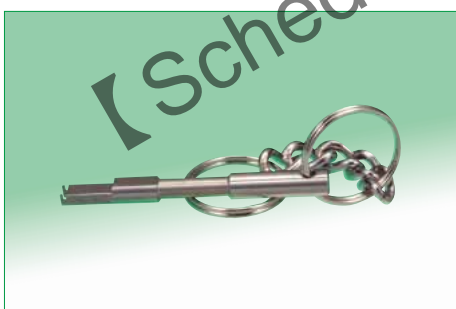
### ◆ Plug-Mating Tool

This tool is used for mating a plug.



| Part No.   | HRS No.    | Packaging |
|------------|------------|-----------|
| W.FL-LP-IN | 331-0323-2 | 1         |

### ◆ Plug-Extraction Tool

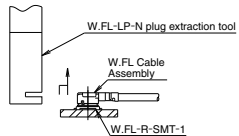
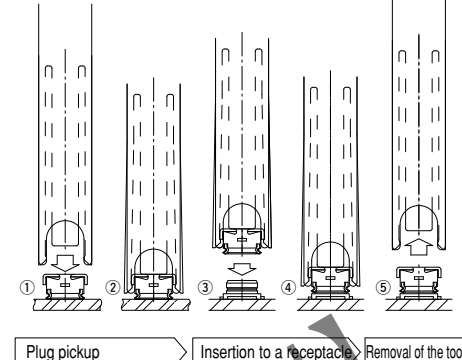
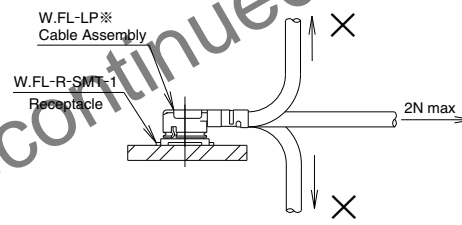


| Part No.  | HRS No.    | Packaging |
|-----------|------------|-----------|
| W.FL-LP-N | 331-0492-0 | 1         |

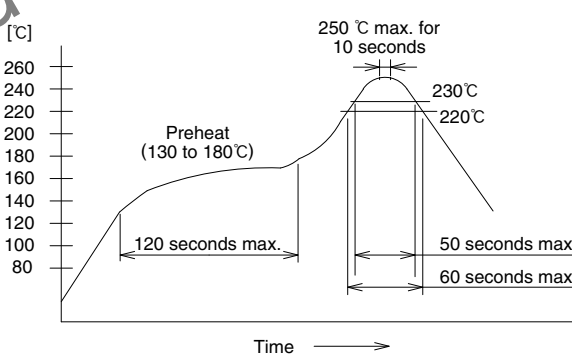
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**◆ Precautions**

**1. Plug**

|  |  |
|--|--|
| <p>(1) Mating / unmating</p>                                   | <p>• <b>Unmating</b> Insert both ends of the extraction tool under the plug (from the direction opposite to the Cable termination), as shown and pull-up in the direction perpendicular to the mounting surface of the receptacle.</p> <p>● Recommended the use of the extraction tool for unmating.<br/>Any attempt of unmating by pulling on the cable may result in damage and affect the mechanical / electrical performance.</p>  <p>• <b>Mating</b></p> <ol style="list-style-type: none"> <li>Align the mating tool W.FL-LP-IN or the mating end of the tool over the plug end of the cable assembly.</li> <li>Firmly place the tool over the plug until it is secured in the tool.</li> <li>Place the plug cable assembly (held in the tool) over the corresponding receptacle.</li> <li>Assuring that the plug and receptacle are aligned press-down perpendicular to the mounting surface until both connectors are fully mated.</li> <li>Remove the mating tool by carefully pulling it up. Removal of the tool.</li> </ol>  |
| <p>(2) Pull forces on the cable after connectors are mated</p> | <p>After the connectors are mating, do not apply a load to the cable in excess of the values indicated in the diagram.</p>    |
| <p>(3) Precautions</p>   | <p>Do not twist connectors excessively during mating / unmating.</p>   |

**2. Receptacle**

|   |  |
|---|--|
| <p>(1) Recommended reflow temperature profile</p> |  <ol style="list-style-type: none"> <li>The temperature of the printed circuit board surface temperature at the points of contact with the terminals.</li> <li>Reflow soldering should be performed at a printed circuit surface temperature of 250°C max.</li> <li>In individual applications the actual temperature may vary, depending on the solder paste type, volume / thickness and board size / thickness. Consult your solder paste and equipment manufacturer for specific recommendations.</li> </ol> |
| <p>(2) Recommended metal mask thickness</p>       | <p>0.1mm to 0.12mm</p>   |
| <p>(3) Reflow cycles</p>                          | <p>2 times</p>   |

**3. Operating environment and storage conditions**

|  |   |
|--|---|
| <p>(1) Operating environment</p>           | <p>The connectors are not designed to operate in the following environments:</p> <ul style="list-style-type: none"> <li>Exposed to a excessive amounts of fine particles and dust</li> <li>Regions and places having a high density of sulfur dioxide, hydrogen sulfide, nitrogen dioxide or other corrosive gasses.</li> <li>Environments having large rapid variations in temperature.</li> </ul> |
| <p>(2) Storage conditions - Receptacle</p> | <p>Store in the Hirose Electric packaging.<br/>Temperature : -10 to +40°C, Humidity : 85% max.<br/>Use within 6 months of delivery.<br/>Receptacles for which the storage period has elapsed must be tested for solderability to the PC board mounting surface.</p>   |

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-  Alternative Solution
-  Excess Inventory Management