

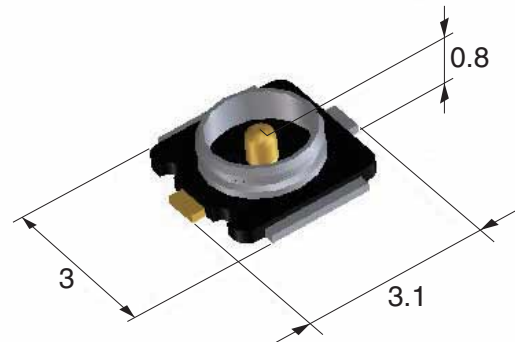
# Lightweight SMT Miniature Coaxial Connectors – 1.4 mm Mated Height

## N.FL Series



### Up to 6 GHz Transmission Speed

#### ●Occupied Mounting Area



### ■Features

#### 1. Low profile

Nominal mated height is 1.4 mm (Max. 1.5 mm)

#### 2. Small size: 7.7 mm<sup>2</sup>

#### 3. Light weight

Receptacle : 14 mg  
Plug : 28 mg

#### 4. Accepts high frequency transmission of DC to 6 GHz.

V.S.W.R. = 1.3 max. (DC to 6 GHz)

#### 5. Board placement with automatic equipment

Receptacles are packaged in embossed carrier tape and reel for automatic mounting.

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

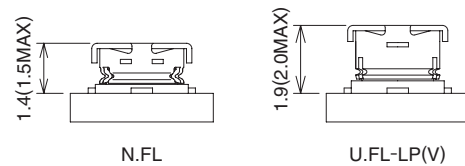
#### 7. Special tool for an extraction

#### 8. RoHS compliant

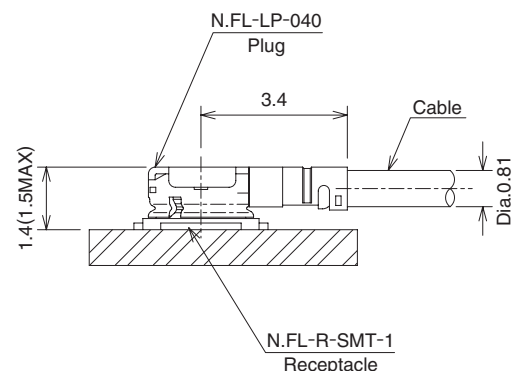
### ■Applications

Cellular phones, PHS, mobile phones, wireless communication devices, electronic measuring instruments, GPS, wireless LAN, Bluetooth and any application requiring high frequency transmission using small coaxial connectors.

#### ●Mated height comparison (With U.FL-LP(V) )



#### ●N.FL Plug and Receptacle



## N.F.L Series ● Lightweight SMT Miniature Coaxial Connectors – 1.4 mm Mated Height

### ■ Specifications

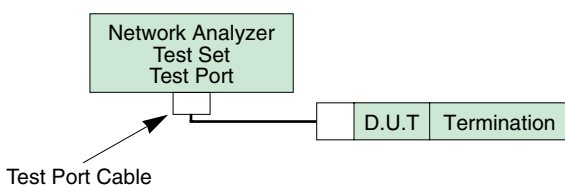
|         |                                  |             |                             |                         |
|---------|----------------------------------|-------------|-----------------------------|-------------------------|
| Ratings | Nominal characteristic impedance | 50 ohms     | Operating temperature range | -40°C to +90°C (90% RH) |
|         | Frequency range                  | DC to 6 GHz | Storage temperature range   | -30°C to +70°C (90% RH) |

| Item                     | Specification   | Conditions   |
|--------------------------|---|--|
| 1. Contact resistance    | Center contact: 25 m ohms max.<br>Outer contact: 25 m ohms max.   | 10 mA max.   |
| 2. Insulation resistance | 500 M ohms min.   | 100V DC  |
| 3. Withstanding voltage  | No flashover or insulation breakdown  | 200V AC / 1 minute   |
| 4. V.S.W.R.(Note)        | 1.3max.   | DC to 6GHz   |
| 5. Durability            | Contact resistance Center contact: 30 m ohms max.<br>Outer contact: 30 m ohms max.<br>No damage, cracks, or parts dislocation                     | 20 cycles  |
| 6. Vibration             | No electrical discontinuity of 1 $\mu$ s or longer<br>No damage, cracks, or parts dislocation   | Frequency: 10 to 100 Hz, single amplitude of 1.5 mm<br>Acceleration: 59 m/s <sup>2</sup> , in each of 3 axis<br>5 cycles |
| 7. Shock                 | No electrical discontinuity of 1 $\mu$ s or longer<br>No damage, cracks, or parts dislocation   | Acceleration of 735 m/s <sup>2</sup> , 11 ms continuous time<br>Waveform: sine half-wave, 3 cycles in each of the 3 axis |
| 8. Humidity              | Insulation resistance: 100 M ohms min. (high humidity)<br>Insulation resistance: 500 M ohms min. (dry)<br>No damage, cracks, or parts dislocation | 96 hours at +40°C, and humidity of 95%   |
| 9. Temperature cycle     | No damage, cracks, or parts dislocation   | Temperature:-40°C→+5°C to +35°C→+90°C→+5°C to +35°C<br>Time: 30 min.→ 5 min. max. → 30 min. → 5 min. max.<br>5 cycles    |
| 10. Salt spray test      | No excessive corrosion  | 5% salt water solution, 48 hours   |

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.

\* V.S.W.R. Measurement System

Measured as shown on the block diagram below.



Note1: A N.F.L Cable assembly (plug) is measured with SMA conversion adapters mated with N.F.L plugs at both ends of a 100cm coaxial cable harness

Note2: A N.F.L receptacle, which is mounted on a 50 ohms glass epoxy board, is measured with a SMA conversion adapter.

### ■ Materials / Finishes

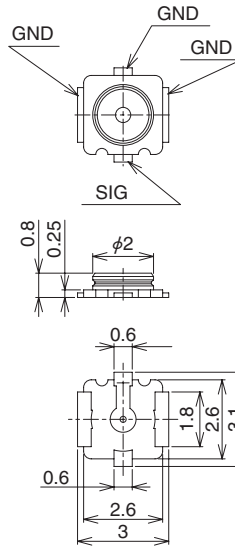
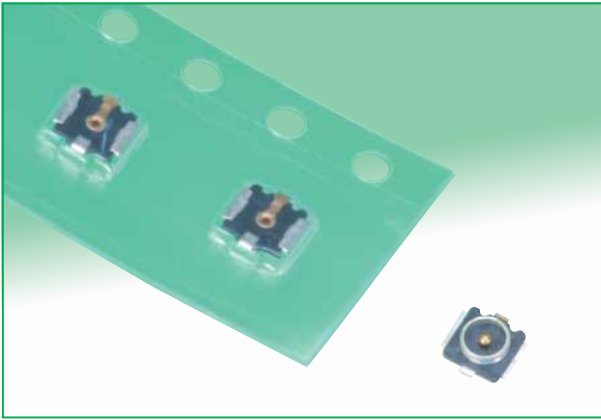
#### ● Plug

| Part                  | Material        | Finish        | Remarks |
|-----------------------|-----------------|---------------|---------|
| Shell                 | Phosphor bronze | Silver plated | —       |
| Female center contact | Phosphor bronze | Gold plated   | —       |
| Insulator             | PBT             | Color: Black  | UL94V-0 |

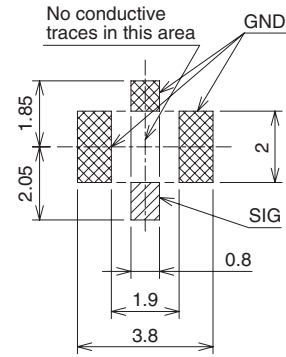
#### ● Receptacle

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

## ■ Receptacle



## ◆ Recommended PCB mounting pattern



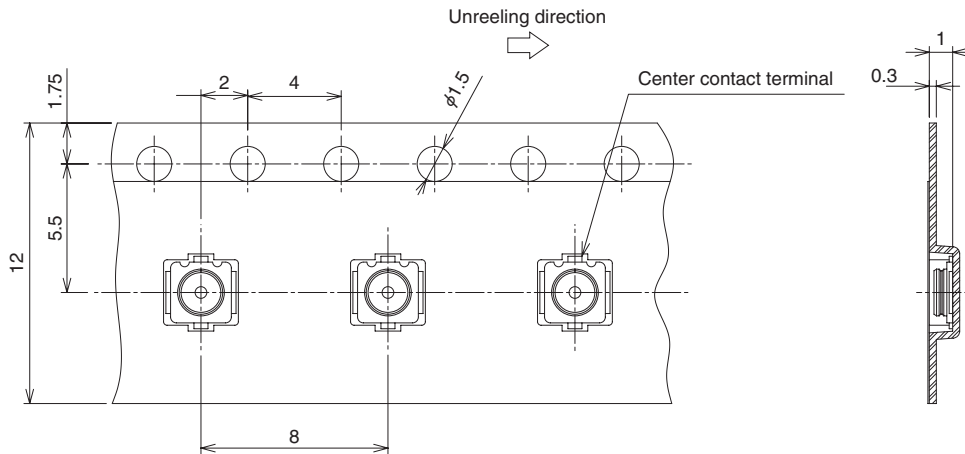
Recommended screen thickness: 0.1mm to 0.12mm

All dimensions: mm

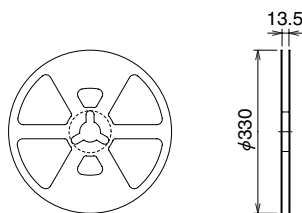
| Part Number      | CL No.        | Packaging                    | Weight/EA | RoHS |
|------------------|---------------|------------------------------|-----------|------|
| N.FL-R-SMT-1(01) | 331-0332-3-01 | Bag (100 pieces per bag)     | 14 mg     | YES  |
| N.FL-R-SMT-1(10) | 331-0332-3-10 | Reel (2,000 pieces per reel) |           |      |
| N.FL-R-SMT-1(40) | 331-0332-3-40 | Reel (5,000 pieces per reel) |           |      |

## ● Packaging Specifications

### Embossed Carrier Tape Dimensions



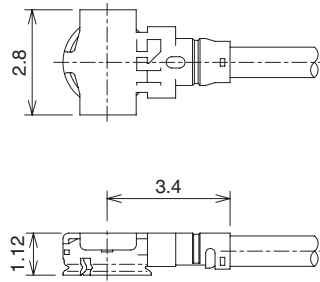
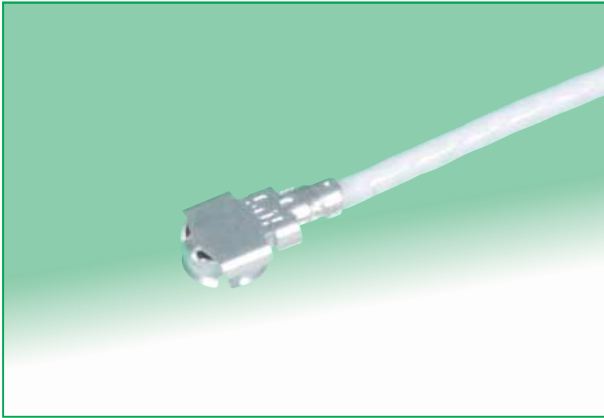
### Reel Dimensions



Reel material: Plastic

All dimensions: mm

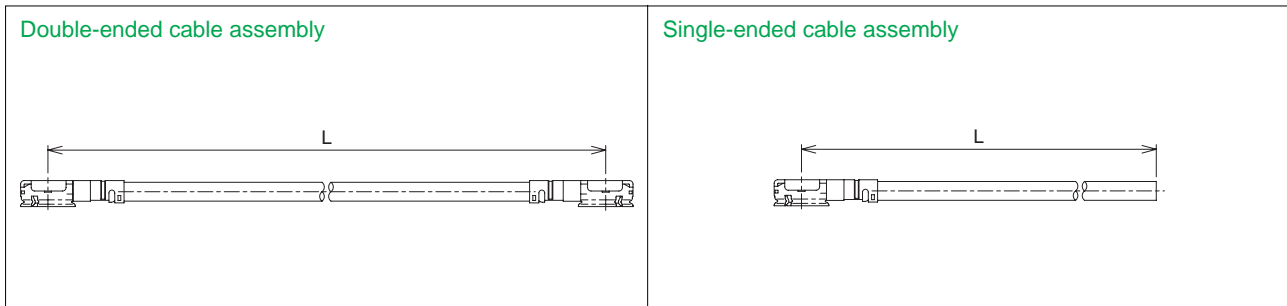
## ■ Plug Assembly (Plug)



Plugs can be ordered only as terminated cable assemblies.

All dimensions: mm

## ■ How to Specify Plug Cable Assembly



## ● Ordering Information

**N.F.L** – **[ ] LP** – **04N** **[ ]** – **A** – **(L)**

|                     |  |
|---------------------|--|
| ① Series name       | N.F.L                                      |
| ② Assembly type     | LP : Single ended<br>2LP : Double ended    |
| ③ Cable type        | 04N : Dia. 0.81mm ultra-fine coaxial cable |
| ④ Cable color       | 1: White, 2: Black                         |
| ⑤ Total length (mm) | Length (L)                                 |

## ● Standard tolerances for (L)

| (L)                    | Standard Tolerance |
|------------------------|--------------------|
| L=35 mm to 200 mm      | ±4 mm (Note 1)     |
| L=200 mm to 500 mm     | ±8 mm              |
| L=500 mm to 1000 mm    | ±12 mm             |
| L= Longer than 1000 mm | ±1.5% of (L)       |

Note1: Minimum available length (L) is 35mm

Note2: Contact nearest HRS representative if different tolerances are required.

Note3: Contact Nearest HRS representative if one end requires preparation.

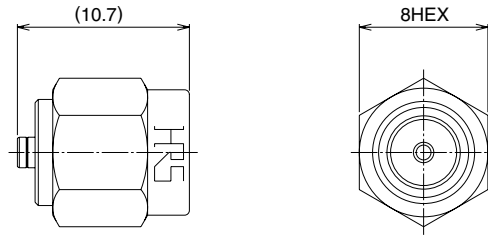
| Part No. of Cable Assembly | Description  | RoHS |
|----------------------------|--|------|
| N.F.L-2LP-04N1-A-(L)       | Dia. 0.81mm double ended coaxial cable, color: white | YES  |

## ■ Conversion Adapters

### ● SMA Conversion Adapter (N.FL / U.FL side jack - SMA side plug)



Note: The U.FL side mating portions has a lower lock retention force than the regular product, therefore, cannot be used for purposes other than performance measurements.



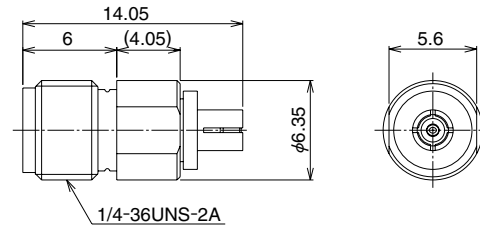
All dimensions: mm

| Part Number    | CL No.        | RoHS |
|----------------|---------------|------|
| HRMP-U.FLJ(40) | 311-0301-5-40 | YES  |

### ● SMA Conversion Adapter (N.FL / U.FL side jack - SMA side jack)



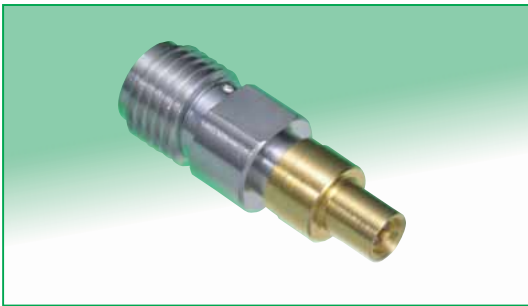
Note: The U.FL side mating portions has a lower lock retention force than the regular product, therefore, cannot be used for purposes other than performance measurements.



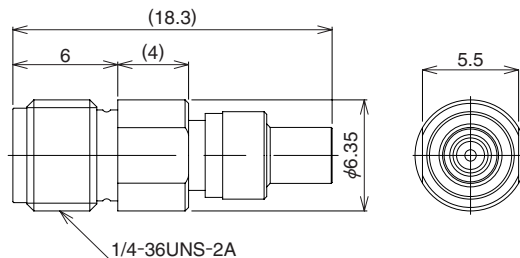
All dimensions: mm

| Part Number    | CL No.        | RoHS |
|----------------|---------------|------|
| HRMJ-U.FLP(40) | 311-0300-2-40 | YES  |

### ● SMA Conversion Adapter



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

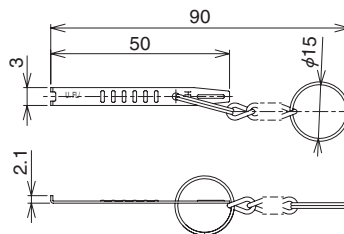


All dimensions: mm

| Part Number    | CL No.     | RoHS |
|----------------|------------|------|
| HRMJ-N.FLP-ST5 | 311-0423-2 | YES  |

## ■ Plug extraction tool

This jig is used for extraction from a mating condition.



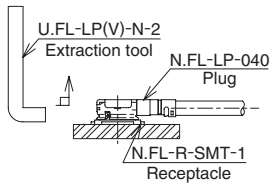
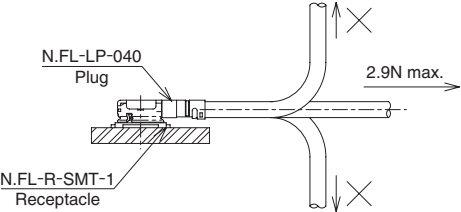
All dimensions: mm

| Part Number    | CL No.     | RoHS |
|----------------|------------|------|
| U.FL-LP(V)-N-2 | 331-0493-2 | YES  |

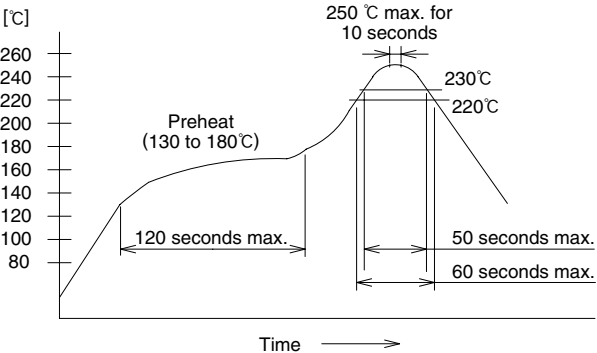
**N.F.L Series Lightweight SMT Miniature Coaxial Connectors – 1.4 mm Mated Height**

## Usage Precautions

### 1. Plug

|  |   |
|--|---|
| <p>(1) Mating / unmating</p>                                   | <ul style="list-style-type: none"> <li>• <b>Unmating</b> Insert the end of an extraction tool into a space between a plug and receptacle, and pull up the tool in the perpendicular to a mounting surface of a receptacle, as shown in the figure.                             <ul style="list-style-type: none"> <li>● Recommended the use of the extraction tool for unmating.</li> </ul>                             Any attempt of unmating by pulling on the cable may result in damage to the mechanical / electrical performance.                         </li> <li>• <b>Mating</b> Do not attempt to insert on an extreme angle.</li> </ul>  |
| <p>(2) Pull forces on the cable after connectors are mated</p> | <p>Do NOT apply any pull forces after the bending of the cable.</p>   |
| <p>(3) Precautions</p>   | <p>Do not twist connectors excessively during mating / unmating.</p>  |

### 2. Receptacle

|   |  |
|---|--|
| <p>(1) Recommended reflow temperature profile</p> |  <p>① The temperature profile indicates the board surface temperature at the point of contacts with the connector leads.<br/>                 ② 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 the detailed recommendations.</p> |
| <p>(2) Manual soldering</p>                       | <p>Soldering iron temperature: 350°C, Soldering time: for 5 seconds max.</p>   |
| <p>(3) Recommended metal mask thickness</p>       | <p>0.1 mm to 0.12 mm</p>   |
| <p>(4) 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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