Thin-Film RF/Microwave Directional Couplers
CP0302/CP0402/CP0603/CP0805 and DB0603N/DB0805 3dB 90°
CP0402W2700FNTR Wide Band High Directivity

ITF TECHNOLOGY
The ITF High Directivity Wide Band LGA Coupler is based on thin film multilayer technology. The technology provides a miniature part with excellent high frequency performance and rugged construction for reliable automatic assembly. The Wide Band High Directivity Coupler displays a stable coupling factor over a wide frequency band.

APPLICATIONS
• Mobile communications
• Satellite TV receivers
• GPS
• Vehicle location systems
• Wireless LAN’s

LAND GRID ARRAY ADVANTAGES
• Inherent Low Profile
• Self Alignment during Reflow
• Excellent Solderability
• Low Parasitics
• Better Heat Dissipation

HOW TO ORDER

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency (MHz)</th>
<th>Sub-Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP 0402 W</td>
<td>XXXX X</td>
<td>N TR T</td>
</tr>
<tr>
<td>Wide Band</td>
<td></td>
<td>LGA Termination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sn100</td>
</tr>
</tbody>
</table>

QUALITY INSPECTION
Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:
• Static Humidity: 85°C, 85% RH, 160 hours
• Endurance: 125°C, \( I_n \), 4 hours

TERMINATION
Nickel/Lead Free solder coating compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

OPERATING TEMPERATURE
-40°C to +85°C

POWER RATING
3W RF Continuous

DIMENSIONS (BOTTOM VIEW)

<table>
<thead>
<tr>
<th>mm (inches)</th>
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</thead>
<tbody>
<tr>
<td>L</td>
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<tr>
<td>W</td>
</tr>
<tr>
<td>T</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>S , H</td>
</tr>
</tbody>
</table>

TERMINALS (TOP VIEW)

Recommended Pad Layout Dimensions mm (inches)

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CP0302/CP0402/CP0603/CP0805 and DB0603N/DB0805 3dB 90°
CP0402W2700FNTR Wide Band High Directivity

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>CP0402W2700FNTR</td>
<td>700-2,700</td>
<td>24±2</td>
<td>0.3</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>

![Graph showing coupling, isolation, and loss over frequency range]
**GENERAL DESCRIPTION**

These jigs are designed for testing the CP0402W2700FNTR High Directivity Couplers using a Vector Network Analyzer.

They consist of a dielectric substrate, having 50Ω microstrips as conducting lines and a bottom ground plane located at a distance of 0.254mm (0.010") from the microstrips.

The substrate used is Neltec's NH9338ST0254C1BC.

The connectors are SMA type (female), 'Johnson Components Inc.' Product P/N: 142-0701-841.

Both a measurement jig and a calibration jig are provided.

The calibration jig is designed for a full 2-port calibration, and consists of an open line, short line and through line. LOAD calibration can be done by a 50Ω SMA termination.

**MEASUREMENT PROCEDURE**

When measuring a component, it can be either soldered or pressed using a non-metallic stick until all four ports touch the appropriate pads. Set the VNA to the relevant frequency band. Connect the VNA using a 10dB attenuator on the jig terminal connected to port 2. Follow the VNA's instruction manual and use the calibration jig to perform a full 2-Port calibration in the required bandwidths.

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**Place the coupler on the measurement jig as follows:**

- GND (Coupler) • Connector 1 (Jig)
- Coupling (Coupler) • Connector 2 (Jig)
- IN (Coupler) • Connector 3 (Jig)
- Out (Coupler) • Connector 4 (Jig)

**To measure I. Loss connect:**

- Connector 3 (Jig) • Port 1 (VNA)
- Connector 4 (Jig) • Port 2 (VNA)

**To measure R. Loss and Coupling connect:**

- Connector 3 (Jig) • Port 1 (VNA)
- Connector 2 (Jig) • Port 2 (VNA)

**To measure Isolation connect:**

- Connector 4 (Jig) • Port 1 (VNA)
- Connector 3 (Jig) • Port 2 (VNA)

**Measurement Jig**

- Connector 1 (not used)
- Connector 2
- Connector 3
- Connector 4

**Calibration Jig**

- Short Line to GND.
- Load & Through
- Load & Through
- Open Line
- Connector Johnson P/N 142-0701-841
Broadband Directional Couplers
Lead-Free LGA Termination
CP0402W3800GNTR - High Directivity

**ITF TECHNOLOGY**
The ITF High Directivity LGA Coupler is based on thin-film multilayer technology. The technology provides a miniature part with excellent high frequency performance and rugged construction for reliable automatic assembly.

The ITF Coupler is offered in a variety of frequency bands compatible with various types of high frequency wireless systems.

**APPLICATIONS**
- Mobile communications
- Satellite TV receivers
- GPS
- Vehicle location systems
- Wireless LAN’s

**LAND GRID ARRAY ADVANTAGES**
- Inherent Low Profile
- Self Alignment during Reflow
- Excellent Solderability
- Low Parasitics
- Better Heat Dissipation

**HOLD TO ORDER**

<table>
<thead>
<tr>
<th>CP</th>
<th>0402</th>
<th>W</th>
<th>3800</th>
<th>G</th>
<th>N</th>
<th>TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Size</td>
<td>Type</td>
<td>Frequency (MHz)</td>
<td>Sub-Type</td>
<td>LGA Term Sn100</td>
<td>Taped &amp; Reeled</td>
</tr>
</tbody>
</table>

**FINAL QUALITY INSPECTION**
Finished parts are 100% tested for electrical parameters and visual/mechanical characteristics. Each production lot is evaluated on a sample basis for:
- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C, Ih, 4 hours

**TERMINATION**
Nickel/Lead-Free Solder coating (Sn100) compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

**OPERATING TEMPERATURE**
-40°C to +85°C

**POWER RATING**
1W RF Continuous

**NOTE**
CP0402W3800GNTR includes a built in 50 Ohm resistor and does not require an external 50 Ohm resistor.

**RECOMMENDED PAD LAYOUT:** (mm)

![Recommended Pad Layout](image)

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042921
Broadband Directional Couplers
Lead-Free LGA Termination
CP0402W3800GNTR - High Directivity

TYPICAL ELECTRICAL PERFORMANCE

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>CP0402W3800GNTR</td>
<td>700-3800</td>
<td>24±2.5</td>
<td>0.4</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

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Broadband Directional Couplers
Lead-Free LGA Termination
CP0402W3800GNTR - High Directivity

TAPE & REEL
All tape and reel specifications are in compliance with EIA 481-1-A. (equivalent to IEC 286 part 3).
- 8mm carrier
- Reeled quantities: Reels of 3,000 per 7” reel or 10,000 pieces per 13” reel
  01005, 0201 and 0402 = 5,000 pieces per 7” reel and 20,000 pieces per 13” reel

REEL DIMENSIONS: millimeters (inches)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180±1.0</td>
<td>1.5 min</td>
<td>13±0.2</td>
<td>20.5 min</td>
<td>50 min</td>
<td>9.6±1.5</td>
</tr>
<tr>
<td></td>
<td>(7.087±0.039)</td>
<td>(0.059 min.)</td>
<td>(0.512±0.008)</td>
<td>(0.795 min.)</td>
<td>(1.969 min.)</td>
<td>(0.370±0.050)</td>
</tr>
</tbody>
</table>

Metric dimensions will govern.
Inch measurement rounded and for reference only.
(1) 330mm (13 inch) reels are available

CARRIER DIMENSIONS: millimeters (inches)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.0±0.3</td>
<td>3.5±0.05</td>
<td>1.75±0.1</td>
<td>2.0±0.05</td>
<td>4.0±0.1</td>
<td>1.5±0.05</td>
</tr>
<tr>
<td></td>
<td>(0.315±0.012)</td>
<td>(0.138±0.002)</td>
<td>(0.069±0.004)</td>
<td>(0.0315±0.0012)</td>
<td>(0.157±0.004)</td>
<td>(0.059±0.002)</td>
</tr>
</tbody>
</table>

The nominal dimensions of the component compartment (W/L) are derived from the component size.
RECOMMENDED REFLOW PROFILE

Lead-Free Solder Profile

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>0.43</td>
<td>50</td>
</tr>
<tr>
<td>1.26</td>
<td>100</td>
</tr>
<tr>
<td>2.10</td>
<td>150</td>
</tr>
<tr>
<td>2.63</td>
<td>200</td>
</tr>
<tr>
<td>3.36</td>
<td>250</td>
</tr>
<tr>
<td>4.19</td>
<td>Peak Temperature: 260°C</td>
</tr>
<tr>
<td>4.92</td>
<td>200</td>
</tr>
<tr>
<td>5.02</td>
<td>150</td>
</tr>
<tr>
<td>5.46</td>
<td>100</td>
</tr>
<tr>
<td>8.29</td>
<td>0</td>
</tr>
</tbody>
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Broadband Directional Couplers
Lead-Free LGA Termination
CP0402W4500JNTR - High Directivity

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The ITF Coupler is offered in a variety of frequency bands compatible with various types of high frequency wireless systems.

**APPLICATIONS**
- 5G Application
- Mobile communications
- Satellite TV receivers
- GPS
- Vehicle location systems

**LAND GRID ARRAY ADVANTAGES**
- Inherent Low Profile
- Self Alignment during Reflow
- Excellent Solderability
- Low Parasitics
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**HOW TO ORDER**

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<th>0402</th>
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<th>4500</th>
<th>J</th>
<th>N</th>
<th>TR</th>
</tr>
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<tbody>
<tr>
<td>Series</td>
<td>Size</td>
<td>Type</td>
<td>Frequency (MHz)</td>
<td>Sub-Type</td>
<td>LGA Term</td>
<td>Sn100</td>
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</table>

**FINAL QUALITY INSPECTION**
Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:
- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C, Iₚ, 4 hours

**TERMINATION**
Nickel/Lead-Free Solder coating (Sn100) compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

**OPERATING TEMPERATURE**
-40°C to +85°C

**POWER RATING**
1W RF Continuous

**RECOMMENDED PAD LAYOUT:** (mm)

**DIMENSIONS:** mm (inches)
(Bottom View)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>L</td>
<td>1.0±0.05 (0.040±0.002)</td>
<td>A</td>
<td>0.20±0.05 (0.008±0.002)</td>
</tr>
<tr>
<td>W</td>
<td>0.58±0.04 (0.023±0.002)</td>
<td>B</td>
<td>0.18±0.05 (0.007±0.002)</td>
</tr>
<tr>
<td>T</td>
<td>0.35±0.05 (0.014±0.002)</td>
<td>S</td>
<td>0.05±0.05 (0.002±0.002)</td>
</tr>
</tbody>
</table>

**TERMINALS:**
(Top View)

GND (4)
Out (2)
In (1)
Coupling (3)
Broadband Directional Couplers
Lead-Free LGA Termination
CP0402W4500JNTR - High Directivity

DIRECTIONAL COUPLER TYPE CP0402W3800GNTR

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>CP0402W4500JNTR</td>
<td>2000-7000</td>
<td>20±2</td>
<td>0.6</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

TYPICAL ELECTRICAL PERFORMANCE