

# Thin-Film Directional Couplers



## CP0603 SMD Type

### GENERAL DESCRIPTION ITF (Integrated Thin-Film) TECHNOLOGY

The ITF SMD 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

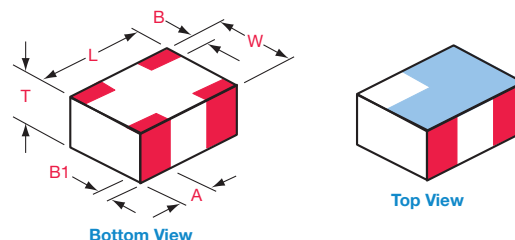
- Mobile Communications
- Satellite TV Receivers
- GPS
- Vehicle Location Systems
- Wireless LAN's

### FEATURES

- Miniature Size: 0603
- Frequency Range: 800MHz - 3GHz
- Characteristic Impedance: 50Ω
- Operating / Storage Temp.: -40°C to +85°C
- Power Rating: 3W Continuous
- Low Profile
- Rugged Construction
- Taped and Reeled

### DIMENSIONS:

millimeters (inches)



|    | 0603                                |
|----|-------------------------------------|
| L  | 1.6±0.1<br>(0.063±0.004)            |
| W  | 0.84±0.1<br>(0.033±0.004)           |
| T  | 0.60±0.1<br>(0.028±0.004)           |
| A  | 0.35±0.15<br>(0.014±0.006)          |
| B  | 0.175±0.1<br>(0.007±0.004)          |
| B1 | 0.00±0.1/0-0.0<br>(0.00±0.004/-0.0) |

### HOW TO ORDER

|                                                       |                                         |                              |                                             |                                  |                                                                           |                                                               |
|-------------------------------------------------------|-----------------------------------------|------------------------------|---------------------------------------------|----------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>CP</b><br>T<br><b>Style</b><br>Directional Coupler | <b>0603</b><br>T<br><b>Size</b><br>0603 | <b>X</b><br>T<br><b>Type</b> | <b>****</b><br>T<br><b>Frequency</b><br>MHz | <b>X</b><br>T<br><b>Sub Type</b> | <b>S</b><br>T<br><b>Termination Code</b><br>W = Sn90, Pb10<br>**S = Sn100 | <b>TR</b><br>T<br><b>Packaging Code</b><br>TR = Tape and Reel |
|-------------------------------------------------------|-----------------------------------------|------------------------------|---------------------------------------------|----------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|

\*\*RoHS compliant

### QUALITY INSPECTION

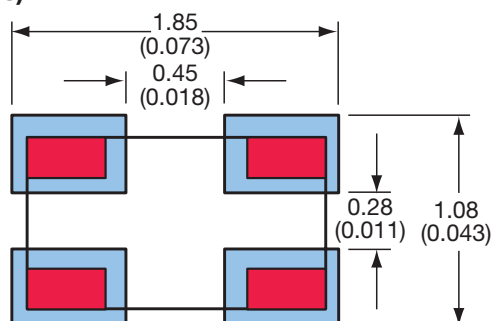
Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:

- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C, I<sub>R</sub>, 4 hours

### TERMINATION

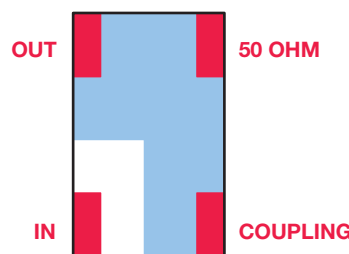
Nickel/Solder coating compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

### Recommended Pad Layout Dimensions mm (inches)

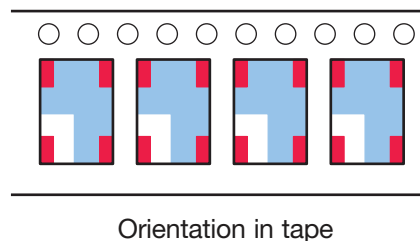


### TERMINALS (Top View)

Not RoHS Compliant



For RoHS compliant products, please select correct termination style.

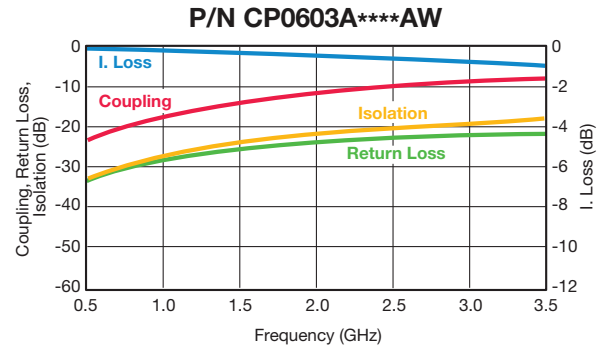


# Thin-Film Directional Couplers

## CP0603 SMD Type

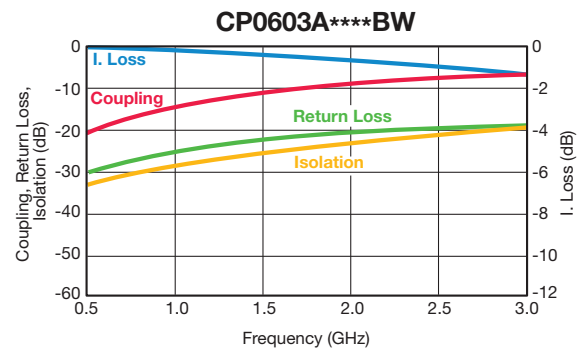
Coupler P/N CP0603A\*\*\*\*AW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |
|--------------|---------------|----------------------|---------------|-------------|----------|
| AMPS         | CP0603A0836AW | 824 - 849            | 18.5±1        | 0.25        | 1.2      |
|              | CP0603A0881AW | 869 - 894            | 18.5±1        |             |          |
| GSM          | CP0603A0902AW | 890 - 915            | 18±1          |             |          |
|              | CP0603A0947AW | 935 - 960            | 17.5±1        |             |          |
| E-GSM        | CP0603A0897AW | 880 - 915            | 18±1          |             |          |
|              | CP0603A0942AW | 925 - 960            | 17.5±1        |             |          |
| PDC          | CP0603A1441AW | 1429 - 1453          | 14±1          | 0.4         |          |
| PCN          | CP0603A1747AW | 1710 - 1785          | 12.5±1        | 0.6         |          |
|              | CP0603A1842AW | 1805 - 1880          | 12±1          |             |          |
| PCS          | CP0603A1880AW | 1850 - 1910          | 12±1          | 0.65        |          |
|              | CP0603A1960AW | 1930 - 1990          | 11.5±1        |             |          |
| PHP          | CP0603A1907AW | 1895 - 1920          | 12±1          | 0.6         |          |
| DECT         | CP0603A1890AW | 1880 - 1900          | 12±1          |             |          |
| Wireless LAN | CP0603A2442AW | 2400 - 2484          | 10±1          | 0.85        |          |



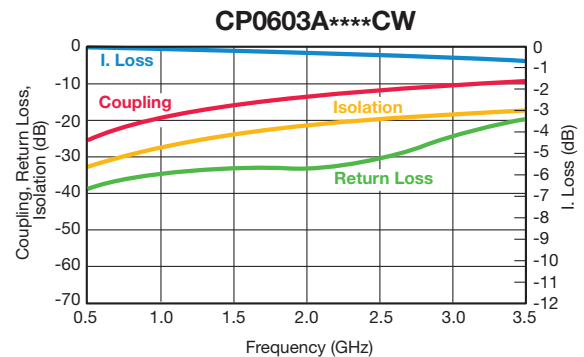
Coupler P/N CP0603A\*\*\*\*BW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |
|--------------|---------------|----------------------|---------------|-------------|----------|
| AMPS         | CP0603A0836BW | 824 - 849            | 16±1          | 0.25        | 1.2      |
|              | CP0603A0881BW | 869 - 894            | 15.5±1        |             |          |
| GSM          | CP0603A0902BW | 890 - 915            | 15.5±1        |             |          |
|              | CP0603A0947BW | 935 - 960            | 15±1          |             |          |
| E-GSM        | CP0603A0897BW | 880 - 915            | 15.5±1        |             |          |
|              | CP0603A0942BW | 925 - 960            | 15±1          |             |          |
| PDC          | CP0603A1441BW | 1429 - 1453          | 11.5±1        | 0.55        |          |
| PCN          | CP0603A1747BW | 1710 - 1785          | 10±1          | 0.8         | 1.3      |
|              | CP0603A1842BW | 1805 - 1880          | 9.5±1         |             |          |
| PCS          | CP0603A1880BW | 1850 - 1910          | 9±1           |             |          |
|              | CP0603A1960BW | 1930 - 1990          | 9±1           |             |          |
| PHP          | CP0603A1907BW | 1895 - 1920          | 9±1           |             |          |
| DECT         | CP0603A1890BW | 1880 - 1900          | 9±1           |             |          |
| Wireless LAN | CP0603A2442BW | 2400 - 2484          | 7.5±1         | 1.1         |          |



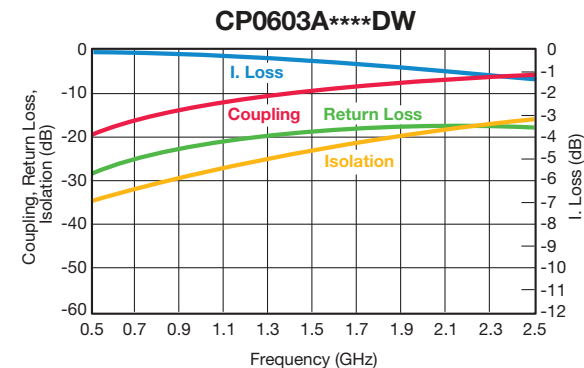
Coupler P/N CP0603A\*\*\*\*CW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |
|--------------|---------------|----------------------|---------------|-------------|----------|
| AMPS         | CP0603A0836CW | 824 - 849            | 21±1          | 0.25        | 1.2      |
|              | CP0603A0881CW | 869 - 894            | 20.5±1        |             |          |
| GSM          | CP0603A0902CW | 890 - 915            | 20.5±1        |             |          |
|              | CP0603A0947CW | 935 - 960            | 20±1          |             |          |
| E-GSM        | CP0603A0897CW | 880 - 915            | 20.5±1        | 0.40        |          |
|              | CP0603A0942CW | 925 - 960            | 20±1          |             |          |
| PDC          | CP0603A1441CW | 1429 - 1453          | 16.5±1        |             |          |
| PCN          | CP0603A1747CW | 1710 - 1785          | 15±1          |             |          |
|              | CP0603A1842CW | 1805 - 1880          | 14.5±1        |             |          |
| PCS          | CP0603A1880CW | 1850 - 1910          | 14.5±1        | 0.65        |          |
|              | CP0603A1960CW | 1930 - 1990          | 14±1          |             |          |
| PHP          | CP0603A1907CW | 1895 - 1920          | 14.5±1        |             |          |
| DECT         | CP0603A1890CW | 1880 - 1900          | 14.5±1        |             |          |
| Wireless LAN | CP0603A2442CW | 2400 - 2484          | 12.5±1        |             |          |



Coupler P/N CP0603A\*\*\*\*DW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |  |  |
|--------------|---------------|----------------------|---------------|-------------|----------|--|--|
| AMPS         | CP0603A0836DW | 824 - 849            | 15.0±1        | 0.40        | 1.2      |  |  |
|              | CP0603A0881DW | 869 - 894            | 14.5±1        |             |          |  |  |
| GSM          | CP0603A0902DW | 890 - 915            | 14.5±1        |             |          |  |  |
|              | CP0603A0947DW | 935 - 960            | 14±1          |             |          |  |  |
| E-GSM        | CP0603A0897DW | 880 - 915            | 14.5±1        |             |          |  |  |
|              | CP0603A0942DW | 925 - 960            | 14±1          |             |          |  |  |
| PDC          | CP0603A1441DW | 1429 - 1453          | 10.5±1        | 0.7         | 1.3      |  |  |
| PCN          | CP0603A1747DW | 1710 - 1785          | 9±1           | 0.9         | 1.5      |  |  |
|              | CP0603A1842DW | 1805 - 1880          | 8.5±1         |             |          |  |  |
| PCS          | CP0603A1880DW | 1850 - 1910          | 8.5±1         | 1.0         |          |  |  |
|              | CP0603A1960DW | 1930 - 1990          | 8±1           |             |          |  |  |
| PHP          | CP0603A1907DW | 1895 - 1920          | 8.5±1         |             |          |  |  |
| DECT         | CP0603A1890DW | 1880 - 1900          | 8.5±1         |             |          |  |  |
| Wireless LAN | CP0603A2442DW | 2400 - 2484          | 6.5±1         | 1.5         |          |  |  |



Important: Couplers can be used at any frequency within the indicated range.

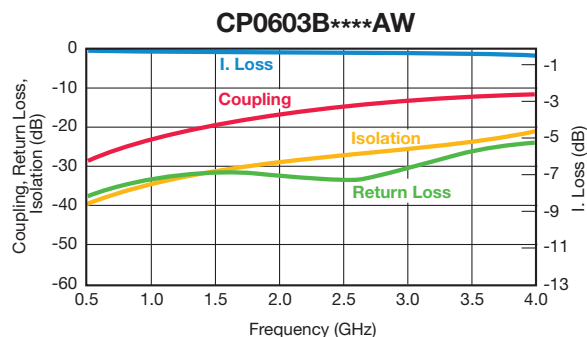
# Thin-Film Directional Couplers



## CP0603 SMD Type

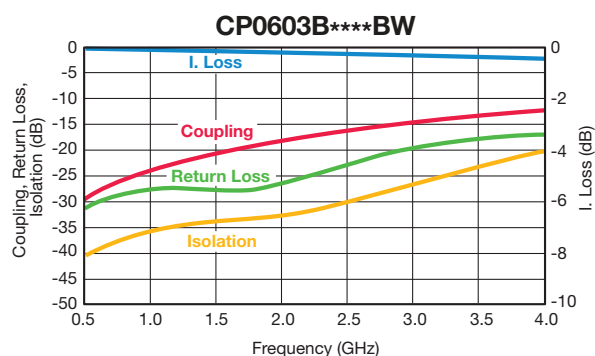
Coupler P/N CP0603B\*\*\*\*AW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |     |
|--------------|---------------|----------------------|---------------|-------------|----------|-----|
| AMPS         | CP0603B0836AW | 824 - 849            | 24.5±1        | 0.2         | 1.2      |     |
|              | CP0603B0881AW | 869 - 894            | 24±1          |             |          |     |
| GSM          | CP0603B0902AW | 890 - 915            | 24±1          |             |          |     |
|              | CP0603B0947AW | 935 - 960            | 23.5±1        |             |          |     |
| E-GSM        | CP0603B0897AW | 880 - 915            | 24±1          | 0.25        |          |     |
|              | CP0603B0942AW | 925 - 960            | 23.5±1        |             |          |     |
| PDC          | CP0603B1441AW | 1429 - 1453          | 20±1          |             |          | 0.3 |
| PCN          | CP0603B1747AW | 1710 - 1785          | 18±1          |             |          |     |
|              | CP0603B1842AW | 1805 - 1880          | 17.5±1        |             |          |     |
| PCS          | CP0603B1880AW | 1850 - 1910          | 17.5±1        | 0.45        |          |     |
|              | CP0603B1960AW | 1930 - 1990          | 17.5±1        |             |          |     |
| PHP          | CP0603B1907AW | 1895 - 1920          | 17.5±1        |             |          |     |
| DECT         | CP0603B1890AW | 1880 - 1900          | 17.5±1        |             |          |     |
| Wireless LAN | CP0603B2442AW | 2400 - 2484          | 15.5±1        |             |          |     |



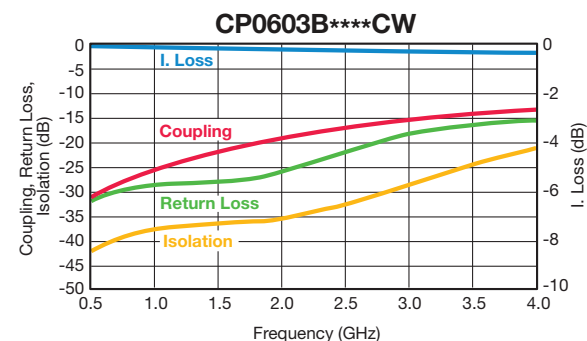
Coupler P/N CP0603B\*\*\*\*BW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |
|--------------|---------------|----------------------|---------------|-------------|----------|
| AMPS         | CP0603B0836BW | 824 - 849            | 25.5±1        | 0.2         | 1.2      |
|              | CP0603B0881BW | 869 - 894            | 25±1          |             |          |
| GSM          | CP0603B0902BW | 890 - 915            | 25±1          |             |          |
|              | CP0603B0947BW | 935 - 960            | 24.5±1        |             |          |
| E-GSM        | CP0603B0897BW | 880 - 915            | 25±1          | 0.25        |          |
|              | CP0603B0942BW | 925 - 960            | 24.5±1        |             |          |
| PDC          | CP0603B1441BW | 1429 - 1453          | 21±1          |             |          |
| PCN          | CP0603B1747BW | 1710 - 1785          | 19±1          |             |          |
|              | CP0603B1842BW | 1805 - 1880          | 19±1          |             |          |
| PCS          | CP0603B1880BW | 1850 - 1910          | 18.5±1        |             |          |
|              | CP0603B1960BW | 1930 - 1990          | 18.5±1        |             |          |
| PHP          | CP0603B1907BW | 1895 - 1920          | 18.5±1        |             |          |
| DECT         | CP0603B1890BW | 1880 - 1900          | 18.5±1        |             |          |
| Wireless LAN | CP0603B2442BW | 2400 - 2484          | 16.5±1        | 0.35        |          |



Coupler P/N CP0603B\*\*\*\*CW

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max | VSWR max |
|--------------|---------------|----------------------|---------------|-------------|----------|
| AMPS         | CP0603B0836CW | 824 - 849            | 26.5±1        | 0.2         | 1.2      |
|              | CP0603B0881CW | 869 - 894            | 26±1          |             |          |
| GSM          | CP0603B0902CW | 890 - 915            | 26±1          |             |          |
|              | CP0603B0947CW | 935 - 960            | 25.5±1        |             |          |
| E-GSM        | CP0603B0897CW | 880 - 915            | 26±1          | 0.25        |          |
|              | CP0603B0942CW | 925 - 960            | 25.5±1        |             |          |
| PDC          | CP0603B1441CW | 1429 - 1453          | 22±1          | 0.25        |          |
| PCN          | CP0603B1747CW | 1710 - 1785          | 20.5±1        |             |          |
|              | CP0603B1842CW | 1805 - 1880          | 20±1          |             |          |
| PCS          | CP0603B1880CW | 1850 - 1910          | 20±1          |             |          |
|              | CP0603B1960CW | 1930 - 1990          | 19.5±1        |             |          |
| PHP          | CP0603B1907CW | 1895 - 1920          | 20±1          |             |          |
| DECT         | CP0603B1890CW | 1880 - 1900          | 20±1          |             |          |
| Wireless LAN | CP0603B2442CW | 2400 - 2484          | 18±1          | 0.35        | 1.3      |



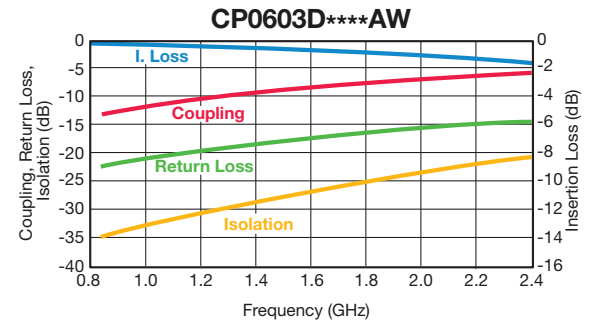
Important: Couplers can be used at any frequency within the indicated range.

# Thin-Film Directional Couplers

## CP0603 SMD Type – High Directivity

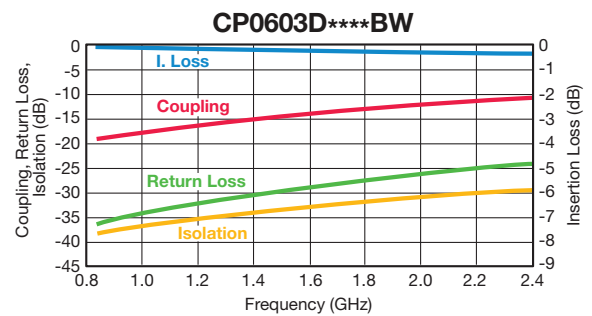
**Coupler P/N CP0603D\*\*\*\*AW**

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|--------------|---------------|----------------------|---------------|-------------------|------------------|------------------|
| AMPS         | CP0603D0836AW | 824 - 849            | 13.50         | 0.50              | 23               | 21               |
|              | CP0603D0881AW | 869 - 894            | 13.00         |                   | 22               |                  |
| GSM          | CP0603D0902AW | 890 - 915            | 12.50         | 1.00              |                  | 18               |
|              | CP0603D0947AW | 935 - 960            | 12.50         |                   | 17               |                  |
| E-GSM        | CP0603D0897AW | 880 - 915            | 13.00         | 7.50              |                  | 16               |
|              | CP0603D0942AW | 925 - 960            | 12.50         |                   | 7.00             |                  |
| PDC          | CP0603D1441AW | 1429 - 1453          | 9.00          | 1.40              |                  | 15               |
| PCN          | CP0603D1747AW | 1710 - 1785          | 8.00          |                   | 2.00             |                  |
|              | CP0603D1842AW | 1805 - 1880          | 7.00          |                   |                  |                  |
| PCS          | CP0603D1880AW | 1850 - 1910          | 7.00          |                   |                  |                  |
|              | CP0603D1960AW | 1930 - 1990          | 5.50          |                   |                  |                  |
| PHP          | CP0603D1907AW | 1895 - 1920          | 7.00          |                   |                  |                  |
| DECT         | CP0603D1890AW | 1880 - 1900          |               |                   |                  |                  |
| Wireless LAN | CP0603D2442AW | 2400 - 2484          | 5.50          |                   |                  |                  |



**Coupler P/N CP0603D\*\*\*\*BW**

| Application  | P/N Examples  | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|--------------|---------------|----------------------|---------------|-------------------|------------------|------------------|
| AMPS         | CP0603D0836BW | 824 - 849            | 20.00         | 0.25              | 36               | 19               |
|              | CP0603D0881BW | 869 - 894            | 19.50         |                   | 35               |                  |
| GSM          | CP0603D0902BW | 890 - 915            | 19.00         | 0.40              | 30               | 19               |
|              | CP0603D0947BW | 935 - 960            | 19.00         |                   | 28               |                  |
| E-GSM        | CP0603D0897BW | 880 - 915            | 19.00         | 0.55              | 27               | 19               |
|              | CP0603D0942BW | 925 - 960            | 19.00         |                   | 24               |                  |
| PDC          | CP0603D1441BW | 1429 - 1453          | 15.50         | 11.00             |                  |                  |
| PCN          | CP0603D1747BW | 1710 - 1785          | 14.00         |                   |                  |                  |
|              | CP0603D1842BW | 1805 - 1880          | 13.50         |                   |                  |                  |
| PCS          | CP0603D1880BW | 1850 - 1910          | 13.00         |                   |                  |                  |
| PHP          | CP0603D1907BW | 1895 - 1920          |               |                   |                  |                  |
| DECT         | CP0603D1890BW | 1880 - 1900          |               |                   |                  |                  |
| Wireless LAN | CP0603D2442BW | 2400 - 2484          |               |                   |                  |                  |



Important: Couplers can be used at any frequency within the indicated range.

# Thin-Film Directional Couplers



## CP0805 and CP0603 Test Jig

### ITF TEST JIG FOR COUPLER TYPES 0805 AND 0603 SMD

#### GENERAL DESCRIPTION

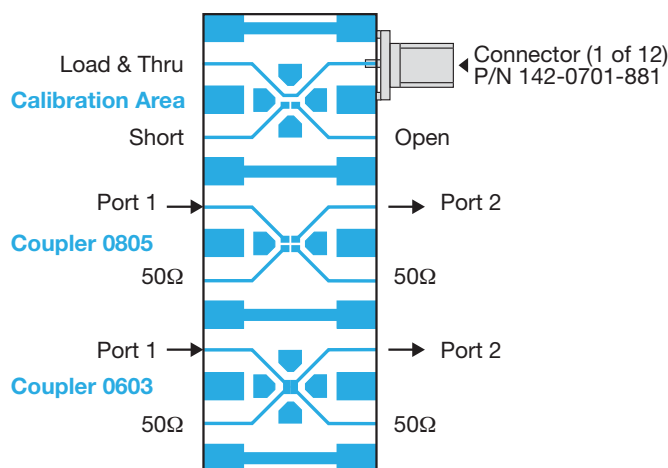
This jig is designed for the testing of CP0805 and CP0603 series Directional Couplers using a vector network analyzer. It consists of a FR4 multi-layer substrate, having 50Ω microstrips as conducting lines and a ground plane in the middle layer, located at a distance of 0.2mm from the microstrips.

The connectors are SMA type (female), 'Johnson Components Inc.' Product P/N: 142-0701-881.

The jig is designed for a full 2-port calibration. LOAD calibration can be done either by a 50Ω SMA termination, or by soldering a 50Ω chip resistor at the 50Ω ports.

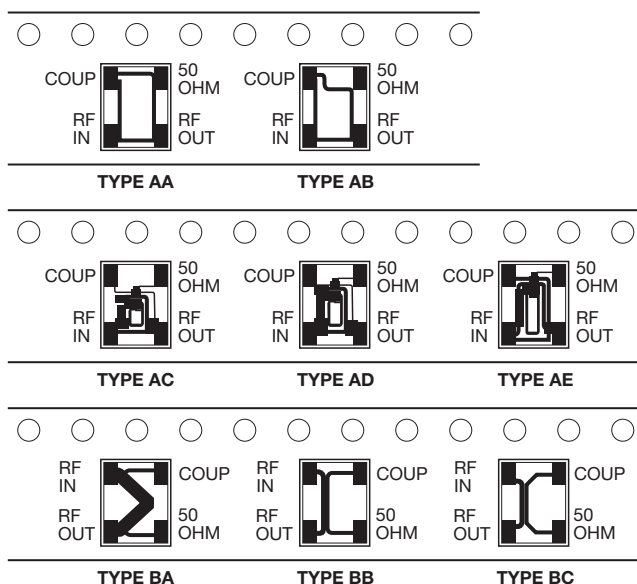
#### MEASUREMENT PROCEDURE

When measuring a component, it can be either soldered or pressed by a non-metallic stick until all four ports touch the appropriate pads. To measure the coupling (and the R. Loss) place the component on the Port 1 & Port 2 pads. Use two SMA 50Ω terminations (male) to terminate the ports, which are not connected to the network analyzer, and connect the network analyzer to the two ports. A 90° rotation of the component on its pads allows measuring a second parameter (I. Loss).



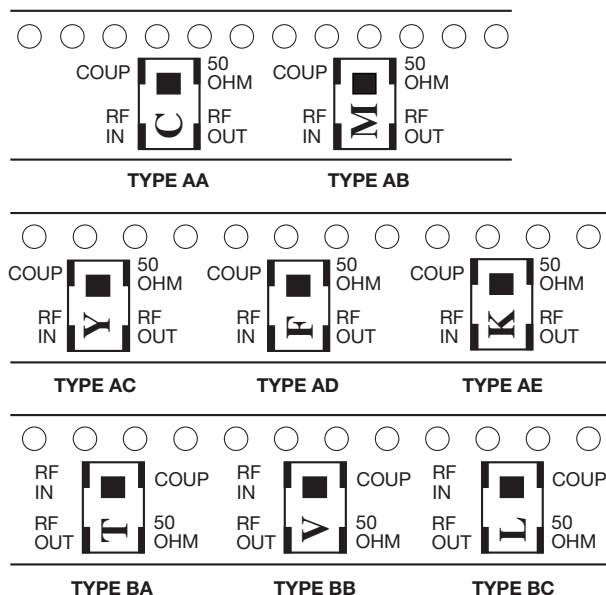
### CP0805 SERIES DIRECTIONAL COUPLERS

#### Orientation and Tape and Reel Packaging Specification (Top View)



The parts should be mounted on the PCB with White (Alumina) side down and the "dark" side up.

#### CP0805xxxxxxSTR (Sn100) (Top View)



The parts should be mounted on the PCB with printed side up.