



# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

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## CP0402 High Directivity LGA Termination

### General Information



#### GENERAL DESCRIPTION

The ITF 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

- 4G LTE
- 5G LTE
- Base Stations
- Automotive
- Industrial
- Mobile Communications
- Satellite TV Receivers
- GPS
- Vehicle Location Systems
- Wireless LAN's

#### FEATURES

- Small size: 0402
- Inherent Low Profile
- Self Alignment during Reflow
- Excellent Solderability
- Low Parasitics
- RoHS compliant
- Better Heat Dissipation
- Operating/Storage Temp -40°C to +85°C
- Power Rating 5W RF CW

#### HOW TO ORDER

|                                           |                             |                  |                                 |                      |                                                                                           |                                                   |
|-------------------------------------------|-----------------------------|------------------|---------------------------------|----------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>CP</b><br>Style<br>Directional Coupler | <b>0402</b><br>Size<br>0402 | <b>X</b><br>Type | <b>****</b><br>Frequency<br>MHz | <b>X</b><br>Sub-Type | <b>N</b><br>Termination Code<br>L = LGA Sn90, Pb10<br>**N = LGA Sn100<br>**RoHS compliant | <b>TR</b><br>Packaging Code<br>TR = Tape and Reel |
| Not RoHS Compliant                        |                             |                  |                                 |                      |                                                                                           |                                                   |



For RoHS compliant products, please select correct termination style.

#### QUALITY INSPECTION

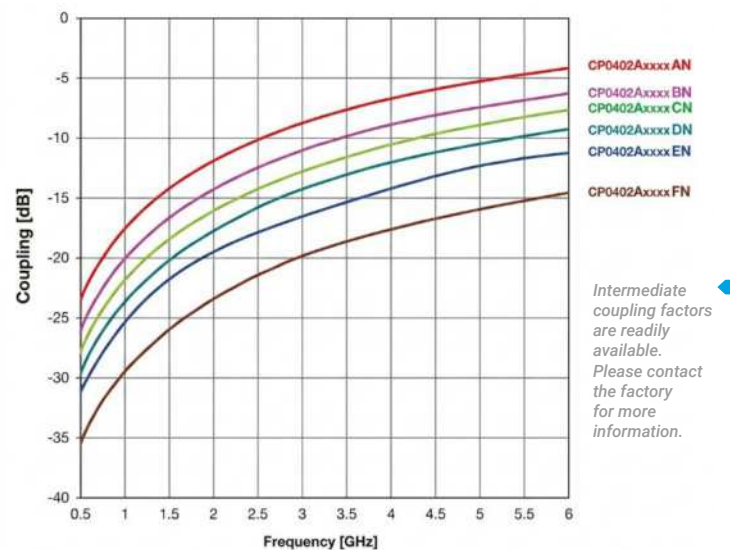
Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:

- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C,  $I_R$ , 4 hours

#### TERMINATION

Sn90Pb10 or Lead-Free Sn100 Nickel/Solder coating compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

#### CP0402 - TYPE SELECTION CHART



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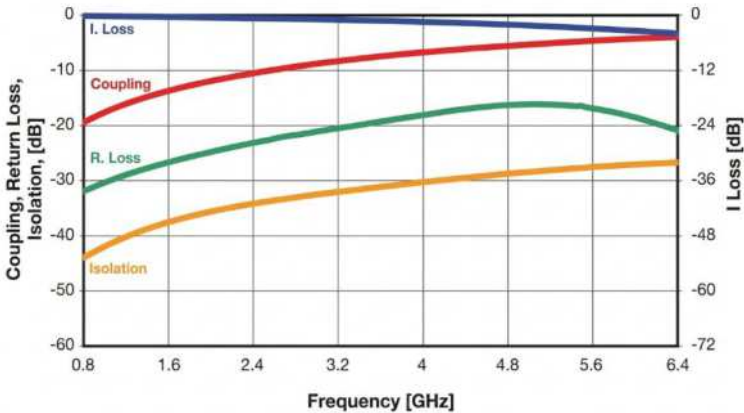
CP0402AxxxxANTR



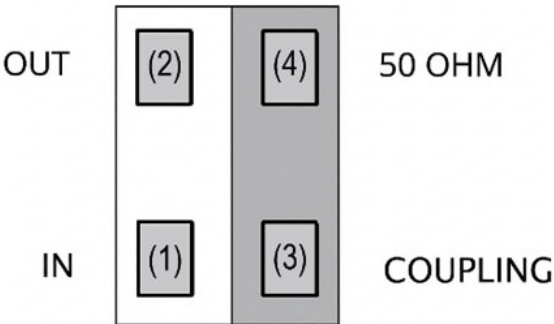
Coupler P/N CP0402AxxxxANTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836ANTR | 824 - 849            | -19.10        | -0.25             | -32              | -21              |
| CP0402A0881ANTR | 869 - 894            | -18.60        | -0.25             | -31              | -21              |
| CP0402A0902ANTR | 890 - 915            | -18.50        | -0.25             | -31              | -21              |
| CP0402A0947ANTR | 935 - 960            | -18.00        | -0.25             | -31              | -21              |
| CP0402A0897ANTR | 880 - 915            | -18.50        | -0.25             | -31              | -21              |
| CP0402A0942ANTR | 925 - 960            | -18.00        | -0.25             | -31              | -21              |
| CP0402A1441ANTR | 1429 - 1453          | -14.50        | -0.40             | -28              | -21              |
| CP0402A1747ANTR | 1710 - 1785          | -13.00        | -0.50             | -26              | -21              |
| CP0402A1842ANTR | 1805 - 1880          | -12.50        | -0.50             | -26              | -21              |
| CP0402A1880ANTR | 1850 - 1910          | -12.30        | -0.50             | -25              | -21              |
| CP0402A1960ANTR | 1930 - 1990          | -12.00        | -0.50             | -25              | -21              |
| CP0402A1907ANTR | 1895 - 1920          | -12.30        | -0.50             | -25              | -21              |
| CP0402A1890ANTR | 1880 - 1900          | -12.30        | -0.50             | -25              | -21              |
| CP0402A2442ANTR | 2400 - 2484          | -10.30        | -0.70             | -23              | -21              |
| CP0402A3500ANTR | 3450 - 3550          | -7.60         | -1.30             | -15              | -14              |
| CP0402A5000ANTR | 4950 - 5050          | -5.00         | -1.50             | -15              | -13              |
| CP0402A5500ANTR | 5450 - 5550          | -4.60         | -1.50             | -14              | -13              |
| CP0402A6000ANTR | 5950 - 6050          | -4.00         | -1.50             | -14              | -13              |

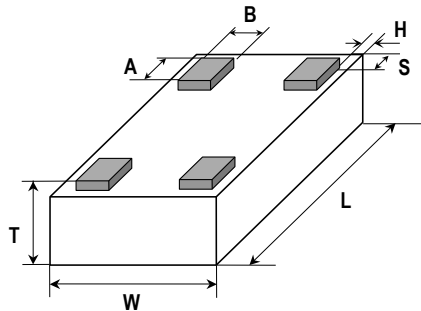
Important: Couplers can be used at any frequency within the indicated range.



TERMINALS (TOP VIEW)

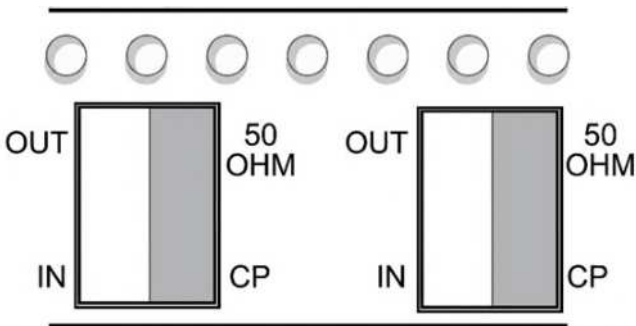


DIMENSIONS: millimeters (inches)  
(Bottom View)

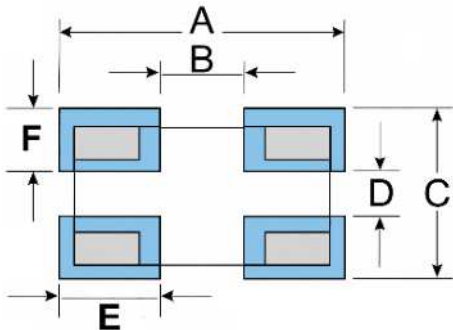


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
| B | 0.18±0.05<br>(0.007±0.002) |
| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

ORIENTATION IN TAPE



RECOMMENDED PAD LAYOUT DIMENSIONS:  
millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")

# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

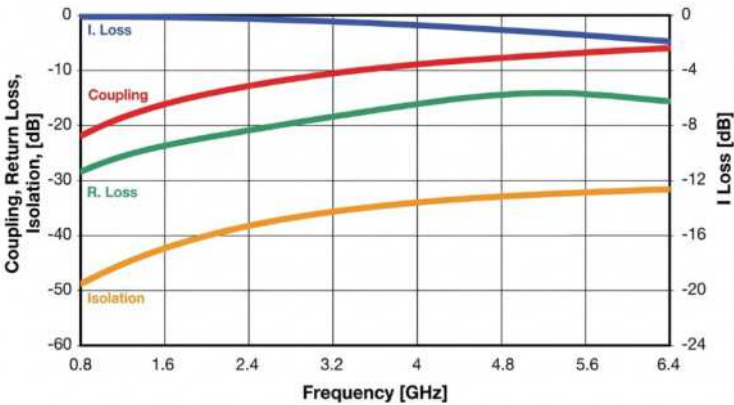
### CP0402AxxxxBNTR



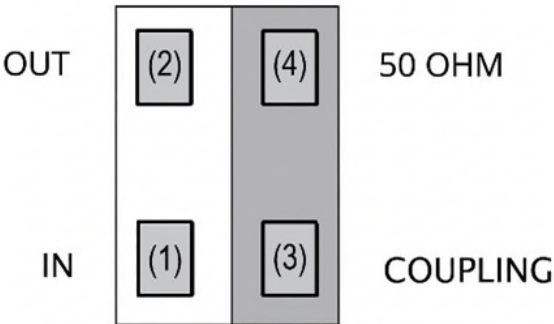
#### Coupler P/N CP0402AxxxxBNTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836BNTR | 824 - 849            | -22.00        | -0.20             | -28              | -27              |
| CP0402A0881BNTR | 869 - 894            | -21.70        | -0.20             | -28              | -27              |
| CP0402A0902BNTR | 890 - 915            | -21.50        | -0.20             | -28              | -27              |
| CP0402A0947BNTR | 935 - 960            | -21.00        | -0.25             | -27              | -27              |
| CP0402A0897BNTR | 880 - 915            | -21.50        | -0.20             | -28              | -27              |
| CP0402A0942BNTR | 925 - 960            | -21.00        | -0.25             | -27              | -27              |
| CP0402A1441BNTR | 1429 - 1453          | -17.50        | -0.25             | -24              | -27              |
| CP0402A1747BNTR | 1710 - 1785          | -16.00        | -0.30             | -23              | -27              |
| CP0402A1842BNTR | 1805 - 1880          | -15.50        | -0.35             | -23              | -27              |
| CP0402A1880BNTR | 1850 - 1910          | -15.50        | -0.35             | -23              | -27              |
| CP0402A1960BNTR | 1930 - 1990          | -15.00        | -0.35             | -22              | -27              |
| CP0402A1907BNTR | 1895 - 1920          | -15.50        | -0.35             | -23              | -27              |
| CP0402A1890BNTR | 1880 - 1900          | -15.50        | -0.35             | -23              | -27              |
| CP0402A2442BNTR | 2400 - 2484          | -13.30        | -0.40             | -21              | -27              |
| CP0402A3500BNTR | 3450 - 3550          | -9.40         | -0.80             | -18              | -14              |
| CP0402A5000BNTR | 4950 - 5050          | -7.40         | -1.20             | -14              | -13              |
| CP0402A5500BNTR | 5450 - 5550          | -6.70         | -1.60             | -14              | -13              |
| CP0402A6000BNTR | 5950 - 6050          | -6.10         | -2.00             | -14              | -13              |

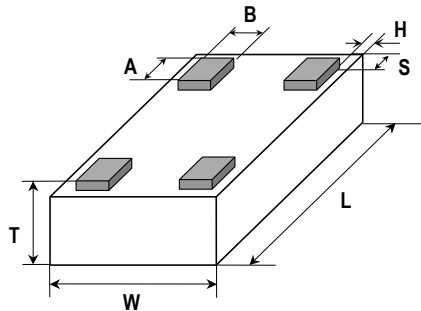
Important: Couplers can be used at any frequency within the indicated range.



#### TERMINALS (TOP VIEW)

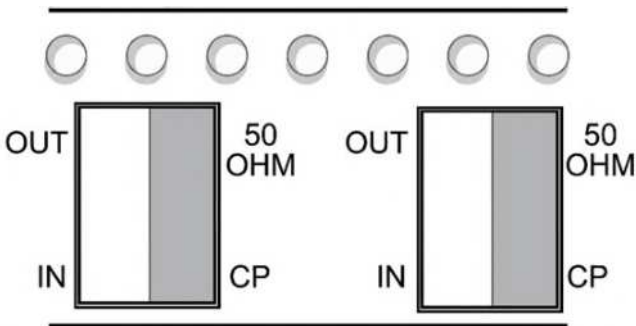


#### DIMENSIONS: millimeters (inches) (Bottom View)

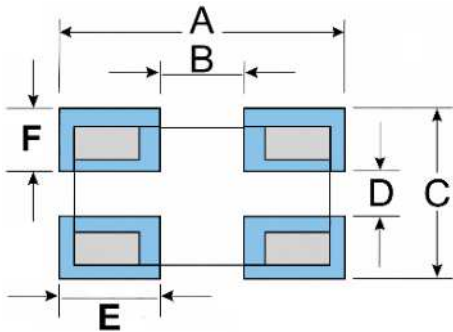


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
| B | 0.18±0.05<br>(0.007±0.002) |
| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

#### ORIENTATION IN TAPE



#### RECOMMENDED PAD LAYOUT DIMENSIONS: millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")

# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

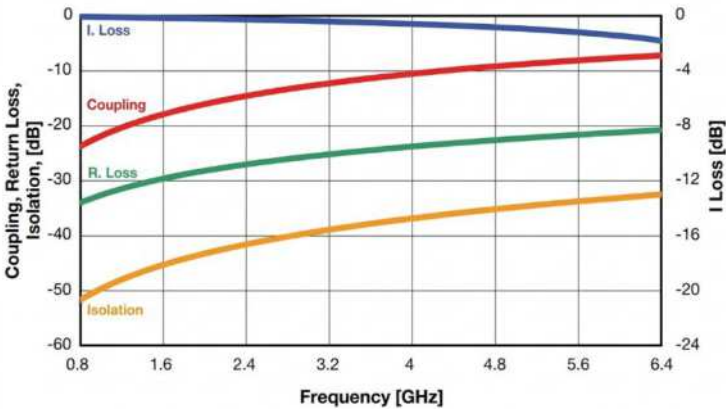
### CP0402AxxxxCNTR



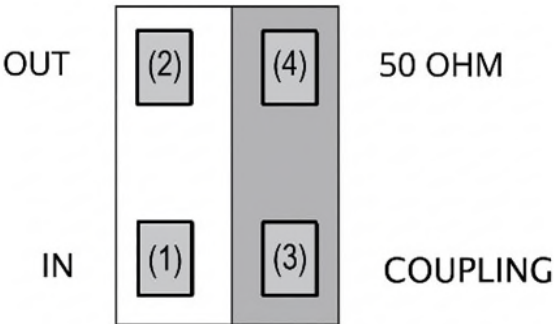
#### Coupler P/N CP0402AxxxxCNTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836CNTR | 824 - 849            | -23.60        | -0.20             | -33              | -22              |
| CP0402A0881CNTR | 869 - 894            | -23.00        | -0.20             | -33              | -22              |
| CP0402A0902CNTR | 890 - 915            | -23.00        | -0.20             | -26              | -22              |
| CP0402A0947CNTR | 935 - 960            | -22.50        | -0.20             | -33              | -22              |
| CP0402A0897CNTR | 880 - 915            | -23.00        | -0.20             | -25              | -22              |
| CP0402A0942CNTR | 925 - 960            | -22.50        | -0.20             | -32              | -22              |
| CP0402A1441CNTR | 1429 - 1453          | -19.00        | -0.25             | -31              | -22              |
| CP0402A1747CNTR | 1710 - 1785          | -17.20        | -0.25             | -30              | -19              |
| CP0402A1842CNTR | 1805 - 1880          | -17.00        | -0.25             | -30              | -19              |
| CP0402A1880CNTR | 1850 - 1910          | -16.80        | -0.25             | -30              | -19              |
| CP0402A1960CNTR | 1930 - 1990          | -16.50        | -0.25             | -29              | -19              |
| CP0402A1907CNTR | 1895 - 1920          | -16.80        | -0.25             | -29              | -19              |
| CP0402A1890CNTR | 1880 - 1900          | -16.80        | -0.25             | -30              | -19              |
| CP0402A2442CNTR | 2400 - 2484          | -14.70        | -0.45             | -28              | -19              |
| CP0402A3500CNTR | 3450 - 3550          | -10.97        | -0.67             | -23              | -17              |
| CP0402A5000CNTR | 4950 - 5050          | -8.00         | -1.00             | -21              | -16              |
| CP0402A5500CNTR | 5450 - 5550          | -7.50         | -1.10             | -21              | -15              |
| CP0402A6000CNTR | 5950 - 6050          | -7.10         | -1.30             | -23              | -15              |

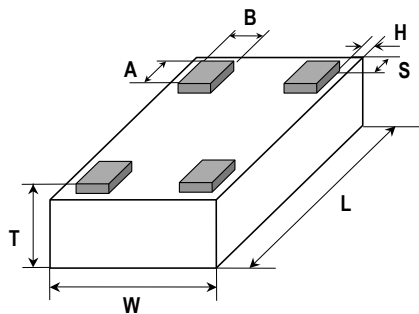
**Important:** Couplers can be used at any frequency within the indicated range.



#### TERMINALS (TOP VIEW)

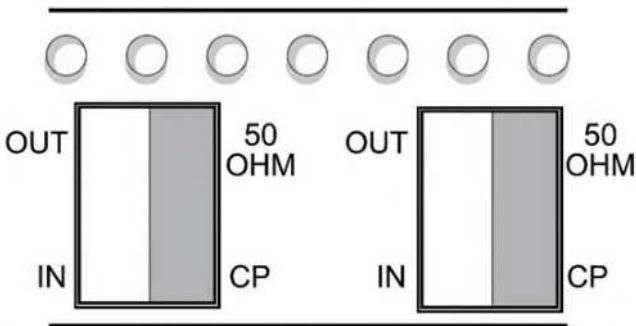


#### DIMENSIONS: millimeters (inches) (Bottom View)

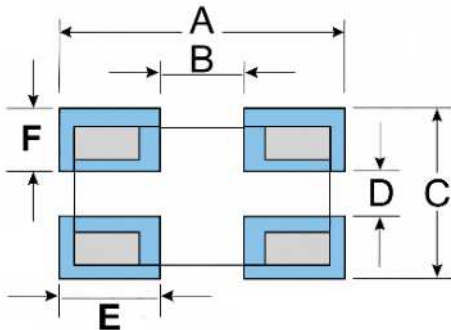


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
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| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

#### ORIENTATION IN TAPE



#### RECOMMENDED PAD LAYOUT DIMENSIONS: millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")

# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

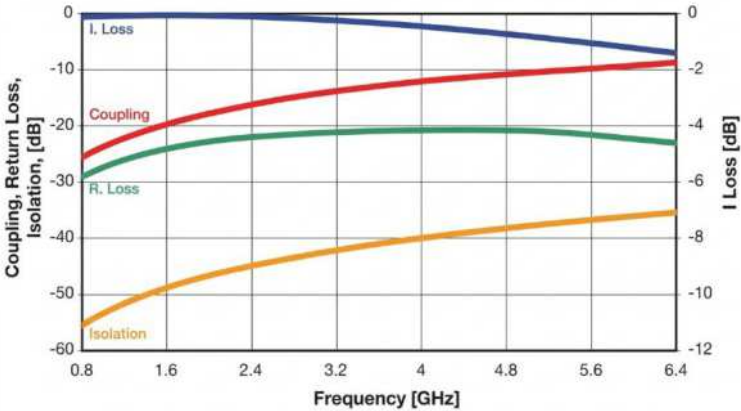
### CP0402AxxxxDNTR



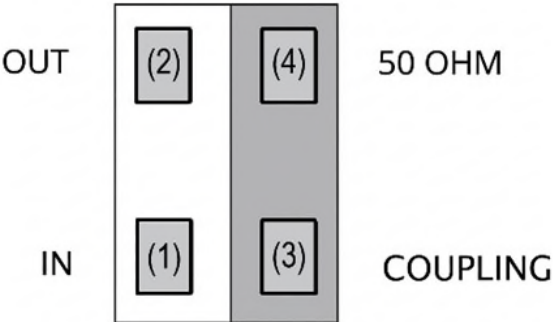
#### Coupler P/N CP0402AxxxxDNTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836DNTR | 824 - 849            | -25.20        | -0.20             | -29              | -20              |
| CP0402A0881DNTR | 869 - 894            | -24.80        | -0.20             | -28              | -20              |
| CP0402A0902DNTR | 890 - 915            | -24.70        | -0.20             | -28              | -20              |
| CP0402A0947DNTR | 935 - 960            | -24.10        | -0.20             | -28              | -20              |
| CP0402A0897DNTR | 880 - 915            | -24.70        | -0.20             | -28              | -20              |
| CP0402A0942DNTR | 925 - 960            | -24.10        | -0.20             | -28              | -20              |
| CP0402A1441DNTR | 1429 - 1453          | -20.50        | -0.20             | -25              | -20              |
| CP0402A1747DNTR | 1710 - 1785          | -19.00        | -0.20             | -24              | -18              |
| CP0402A1842DNTR | 1805 - 1880          | -18.50        | -0.25             | -23              | -18              |
| CP0402A1880DNTR | 1850 - 1910          | -18.20        | -0.25             | -23              | -18              |
| CP0402A1960DNTR | 1930 - 1990          | -18.00        | -0.25             | -23              | -18              |
| CP0402A1907DNTR | 1895 - 1920          | -18.10        | -0.25             | -23              | -18              |
| CP0402A1890DNTR | 1880 - 1900          | -18.20        | -0.25             | -23              | -18              |
| CP0402A2442DNTR | 2400 - 2484          | -16.00        | -0.35             | -22              | -18              |
| CP0402A3500DNTR | 3450 - 3550          | -12.50        | -0.46             | -21              | -17              |
| CP0402A5000DNTR | 4950 - 5050          | -10.00        | -0.65             | -21              | -16              |
| CP0402A5500DNTR | 5450 - 5550          | -9.60         | -0.76             | -20              | -15              |
| CP0402A6000DNTR | 5950 - 6050          | -9.10         | -0.84             | -20              | -15              |

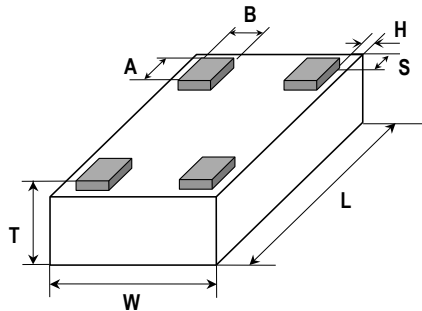
Important: Couplers can be used at any frequency within the indicated range.



#### TERMINALS (TOP VIEW)

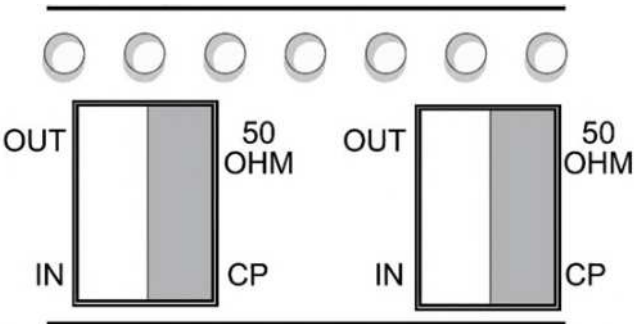


#### DIMENSIONS: millimeters (inches) (Bottom View)

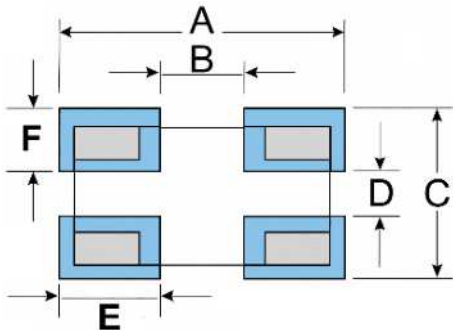


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
| B | 0.18±0.05<br>(0.007±0.002) |
| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

#### ORIENTATION IN TAPE



#### RECOMMENDED PAD LAYOUT DIMENSIONS: millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")

# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

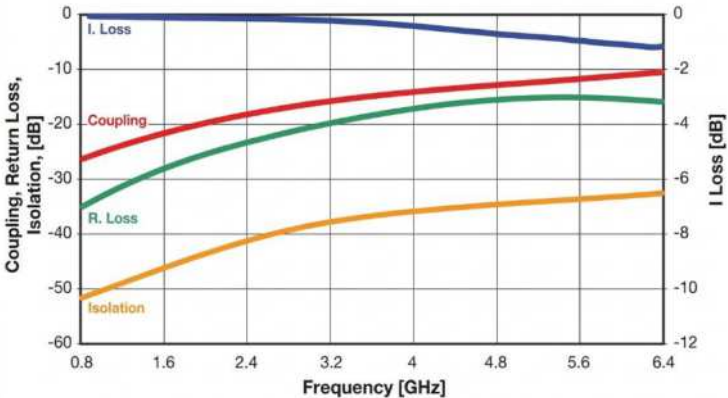
### CP0402AxxxxENTR



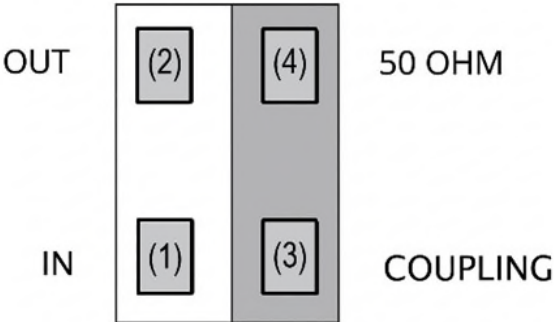
#### Coupler P/N CP0402AxxxxENTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836ENTR | 824 - 849            | -25.20        | -0.20             | -29              | -20              |
| CP0402A0881ENTR | 869 - 894            | -24.80        | -0.20             | -28              | -20              |
| CP0402A0902ENTR | 890 - 915            | -24.70        | -0.20             | -28              | -20              |
| CP0402A0947ENTR | 935 - 960            | -24.10        | -0.20             | -28              | -20              |
| CP0402A0897ENTR | 880 - 915            | -24.70        | -0.20             | -28              | -20              |
| CP0402A0942ENTR | 925 - 960            | -24.10        | -0.20             | -28              | -20              |
| CP0402A1441ENTR | 1429 - 1453          | -20.50        | -0.20             | -25              | -20              |
| CP0402A1747ENTR | 1710 - 1785          | -19.00        | -0.20             | -24              | -18              |
| CP0402A1842ENTR | 1805 - 1880          | -18.50        | -0.25             | -23              | -18              |
| CP0402A1880ENTR | 1850 - 1910          | -18.20        | -0.25             | -23              | -18              |
| CP0402A1960ENTR | 1930 - 1990          | -18.00        | -0.25             | -23              | -18              |
| CP0402A1907ENTR | 1895 - 1920          | -18.10        | -0.25             | -23              | -18              |
| CP0402A1890ENTR | 1880 - 1900          | -18.20        | -0.25             | -23              | -18              |
| CP0402A2442ENTR | 2400 - 2484          | -16.00        | -0.35             | -22              | -18              |
| CP0402A3500ENTR | 3450 - 3550          | -12.50        | -0.46             | -21              | -17              |
| CP0402A5000ENTR | 4950 - 5050          | -10.00        | -0.65             | -21              | -16              |
| CP0402A5500ENTR | 5450 - 5550          | -9.60         | -0.76             | -20              | -15              |
| CP0402A6000ENTR | 5950 - 6050          | -9.10         | -0.84             | -20              | -15              |

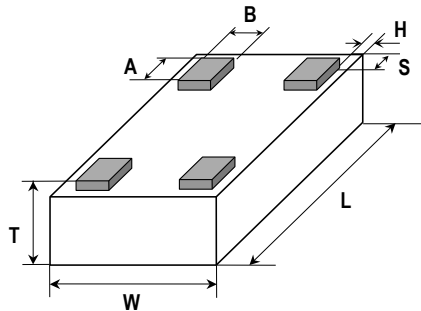
Important: Couplers can be used at any frequency within the indicated range.



#### TERMINALS (TOP VIEW)

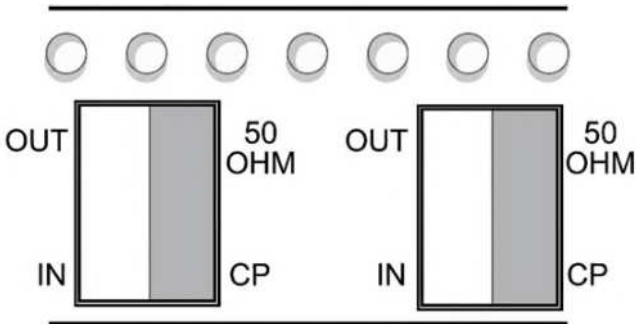


#### DIMENSIONS: millimeters (inches) (Bottom View)

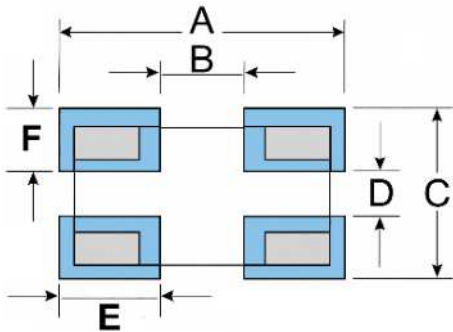


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
| B | 0.18±0.05<br>(0.007±0.002) |
| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

#### ORIENTATION IN TAPE



#### RECOMMENDED PAD LAYOUT DIMENSIONS: millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")

# Thin-Film RF/Microwave Directional Couplers

## CP0402 High Directivity LGA Termination

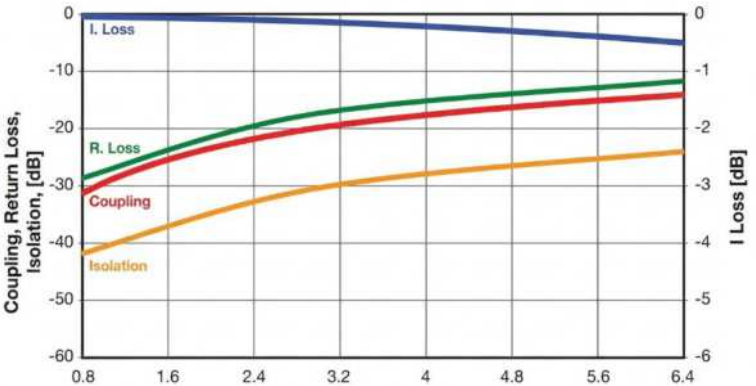
### CP0402AxxxxFNTR



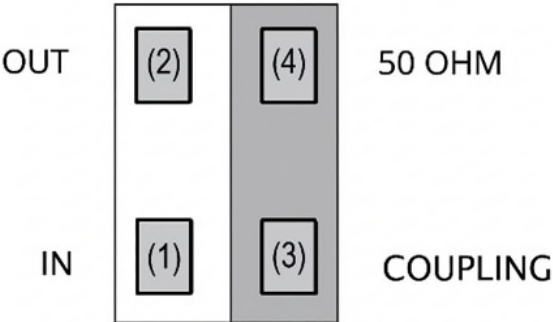
#### Coupler P/N CP0402AxxxxFNTR

| P/N Examples*   | Frequency Band [MHz] | Coupling [dB] | I. Loss max. [dB] | Return Loss [dB] | Directivity [dB] |
|-----------------|----------------------|---------------|-------------------|------------------|------------------|
| CP0402A0836FNTR | 824 - 849            | -31.00        | -0.20             | -29.10           | -11              |
| CP0402A0881FNTR | 869 - 894            | -30.70        | -0.20             | -28.60           | -11              |
| CP0402A0902FNTR | 890 - 915            | -30.60        | -0.20             | -28.50           | -11              |
| CP0402A0947FNTR | 935 - 960            | -30.00        | -0.20             | -28.10           | -11              |
| CP0402A0897FNTR | 880 - 915            | -30.60        | -0.20             | -28.50           | -11              |
| CP0402A0942FNTR | 925 - 960            | -30.00        | -0.20             | -28.10           | -11              |
| CP0402A1441FNTR | 1429 - 1453          | -26.50        | -0.20             | -25.00           | -11              |
| CP0402A1747FNTR | 1710 - 1785          | -25.00        | -0.20             | -23.80           | -11              |
| CP0402A1842FNTR | 1805 - 1880          | -24.50        | -0.20             | -23.60           | -11              |
| CP0402A1880FNTR | 1850 - 1910          | -24.20        | -0.20             | -23.50           | -11              |
| CP0402A1960FNTR | 1930 - 1990          | -24.00        | -0.20             | -23.30           | -11              |
| CP0402A1907FNTR | 1895 - 1920          | -24.20        | -0.20             | -23.40           | -11              |
| CP0402A1890FNTR | 1880 - 1900          | -24.20        | -0.20             | -23.50           | -11              |
| CP0402A2442FNTR | 2400 - 2484          | -22.00        | -0.25             | -22.60           | -11              |
| CP0402A3500FNTR | 3450 - 3550          | -18.00        | -0.27             | -22.00           | -9               |
| CP0402A5000FNTR | 4950 - 5050          | -15.70        | -0.30             | -23.01           | -8               |
| CP0402A5500FNTR | 5450 - 5550          | -15.20        | -0.30             | -20.36           | -7.5             |
| CP0402A6000FNTR | 5950 - 6050          | -14.50        | -0.30             | -18.94           | -7.5             |

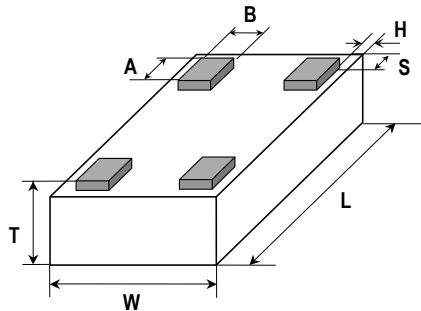
**Important:** Couplers can be used at any frequency within the indicated range.



#### TERMINALS (TOP VIEW)

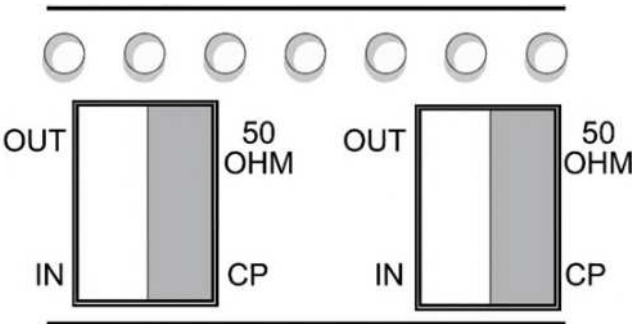


#### DIMENSIONS: millimeters (inches) (Bottom View)

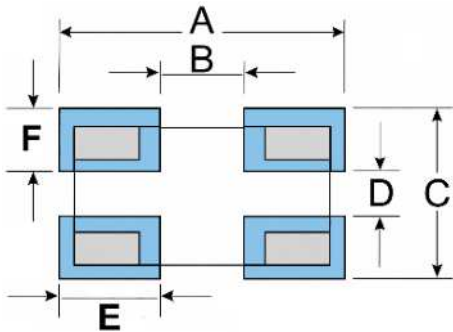


|   |                            |
|---|----------------------------|
| L | 1.00±0.05<br>(0.040±0.002) |
| W | 0.58±0.04<br>(0.023±0.002) |
| T | 0.35±0.05<br>(0.014±0.002) |
| A | 0.20±0.05<br>(0.008±0.002) |
| B | 0.18±0.05<br>(0.007±0.002) |
| H | 0.05±0.05<br>(0.002±0.002) |
| S | 0.05±0.05<br>(0.002±0.002) |

#### ORIENTATION IN TAPE



#### RECOMMENDED PAD LAYOUT DIMENSIONS: millimeters (inches)



|   |                            |
|---|----------------------------|
| A | 1.15±0.05<br>(0.045±0.002) |
| B | 0.53±0.05<br>(0.021±0.002) |
| C | 0.55±0.05<br>(0.022±0.002) |
| D | 0.15±0.05<br>(0.006±0.002) |
| E | 0.31±0.05<br>(0.012±0.002) |
| F | 0.20±0.05<br>(0.008±0.002) |

\*The recommended distance to the PCB Ground Plane is 0.254mm (0.010")