

Ceramic Directional Coupler

DCW-11-722+

50Ω 11 dB Coupling 2400 to 7200 MHz

Maximum Ratings

Operating Temperature -55°C to 105°C

Storage Temperature -55°C to 105°C

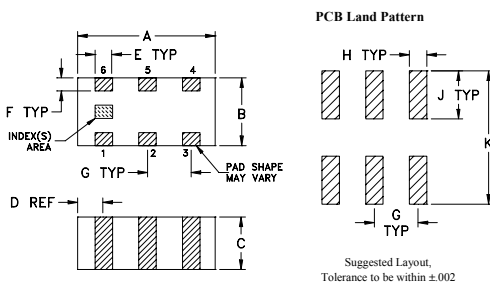
Input Power¹ 1W

Permanent damage may occur if any of these limits are exceeded.
1. Derate linearly 0.5W at 0.5°C

Pad Connections

| | |
|-------------|-----|
| INPUT | 1 |
| OUTPUT | 4 |
| COUPLED | 6 |
| TERMINATION | 3 |
| GROUND | 2,5 |

Outline Drawing

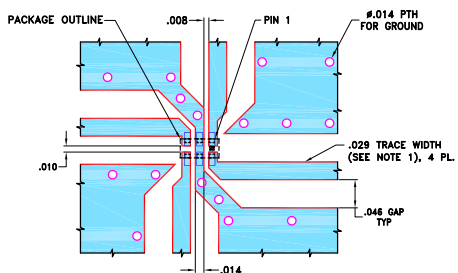


Outline Dimensions (inch/mm)

| A | B | C | D | E | F |
|------|------|------|------|-------|------|
| .063 | .031 | .024 | .012 | .008 | .006 |
| 1.60 | 0.79 | 0.61 | 0.30 | 0.20 | 0.15 |
| G | H | J | K | wt | |
| .020 | .010 | .022 | .053 | grams | |
| 0.51 | 0.25 | 0.56 | 1.35 | 0.005 | |

Product Marking: A

Demo Board MCL P/N: TB-DCW-11-722+ Suggested PCB Layout (PL-572)



NOTES:
1. TRACE WIDTH & GAP ARE SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .015±.0015, COPPER: 1/2 OZ EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. REFER TO MODEL DATASHEET FOR PIN OUTS.
[Legend: Blue box = DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER). Yellow box = DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.]

Features

- Wideband, 2400-7200 MHz
- Excellent return loss for input/output ports ideal for signal-tap
- Ultra small size, 0603 (1.6 x 0.8 mm)
- Temperature stable
- LTCC construction

Applications

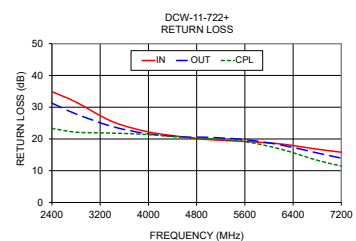
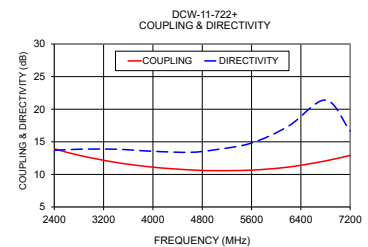
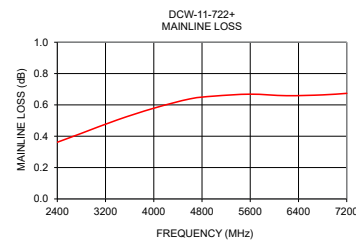
- ISM
- UMTS
- WiMAX
- PCS
- Wi-Fi
- LTE

Electrical Specifications at 25°C

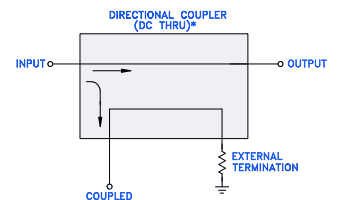
| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|----------------------|-----------------|------|------|------|------|
| Frequency Range | | 2400 | | 7200 | MHz |
| Mainline Loss | 2400-7200 | — | 0.7 | 2.2 | dB |
| Midband Coupling | 2400-7200 | — | 11 | — | dB |
| Coupling Flatness(±) | 2400-7200 | — | 2.5 | — | dB |
| Directivity | 2400-7200 | — | 12 | — | dB |
| Return Loss (Input) | 2400-7200 | 9.5 | 17 | — | dB |
| Return Loss (Output) | 2400-7200 | 9.5 | 17 | — | dB |

Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) | | Cpl |
|-----------------|---------------------------|----------------------|------------------|------------------|-------|-------|
| | | | | In | Out | |
| 2400 | 0.36 | 13.93 | 13.69 | 34.89 | 31.26 | 23.33 |
| 2800 | 0.42 | 12.93 | 13.86 | 31.59 | 27.87 | 22.12 |
| 3400 | 0.50 | 11.84 | 13.86 | 25.48 | 23.92 | 21.83 |
| 4000 | 0.58 | 11.11 | 13.54 | 22.22 | 21.59 | 21.39 |
| 4600 | 0.64 | 10.69 | 13.39 | 20.58 | 20.63 | 20.42 |
| 5000 | 0.66 | 10.58 | 13.77 | 19.80 | 20.51 | 20.09 |
| 5600 | 0.67 | 10.66 | 14.81 | 19.22 | 19.79 | 19.16 |
| 6200 | 0.66 | 11.12 | 17.41 | 18.42 | 18.10 | 16.77 |
| 6800 | 0.66 | 12.07 | 21.40 | 16.78 | 15.58 | 13.28 |
| 7200 | 0.67 | 12.92 | 16.67 | 15.83 | 13.96 | 11.49 |



Electrical Schematic



* ELECTRICAL SCHEMATIC FOR DIRECTIONAL COUPLERS REQUIRING EXTERNAL TERMINATION THAT IS DESIGNED WITHOUT INTERNAL TRANSFORMERS.



Generic photo used for illustration purposes only

CASE STYLE: JC0603C

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel |
|-----------|-----------------------------------|
| 7" | 20, 50, 100, 200, 500, 1000, 4000 |

Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
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REV. C
ECO-026517
DCW-11-722+
AVB/CP/AM
250812
Page 1 of 1

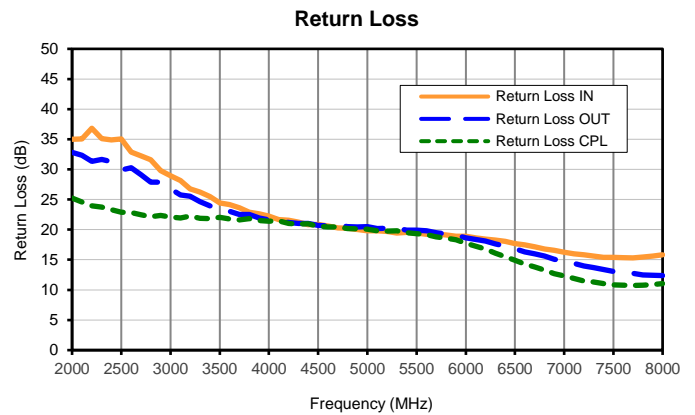
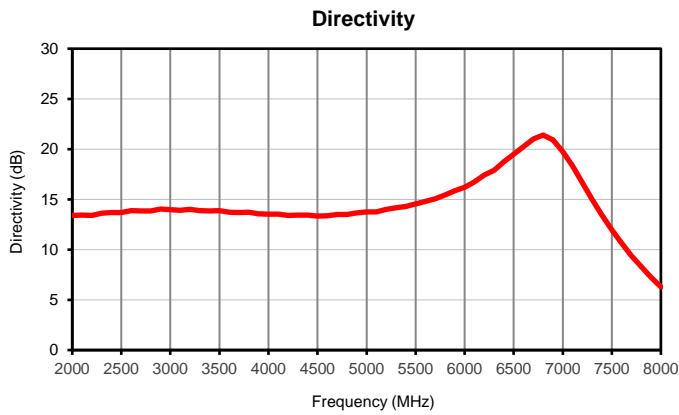
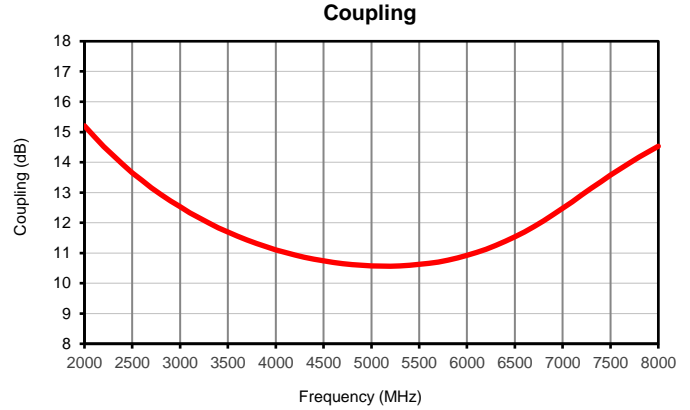
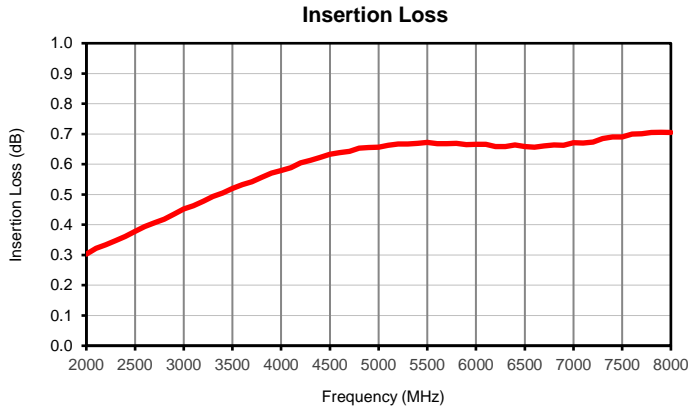
Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | COUPLING (dB) | DIRECTIVITY (dB) | RETURN LOSS (dB) | | |
|--------------------|---------------------------|------------------|---------------------|---------------------|-------|-------|
| | | | | IN | OUT | CPL |
| 2000 | 0.30 | 15.20 | 13.40 | 34.97 | 32.82 | 25.24 |
| 2100 | 0.32 | 14.86 | 13.43 | 35.05 | 32.35 | 24.57 |
| 2200 | 0.33 | 14.52 | 13.42 | 36.82 | 31.31 | 23.95 |
| 2300 | 0.35 | 14.22 | 13.61 | 35.11 | 31.67 | 23.75 |
| 2400 | 0.36 | 13.93 | 13.69 | 34.89 | 31.26 | 23.33 |
| 2500 | 0.38 | 13.66 | 13.68 | 35.06 | 29.91 | 22.88 |
| 2600 | 0.39 | 13.41 | 13.88 | 32.88 | 30.28 | 22.85 |
| 2700 | 0.41 | 13.16 | 13.85 | 32.22 | 29.08 | 22.46 |
| 2800 | 0.42 | 12.93 | 13.86 | 31.59 | 27.87 | 22.12 |
| 2900 | 0.44 | 12.72 | 14.03 | 29.81 | 27.89 | 22.36 |
| 3000 | 0.45 | 12.53 | 13.96 | 28.96 | 26.77 | 22.10 |
| 3100 | 0.46 | 12.33 | 13.92 | 28.13 | 25.77 | 21.91 |
| 3200 | 0.48 | 12.16 | 14.02 | 26.77 | 25.55 | 22.22 |
| 3300 | 0.49 | 12.00 | 13.89 | 26.21 | 24.65 | 21.89 |
| 3400 | 0.50 | 11.84 | 13.86 | 25.48 | 23.92 | 21.83 |
| 3500 | 0.52 | 11.70 | 13.88 | 24.43 | 23.68 | 22.02 |
| 3600 | 0.53 | 11.56 | 13.73 | 24.16 | 23.05 | 21.77 |
| 3700 | 0.54 | 11.43 | 13.70 | 23.62 | 22.54 | 21.64 |
| 3800 | 0.56 | 11.32 | 13.73 | 22.90 | 22.53 | 21.81 |
| 3900 | 0.57 | 11.21 | 13.55 | 22.64 | 21.94 | 21.51 |
| 4000 | 0.58 | 11.11 | 13.54 | 22.22 | 21.59 | 21.39 |
| 4100 | 0.59 | 11.02 | 13.52 | 21.65 | 21.57 | 21.47 |
| 4200 | 0.60 | 10.94 | 13.39 | 21.57 | 21.16 | 21.03 |
| 4300 | 0.61 | 10.86 | 13.44 | 21.25 | 21.05 | 20.92 |
| 4400 | 0.62 | 10.80 | 13.45 | 20.80 | 21.01 | 20.96 |
| 4500 | 0.63 | 10.74 | 13.34 | 20.87 | 20.69 | 20.57 |
| 4600 | 0.64 | 10.69 | 13.39 | 20.58 | 20.63 | 20.42 |
| 4700 | 0.64 | 10.65 | 13.50 | 20.27 | 20.76 | 20.42 |
| 4800 | 0.65 | 10.62 | 13.50 | 20.25 | 20.47 | 20.16 |
| 4900 | 0.66 | 10.59 | 13.66 | 20.04 | 20.44 | 20.12 |
| 5000 | 0.66 | 10.58 | 13.77 | 19.80 | 20.51 | 20.09 |
| 5100 | 0.66 | 10.57 | 13.77 | 19.82 | 20.18 | 19.80 |
| 5200 | 0.67 | 10.57 | 13.99 | 19.69 | 20.25 | 19.75 |
| 5300 | 0.67 | 10.58 | 14.16 | 19.44 | 20.21 | 19.78 |
| 5400 | 0.67 | 10.59 | 14.31 | 19.56 | 19.91 | 19.49 |
| 5500 | 0.67 | 10.62 | 14.54 | 19.45 | 19.89 | 19.35 |
| 5600 | 0.67 | 10.66 | 14.81 | 19.22 | 19.79 | 19.16 |
| 5700 | 0.67 | 10.70 | 15.06 | 19.29 | 19.48 | 18.81 |
| 5800 | 0.67 | 10.77 | 15.44 | 19.10 | 19.28 | 18.58 |
| 5900 | 0.67 | 10.83 | 15.87 | 18.91 | 19.05 | 18.30 |
| 6000 | 0.67 | 10.92 | 16.19 | 18.88 | 18.64 | 17.71 |
| 6100 | 0.67 | 11.02 | 16.76 | 18.62 | 18.36 | 17.24 |
| 6200 | 0.66 | 11.12 | 17.41 | 18.42 | 18.10 | 16.77 |
| 6300 | 0.66 | 11.25 | 17.90 | 18.26 | 17.61 | 16.06 |
| 6400 | 0.66 | 11.39 | 18.77 | 18.05 | 17.27 | 15.52 |
| 6500 | 0.66 | 11.54 | 19.50 | 17.67 | 16.85 | 14.94 |
| 6600 | 0.66 | 11.70 | 20.25 | 17.46 | 16.31 | 14.29 |
| 6700 | 0.66 | 11.88 | 21.03 | 17.16 | 16.00 | 13.79 |
| 6800 | 0.66 | 12.07 | 21.40 | 16.78 | 15.58 | 13.28 |
| 6900 | 0.66 | 12.27 | 20.91 | 16.56 | 15.06 | 12.69 |
| 7000 | 0.67 | 12.48 | 19.74 | 16.27 | 14.76 | 12.32 |
| 7100 | 0.67 | 12.69 | 18.33 | 15.96 | 14.37 | 11.89 |
| 7200 | 0.67 | 12.92 | 16.67 | 15.83 | 13.96 | 11.49 |
| 7300 | 0.68 | 13.14 | 14.96 | 15.60 | 13.69 | 11.30 |
| 7400 | 0.69 | 13.36 | 13.43 | 15.42 | 13.36 | 11.04 |
| 7500 | 0.69 | 13.57 | 11.98 | 15.38 | 13.06 | 10.84 |
| 7600 | 0.70 | 13.78 | 10.63 | 15.34 | 12.88 | 10.80 |
| 7700 | 0.70 | 13.98 | 9.40 | 15.31 | 12.72 | 10.73 |
| 7800 | 0.71 | 14.17 | 8.29 | 15.46 | 12.48 | 10.76 |
| 7900 | 0.71 | 14.35 | 7.21 | 15.62 | 12.44 | 10.88 |
| 8000 | 0.70 | 14.53 | 6.29 | 15.80 | 12.37 | 11.03 |

Directional Coupler

Typical Performance Curves

DCW-11-722+

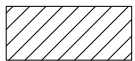
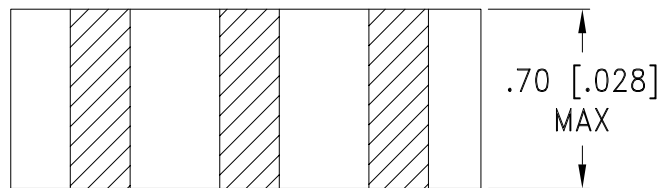
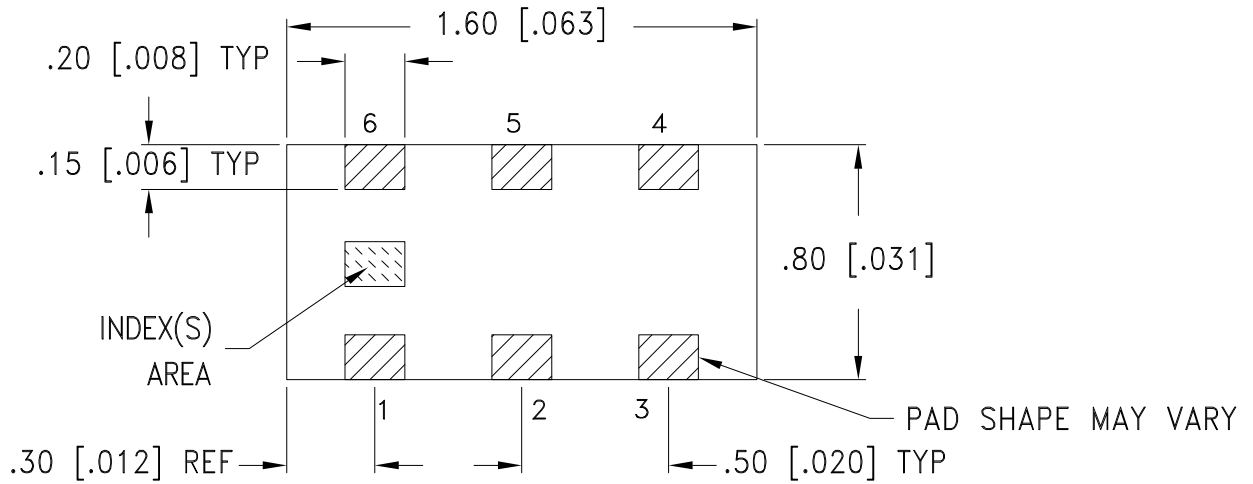


Case Style

JC

Outline Dimensions

JC0603C



METALLIZATION

Weight: .005 grams

Dimensions are in mm [inch]. Tolerances: ± 0.13 mm

Notes:

1. Open style, ceramic base.
2. Termination finish:

For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.

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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R



ILLUSTRATION 1

| Applicable Case Styles | |
|------------------------|-----------|
| GE0805C | JC0603C |
| GE0805C-1 | JC0603C-4 |
| GE0805C-1AP | JC0603C-6 |
| GE0805C-7 | |
| GE0805C-9 | |
| GE0805C-10 | |
| GE0805C-11 | |
| GE0805C-12 | |

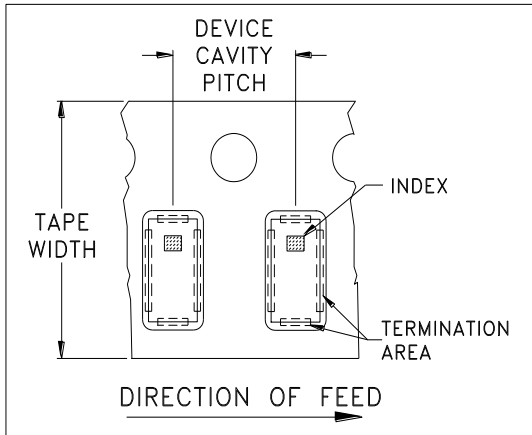


ILLUSTRATION 2

| Applicable Case Styles | |
|------------------------|-----------|
| GE0805C-2 | JC0603C-1 |
| GE0805C-3 | JC0603C-2 |
| GE0805C-4 | JC0603C-3 |
| GE0805C-5 | JC0603C-5 |
| GE0805C-6 | JC0603C-7 |
| GE0805C-8 | |
| GE0805C-15 | |

| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel | |
|----------------|-------------------------|-------------------|-------------------------------------|------|
| 8 | 4 | 7 | Small quantity standards (see note) | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | | | 1000 |
| | | | Standard | 4000 |

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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| Specification | Test/Inspection Condition | Reference/Spec |
|----------------------------|---|--|
| Operating Temperature | -55° to 100°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C Ambient Environment | Individual Model Data Sheet |
| Humidity | 90 to 95% RH, 240 hours, 50°C | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36) | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes | MIL-STD-202, Method 213, Condition A |