

# Ceramic Directional Coupler

## DCW-11-722+

50Ω 11 dB Coupling 2400 to 7200 MHz



Generic photo used for illustration purposes only

CASE STYLE: JC0603C

### Maximum Ratings

Operating Temperature -55°C to 105°C

Storage Temperature -55°C to 105°C

Input Power<sup>1</sup> 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

### 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

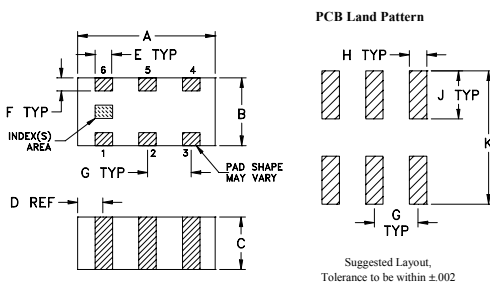
### Applications

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

**+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 7" Devices/Reel 20, 50, 100, 200, 500, 1000, 4000

### Outline Drawing

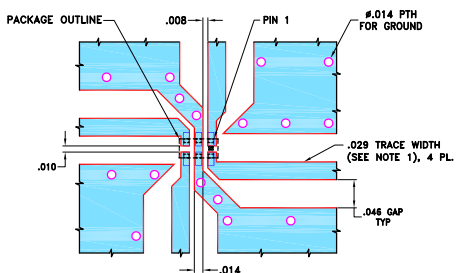


### Outline Dimensions (inch/mm)

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)



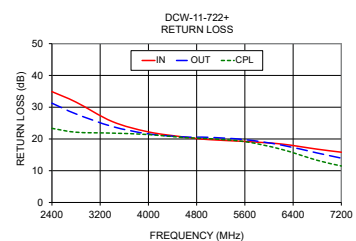
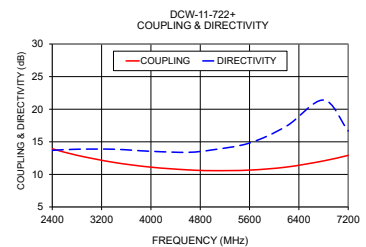
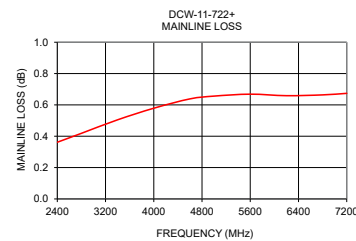
- NOTES:
1. TRACE WIDTH & GAP ARE SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .015±.0015. COPPER: 1/2 OZ EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
  2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
  3. REFER TO MODEL DATASHEET FOR PIN OUTS.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

### Electrical Specifications at 25°C

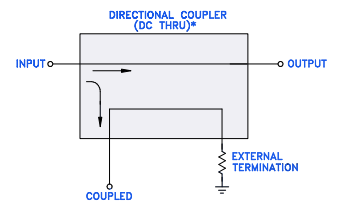
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		2400		7200	MHz
Mainline Loss	2400-7200	—	0.7	2.2	dB
Midband Coupling	2400-7200	—	11	—	dB
Coupling Flatness(±)	2400-7200	—	2.5	—	dB
Directivity	2400-7200	—	12	—	dB
Return Loss (Input)	2400-7200	9.5	17	—	dB
Return Loss (Output)	2400-7200	9.5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

### Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
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.

### 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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ECO-026517  
DCW-11-722+  
AVB/CP/AM  
250812  
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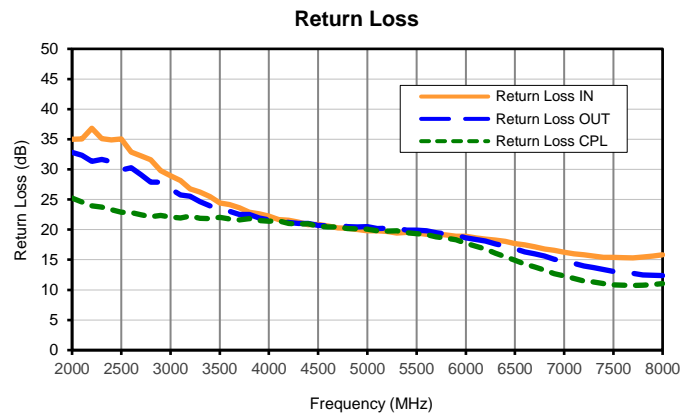
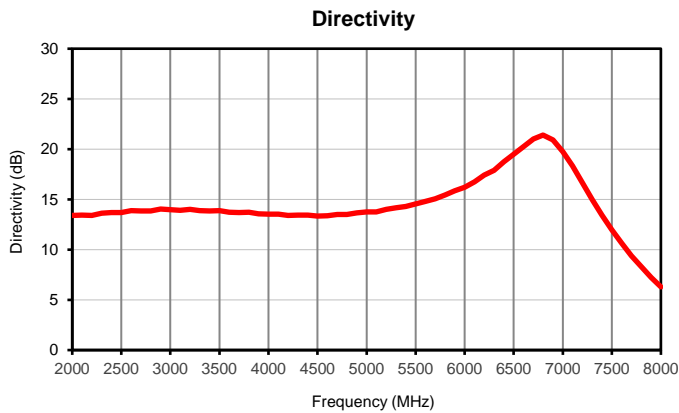
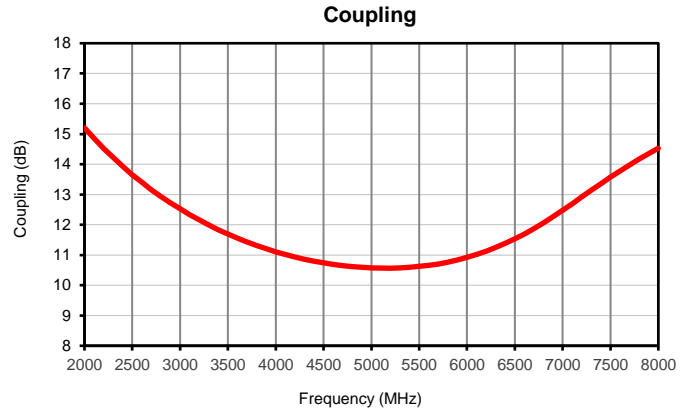
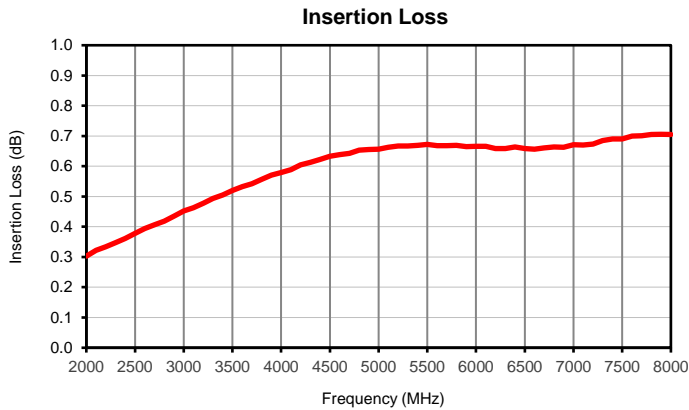
## Typical Performance Data

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+





# 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	

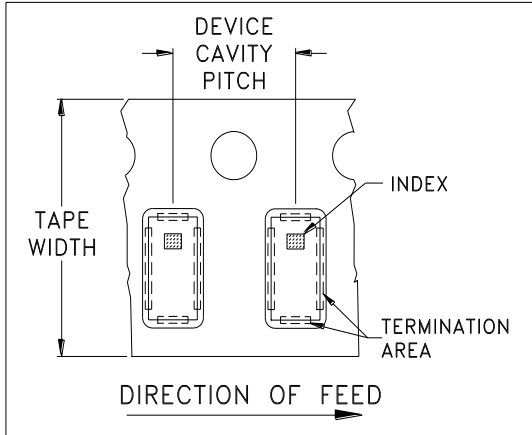


ILLUSTRATION 2

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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All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

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