

# LTCC Coupler

50Ω 2400 to 2500 MHz 6dB Coupling

## CPJC-6-252R+



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

### Maximum Ratings

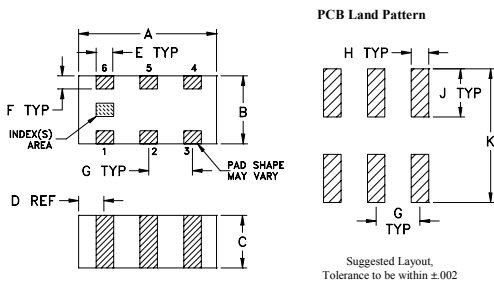
Operating Temperature	-40°C to 85°C
Storage Temperature*	-40°C to 85°C

\*Refer to product storage temperature after installation.  
Suggestion for T&R unused product storage condition: +5--+35°C, Humidity 45-75%RH, 12 Month max.  
Permanent damage may occur if any of these limits are exceeded.

### Pad Connections

Input	1
GND	2
Coupled	3
Termination	4
GND	5
Output	6

### Outline Drawing



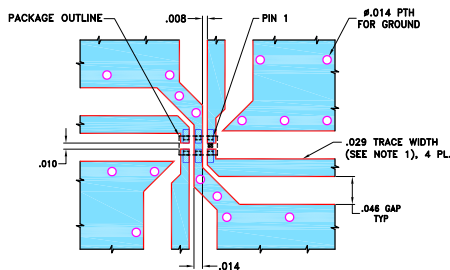
### Outline Dimensions (inch/mm)

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

### Evaluation Board MCL P/N: TB-1031+ Suggested PCB Layout (PL-572)



- NOTES:
- TRACE WIDTH & GAP ARE SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
  - 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.

### 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-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuit's standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuit's website at [www.minicircuits.com/WCLStore/terms.jsp](http://www.minicircuits.com/WCLStore/terms.jsp)

### Features

- miniature size 0603
- low cost
- aqueous washable

### Applications

- ISM Band
- WLAN
- Bluetooth
- Zigbee

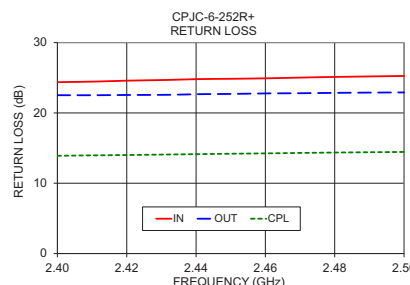
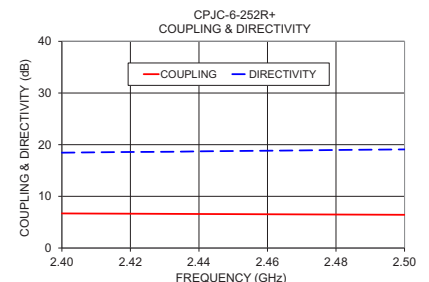
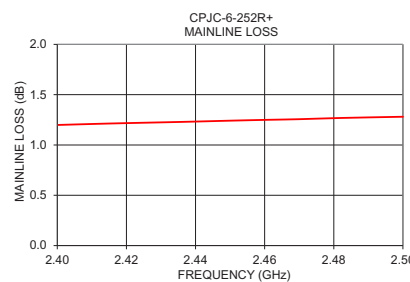
### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		2400		2500	MHz
Mainline Loss	2400 - 2500	—	1.27	1.83	dB
Coupling	2400 - 2500	—	6.5±1.0	—	dB
Directivity	2400 - 2500	13.5	18	—	dB
Return Loss (Input)	2400 - 2500	13.9	21	—	dB
Return Loss (Output)	2400 - 2500	13.9	21	—	dB
Input Power <sup>1</sup>	2400 - 2500	—	—	2	W

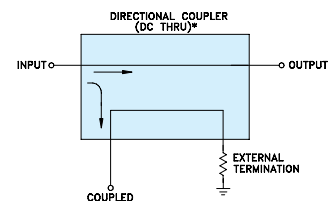
1. Derate linearly to 1W at 85°C.

### Typical Performance Data

Frequency (GHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
2.400	1.20	6.70	18.45	24.38	22.52	13.91
2.411	1.21	6.67	18.53	24.46	22.52	13.97
2.420	1.22	6.64	18.59	24.59	22.56	14.02
2.432	1.23	6.61	18.63	24.70	22.58	14.09
2.441	1.23	6.58	18.72	24.82	22.67	14.14
2.450	1.24	6.56	18.77	24.85	22.70	14.20
2.461	1.25	6.53	18.84	24.93	22.78	14.25
2.470	1.26	6.51	18.89	25.03	22.80	14.31
2.482	1.27	6.48	18.99	25.13	22.87	14.38
2.491	1.27	6.45	19.04	25.22	22.91	14.41
2.500	1.28	6.43	19.08	25.26	22.92	14.45



### Electrical Schematic



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

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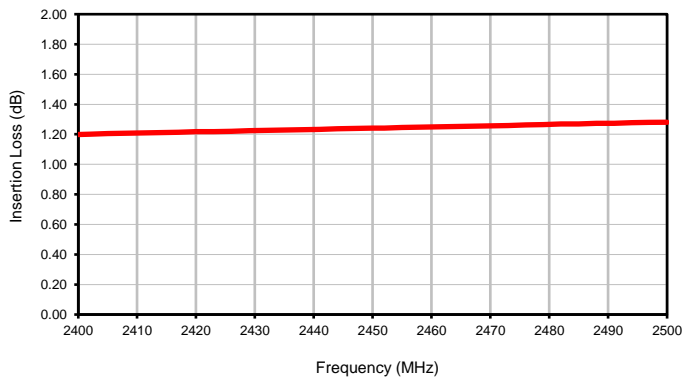
REV. A  
ECO-005220  
CPJC-6-252R+  
SL/CP/AM  
201203  
Page 1 of 1

## Typical Performance Data

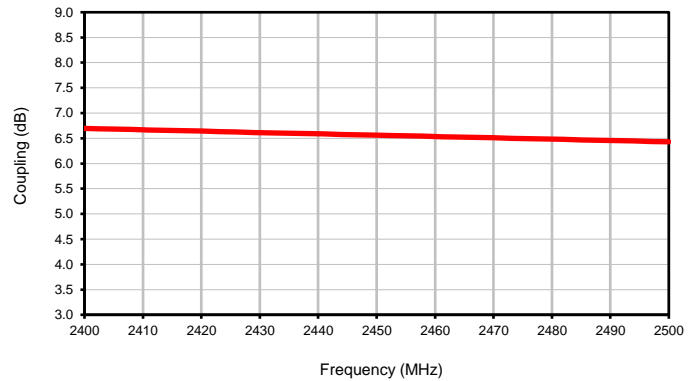
FREQ. (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	OUT	CPL
2400	1.20	6.70	18.45	24.38	22.52	13.91
2402	1.20	6.69	18.46	24.40	22.50	13.92
2405	1.20	6.68	18.48	24.46	22.52	13.93
2408	1.21	6.67	18.50	24.44	22.52	13.95
2411	1.21	6.67	18.53	24.46	22.52	13.97
2414	1.21	6.66	18.52	24.52	22.54	13.98
2417	1.21	6.65	18.57	24.54	22.53	14.00
2420	1.22	6.64	18.59	24.59	22.56	14.02
2423	1.22	6.63	18.60	24.62	22.56	14.03
2426	1.22	6.63	18.60	24.64	22.57	14.06
2429	1.22	6.62	18.64	24.65	22.58	14.08
2432	1.23	6.61	18.63	24.70	22.58	14.09
2435	1.23	6.60	18.67	24.72	22.62	14.10
2438	1.23	6.59	18.72	24.74	22.63	14.13
2441	1.23	6.58	18.72	24.82	22.67	14.14
2444	1.24	6.58	18.75	24.81	22.68	14.16
2447	1.24	6.57	18.77	24.84	22.68	14.19
2450	1.24	6.56	18.77	24.85	22.70	14.20
2452	1.24	6.56	18.80	24.88	22.71	14.21
2455	1.25	6.55	18.79	24.90	22.76	14.22
2458	1.25	6.54	18.83	24.90	22.78	14.24
2461	1.25	6.53	18.84	24.93	22.78	14.25
2464	1.25	6.52	18.88	24.97	22.78	14.28
2467	1.26	6.52	18.87	25.02	22.80	14.29
2470	1.26	6.51	18.89	25.03	22.80	14.31
2473	1.26	6.50	18.94	25.07	22.83	14.32
2476	1.26	6.49	18.93	25.09	22.84	14.33
2479	1.26	6.48	18.98	25.14	22.87	14.35
2482	1.27	6.48	18.99	25.13	22.87	14.38
2485	1.27	6.47	18.98	25.21	22.87	14.38
2488	1.27	6.46	19.04	25.18	22.89	14.40
2491	1.27	6.45	19.04	25.22	22.91	14.41
2494	1.28	6.45	19.06	25.22	22.91	14.43
2497	1.28	6.44	19.08	25.25	22.93	14.44
2500	1.28	6.43	19.08	25.26	22.92	14.45

## Typical Performance Curves

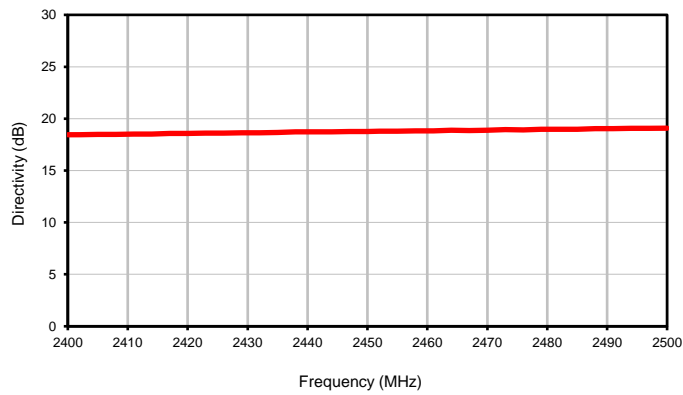
### Insertion Loss



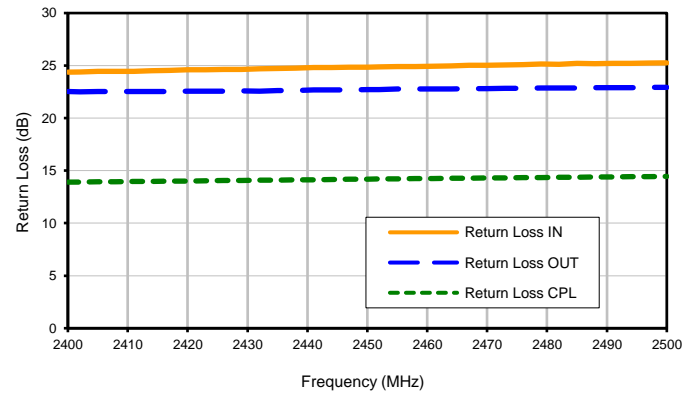
### Coupling



### Directivity

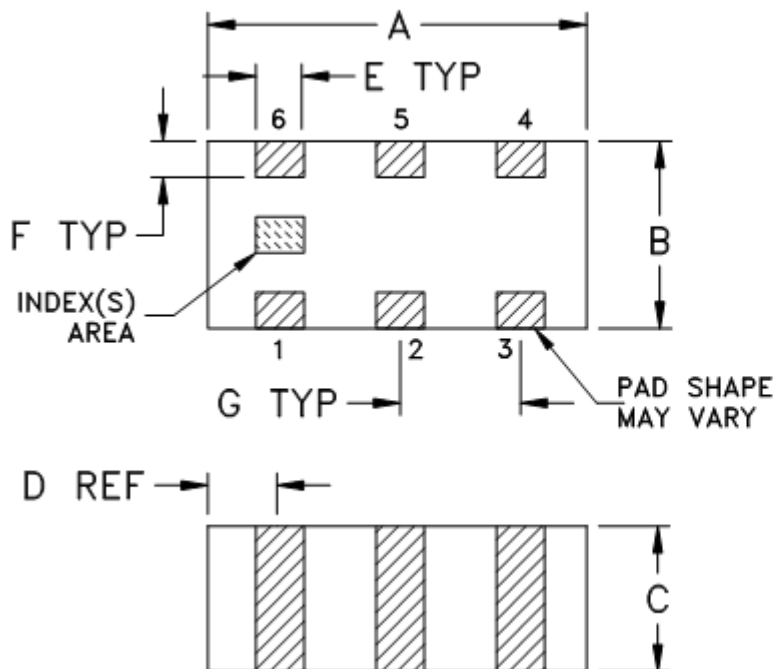


### Return Loss

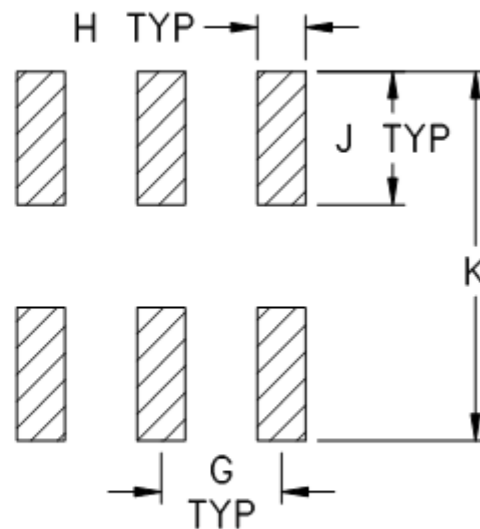


## Outline Dimensions

JC0603C



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
JC0603C	.063 (1.60)	.031 (0.80)	.024 (0.60)	.012 (0.30)	.008 (0.20)	.006 (0.15)	.020 (0.50)	.010 (0.25)	.022 (0.55)	0.053 (1.35)	.005

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

- Open style, ceramic base.
- 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

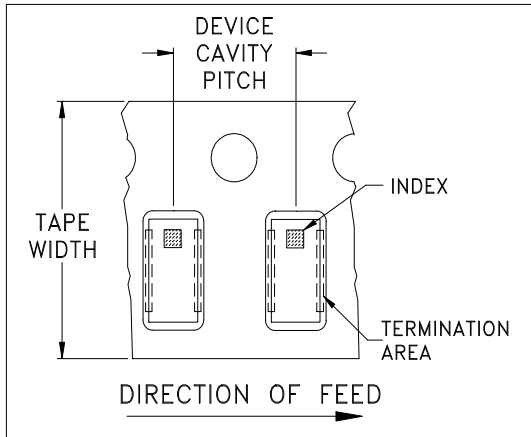


ILLUSTRATION 1

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

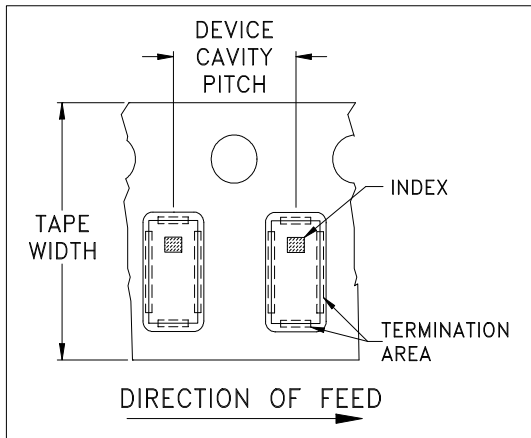


ILLUSTRATION 2

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	JV1210C-1
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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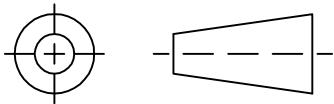
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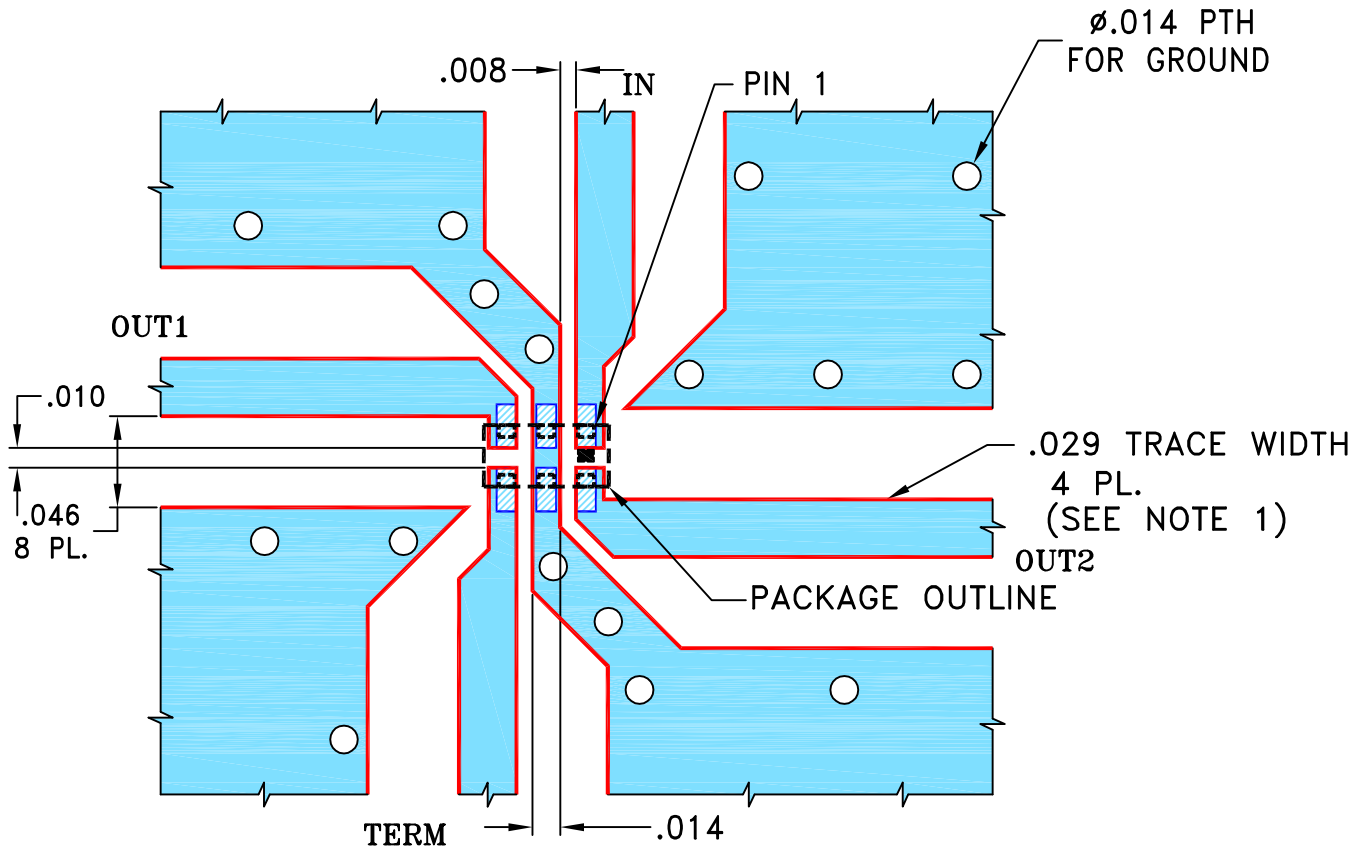
THIRD ANGLE PROJECTION



REVISIONS



REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M168200	NEW RELEASE	05/31/18	NP	SL

SUGGESTED MOUNTING CONFIGURATION  
FOR JC0603C CASE STYLE, "06DC12" PIN CODE




**NOTES:**

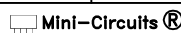
1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS  $.016 \pm .0015$ . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).  
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DRAWN	NP	05/30/18
CHECKED	GF	05/30/18
APPROVED	SL	05/31/18

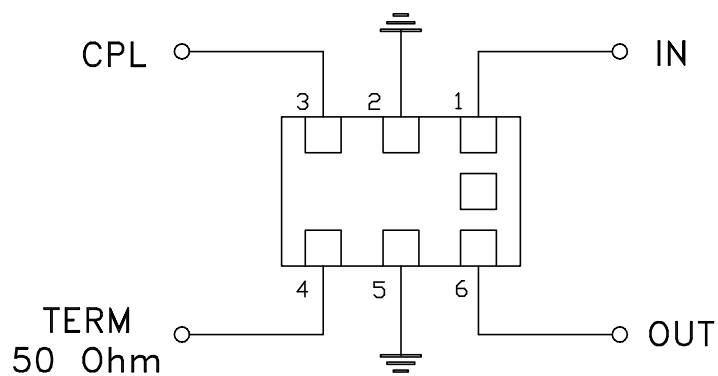
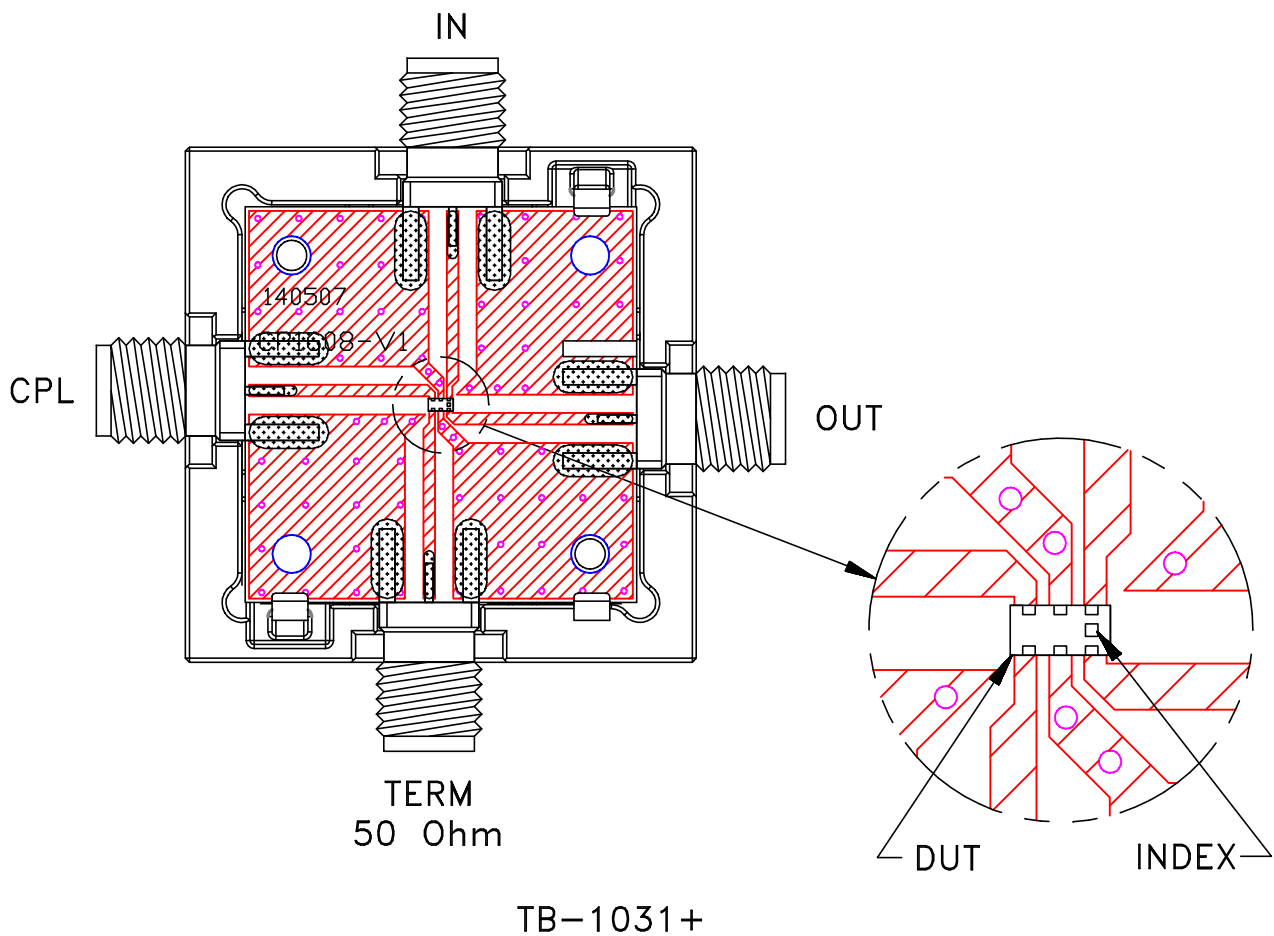
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PL, 06DC12, JC0603C, TB-1031+

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 ASHEETA1.DWG REV:A DATE:01/12/95

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-572	OR
FILE:	98PL572	SCALE: 10:1	SHEET: 1 OF 1


# Evaluation Board and Circuit



Schematic Diagram

**Notes:**

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,  
Dielectric Constant=4.5, Thickness=.016 inch.

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-40° to 125°C, 100 cycles	MIL-STD-202 Method 107, Condition A-3 except -40°C instead of -55° C and +125° C instead of -85° C
Solder Reflow Heat	Pb-Free Process 245° -250°C peak,	J-STD-020, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Shelf Life	Shelf life is 12 months when kept in sealed bags. Unused parts are to be resealed to preserve shelf life for proper solderability.	