

# Very Wideband <sup>top hat</sup> RF Choke

50Ω 50 to 8200 MHz

## TCCH-80+



CASE STYLE: GU1604

**+RoHS Compliant**

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

### Maximum Ratings

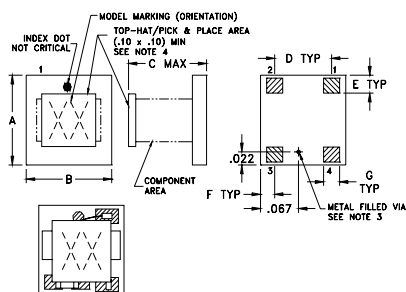
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
DC Current	300 mA

Permanent damage may occur if any of these limits are exceeded.

### Pad Terminations

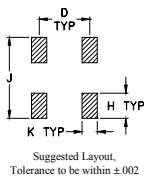
RF-IN & DC	1
DC	3
NOT USED	2,4

### Outline Drawing



TOP VIEW OF "TCCH" SERIES MODELS

### PCB Land Pattern



#### Notes:

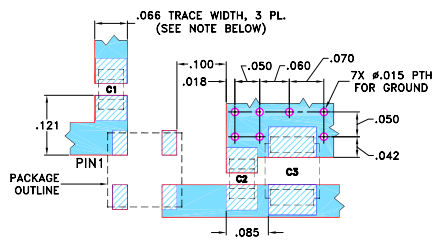
- Open style, Ceramic Base.
- Termination Finish: Palladium Silver.
- Must be isolated from external conductors on mounting surface. Suggested solder mask area is .025 x .025
- At Mini-Circuits option via may be removed.

4. Top-Hat total thickness: .013 inches MAX.

### Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J	K	wt
.150	.150	.150	.100	.030	.025	.028	.050	.160	.030	grams
3.81	3.81	3.81	2.54	0.76	0.64	0.71	1.27	4.06	0.76	0.10

### Demo Board MCL P/N: TB-272 Suggested PCB Layout (PL-147)



CAPACITORS C1,C2: 39000 pF, EIA CODE (MM): 2012  
CAPACITORS C3: TANT, 1 uF, EIA CODE (MM): 3528

- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ, EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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

#### Notes

- A. 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.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits 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-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

### Features

- very broadband
- miniature size, 0.15"x0.15"
- low parasitic capacitance 0.1 pf typ.
- effective parallel resistance, Rch 500 ohm typ.
- usable up to 10GHz
- aqueous washable
- protected by U.S. Patent 7,012,485
- low DC resistance, 0.1Ω

### Applications

- biasing amplifiers
- biasing of laser diodes
- biasing of active antennas

### Electrical Specifications @ 25°C

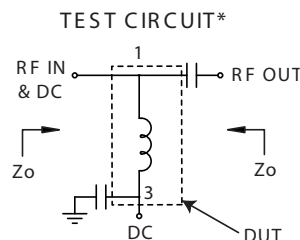
FREQ. RANGE (MHz)	INSERTION LOSS* (dB)		VSWR* (:1)		DC CURRENT (mA)	INDUCTANCE (μH) Typ. at			
	Typ.	Max.	Typ.	Max.		0mA	50mA	100mA	200mA
50-8200	0.5	1.1	1.1	1.7	200	4	1.3	0.9	0.5

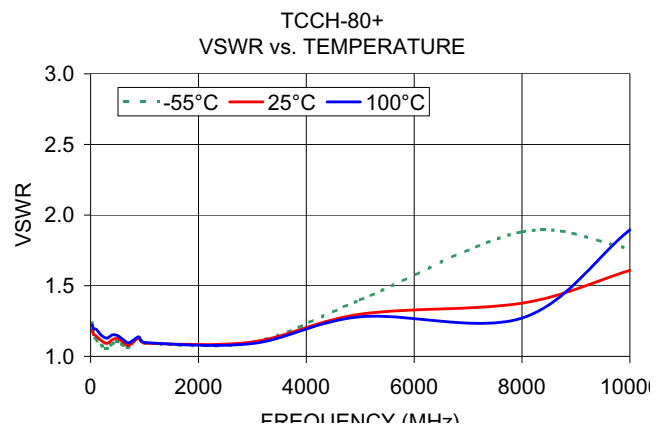
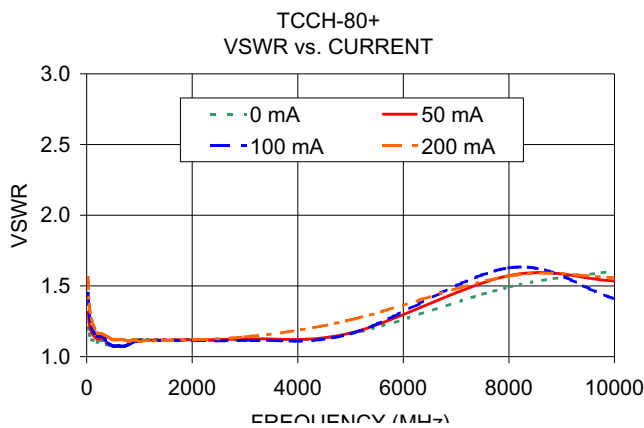
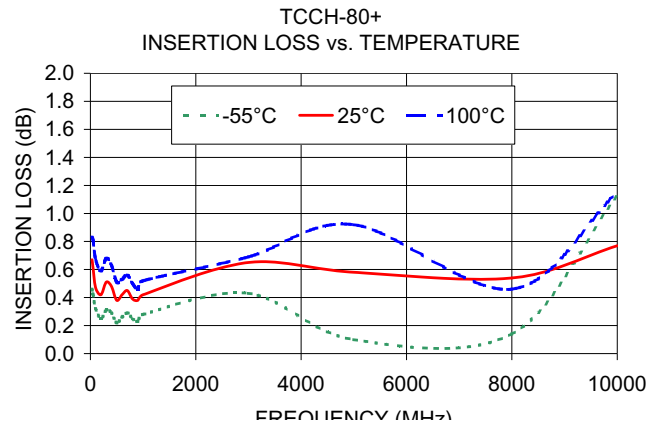
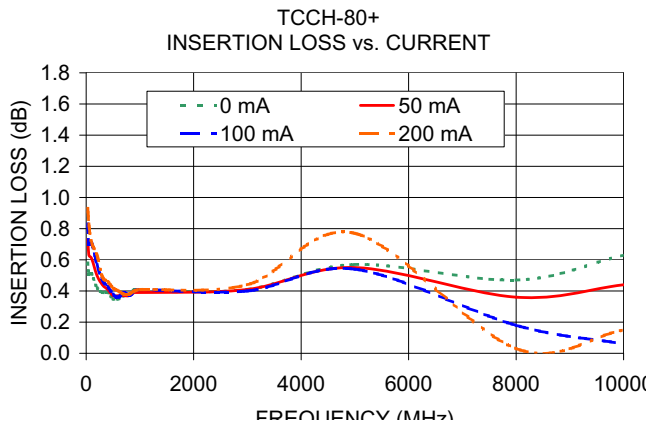
\*tested with circuit shown below, Zo=50 ohms

### Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB) with current				VSWR (:1) with current			
	0mA	50mA	100mA	200mA	0mA	50mA	100mA	200mA
30	0.58	0.73	0.83	0.93	1.20	1.31	1.45	1.56
50	0.51	0.63	0.70	0.83	1.16	1.23	1.31	1.37
100	0.51	0.61	0.71	0.71	1.12	1.16	1.20	1.25
200	0.42	0.50	0.57	0.63	1.10	1.12	1.15	1.17
300	0.39	0.44	0.47	0.49	1.12	1.13	1.14	1.16
400	0.39	0.41	0.43	0.46	1.09	1.09	1.10	1.14
500	0.35	0.37	0.38	0.42	1.08	1.08	1.07	1.12
600	0.35	0.37	0.36	0.40	1.08	1.08	1.08	1.12
700	0.37	0.37	0.39	0.38	1.07	1.07	1.07	1.12
800	0.38	0.37	0.37	0.38	1.09	1.09	1.09	1.11
900	0.41	0.39	0.40	0.40	1.11	1.11	1.11	1.12
1000	0.40	0.39	0.41	0.41	1.12	1.12	1.11	1.11
3000	0.41	0.41	0.40	0.44	1.12	1.12	1.12	1.14
5000	0.57	0.55	0.54	0.77	1.16	1.17	1.16	1.26
8000	0.47	0.36	0.18	0.03	1.49	1.57	1.63	1.57
10000	0.63	0.44	0.06	0.15	1.61	1.54	1.41	1.56

### Electrical Schematic





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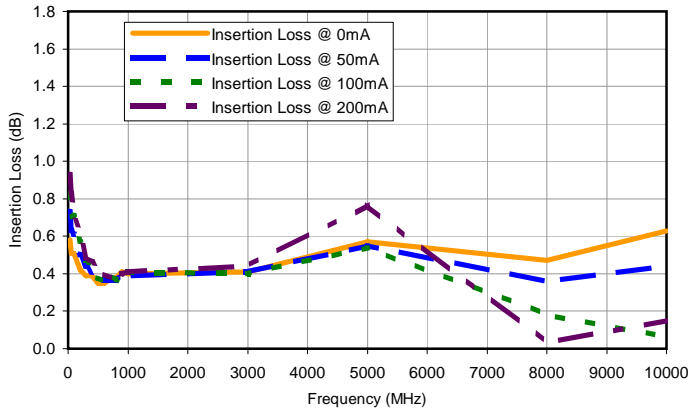


*Typical Performance Data*

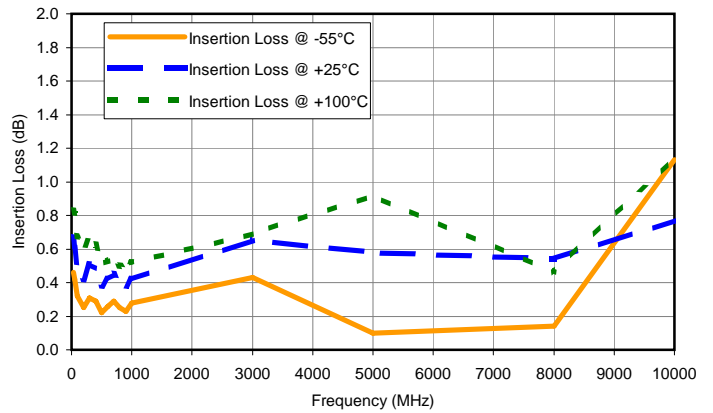
Frequency (MHz)	Insertion Loss vs. Current (dB)				Return Loss vs. Current (:1)				Insertion Loss vs. Temperature (dB)			Return Loss vs. Temperature (:1)		
	0mA	50mA	100mA	200mA	0mA	50mA	100mA	200mA	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C
30.0	0.58	0.73	0.83	0.93	20.64	17.34	14.75	13.20	0.46	0.67	0.83	19.48	21.24	19.96
50.0	0.51	0.63	0.70	0.83	22.63	19.65	17.46	16.13	0.42	0.61	0.81	22.55	22.60	20.98
100.0	0.51	0.61	0.71	0.71	24.86	22.42	20.88	19.08	0.32	0.47	0.67	24.99	23.43	21.13
200.0	0.42	0.50	0.57	0.63	26.17	24.63	23.36	22.12	0.25	0.42	0.59	28.35	25.56	23.17
300.0	0.39	0.44	0.47	0.49	25.18	24.31	23.50	22.61	0.31	0.51	0.68	31.37	27.15	24.38
400.0	0.39	0.41	0.43	0.46	27.76	27.20	26.53	23.69	0.29	0.48	0.63	27.50	25.11	23.06
500.0	0.35	0.37	0.38	0.42	28.57	28.82	28.88	24.94	0.22	0.38	0.51	26.06	24.44	23.26
600.0	0.35	0.37	0.36	0.40	28.33	28.59	28.75	24.94	0.26	0.42	0.53	28.12	26.32	24.93
700.0	0.37	0.37	0.39	0.38	29.02	29.11	29.03	24.94	0.29	0.45	0.56	30.30	28.60	26.79
800.0	0.38	0.37	0.37	0.38	27.21	27.54	27.66	25.66	0.25	0.39	0.50	26.22	26.03	25.15
900.0	0.41	0.39	0.40	0.40	25.47	25.72	25.95	24.94	0.23	0.38	0.46	24.33	24.38	23.82
1000.0	0.40	0.39	0.41	0.41	24.86	25.16	25.62	25.66	0.28	0.42	0.52	26.94	26.97	26.60
3000.0	0.41	0.41	0.40	0.44	24.97	24.64	25.22	23.69	0.43	0.65	0.69	26.54	26.24	27.25
5000.0	0.57	0.55	0.54	0.77	22.48	22.24	22.48	18.78	0.10	0.58	0.92	15.56	17.73	18.21
8000.0	0.47	0.36	0.18	0.03	14.09	13.04	12.43	13.08	0.14	0.54	0.46	10.29	15.99	18.47
10000.0	0.63	0.44	0.06	0.15	12.67	13.51	15.39	13.20	1.13	0.77	1.15	11.17	12.64	10.19

## Typical Performance Curves

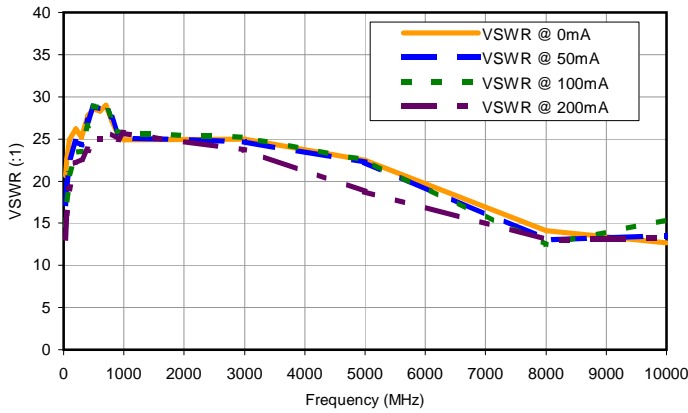
Insertion Loss vs. Frequency & Current



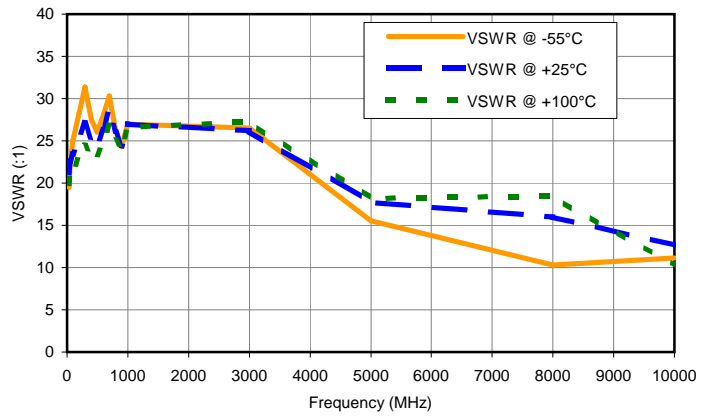
Insertion Loss vs. Frequency & Temperature



Return Loss vs. Frequency & Current

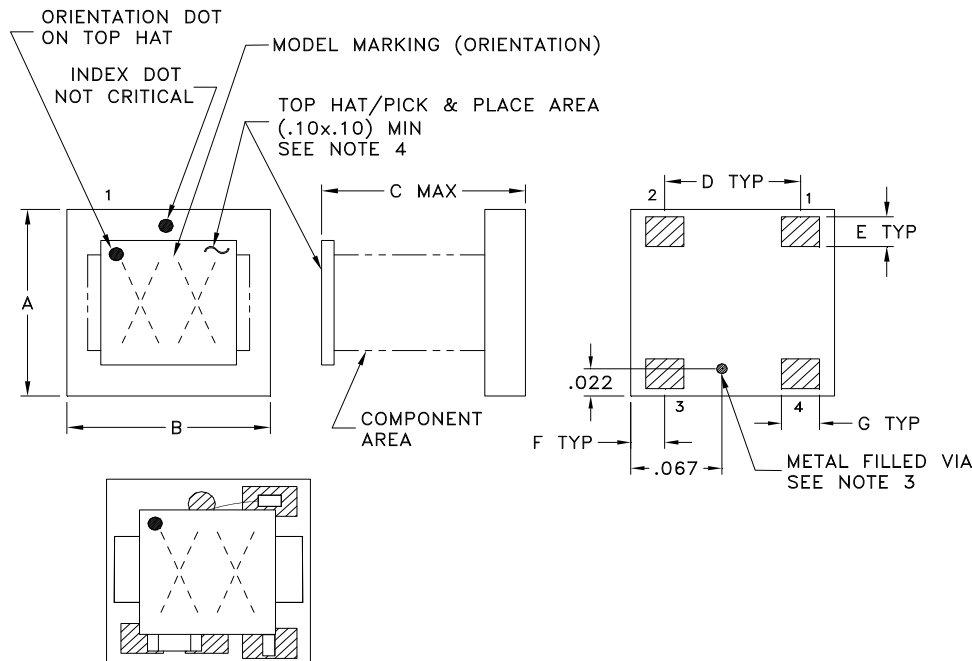


Return Loss vs. Frequency & Temperature



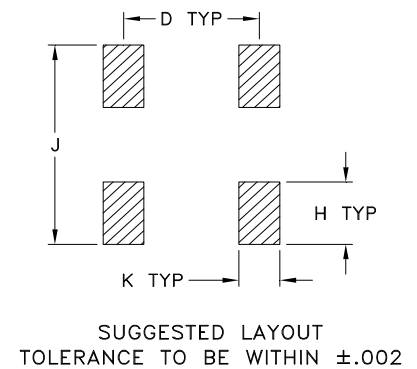
## Outline Dimensions

GU1604



TOP VIEW OF "TCBT" SERIES MODELS

## PCB Land Pattern



CASE #	A	B	C	D	E	F	G	H	J	K	WT.GRAMS
GU1604	.150 (3.81)	.150 (3.81)	.150 (3.81)	.100 (2.54)	.030 (.76)	.025 (.64)	.028 (.71)	.050 (1.27)	.160 (4.06)	.030 (.76)	.10

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

### Notes:

1. Open style, Ceramic Base.
2. Termination finish: Silver Palladium or Gold Over Nickel based on stock availability.
3. Must be isolated from external conductors on mounting surface. Suggested solder mask area is .025 x .025.  
At Mini-Circuits option via may be removed.
4. Top-Hat total thickness: .013 inches MAX.
5. Orientation Dot on Top Hat corresponds to Pin #1.



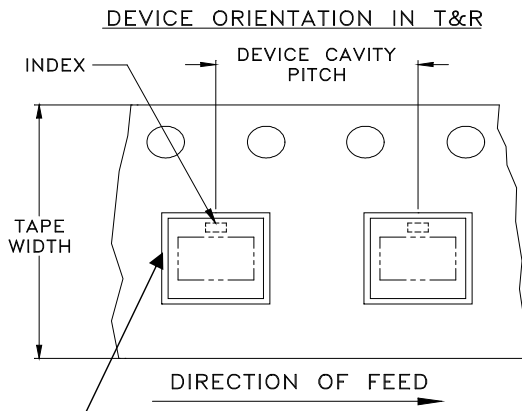
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



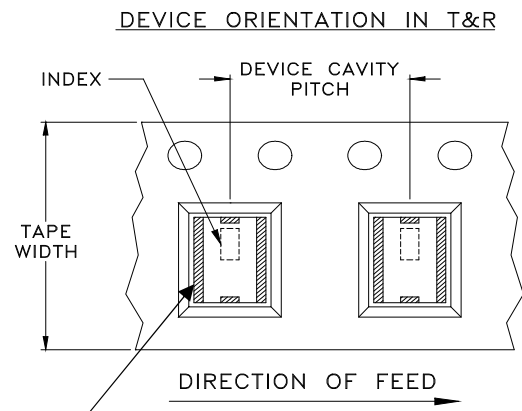
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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F77



Note: The shape of the pocket may differ



Note: The location and shape of the metallization may differ

### Applicable Case Styles

GU1604, GU1804, GU2644,  
TT1618-2

### Applicable Case Styles

MZ4532C, NM1812C,  
NM1812C-1, NM1812C-2,  
NM1812C-3, NM1812C-5,  
NM1812C-6, NM3237

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	8	7	Small quantity standards (see note)	20
				50
				100
				200
				500
		1000		
		13	Standard	2000

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.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



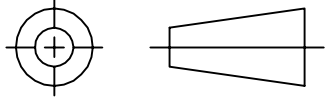
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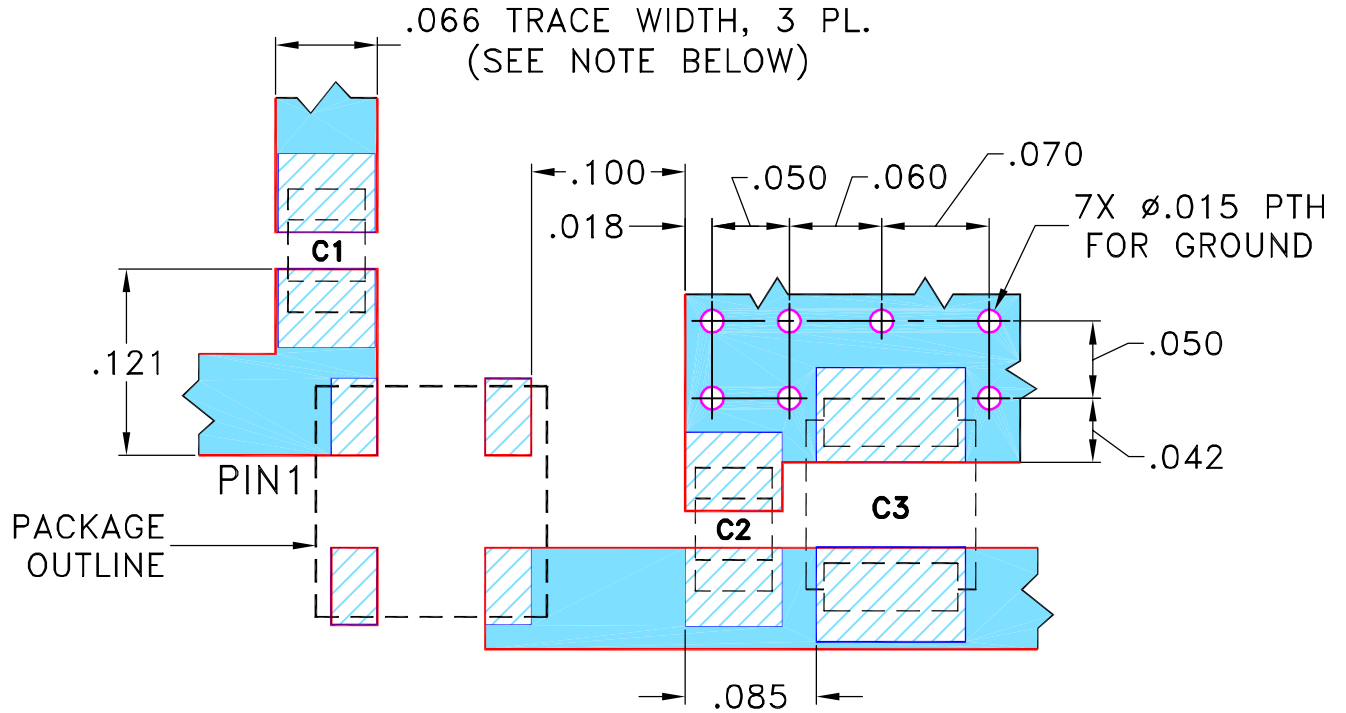
THIRD ANGLE PROJECTION



REVISIONS



REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M89280	NEW RELEASE	12/31/03	MMG	DJ
A	M90577	TCCH-80 WAS TCH-80 IN TITLE	01/19/04	AV	DJ
B	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION  
FOR GU1041 CASE STYLE, "pe" PIN CONNECTION



CAPACITORS C1,C2: 39000 pF, EIA CODE (MM): 2012  
CAPACITORS C3: TANT, 1 uF, EIA CODE (MM): 3528

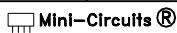
- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN MMG	12/30/03
TOLERANCES ON:	CHECKED AV	12/31/03
2 PL DECIMALS ±	APPROVED DJ	12/31/03
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

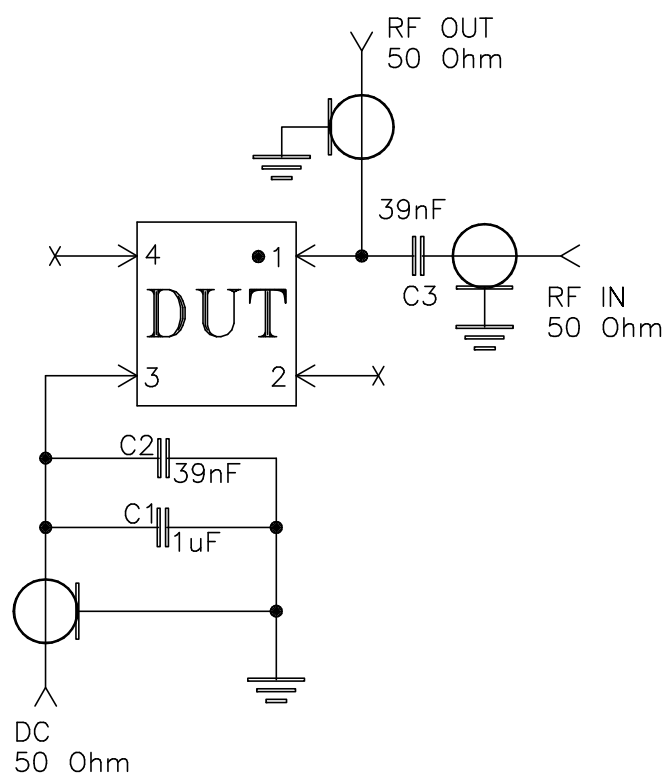
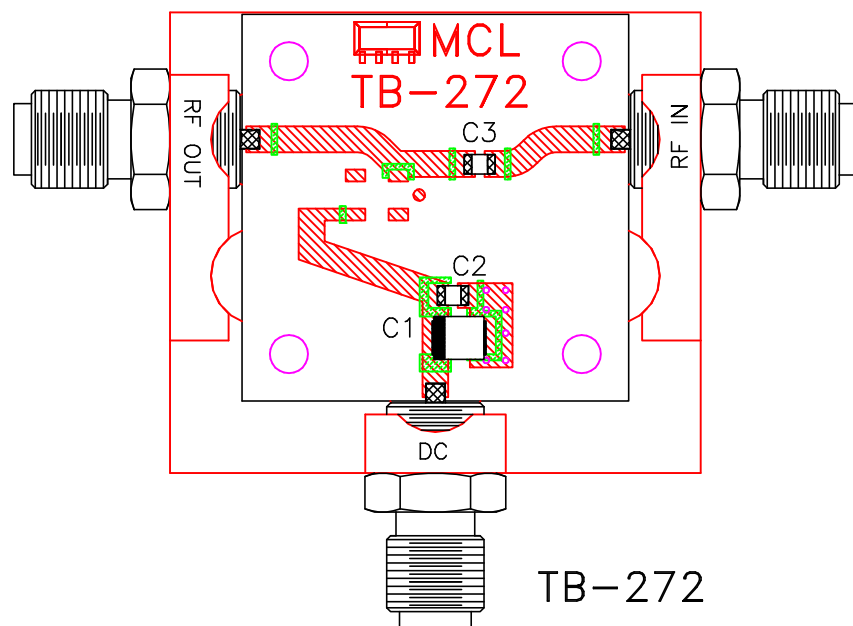
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PL, pe, GU1041, TCCH-80, TB-272

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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-147	B
FILE:	98PL147	SCALE:	SHEET:
		8:1	1 OF 1


# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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	-40° to 85°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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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, 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
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215