

THE BIG DEAL

- Low Insertion Loss, 1.0 dB Typ.
- Good Return Loss, 20 dB Typ. at 1 dB Band
- Excellent Amplitude Unbalance, 0.3 dB Typ.
- Power Handling up to 0.25 W
- Wideband, 5 to 1200 MHz
- Suitable for Tin/Lead and RoHS Solder Systems
- Balanced Transmission Line
- Aqueous Washable



Generic photo used for illustration purposes only

CASE STYLE: TT1618

+RoHS Compliant

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

APPLICATIONS

- Balanced to Unbalanced Transformation
- Push-Pull Amplifiers
- PCS/DCS
- Cable TV
- Cellular

PRODUCT OVERVIEW

Mini-Circuits' TRS2-1T-75+ is a 75Ω surface mount balanced-to-balanced transformer with a 2:1 secondary/primary impedance ratio covering the 5 to 1200 MHz band, meeting bandwidth requirements for DOCSIS® 3.1 compliant systems and equipment, among other applications. This model handles RF input power up to 0.25 W and provides low insertion loss, good return loss and low amplitude unbalance. Measuring only 0.28x0.25x0.12", the unit features core and wire, all-welded construction with gold over nickel plate wraparound terminations suitable for tin/lead and RoHS solder systems. The unit also includes MiniCircuits' Top Hat® feature for faster more accurate pick-and-place assembly.

KEY FEATURES

Features	Advantages
Wideband, 5 to 1200 MHz	TRS2-1T-75+ supports a variety of applications including CATV and DOCSIS 3.1 systems and equipment.
Low Insertion Loss, 1.0 dB	Enables excellent signal power transmission from input to output.
Good Return Loss, 20 dB Typ.	Excellent matching for 75Ω systems with minimal signal reflection.
Low Amplitude Unbalance, 0.3 dB	Low unbalance can improve a system's electromagnetic compatibility by rejecting unwanted common-mode noise.
Small Footprint, 0.28x0.25"	Accommodates tight space requirements for dense PCB layouts.
Top Hat® Feature	Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection.



ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (Secondary/Primary)			2		
Frequency Range		5		1200	MHz
Insertion Loss ¹	5-600		0.6	1.0	dB
	600-1000		1.0	1.8	
	1000-1200		1.3	2.2	
Amplitude Unbalance	5-600		0.3	1.0	dB
	600-1000		0.6	1.7	
	1000-1200		0.8	1.9	
Phase Unbalance	5-50		0.8	3	Degree
	50-1200		5	9	
Primary Return Loss (Input)	5-50	17	22		dB
	50-1000	13	22		
	1000-1200	9	17		

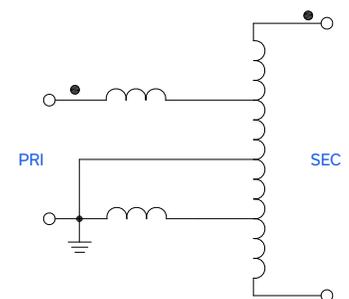
1. Insertion Loss is referenced to mid-band loss, 0.6 dB typ.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power	0.25 W
DC Current	30 mA

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

CONFIG. P1



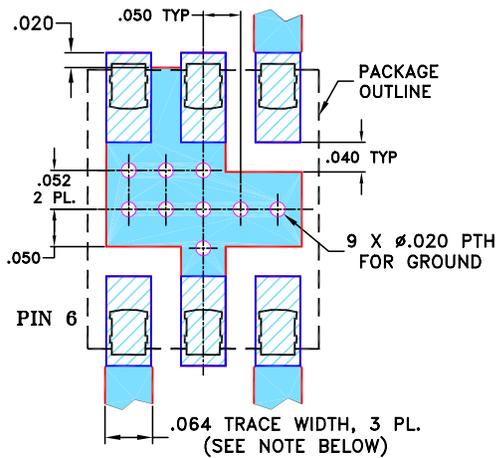


PIN CONNECTIONS

PRIMARY DOT	1
PRIMARY (GROUND)	4
SECONDARY DOT	3
SECONDARY	2

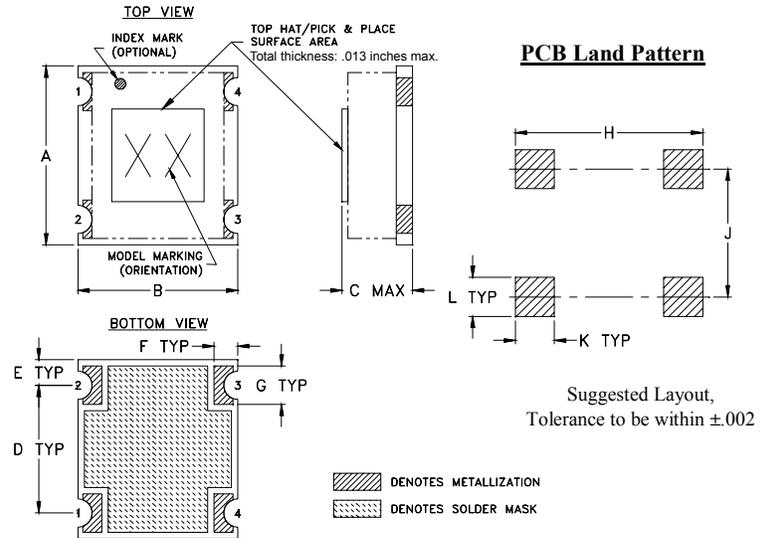
PRODUCT MARKING: GQ

DEMO BOARD MCL P/N: TB-TRS2-1T-75+ SUGGESTED PCB LAYOUT (PL-237)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

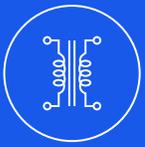
OUTLINE DRAWING



OUTLINE DIMENSIONS (Inch mm)

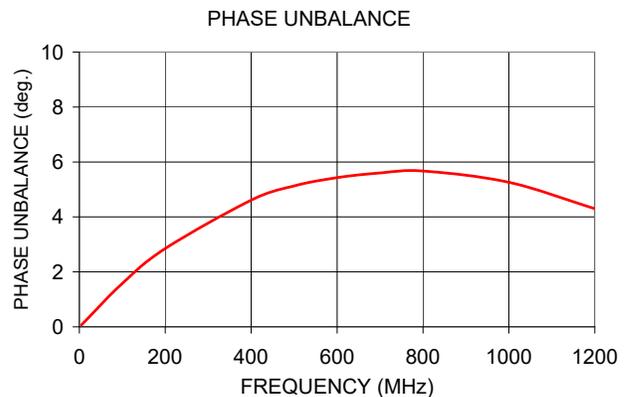
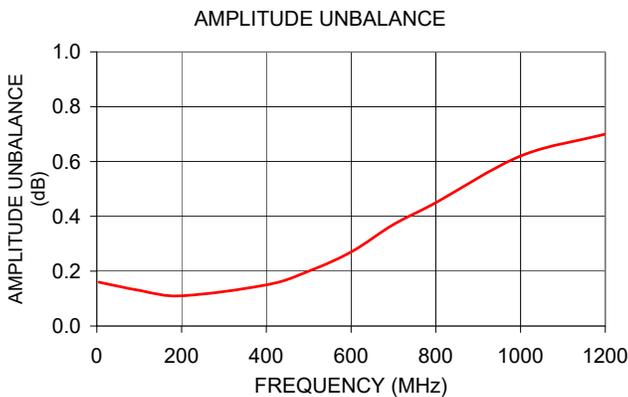
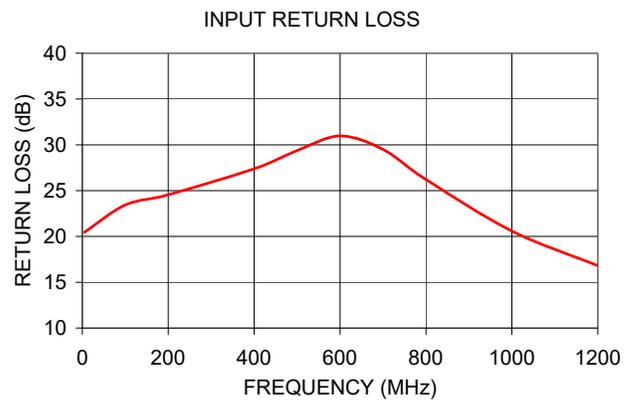
A	B	C	D	E	F
.280	.250	.12	.200	.040	.037
7.11	6.35	3.05	5.08	1.02	0.94
G	H	J	K	L	wt.
.060	.293	.200	.061	.061	grams
1.52	7.44	5.08	1.55	1.55	2.8

TAPE & REEL INFORMATION: F2



TYPICAL PERFORMANCE DATA

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
5	0.76	20.46	0.16	0.07
100	0.72	23.43	0.13	1.58
200	0.77	24.55	0.11	2.85
400	0.87	27.39	0.15	4.61
500	0.94	29.37	0.20	5.13
600	1.02	30.97	0.27	5.43
700	1.11	29.50	0.37	5.60
800	1.21	26.22	0.45	5.67
1000	1.45	20.59	0.62	5.26
1200	1.75	16.81	0.70	4.30



- 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.
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RF Transformer

TRS2-1T-75+

Typical Performance Data

FREQUENCY MHz	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
0.5	1.88	10.45	0.15	0.27
0.6	1.70	11.35	0.16	0.21
0.7	1.56	12.12	0.17	0.21
0.8	1.46	12.77	0.16	0.14
1.0	1.31	13.83	0.16	0.09
3.0	0.86	18.67	0.16	0.01
5.0	0.76	20.46	0.16	0.07
7.0	0.73	21.33	0.16	0.13
10	0.71	21.96	0.16	0.18
30	0.70	22.69	0.15	0.53
50	0.70	22.99	0.15	0.86
70	0.71	23.20	0.14	1.17
100	0.72	23.43	0.13	1.58
150	0.74	24.05	0.13	2.23
200	0.77	24.55	0.11	2.85
250	0.79	25.15	0.11	3.39
300	0.81	25.54	0.12	3.84
350	0.84	26.47	0.13	4.24
400	0.87	27.39	0.15	4.61
450	0.90	28.27	0.17	4.88
500	0.94	29.37	0.20	5.13
550	0.98	30.09	0.23	5.28
600	1.02	30.97	0.27	5.43
650	1.07	30.16	0.32	5.52
700	1.11	29.50	0.37	5.60
750	1.16	27.89	0.41	5.72
800	1.21	26.22	0.45	5.67
850	1.26	24.85	0.50	5.66
900	1.33	23.16	0.53	5.56
950	1.38	22.01	0.58	5.42
1000	1.45	20.59	0.62	5.26
1050	1.52	19.63	0.65	5.12
1100	1.59	18.54	0.68	4.86
1150	1.67	17.62	0.69	4.60
1200	1.75	16.81	0.70	4.30
1250	1.84	15.96	0.69	3.87
1300	1.93	15.37	0.68	3.36
1400	2.13	14.08	0.60	2.19



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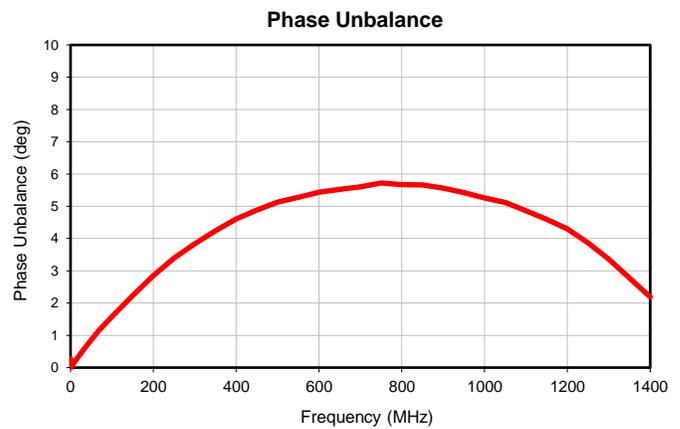
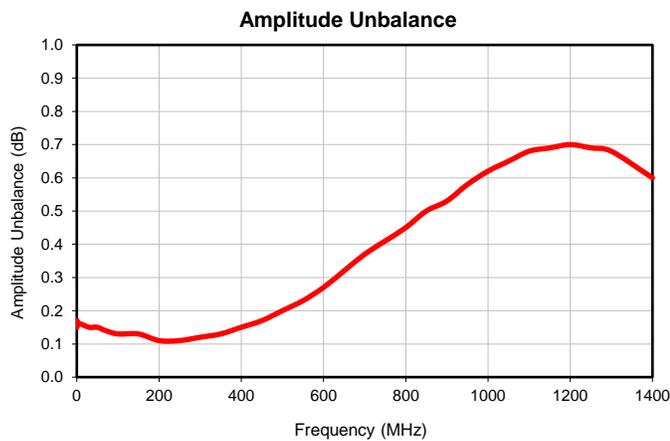
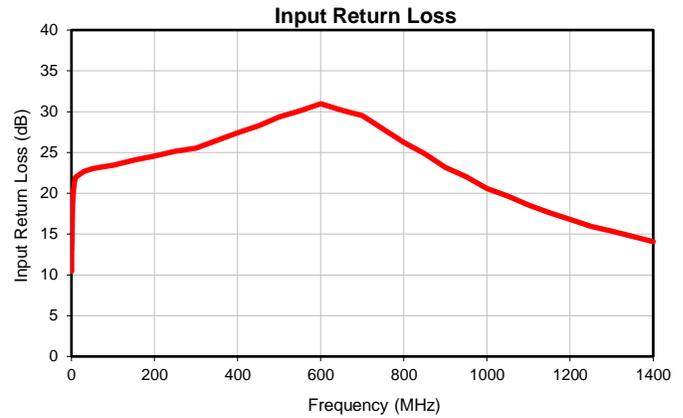
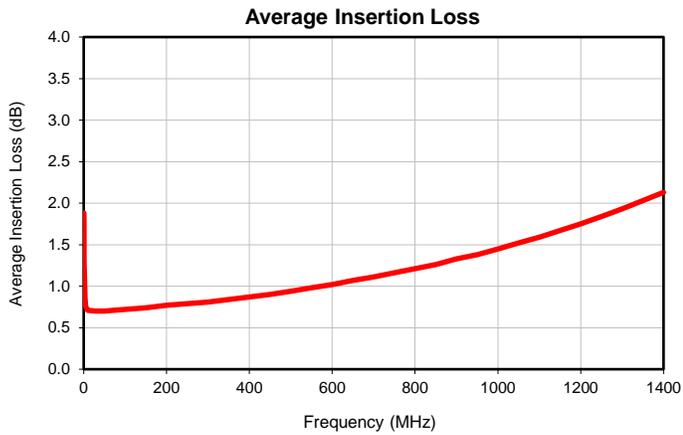


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IF/RF MICROWAVE COMPONENTS

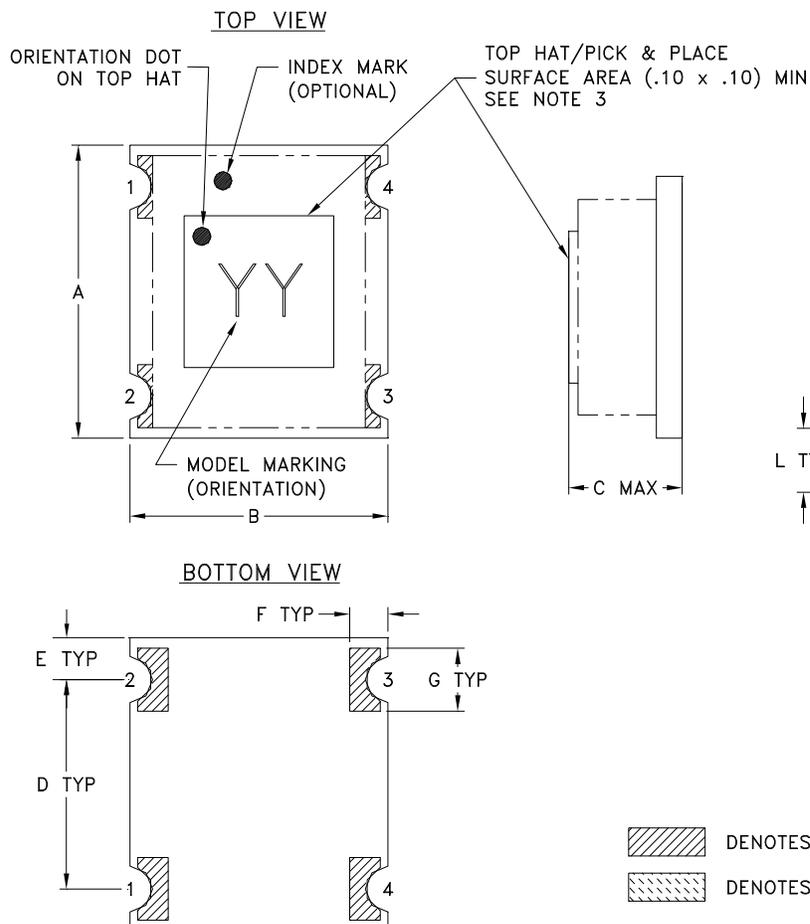
REV. OR
TRS2-1T-75+
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Page 1 of 1

Typical Performance Data

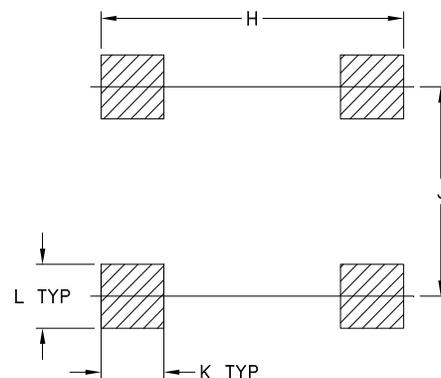


Outline Dimensions

TT1618



PCB Land Pattern



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ± 0.002

 DENOTES METALLIZATION
 DENOTES SOLDER RESIST

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT GRAMS
TT1618	.280 (7.11)	.250 (6.35)	.12 (3.05)	.200 (5.08)	.040 (1.02)	.037 (.94)	.060 (1.52)	.293 (7.44)	.200 (5.08)	.061 (1.55)	.061 (1.55)	2.80

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

Notes:

1. Open style, Base material: Printed wiring laminate.
2. Termination finish: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.
3. Top-Hat total thickness: .013 inches MAX.
4. Orientation Dot on Top Hat & PCB corresponds to Pin #1.


ISO 9001 ISO 14001 CERTIFIED

ALL NEW

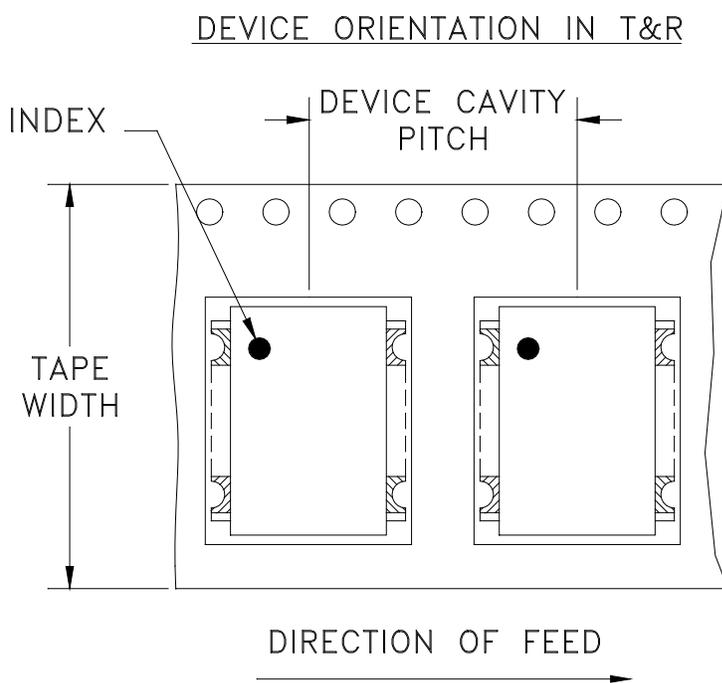

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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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Go to: www.minicircuits.com/pages/pdfs/tape.pdf



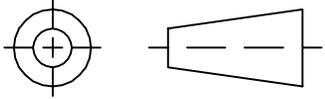
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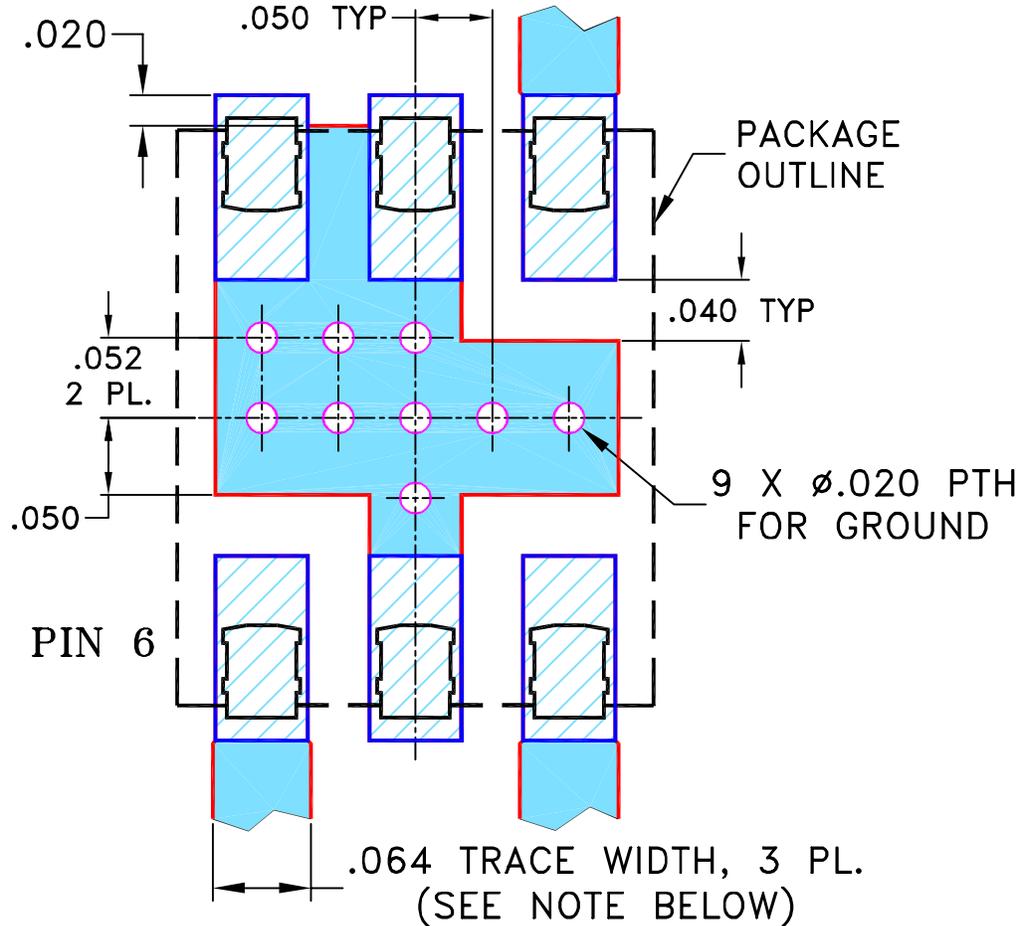
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M102713	NEW RELEASE	01/18/08	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "gn" PIN CONNECTION.



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

01/18/08

TOLERANCES ON:

CHECKED

AV

01/18/08

2 PL DECIMALS ±

APPROVED

IL

01/18/08

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±



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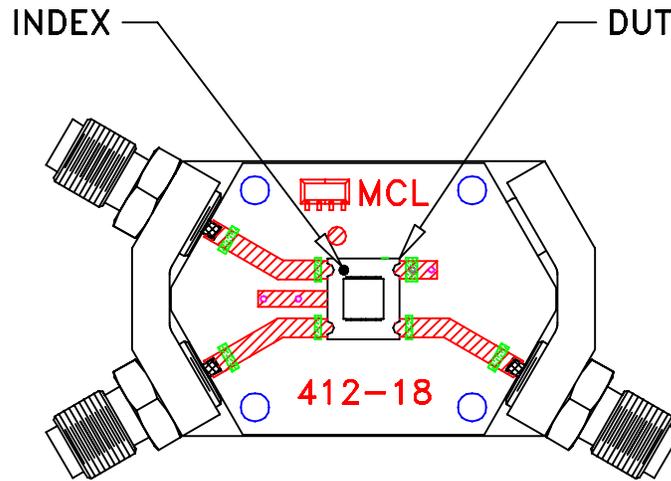
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Brooklyn NY 11235

PL, gn, QQQ569, LRPS-J, TB-100

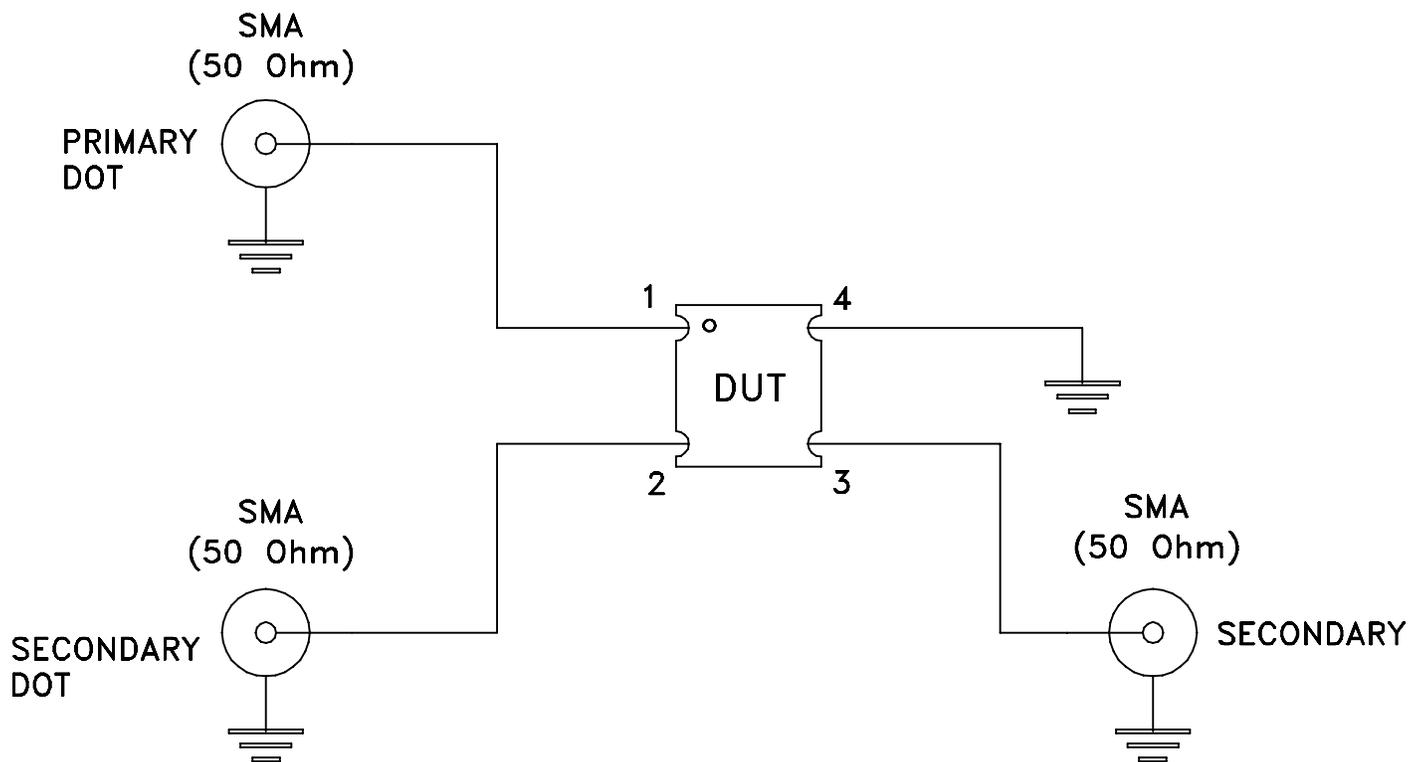
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-237	REV: OR
FILE:	98PL237	SCALE: 8:1	SHEET: 1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-619+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: 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