SURFACE MOUNT

RF Transformer

TRS278-122-75+

75Ω 40 to 1250 MHz

THE BIG DEAL

- Wideband, 40-1250 MHz
- Balanced transmission line with secondary center tap
- Suitable for tin/lead and RoHS solder systems
- Aqueous washable

CASE STYLE: TT2315-3

Generic photo used for illustration purposes only

+RoHS Compliant

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

APPLICATIONS

- CATV
- DOCSIS 3.1
- DOCSIS 4.0
- FDX

PRODUCT OVERVIEW

TRS278-122-75+ is a 75Ω surface-mount balanced to balanced transformer covering the 40 to 1250 MHz band, supporting bandwidth requirements for DOCSIS® 3.1 compliant systems and equipment. The transformer provides a 2.78:1 secondary/primary impedance ratio with 0.6 dB insertion loss, 0.3 dB amplitude unbalance, and ±1° phase unbalance typ. Featuring core and wire construction on a 6-pad printed laminate base with gold over nickel termination finish, the unit measures 0.250" x 0.280" x 0.165", accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
Wide bandwidth, 40 to 1250 MHz	Wide frequency range covers bandwidth requirements for DOCSIS® 3.1 systems and equipment.
Low insertion loss, 0.6 dB	Provides excellent signal power transmission from input to output.
Secondary center tap	Allows DC feed up to 30mA and DC bias without adding bias tees into the signal chain.
Small footprint (0.250" x 0.280" x 0.165")	Accommodates tight space requirements for dense PCB layouts.

REV. B
ECO-011926
TRS278-122-75+
IG/CP/AM
220216

ELECTRICAL SPECIFICATIONS AT 25°C

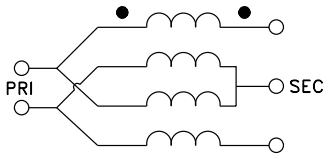
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Impendance Ratio (secondary/primary)			2.78		
Frequency Range		40		1250	MHz
Insertion Loss*	40-600		0.3	0.7	dB
	600-1250		1.0	1.5	
Amplitude Unbalance	40-600		0.2	0.5	dB
	600-1250		0.4	1.2	
Phase Unbalance	40-600		5	10	Degree
	600-1250		7	15	
Return Loss	40-600		30		dB
	600-1250		22		

* Insertion Loss is referenced to mid-band loss, 0.3 dB typ. Measured in Balanced-to-Balanced Setup.

MAXIMUM RATINGS

Parameter	Ratings
Operating temperature	-40°C to 65°C
Storage temperature	-55°C to 100°C
RF Power	0.25W
DC Current	30mA

CONFIGURATION H



SURFACE MOUNT

RF Transformer

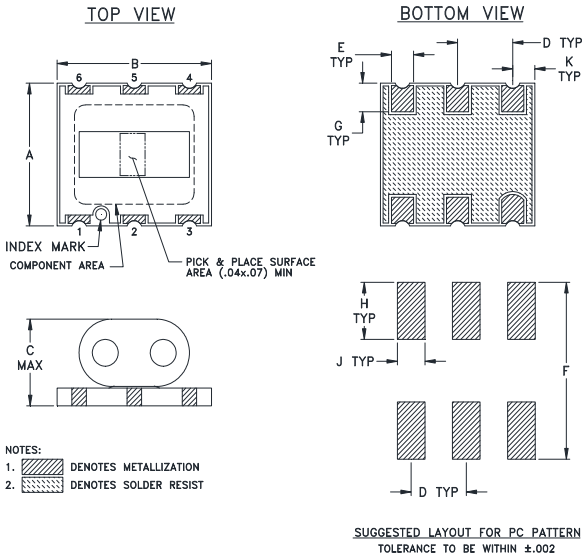
TRS278-122-75+

PAD CONNECTIONS

Function	Pad Number
PRIMARY DOT	1
PRIMARY	3
SECONDARY DOT	6
SECONDARY	4
SECONDARY CT	2,5

DEMO BOARD MCL P/N: TB-1119+

OUTLINE DRAWING



OUTLINE DIMENSIONS (INCH/MM)

A	B	C	D	E	F	G	H	J	K	wt
.250	.280	.165	.100	.040	.310	.050	.100	.050	.040	grams
6.35	7.11	4.19	2.54	1.02	7.87	1.27	2.54	1.27	1.02	0.20

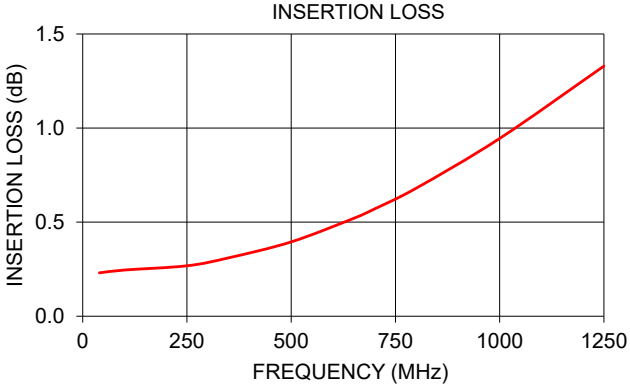
RF Transformer

TRS278-122-75+

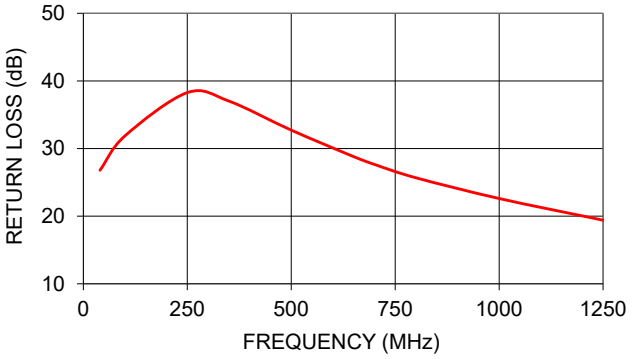
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (deg)
40	0.23	26.80	0.01	0.19
100	0.25	31.87	0.00	0.22
250	0.27	38.27	0.01	0.47
350	0.31	37.02	0.03	0.60
500	0.40	32.72	0.04	0.80
650	0.52	28.81	0.06	0.99
700	0.57	27.65	0.07	1.05
800	0.68	25.67	0.07	1.12
1000	0.94	22.61	0.08	1.32
1250	1.33	19.41	0.11	1.54

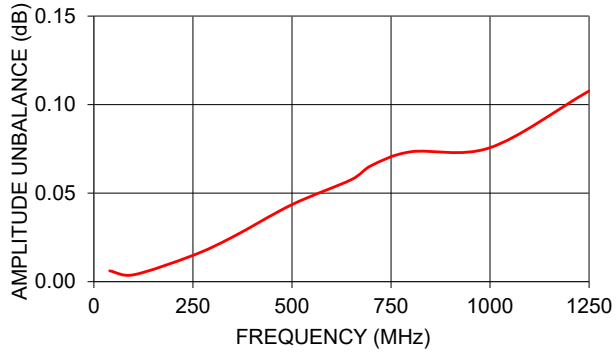
TRS278-122-75+
INSERTION LOSS



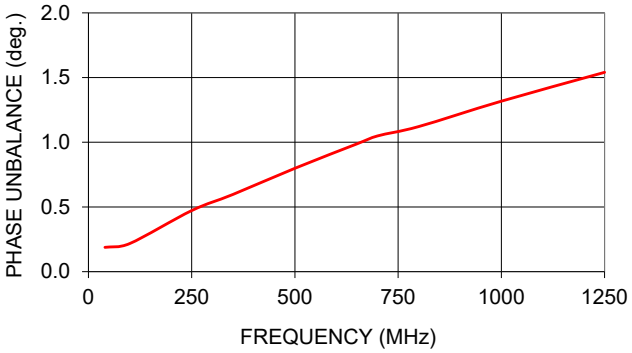
TRS278-122-75+
INPUT RETURN LOSS



TRS278-122-75+
AMPLITUDE UNBALANCE



TRS278-122-75+
PHASE UNBALANCE



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 TRS278-122-75+

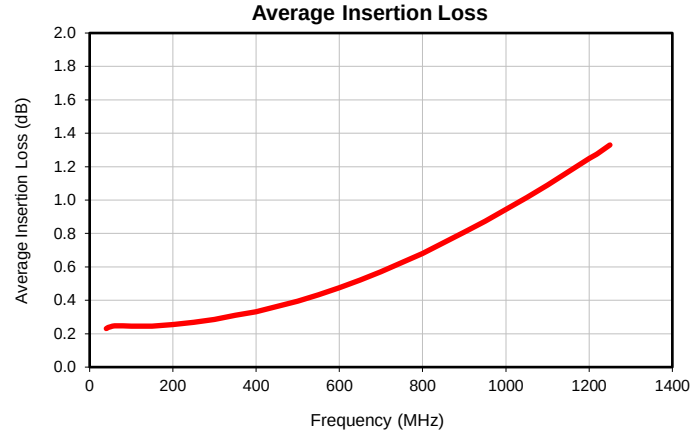
Typical Performance Data

FREQUENCY MHz	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
40.0	0.23	26.80	0.01	0.19
45.0	0.24	27.59	0.00	0.19
50.0	0.24	28.28	0.00	0.19
55.0	0.25	28.86	0.00	0.19
60.0	0.25	29.43	0.00	0.19
80.0	0.25	31.24	0.00	0.20
100.0	0.25	31.87	0.00	0.22
150.0	0.25	35.73	0.00	0.33
200	0.26	37.00	0.01	0.37
250	0.27	38.27	0.01	0.47
300	0.28	38.67	0.02	0.55
350	0.31	37.02	0.03	0.60
400	0.33	35.45	0.03	0.67
500	0.40	32.72	0.04	0.80
550	0.43	31.44	0.05	0.85
600	0.47	29.98	0.05	0.93
650	0.52	28.81	0.06	0.99
700	0.57	27.65	0.07	1.05
800	0.68	25.67	0.07	1.12
900	0.81	24.04	0.08	1.20
950	0.87	23.39	0.07	1.25
1000	0.94	22.61	0.08	1.32
1050	1.02	22.03	0.07	1.37
1100	1.09	21.27	0.07	1.45
1200	1.25	19.94	0.10	1.50
1218	1.27	19.72	0.10	1.53
1220	1.28	19.70	0.10	1.53
1250	1.33	19.41	0.11	1.54

RF Transformer TRS278-122-75+

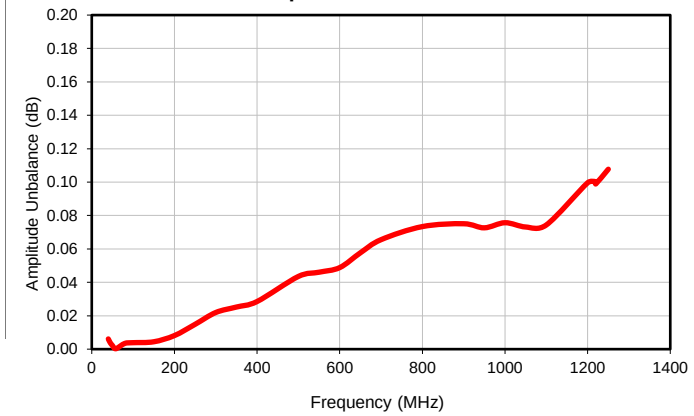
Typical Performance Data

Average Insertion Loss

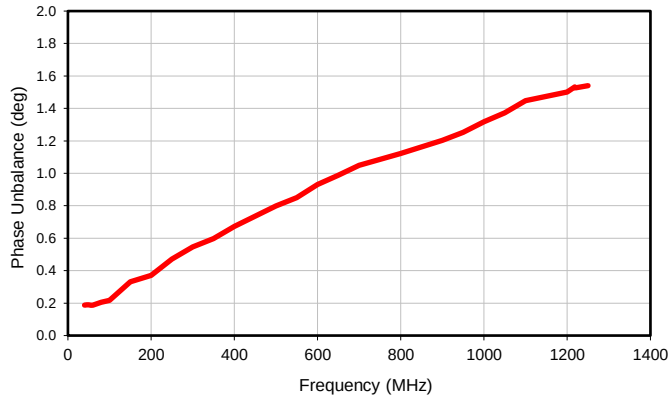


Input Return Loss

Amplitude Unbalance



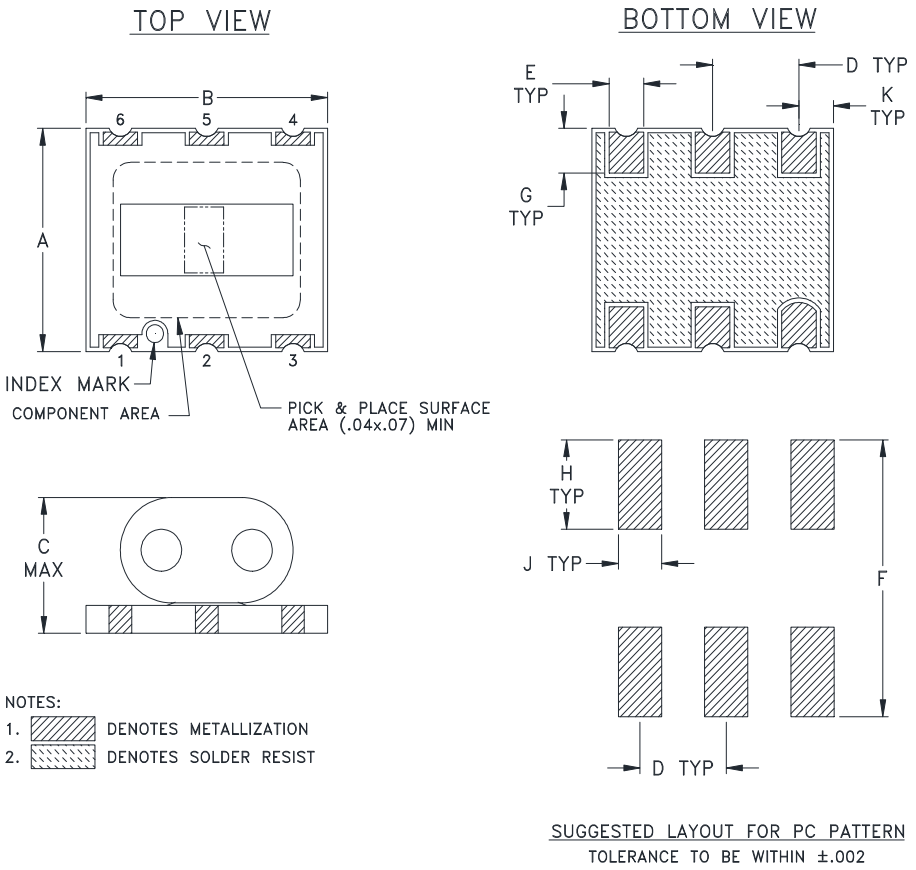
Phase Unbalance



Case Style TT

TT2315-3

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT. GRAMS
TT2315-3	.250 (6.35)	.280 (7.11)	.165 (4.19)	.100 (2.54)	.040 (1.02)	.310 (7.87)	.050 (1.27)	.100 (2.54)	.050 (1.27)	.040 (1.02)	0.2

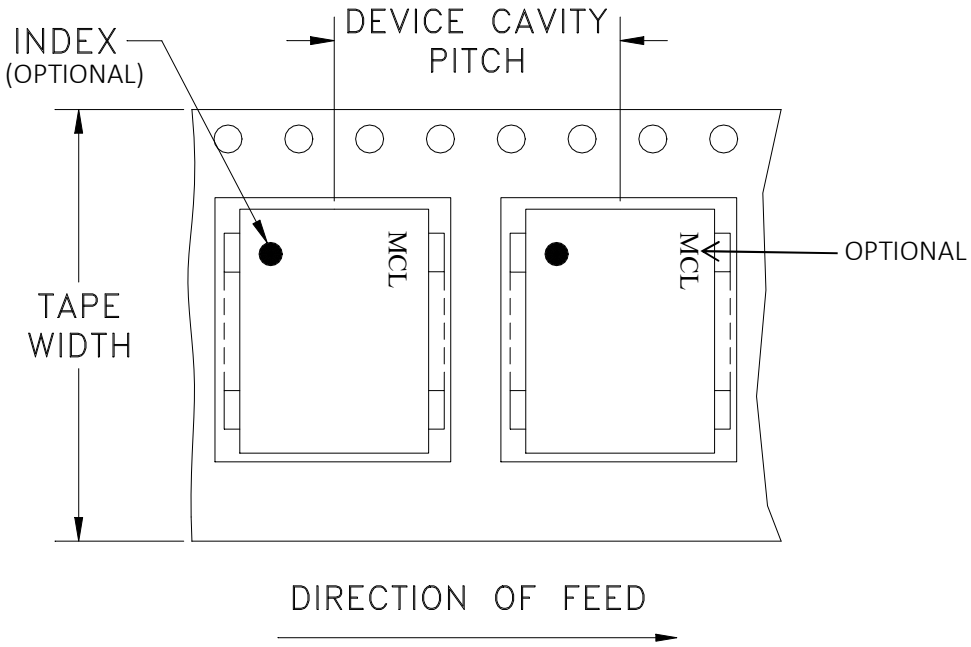
Dimensions are in (mm). Tolerances : 2 Pl.±.01[.25]; 3 Pl.±.005[0.127]

Notes:

1. Case material : Printed wiring laminate.
2. Termination finished : 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
3. Orientation dot on Core & PCB corresponds to Pin # 1.

Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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

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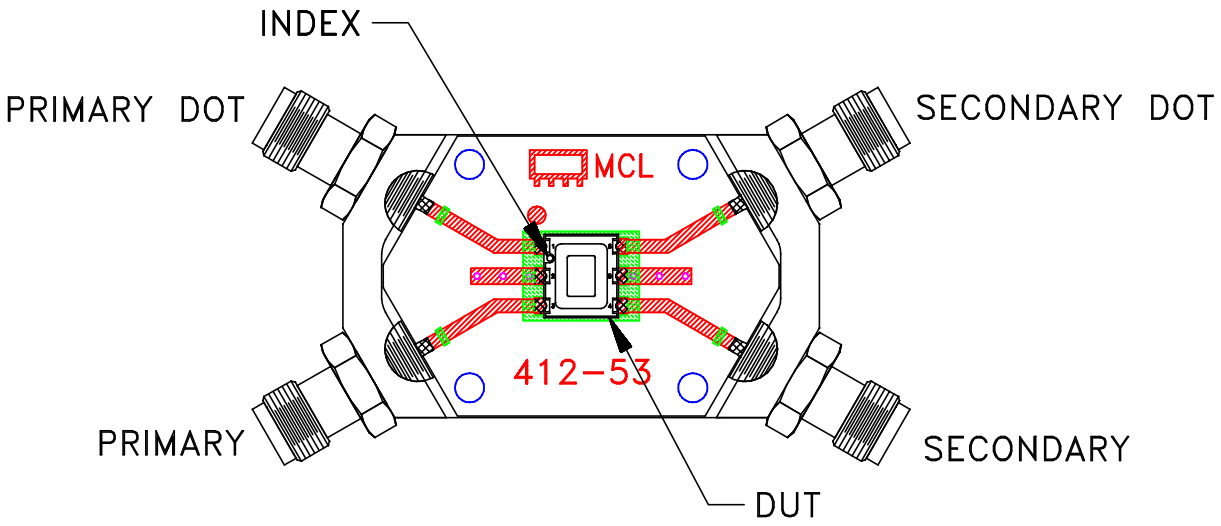
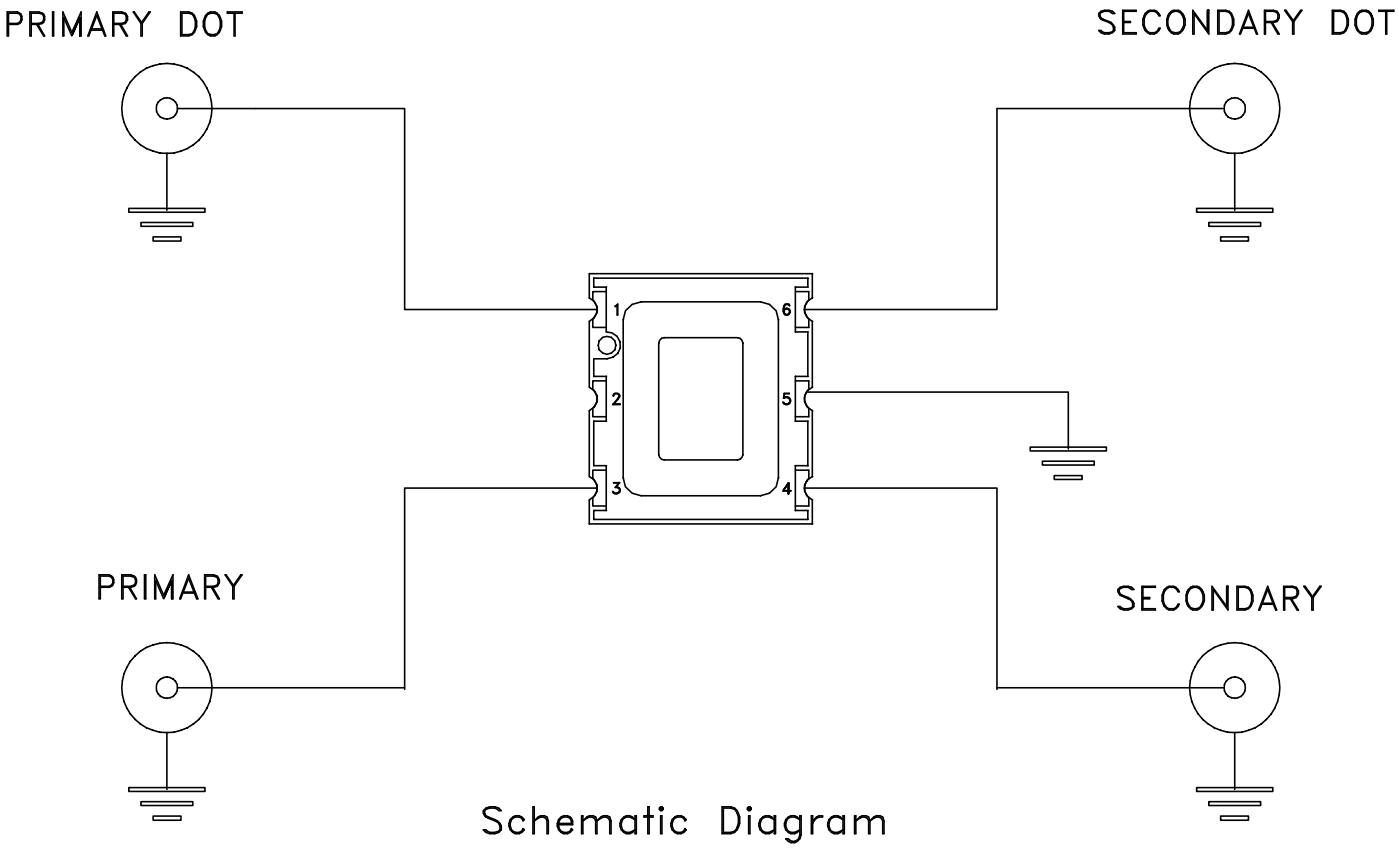
Evaluation Board and Circuit



TB-TRS27812275+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.

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Environmental Specifications ENV02T1

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