Surface Mount top hat®

RF Transformer

TCM2-142-75X+

75Ω 10 to 1400 MHz

The Big Deal

- Wideband, 10 to 1400 MHz
- Low insertion loss, 1.3 dB.
- Good input return loss, 17 dB typ.
- Low amplitude unbalance, 0.5 dB

CASE STYLE: AT1740

Product Overview

Mini-Circuits' TCM2-142-75X+ is a 75Ω surface-mount transmission line transformer covering a wide range of applications from 10 to 1400 MHz. The transformer provides input power handling up to 0.4W, low insertion loss, good input return loss and low amplitude unbalance. Featuring core and wire construction on a 5-pad ceramic base, the unit measures 0.15 x 0.15 x 0.15", accommodating dense circuit board layouts. It also incorporates Mini-Circuits' Top Hat® feature for faster, more accurate pick-and-place assembly and easy visual inspection.

Key Features

Feature	Advantages
Wideband, 10 to 1400 MHz	Wide frequency range covers bandwidth requirements for many broadband applications.
Good power handling, 0.4W	Supports a wide range of system power requirements.
Low insertion loss, 1.3 dB	TCM2-142-75X+ provides excellent signal transmission from input to output.
Good input return loss, 17 dB typ.	Provides good matching with minimal signal reflection.
Low amplitude unbalance, 0.5 dB	Low amplitude unbalance can improve a system's electromagnetic compatibility by rejecting unwanted common-mode noise.
Small footprint (0.15 x 0.15")	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.

Surface Mount top hat®

RF Transformer

TCM2-142-75X+

75Ω 10 to 1400 MHz

Generic photo used for illustration purposes only

CASE STYLE: AT1740

+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
13"	1000, 2000

Features

- wide bandwidth 10 to 1400 MHz
- balanced transmission line
- excellent return loss
- aqueous washable

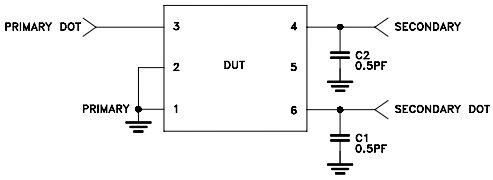
Applications

- PCS
- wideband push-pull amplifiers
- cellular

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/primary)			2		
Frequency Range		10		1400	MHz
Insertion Loss	10-1400	—	1.3	3.0	dB
Amplitude Unbalance	10-1400	—	0.5	—	dB
Phase Unbalance	10-1400	—	10	—	Degree

Electrical Schematic



Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.4W
DC Current	30mA

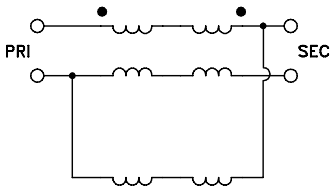
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

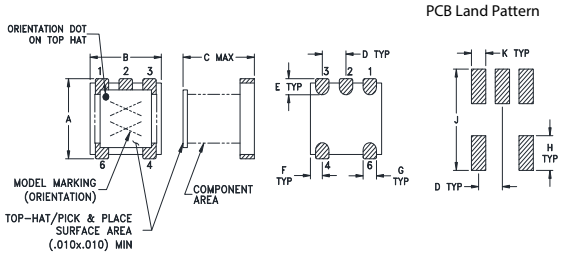
Function	
PRIMARY DOT	3
PRIMARY	1,2
SECONDARY DOT	6
SECONDARY	4
GND	1,2
NOT USED	5

Product Marking

Config. K



Outline Drawing

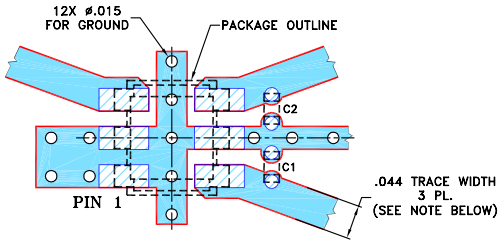


Outline Dimensions (inch / mm)

A	B	C	D	E	F
.150	.150	.150	.050	.030	.025
3.81	3.81	3.81	1.27	0.76	0.64

G	H	J	K	wt
.028	.065	.190	.030	grams
0.71	1.65	4.83	0.76	0.10

Demo Board MCL P/N: TB-676+
Suggested PCB Layout (PL-380)



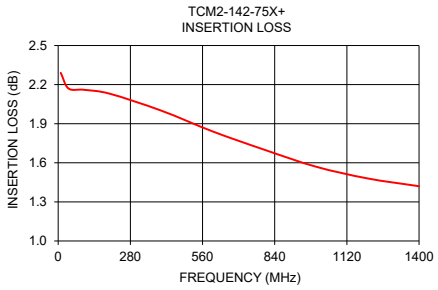
COMPONENT	SIZE
C1, C2	0402

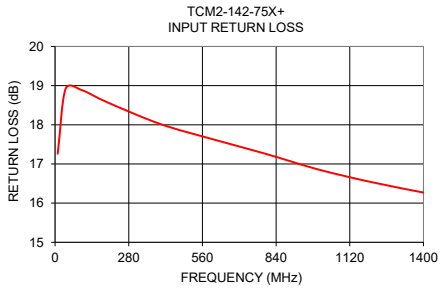
NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-676+.

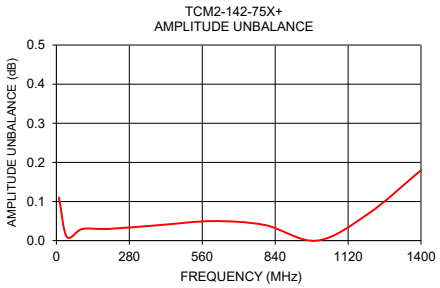
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

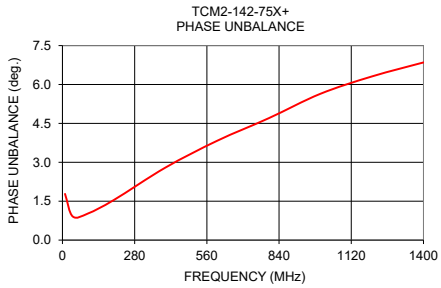
Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)	Input R. Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
10	2.29	17.26	0.11	1.78
40	2.17	18.92	0.01	0.91
100	2.16	18.89	0.03	1.03
200	2.13	18.57	0.03	1.55
400	2.00	18.02	0.04	2.80
600	1.84	17.63	0.05	3.83
800	1.70	17.26	0.04	4.70
1000	1.57	16.86	0.00	5.64
1200	1.48	16.54	0.07	6.31
1400	1.42	16.27	0.18	6.85









Additional Notes

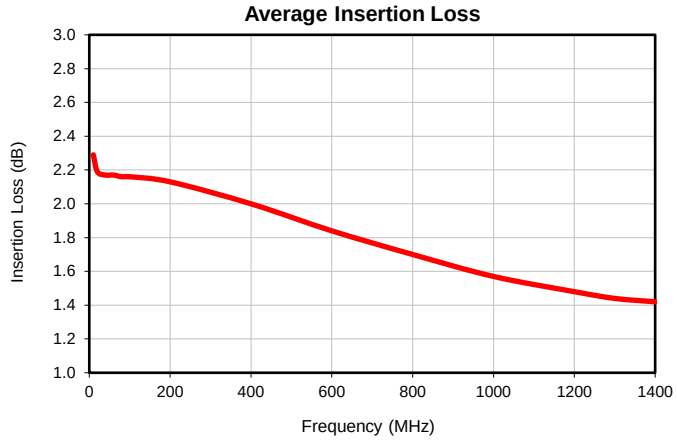
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

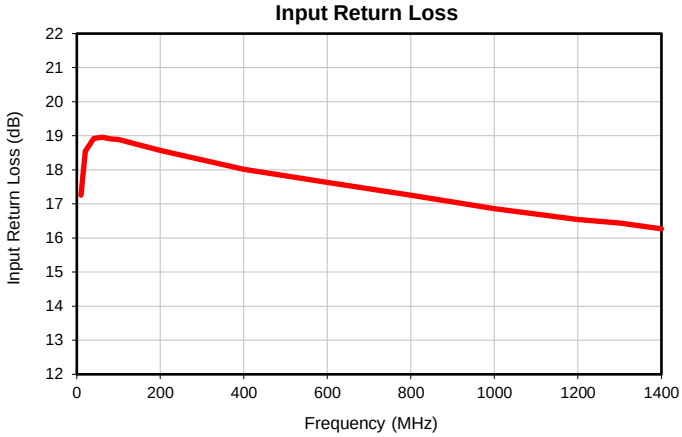
RF Transformer TCM2-142-75X+

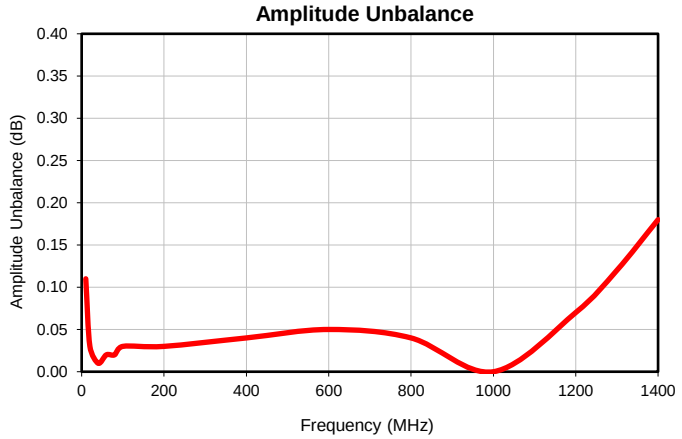
Typical Performance Data

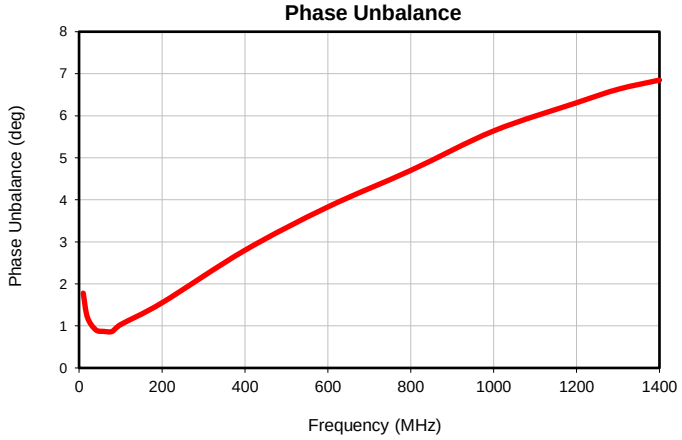
FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
10	2.29	17.26	0.11	1.78
20	2.19	18.54	0.03	1.21
40	2.17	18.92	0.01	0.91
60	2.17	18.96	0.02	0.87
80	2.16	18.91	0.02	0.87
100	2.16	18.89	0.03	1.03
200	2.13	18.57	0.03	1.55
400	2.00	18.02	0.04	2.80
600	1.84	17.63	0.05	3.83
800	1.70	17.26	0.04	4.70
1000	1.57	16.86	0.00	5.64
1200	1.48	16.54	0.07	6.31
1300	1.44	16.44	0.12	6.63
1400	1.42	16.27	0.18	6.85

Typical Performance Data





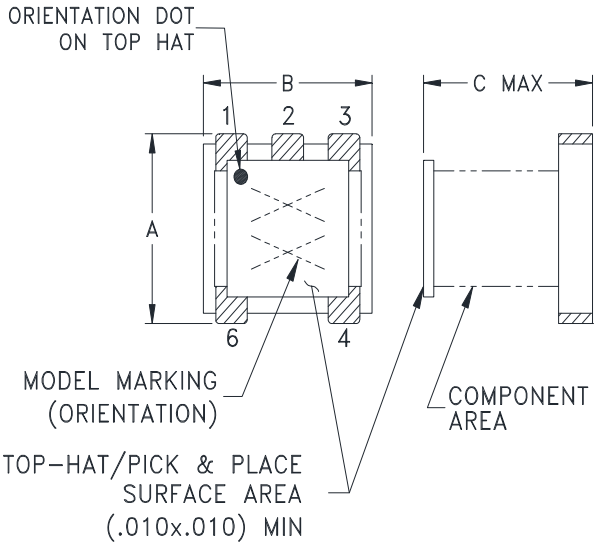




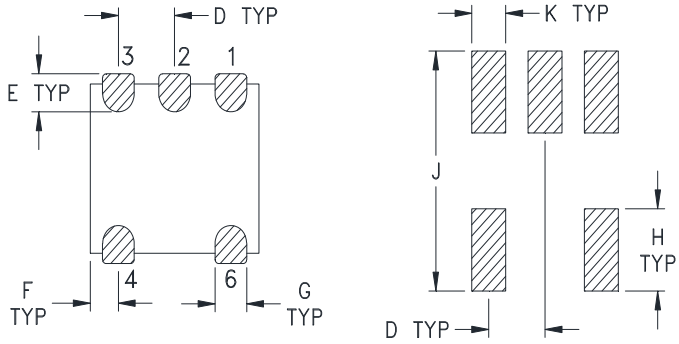
Case Style AT

Outline Dimensions

AT1740



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS
AT1740	.150 (3.81)	.150 (3.81)	.150 (3.81)	.050 (1.27)	.030 (0.76)	.025 (0.64)	.028 (0.71)	.065 (1.65)	.190 (4.83)	.030 (0.76)	-- --	.10

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

Notes:
1. Open style, Ceramic base.
2. Termination finish:. 3.15-5.12 µ inch (.08-.130 microns) Gold over 78–236 µ inch (1.98-6.0 microns) Nickel plate
3. Top-hat thickness: .013 max.
4. Orientation Dot on Top Hat & refers to Pin #1 of the Unit.

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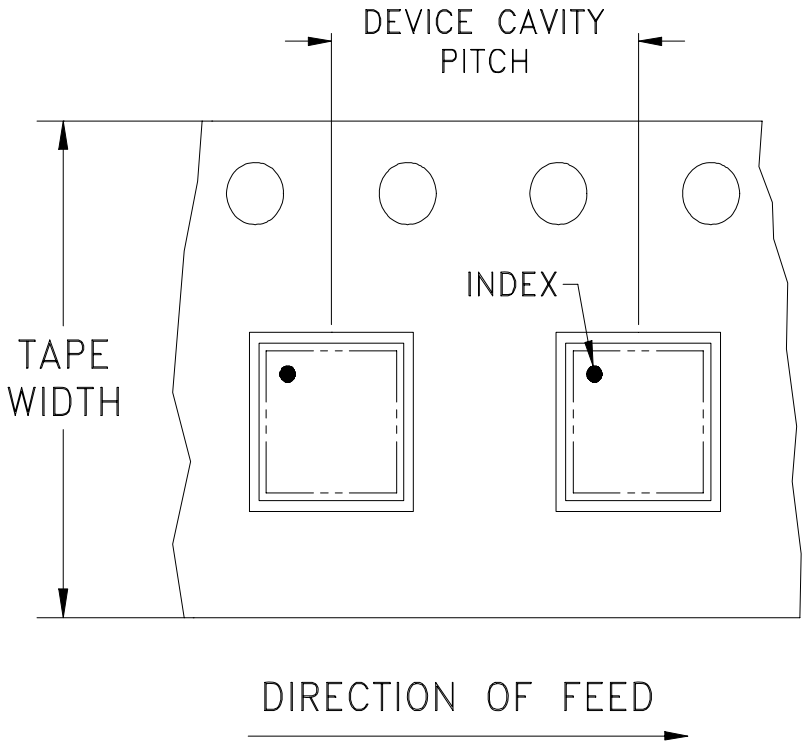
Tape & Reel Packaging TR-F102

DEVICE ORIENTATION IN T&R



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
		13	Standard	1000

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

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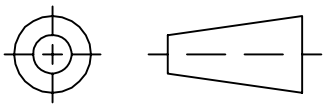
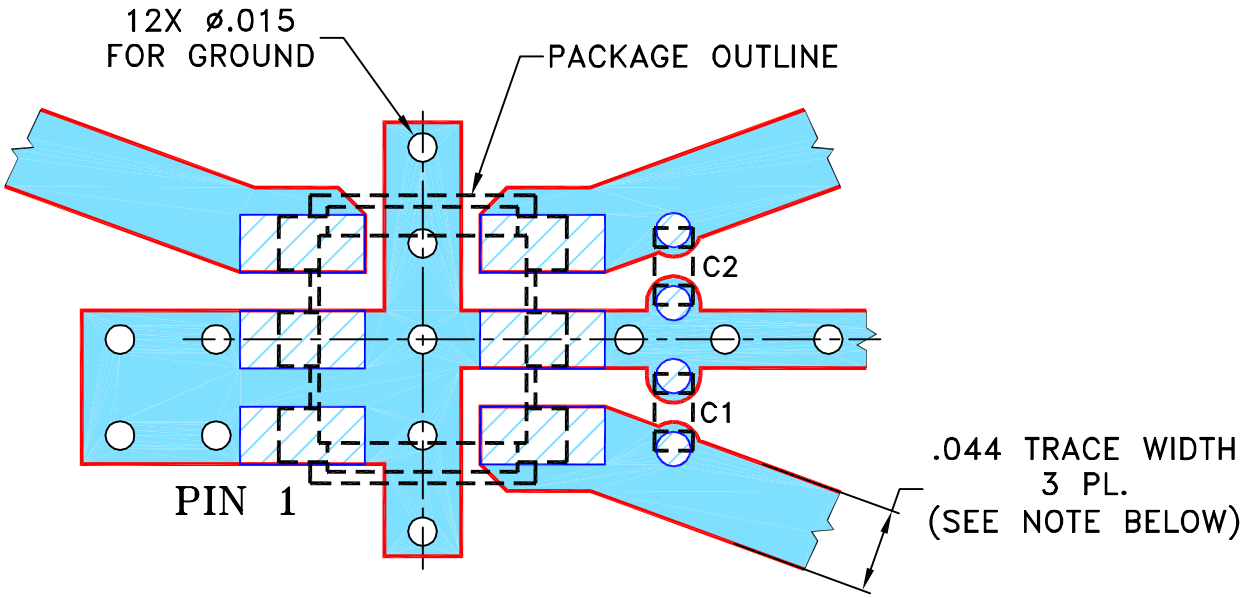
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M138367	NEW RELEASE	08/15/12	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DB1627 CASE STYLE, "06TK02" PIN CODE



COMPONENT	SIZE
C1, C2	0402

NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; 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.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-676+.

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	AV	08/13/12
TOLERANCES ON:	CHECKED	IL	08/15/12
2 PL DECIMALS ±	APPROVED	DJ	08/15/12
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

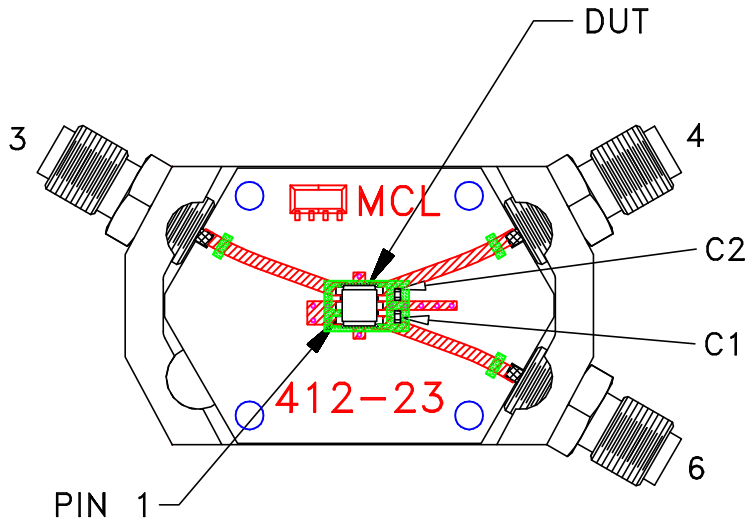
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 06TK02, DB1627, TB-676+

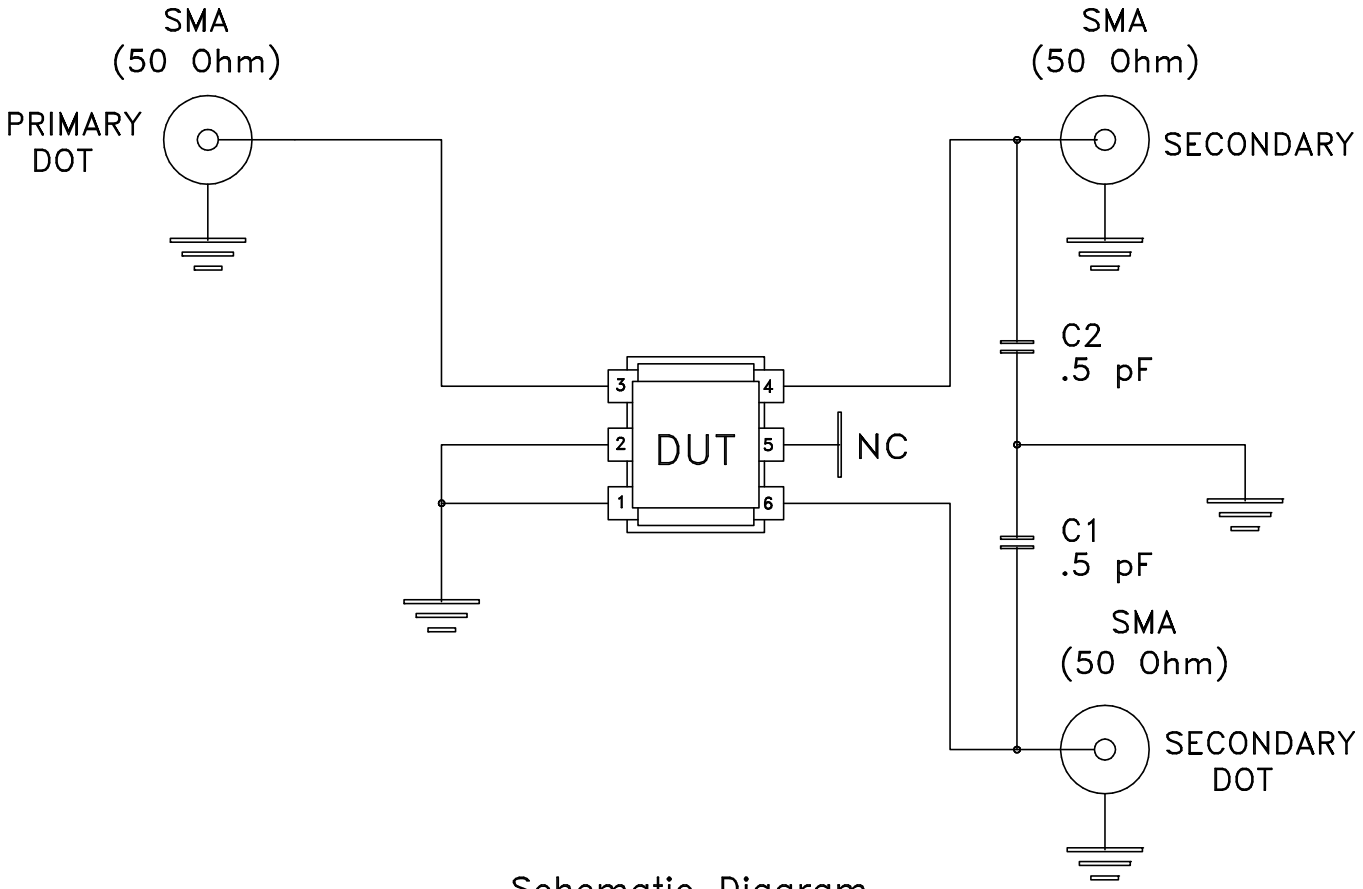
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-380	OR

FILE:	SCALE:	SHEET:
98PL380	10:1	1 OF 1

Evaluation Board and Circuit



TB-676+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.020 inch.

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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

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