



# SURFACE MOUNT Bias Tee

## RCBT-63H+

50Ω Wideband 900 MHz to 6 GHz

### THE BIG DEAL

- Low insertion loss, 0.3 dB typ.
- 2.5A DC current
- Good isolation, 20 dB typ.
- Good return loss, 18 dB typ.
- Miniature surface mount 0.31"x0.25"
- Aqueous washable

### APPLICATIONS

- Biasing amplifiers
- Biasing of laser diodes
- Biasing of active antennas



Generic photo used for illustration purposes only

CASE STYLE: TT1224-2

#### +RoHS Compliant

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

### PRODUCT OVERVIEW

Mini-Circuits' RCBT-63H+ is a surface mount bias tee providing high DC voltage/current handling and low insertion loss for applications over a very wide frequency range from 900 to 6000 MHz. This model is capable of handling up to +30 dBm (1W) RF input power, 50V DC voltage and 2.5A DC current. RCBT-63H+ is enclosed in a small package of 0.31"x 0.25", saving significant space on customers' PCB.

### KEY FEATURES

Feature	Advantages
Wideband, 900 MHz to 6 GHz	Supports a wide range of applications with a single device, including biasing broadband amplifier, laser diodes, active antennas and more.
Low insertion loss, 0.3 dB typ.	Preserves signal strength from input to output and minimizes overall system loss
Excellent return loss, 18 dB typ.	Provides excellent matching for 50Ω systems, with minimal signal reflection.
RF power handling up to 1 W	This model supports applications with a variety of power requirements.
High DC current handling, 2.5A	RCBT-63H+ supports systems/applications with high DC current requirements.



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50Ω Wideband 900 MHz to 6 GHz

### ELECTRICAL SPECIFICATIONS AT 25°C

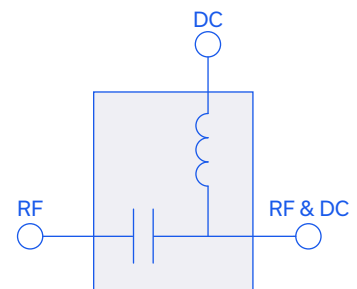
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		900		6000	MHz
Insertion Loss	900-1200	-	0.3	0.6	dB
	1200-5700	-	0.2	0.5	
	5700-6000	-	0.4	0.7	
Isolation	900-4800	20	23	-	dB
	4800-6000	14	17	-	
VSWR	900-1200	-	1.5	1.8	:1
	1200-5700	-	1.3	1.5	
	5700-6000	-	1.4	1.7	

### MAXIMUM RATINGS

Operating Temperature	-40 °C to 85 °C
Storage Temperature	-55 °C to 100 °C
RF Power	30 dBm max.
Voltage at DC port	50 V max.
Input Current	2.5A max.

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

### FUNCTIONAL SCHEMATIC





# SURFACE MOUNT Bias Tee

## RCBT-63H+

Mini-Circuits

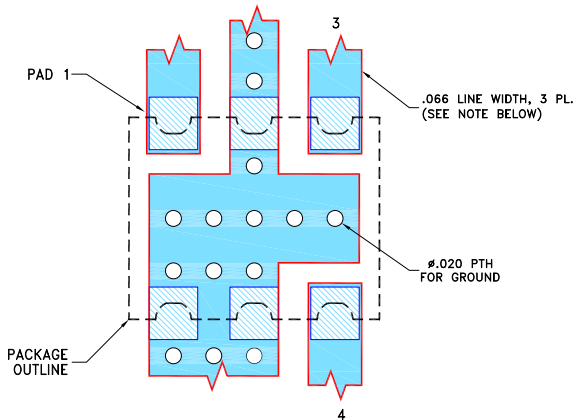
50Ω Wideband 900 MHz to 6 GHz

### PAD CONNECTIONS

RF	4
RF & DC	3
DC	1
NOT USED	2,5,6

PRODUCT MARKING: N/A

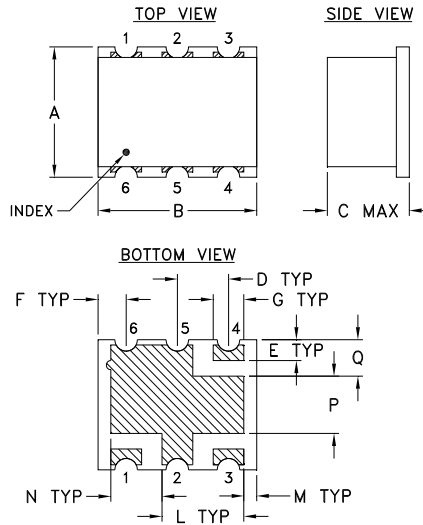
DEMO BOARD MCL P/N: TB-907+  
SUGGESTED PCB LAYOUT (PL-577)



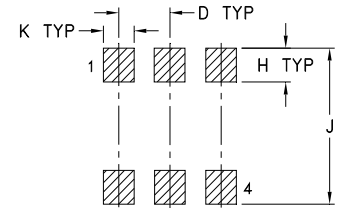
- NOTES:
1. LINE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.030 \pm .002$ ". COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
  2. FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
  3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

### OUTLINE DRAWING



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within .002

### OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	H
.25	.31	.16	.100	.040	.055	.060	.065
6.35	7.87	4.06	2.54	1.02	1.40	1.52	1.65
J	K	L	M	N	P	Q	wt.
.300	.060	.160	.025	.100	.110	.070	grams
7.62	1.52	4.06	0.64	2.54	2.79	1.78	0.16



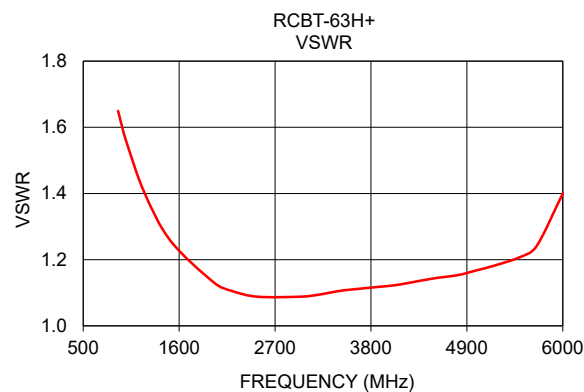
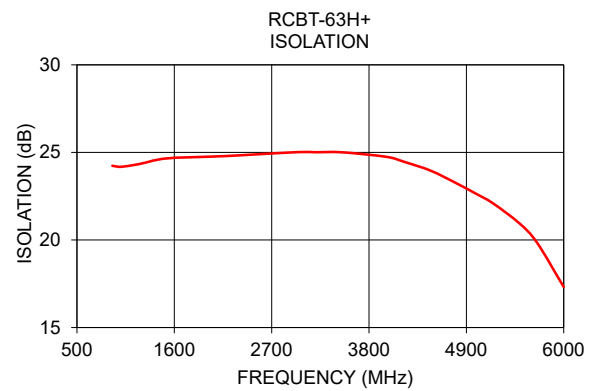
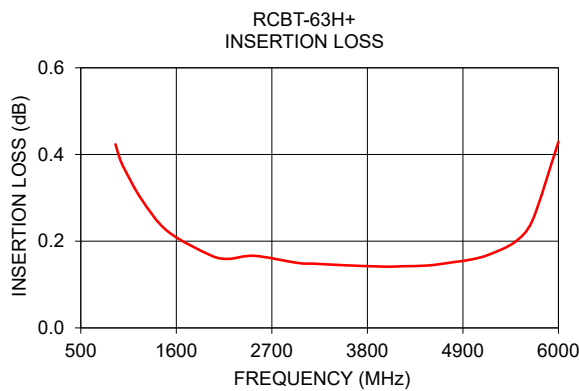
# SURFACE MOUNT Bias Tee

## RCBT-63H+

50Ω Wideband 900 MHz to 6 GHz

### TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB) RF & DC-RF	Isolation (dB) RF	VSWR (:1) RF & DC - DC
900	0.42	24.24	1.65
950	0.39	24.20	1.60
1000	0.37	24.18	1.55
1200	0.30	24.33	1.40
1500	0.22	24.65	1.26
2000	0.17	24.76	1.13
2200	0.16	24.80	1.11
2500	0.17	24.88	1.09
3000	0.15	25.02	1.09
3200	0.15	25.01	1.09
3500	0.14	25.00	1.11
4000	0.14	24.75	1.12
4200	0.14	24.46	1.13
4500	0.14	23.95	1.14
4800	0.15	23.21	1.15
5000	0.16	22.66	1.17
5200	0.17	22.10	1.18
5500	0.20	20.95	1.21
5700	0.25	19.84	1.24
6000	0.43	17.32	1.40



#### NOTES

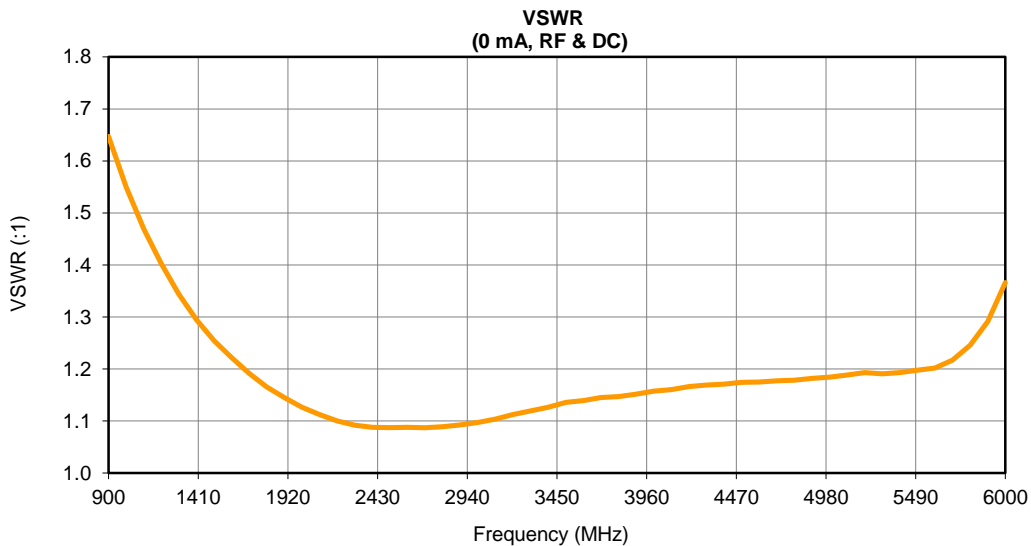
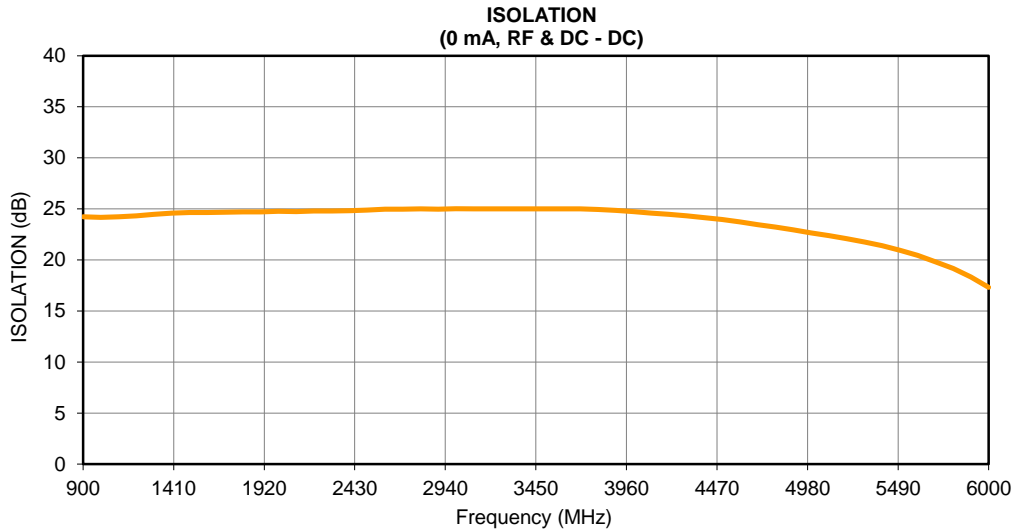
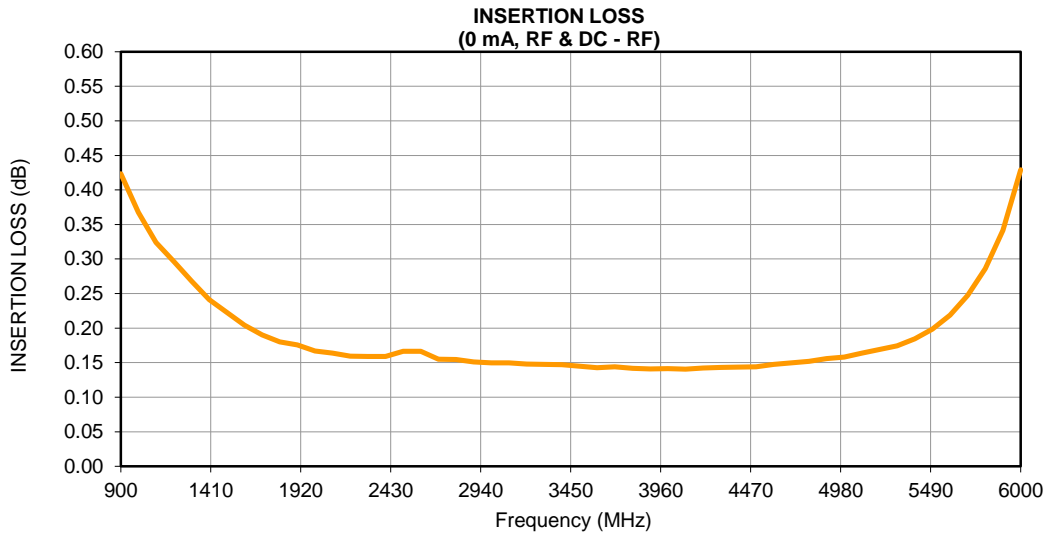
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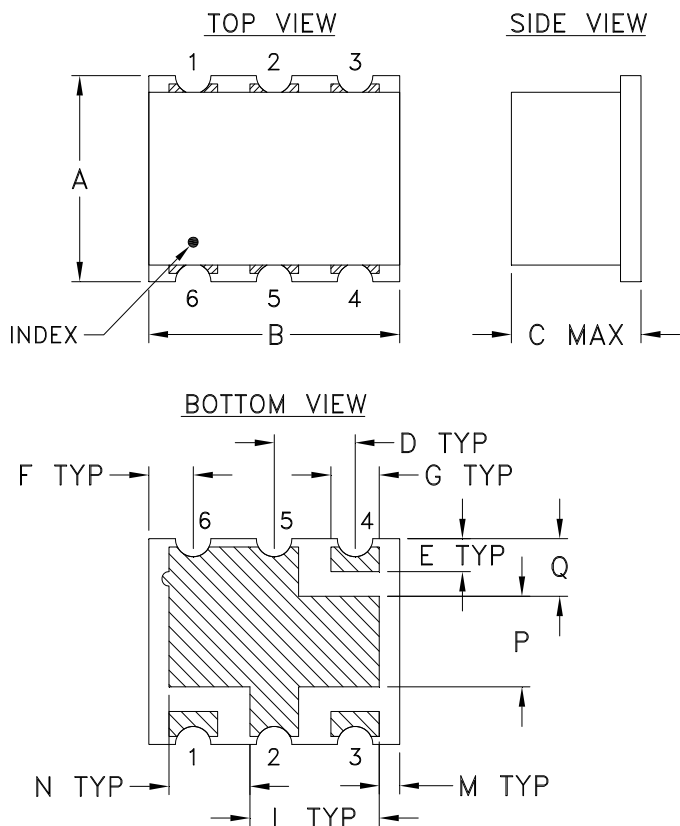
## Typical Performance Data

FREQ	INSERTION LOSS RF & DC-RF 0 mA	ISOLATION RF & DC-DC 0 mA	VSWR RF & DC 0 mA
(MHz)	(dB)	(dB)	(:1)
900	0.42	24.24	1.65
1000	0.37	24.18	1.55
1100	0.32	24.24	1.47
1200	0.30	24.33	1.40
1300	0.27	24.48	1.34
1400	0.24	24.58	1.29
1500	0.22	24.65	1.25
1600	0.20	24.65	1.22
1700	0.19	24.67	1.19
1800	0.18	24.72	1.17
1900	0.18	24.71	1.15
2000	0.17	24.76	1.13
2100	0.16	24.75	1.11
2200	0.16	24.80	1.10
2300	0.16	24.81	1.09
2400	0.16	24.83	1.09
2500	0.17	24.88	1.09
2600	0.17	24.99	1.09
2700	0.16	24.96	1.09
2800	0.15	24.99	1.09
2900	0.15	24.99	1.09
3000	0.15	25.02	1.10
3100	0.15	25.00	1.10
3200	0.15	25.01	1.11
3300	0.15	25.01	1.12
3400	0.15	25.00	1.13
3500	0.14	25.00	1.14
3600	0.14	25.01	1.14
3700	0.14	24.99	1.14
3800	0.14	24.95	1.15
3900	0.14	24.87	1.15
4000	0.14	24.75	1.16
4100	0.14	24.60	1.16
4200	0.14	24.46	1.17
4300	0.14	24.31	1.17
4400	0.14	24.13	1.17
4500	0.14	23.95	1.17
4600	0.15	23.73	1.17
4700	0.15	23.47	1.18
4800	0.15	23.21	1.18
4900	0.16	22.94	1.18
5000	0.16	22.66	1.18
5100	0.16	22.38	1.19
5200	0.17	22.10	1.19
5300	0.17	21.76	1.19
5400	0.18	21.40	1.19
5500	0.20	20.95	1.20
5600	0.22	20.44	1.20
5700	0.25	19.84	1.22
5800	0.29	19.17	1.25
5900	0.34	18.32	1.29
6000	0.43	17.32	1.37

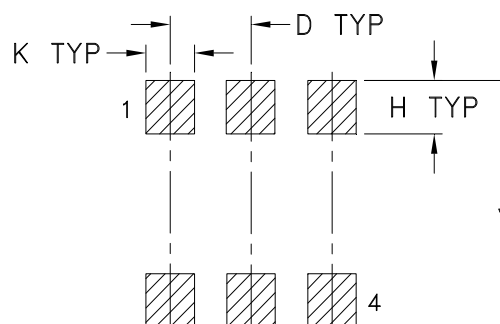
Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	L
TT1224-2	.25 (6.35)	.31 (7.87)	.16 (4.06)	.100 (2.54)	.040 (1.02)	.055 (1.40)	.060 (1.52)	.065 (1.65)	.300 (7.62)	.060 (1.52)	.160 (4.06)

CASE #	M	N	P	Q	WT. GRAM
TT1224-2	.025 (.64)	.100 (2.54)	.110 (2.79)	.070 (1.78)	.16

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

#### Notes:

- Case material: Plastic.
- Termination: 2-10  $\mu$  inch (.05-.25 microns) Gold over 100-300  $\mu$  inch (2.54-7.62 microns) Nickel plate



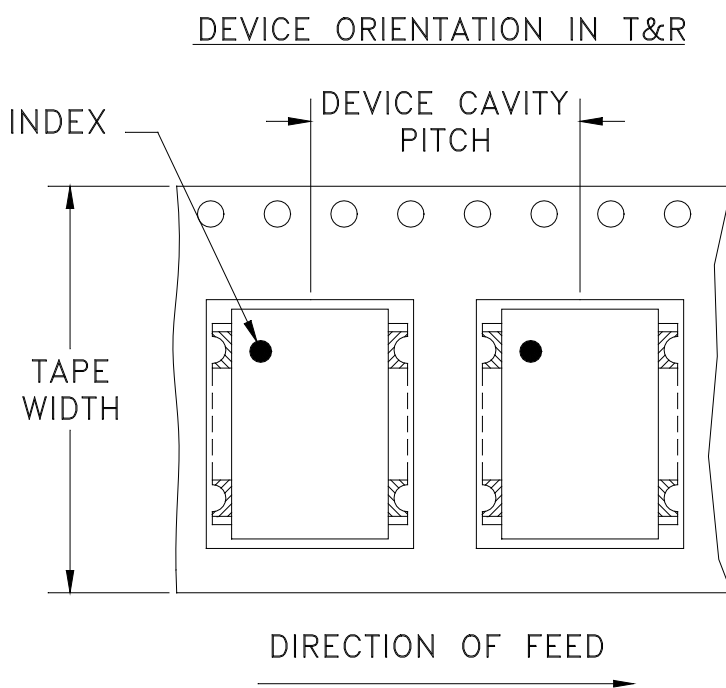
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-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

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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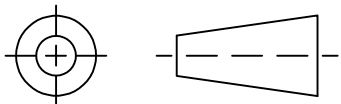
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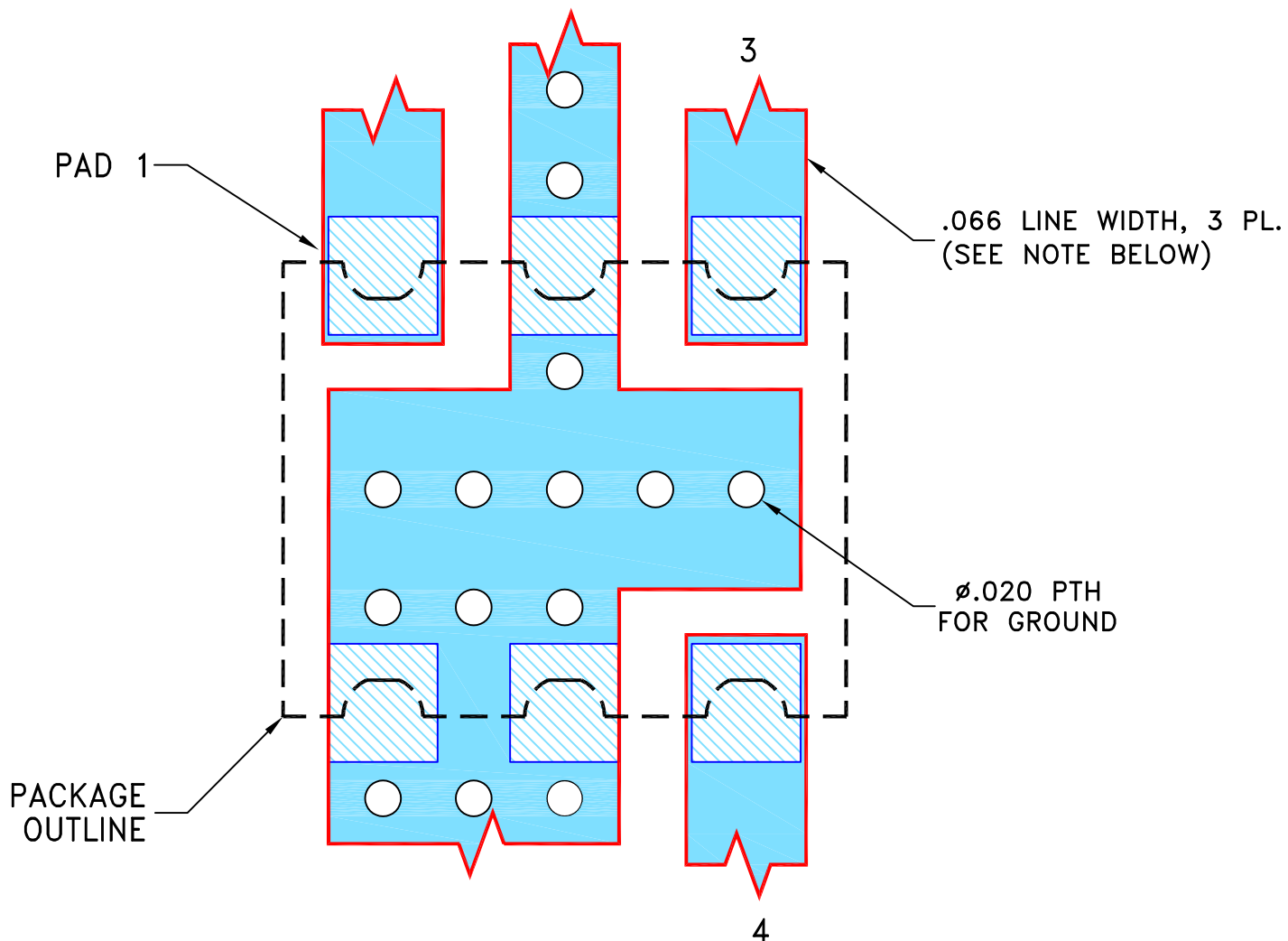
THIRD ANGLE PROJECTION



REVISIONS

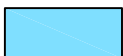
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OR	M166583	NEW RELEASE	03/28/18	ITG	ZL
A	ECO-016514	CORRECTED TYPO	01/19/23	ITG	TN

SUGGESTED MOUNTING CONFIGURATION  
FOR TT1224-2 CASE STYLE, "06BT03" PIN CODE

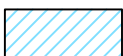


NOTES:

1. LINE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.030 \pm .002$ ".  
COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
3. 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	ITG	03/19/18
TOLERANCES ON:	CHECKED	GF	03/28/18
2 PL DECIMALS ±	APPROVED	ZL	03/28/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL, 06BT03, TT1224-2, TB-907+

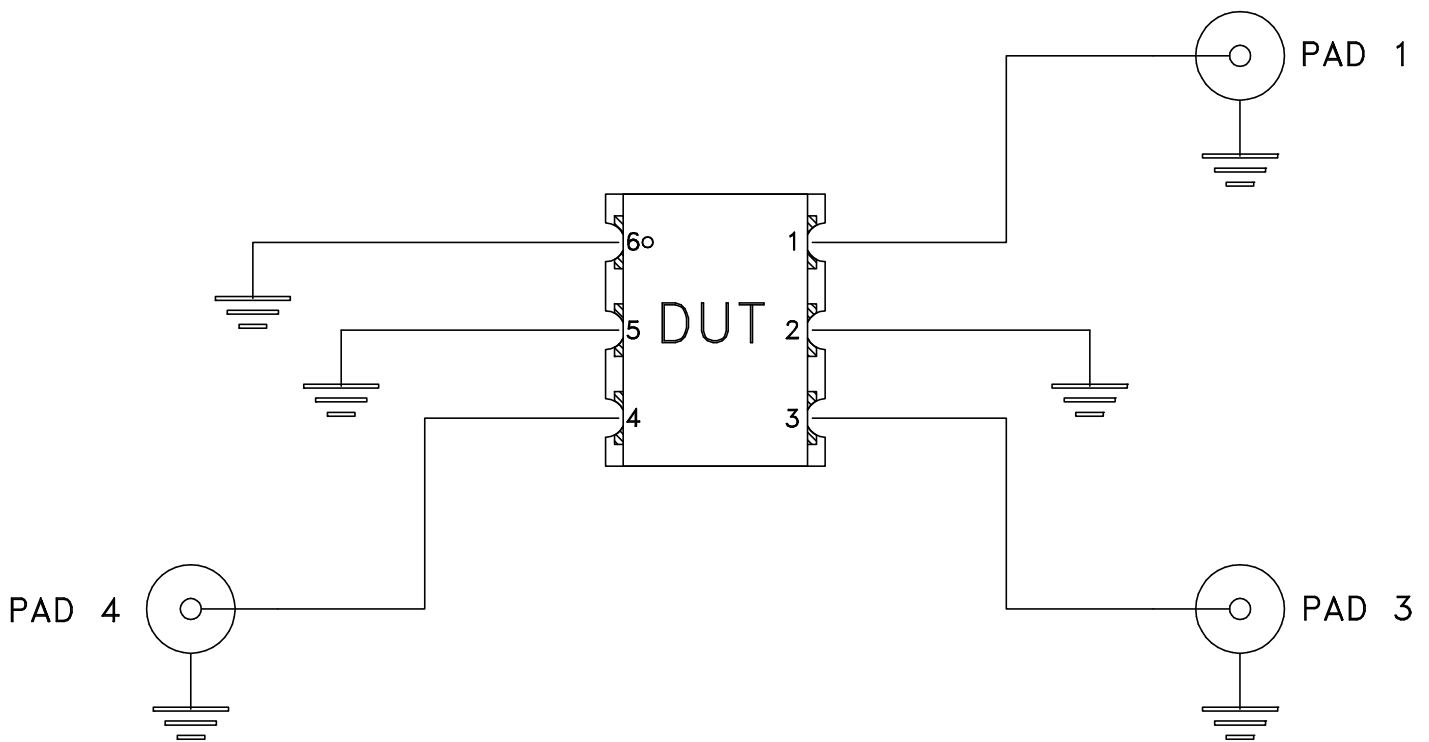
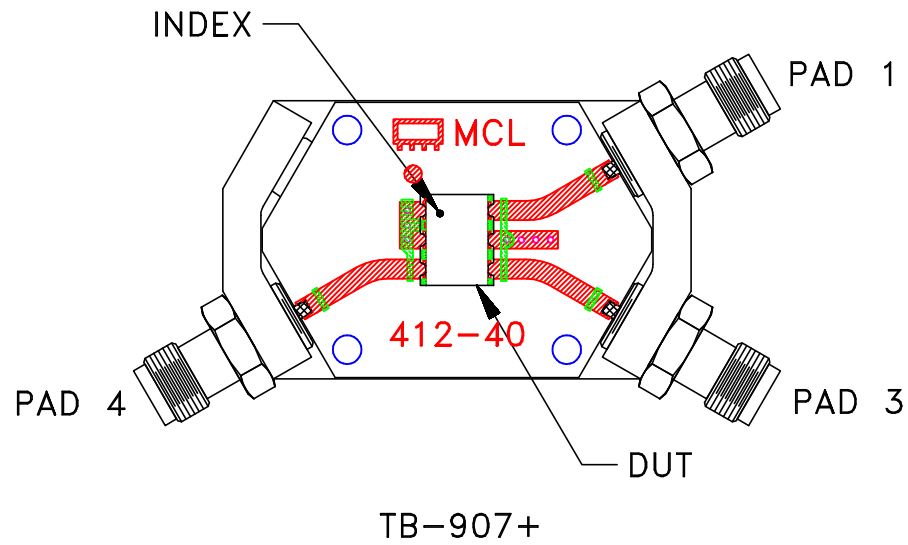
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FILE: 98PL577	SCALE: 10:1	SHEET: 1 OF 1	

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# Evaluation Board and Circuit


For Pad connection refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

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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