

# Engineering Development Model

## Active Mixer

## MACY-ED12692

Level 0 (LO Power 0 dBm)

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



**CASE STYLE : BJ293**

Please click "Back", and then click "Contact Us" for Applications support.

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		Min.	Typ.	Max.	Units
<b>Frequency</b>	<b>LO</b> (fL to fu)	1651		2358	MHz
	<b>RF</b> (fL to fu)	1651		2358	MHz
	<b>IF</b>	247		252	MHz
<b>Conversion Loss</b>	<b>Total Range</b>		7.9		dB
<b>LO-RF Isolation</b>			17		dB
<b>LO-IF Isolation</b>			19		dB
<b>Input IP3</b>			+29		dBm
<b>DC Voltage</b>			5		V
<b>DC Current</b>				100	mA

MAXIMUM RATINGS	
<b>Operating Temperature</b>	-40°C to 85°C
<b>Storage Temperature</b>	-55°C to +100°C

PIN CONNECTIONS	
<b>LO</b>	1
<b>RF</b>	5
<b>IF</b>	3
<b>DC</b>	7
<b>GROUND</b>	2,4,6,8

# Frequency Mixer

# MACY-ED12692

## Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			LO (MHz)	RF (MHz)	IP-3 Input (dBm)
		@LO (dBm)				@LO (dBm)			@LO (dBm)					@LO (dBm)
		-3	0	+3		-3	0	+3	-3	0	+3			0
1518.0	1768.0	9.30	9.00	8.95	1768.0	17.3	17.3	19.0	3.7	5.0	7.5	1768.0	1518.0	22.0
1551.3	1801.3	9.77	9.62	9.67	1801.3	18.6	16.7	17.6	4.8	6.6	9.4	1801.3	1551.3	21.9
1584.5	1834.5	9.46	9.32	9.37	1834.5	21.5	19.3	20.1	5.5	7.4	10.4	1834.5	1584.5	23.8
1617.8	1867.8	8.85	8.68	8.73	1867.8	26.6	24.0	25.7	6.6	8.4	11.8	1867.8	1617.8	25.4
1651.0	1901.0	8.30	8.15	8.20	1901.0	25.5	23.7	24.7	8.4	10.5	14.4	1901.0	1651.0	27.1
1684.3	1934.3	7.90	7.76	7.85	1934.3	20.5	18.9	19.6	10.0	12.3	16.4	1934.3	1684.3	28.1
1717.5	1967.5	7.85	7.74	7.78	1967.5	17.4	15.8	16.2	11.6	13.6	17.2	1967.5	1717.5	30.7
1750.8	2000.8	7.84	7.75	7.76	2000.8	14.9	13.8	14.8	14.3	16.7	20.5	2000.8	1750.8	34.4
1784.0	2034.0	7.83	7.75	7.71	2034.0	12.6	13.0	14.5	17.5	21.9	27.0	2034.0	1784.0	35.1
1817.3	2067.3	7.77	7.69	7.63	2067.3	11.8	12.0	13.4	21.7	27.4	33.4	2067.3	1817.3	33.1
1850.5	2100.5	7.52	7.46	7.43	2100.5	11.2	11.5	12.8	21.9	25.5	29.1	2100.5	1850.5	33.1
1883.8	2133.8	7.60	7.55	7.52	2133.8	10.5	11.5	12.9	19.9	23.2	26.4	2133.8	1883.8	36.0
1917.0	2167.0	8.00	7.95	7.92	2167.0	10.4	11.6	13.0	18.3	21.1	23.9	2167.0	1917.0	37.4
1950.3	2200.3	8.36	8.33	8.33	2200.3	10.6	12.1	13.9	17.5	20.1	22.9	2200.3	1950.3	38.2
1983.5	2233.5	8.57	8.55	8.56	2233.5	11.1	12.8	14.7	17.2	19.6	22.3	2233.5	1983.5	35.9
2016.8	2266.8	8.43	8.43	8.44	2266.8	11.8	14.0	16.4	16.9	19.2	21.8	2266.8	2016.8	34.3
2050.0	2300.0	8.17	8.14	8.15	2300.0	12.7	15.3	18.0	17.1	19.5	22.2	2300.0	2050.0	33.3
2078.0	2328.0	8.07	8.06	8.05	2328.0	13.5	16.2	18.9	17.4	20.0	22.8	2328.0	2078.0	31.5
2106.0	2356.0	8.05	8.09	8.10	2356.0	14.1	17.0	19.8	17.5	20.2	23.3	2356.0	2106.0	29.4
2134.0	2384.0	8.06	8.10	8.12	2384.0	14.5	17.6	20.5	17.4	20.5	23.8	2384.0	2134.0	28.0
2162.0	2412.0	8.02	8.06	8.07	2412.0	15.0	18.1	21.2	17.2	20.4	24.1	2412.0	2162.0	26.1
2190.0	2440.0	7.86	7.86	7.86	2440.0	15.6	19.1	22.7	16.6	19.7	23.4	2440.0	2190.0	24.0
2218.0	2468.0	7.76	7.70	7.66	2468.0	16.3	20.1	24.0	16.0	18.8	22.1	2468.0	2218.0	22.7
2246.0	2496.0	7.76	7.64	7.57	2496.0	16.9	20.9	24.2	15.7	18.3	21.1	2496.0	2246.0	21.8
2274.0	2524.0	7.77	7.64	7.56	2524.0	17.3	21.3	24.2	15.3	17.7	20.2	2524.0	2274.0	21.6
2302.0	2552.0	7.83	7.69	7.60	2552.0	17.5	21.6	24.9	14.9	17.0	19.0	2552.0	2302.0	21.5
2330.0	2580.0	7.91	7.75	7.64	2580.0	18.4	22.8	27.2	14.5	16.3	18.2	2580.0	2330.0	21.7
2358.0	2608.0	8.09	7.94	7.82	2608.0	21.9	27.2	31.7	14.5	16.0	17.7	2608.0	2358.0	22.8
2386.0	2636.0	8.54	8.39	8.28	2636.0	28.0	25.4	24.0	14.7	16.0	17.4	2636.0	2386.0	23.6
2414.0	2664.0	9.01	8.91	8.78	2664.0	21.0	19.1	18.7	15.4	16.4	17.6	2664.0	2414.0	24.9
2442.0	2692.0	9.48	9.35	9.21	2692.0	16.9	16.1	16.5	16.0	16.7	17.7	2692.0	2442.0	25.9
2470.0	2720.0	9.73	9.59	9.46	2720.0	15.5	15.4	16.2	16.0	16.6	17.5	2720.0	2470.0	25.7
2498.0	2748.0	9.69	9.58	9.46	2748.0	15.9	16.0	16.9	16.1	16.5	17.2	2748.0	2498.0	25.0



# Frequency Mixer

# MACY-ED12692

## Typical Performance Data

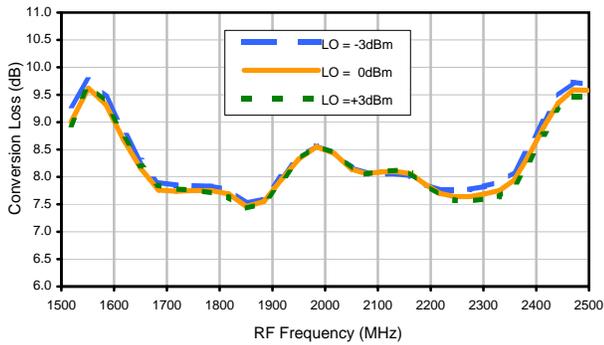
RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)		
	@LO (dBm)			@LO (dBm)				@LO (dBm)		
	-3	0	+3	-3	0	+3		-3	0	+3
1768.0	3.62	3.24	3.16	1.38	1.35	1.28	0.3	2.19	2.41	2.44
1801.3	3.05	2.72	2.63	1.37	1.34	1.27	2.8	1.55	1.80	1.82
1834.5	2.80	2.56	2.44	1.39	1.35	1.27	5.3	1.45	1.66	1.71
1867.8	2.81	2.55	2.43	1.33	1.30	1.23	7.8	1.44	1.58	1.64
1901.0	2.46	2.30	2.20	1.37	1.32	1.24	10.3	1.52	1.72	1.79
1934.3	2.48	2.34	2.28	1.36	1.31	1.27	15.0	1.55	1.75	1.87
1967.5	2.33	2.25	2.21	1.36	1.30	1.30	45.0	1.51	1.65	1.72
2000.8	2.26	2.21	2.19	1.37	1.32	1.35	75.0	1.46	1.60	1.65
2034.0	2.36	2.34	2.32	1.29	1.27	1.32	105.0	1.47	1.57	1.64
2067.3	2.21	2.20	2.20	1.25	1.26	1.34	135.0	1.52	1.60	1.66
2100.5	2.27	2.27	2.27	1.18	1.23	1.33	165.0	1.62	1.68	1.72
2133.8	2.24	2.26	2.26	1.14	1.21	1.30	195.0	1.79	1.83	1.85
2167.0	2.23	2.26	2.26	1.16	1.22	1.30	225.0	1.94	1.96	1.97
2200.3	2.39	2.44	2.45	1.18	1.21	1.27	255.0	2.06	2.07	2.07
2233.5	2.30	2.35	2.36	1.24	1.24	1.26	285.0	2.19	2.19	2.18
2266.8	2.36	2.43	2.45	1.30	1.27	1.27	315.0	2.31	2.31	2.29
2300.0	2.30	2.38	2.43	1.35	1.30	1.27	345.0	2.45	2.44	2.43
2328.0	2.12	2.20	2.25	1.44	1.38	1.33	375.0	2.51	2.52	2.51
2356.0	2.05	2.15	2.22	1.50	1.44	1.37	405.0	2.57	2.58	2.59
2384.0	1.92	2.03	2.12	1.53	1.48	1.40	435.0	2.58	2.60	2.61
2412.0	1.74	1.84	1.93	1.64	1.59	1.48	465.0	2.56	2.59	2.60
2440.0	1.62	1.72	1.82	1.70	1.64	1.54	507.0	2.54	2.57	2.58
2468.0	1.47	1.58	1.68	1.70	1.64	1.55	549.0	2.51	2.52	2.54
2496.0	1.34	1.46	1.57	1.82	1.74	1.63	591.0	2.47	2.47	2.47
2524.0	1.30	1.42	1.54	1.88	1.78	1.66	633.0	2.35	2.34	2.33
2552.0	1.29	1.39	1.49	1.86	1.76	1.64	717.0	2.27	2.22	2.19
2580.0	1.34	1.41	1.48	2.00	1.86	1.69	801.0	2.10	2.08	2.08
2608.0	1.48	1.53	1.58	2.08	1.92	1.71	885.0	2.02	1.96	1.93
2636.0	1.65	1.70	1.74	2.03	1.88	1.70	969.0	1.75	1.69	1.64
2664.0	1.84	1.88	1.92	2.19	2.01	1.78	1053.0	1.61	1.55	1.54
2692.0	2.08	2.12	2.17	2.29	2.10	1.84	1137.0	1.72	1.64	1.62
2720.0	2.27	2.31	2.35	2.20	2.03	1.80	1221.0	1.73	1.68	1.67
2748.0	2.41	2.43	2.45	2.37	2.16	1.90	1305.0	1.94	1.86	1.84

# Frequency Mixer

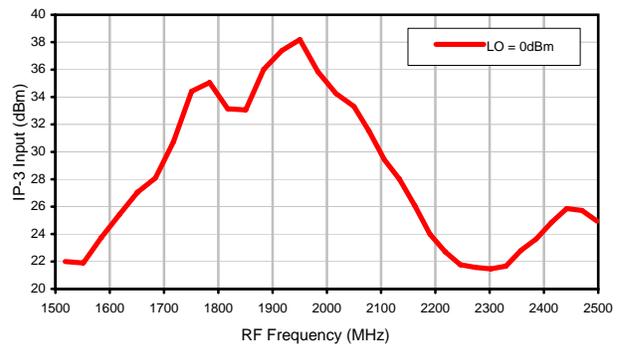
# MACY-ED12692

## Typical Performance Curves

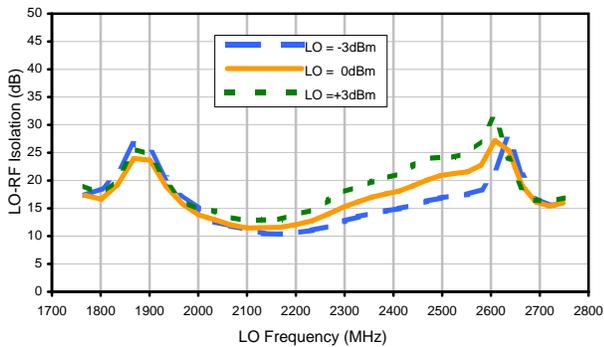
**Conversion Loss**



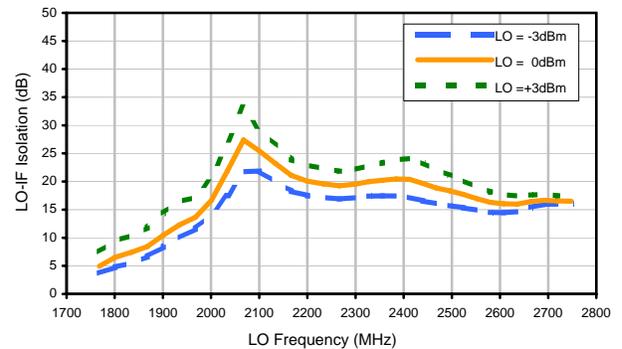
**IP-3 Input**



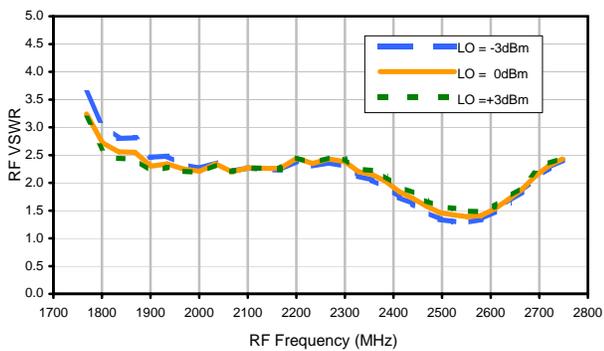
**LO-RF Isolation**



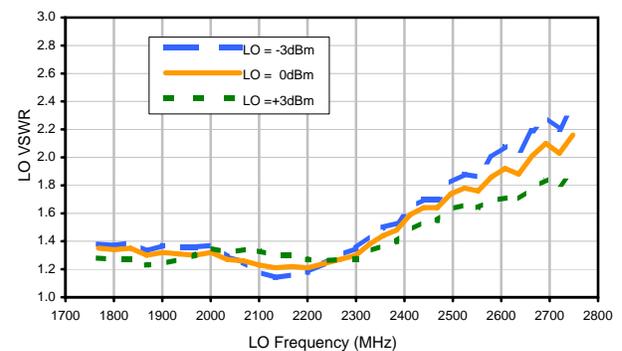
**LO-IF Isolation**



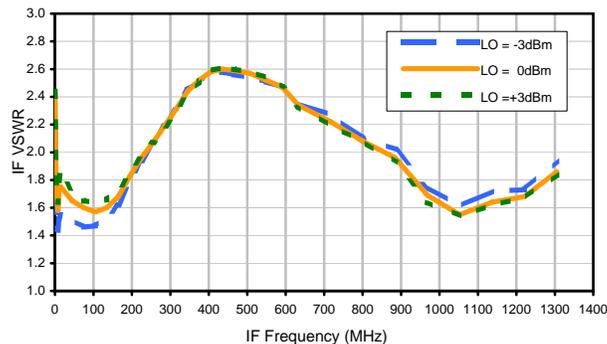
**RF VSWR**



**LO VSWR**

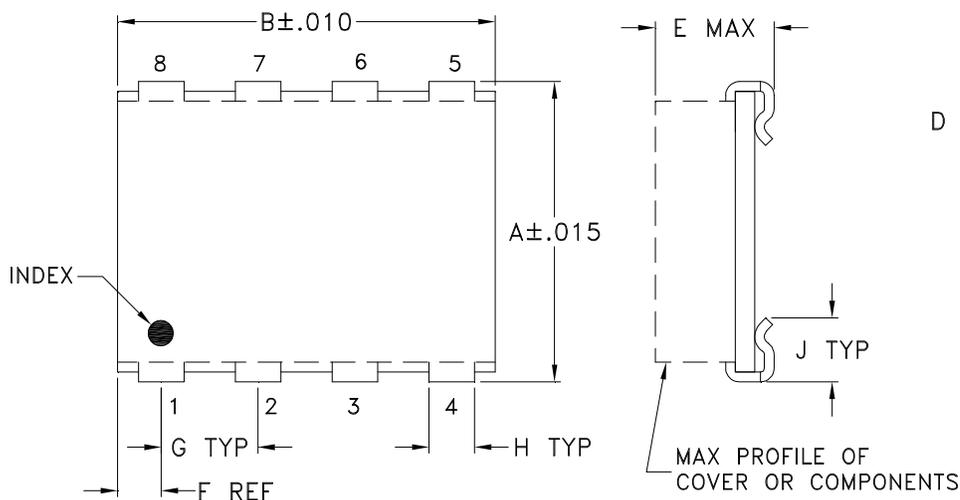


**IF VSWR**

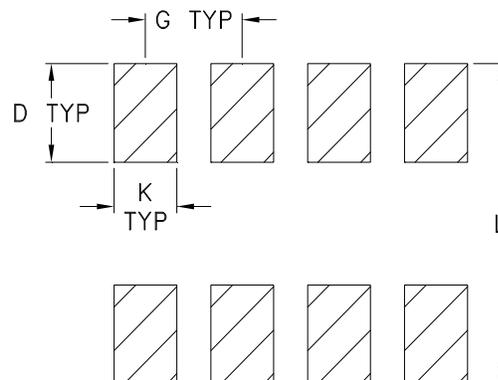


## Outline Dimensions

BJ293  
BJ398



## PCB Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS
BJ293	.395 (10.03)	.500 (12.70)	-- --	.100 (2.54)	.230 (5.84)	.100 (2.54)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.425 (10.80)	.80
BJ398	.305 (7.75)	.390 (9.91)	-- --	.100 (2.54)	.105 (2.67)	.045 (1.14)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.325 (8.26)	.20

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

### Notes:

- Case material: Plastic.
- Base material: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

**Mini-Circuits®**

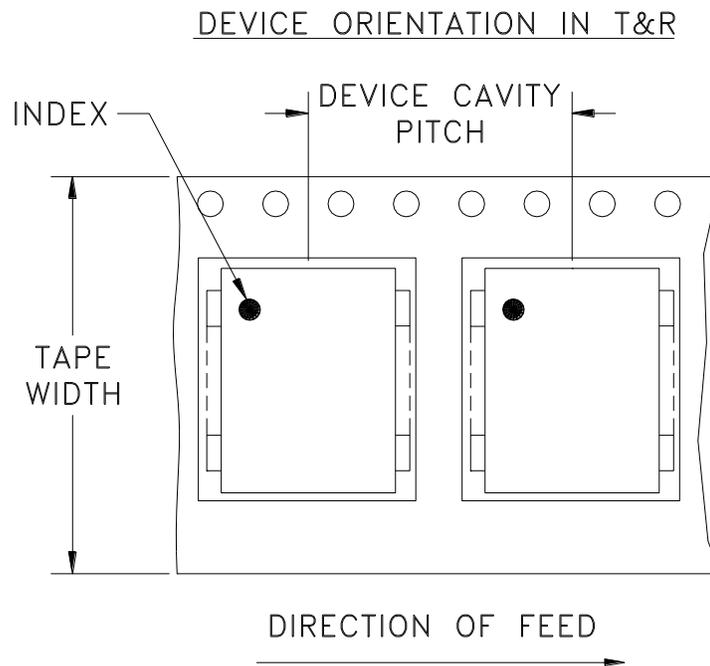
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

# Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100
		13	200,500

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)

Note: Please consult individual model data sheet to determine device per reel availability.



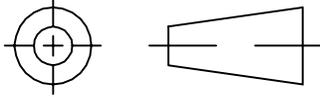
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

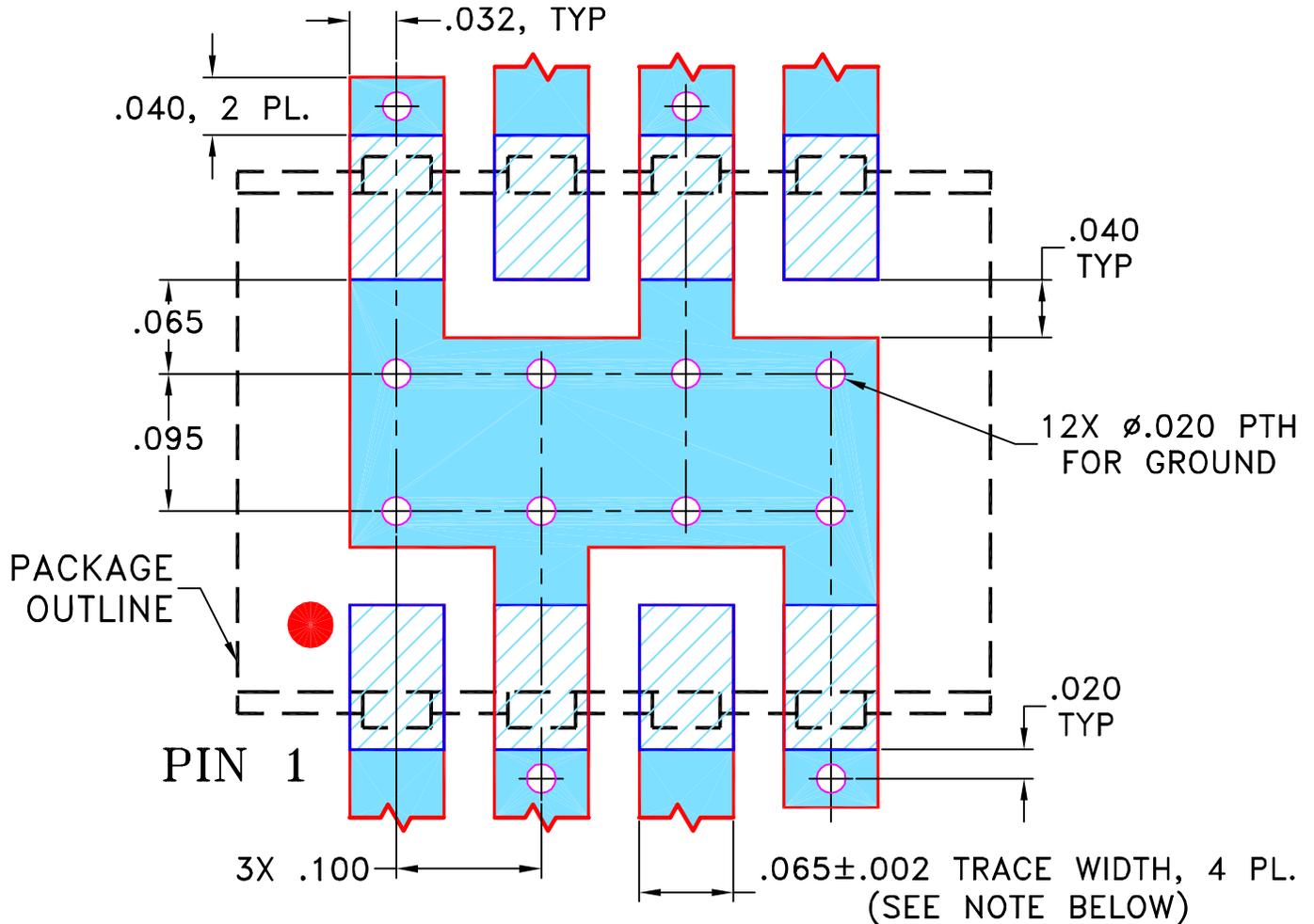
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M109132	NEW RELEASE	01/29/07	AV	DJ

SUGGESTED MOUNTING CONFIGURATION  
FOR BJ937-1 CASE STYLE, "nv" PIN CONNECTION.



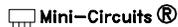
- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 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 AV	01/03/07
TOLERANCES ON:	CHECKED IL	01/29/07
2 PL DECIMALS ±	APPROVED DJ	01/29/07
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

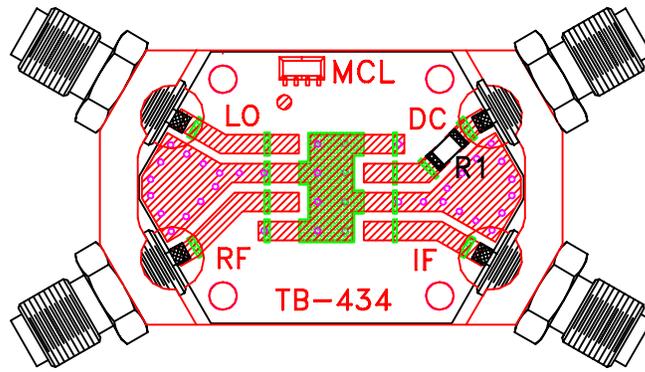
 **Mini-Circuits®** 13 Neptune Avenue  
 Brooklyn NY 11235

PL, nv, BJ937-1, MAX, TB-434+

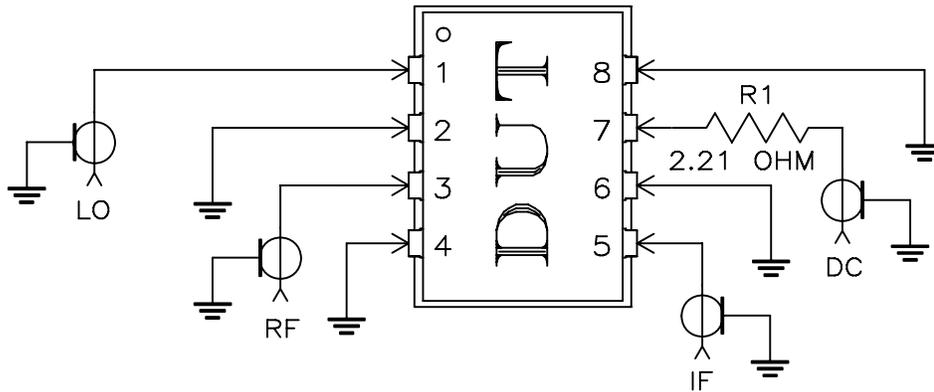
 Mini-Circuits®  
 THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-263	OR
FILE:	98PL263	SCALE: 8:1	SHEET: 1 OF 1

# Evaluation Board and Circuit



TB-434+



Schematic Diagram

## Notes:

1. 50 Ohm 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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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
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
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
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