NON-CATALOG

Surface Mount

Voltage Controlled Oscillator

JTOS-1550+

Linear Tuning 1150 to 1550 MHz

CASE STYLE: BK377

Features
- linear tuning characteristics, 20-45 MHz/V typ.
- low phase noise, -142 dBc/Hz at 1 MHz offset
- aqueous washable

Applications
- GPS
- wide frequency synthesizers
- agile communication systems

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

Electrical Specifications

FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNING VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB at offset frequencies: Typ.				PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MODULATION BANDWIDTH (MHz)	DC OPERATING POWER	
Min.	Max.	Typ.	Min.	Max.	1 kHz	10 kHz	100 kHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.	Vcc (volts)	Current (mA) Max.
1150	1550	+9.0	0.5	18	-72	-100	-122	-142	14	1.2	20-45	-18	—	100	12	32

Pin Connections

RF OUT	13
VCC	2
V-TUNE	5
GROUND	1,3,4,6,7,8,9,10,11,12,14

Maximum Ratings

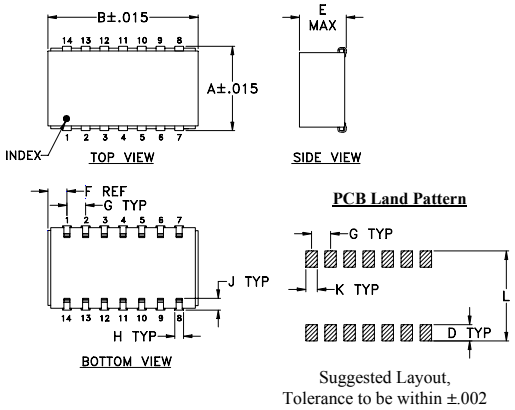
Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
Absolute Max. Supply Voltage (Vcc)	13V
Absolute Max. Tuning Voltage (Vtune)	20V
All specifications	50 ohm system

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

Tape & Reel: F107
7" Reels with 10, 20, 50, 100 devices
13" Reels with 200 devices

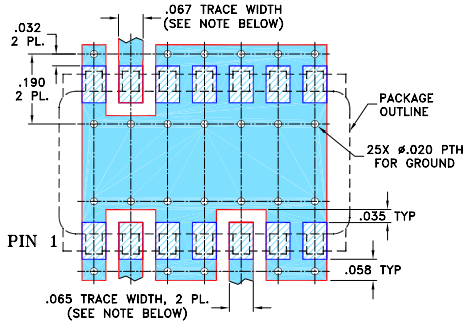
Environmental Ratings: ENV65

Outline Drawing



Suggested Layout,
Tolerance to be within ±.002

Demo Board MCL P/N: TB-04
Suggested PCB Layout (PL-005)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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 Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	wt
.505	.800	--	.100	.250	.100	.100	.047	.065	.065	.525	grams
12.83	20.32	--	2.54	6.35	2.54	2.54	1.19	1.65	1.65	13.34	3.0

Notes
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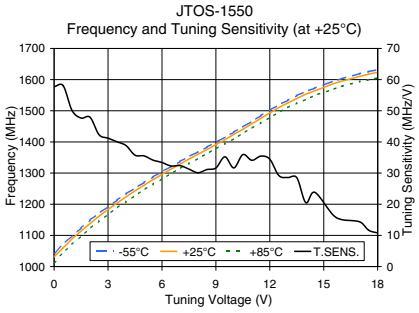
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty 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

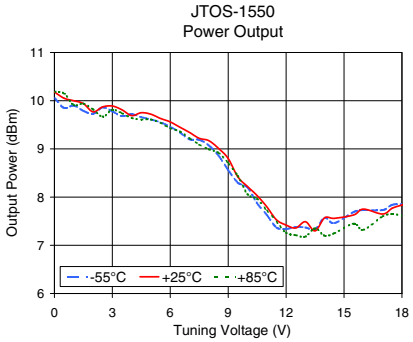
NON-CATALOG

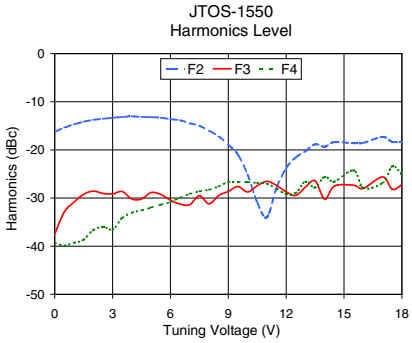
Performance Data & Curves

JTOS-1550+

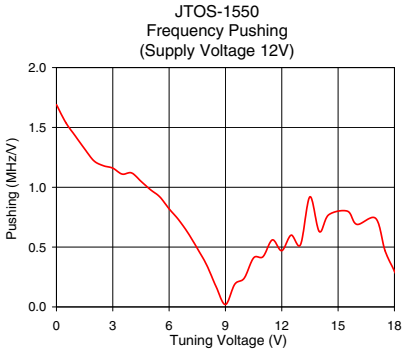


V TUNE	TUNING SENS. (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)		
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C
0.00	57.73	1042.3	1031.2	1012.8	10.06	10.18	10.19
0.50	58.05	1071.5	1060.1	1044.2	9.85	10.05	10.15
1.00	50.05	1099.0	1089.1	1071.7	9.90	10.00	9.91
2.00	47.90	1149.3	1138.0	1122.1	9.73	9.77	9.82
2.50	42.31	1171.3	1161.9	1146.0	9.86	9.87	9.67
4.00	38.84	1233.4	1223.7	1208.5	9.72	9.69	9.64
5.00	35.52	1269.9	1261.0	1246.4	9.61	9.72	9.61
6.00	33.40	1304.3	1295.8	1281.4	9.46	9.56	9.43
7.50	31.30	1353.0	1344.9	1330.7	9.19	9.22	9.09
8.00	30.12	1368.1	1360.5	1346.9	9.07	9.17	8.99
9.00	31.63	1398.8	1391.2	1377.8	8.56	8.80	8.70
10.00	31.66	1431.7	1424.6	1410.4	8.20	8.22	8.06
11.00	34.11	1466.3	1458.4	1443.8	7.63	7.80	7.72
12.00	34.46	1501.6	1493.2	1478.2	7.34	7.42	7.26
13.00	28.56	1533.4	1525.0	1510.3	7.37	7.49	7.18
13.50	28.55	1548.8	1539.3	1524.4	7.33	7.30	7.35
14.00	20.53	1561.7	1553.6	1536.3	7.57	7.57	7.20
16.00	15.07	1602.8	1594.7	1578.3	7.73	7.75	7.32
17.00	14.35	1619.1	1610.4	1593.9	7.73	7.65	7.60
18.00	10.77	1631.5	1623.0	1605.4	7.86	7.84	7.62





V TUNE	HARMONICS (dBc)			FREQ. PUSHING (MHz/V)
	F2	F3	F4	
0.00	-16.2	-37.5	-39.4	1.69
0.50	-15.4	-32.9	-39.9	1.54
1.00	-14.7	-30.9	-39.3	1.43
2.00	-13.8	-28.6	-36.7	1.22
2.50	-13.6	-29.0	-36.0	1.18
4.00	-13.0	-30.2	-33.0	1.12
5.00	-13.2	-28.9	-32.0	0.98
6.00	-13.6	-30.4	-30.8	0.82
7.50	-15.0	-29.5	-28.6	0.49
8.00	-16.0	-31.2	-28.3	0.35
9.00	-18.9	-28.6	-26.7	0.02
10.00	-25.1	-28.7	-26.7	0.24
11.00	-34.0	-26.5	-27.0	0.42
12.00	-23.8	-28.7	-29.2	0.47
13.00	-20.3	-27.7	-26.6	0.52
13.50	-18.8	-26.4	-27.8	0.92
14.00	-19.3	-30.2	-25.6	0.63
16.00	-18.5	-28.0	-27.9	0.69
17.00	-17.3	-25.6	-26.9	0.74
18.00	-18.3	-27.3	-25.1	0.30



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Voltage Controlled Oscillator JTOS-1550+

Typical Performance Data

V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			HARMONICS (dBc)			FREQ. PUSH (MHz/V)
		-55ºC	+25ºC	+85ºC	-55ºC	+25ºC	+85ºC	F2	F3	F4	
0.0	57.73	1042.28	1031.24	1012.82	10.06	10.18	10.19	-16.24	-37.46	-39.35	1.69
0.5	58.05	1071.53	1060.11	1044.20	9.85	10.05	10.15	-15.37	-32.88	-39.86	1.54
1.0	50.05	1098.98	1089.13	1071.72	9.90	10.00	9.91	-14.71	-30.86	-39.31	1.43
1.5	47.65	1123.89	1114.15	1097.92	9.79	9.94	9.94	-14.14	-29.22	-38.64	1.32
2.0	47.90	1149.26	1137.98	1122.13	9.73	9.77	9.82	-13.76	-28.57	-36.66	1.22
2.5	42.31	1171.33	1161.93	1146.05	9.86	9.87	9.67	-13.55	-29.04	-35.96	1.18
3.0	41.22	1192.51	1183.09	1167.77	9.78	9.89	9.81	-13.33	-29.14	-36.51	1.16
3.5	40.02	1213.29	1203.70	1188.34	9.68	9.81	9.74	-13.15	-28.66	-34.14	1.11
4.0	38.84	1233.37	1223.71	1208.46	9.72	9.69	9.64	-13.03	-30.20	-33.04	1.12
4.5	35.75	1251.87	1243.13	1228.03	9.66	9.75	9.61	-13.13	-30.20	-32.55	1.05
5.0	35.52	1269.85	1261.00	1246.43	9.61	9.72	9.61	-13.19	-28.86	-31.97	0.98
5.5	34.16	1287.45	1278.76	1263.91	9.55	9.63	9.54	-13.31	-29.25	-31.37	0.92
6.0	33.40	1304.35	1295.84	1281.39	9.46	9.56	9.43	-13.62	-30.44	-30.84	0.82
6.5	32.29	1320.89	1312.54	1298.13	9.34	9.45	9.36	-13.83	-31.26	-29.94	0.73
7.0	32.40	1337.18	1328.69	1314.60	9.20	9.34	9.22	-14.47	-31.37	-29.14	0.62
7.5	31.30	1352.98	1344.89	1330.75	9.19	9.22	9.09	-14.98	-29.51	-28.63	0.49
8.0	30.12	1368.11	1360.53	1346.90	9.07	9.17	8.99	-16.02	-31.20	-28.27	0.35
8.5	31.12	1383.23	1375.60	1362.43	8.86	9.01	8.92	-17.19	-29.49	-27.59	0.17
9.0	31.63	1398.82	1391.16	1377.76	8.56	8.80	8.70	-18.91	-28.62	-26.68	0.02
9.5	35.22	1415.17	1406.97	1394.00	8.30	8.42	8.44	-21.00	-27.62	-26.68	0.19
10.0	31.66	1431.67	1424.58	1410.41	8.20	8.22	8.06	-25.10	-28.73	-26.68	0.24
10.5	35.94	1448.09	1440.41	1427.89	7.87	8.03	7.96	-30.89	-27.46	-26.85	0.41
11.0	34.11	1466.25	1458.38	1443.84	7.63	7.80	7.72	-34.02	-26.53	-27.02	0.42
11.5	35.45	1484.22	1475.43	1461.48	7.37	7.53	7.49	-27.86	-27.38	-28.04	0.56
12.0	34.46	1501.62	1493.16	1478.22	7.34	7.42	7.26	-23.78	-28.69	-29.16	0.47
12.5	29.23	1519.12	1510.39	1494.72	7.38	7.36	7.21	-21.56	-29.45	-28.93	0.60
13.0	28.56	1533.41	1525.00	1510.27	7.37	7.49	7.18	-20.29	-27.73	-26.58	0.52
13.5	28.55	1548.75	1539.28	1524.36	7.33	7.30	7.35	-18.83	-26.42	-27.82	0.92
14.0	20.53	1561.73	1553.56	1536.26	7.57	7.57	7.20	-19.31	-30.24	-25.60	0.63
14.5	23.83	1572.42	1563.82	1549.39	7.46	7.56	7.25	-18.36	-27.51	-26.58	0.77
15.5	16.68	1594.82	1586.37	1568.59	7.69	7.63	7.45	-18.62	-27.34	-24.25	0.80
16.0	15.07	1602.77	1594.70	1578.30	7.73	7.75	7.32	-18.53	-28.00	-27.90	0.69
17.0	14.35	1619.09	1610.37	1593.92	7.73	7.65	7.60	-17.30	-25.62	-26.85	0.74
17.5	11.65	1625.89	1617.55	1599.93	7.84	7.77	7.65	-18.32	-28.17	-23.43	0.47
18.5	9.89	1637.17	1628.52	1610.80	7.87	7.90	7.58	-18.32	-26.36	-26.73	0.13
19.0	9.22	1642.54	1633.46	1615.86	7.87	7.90	7.62	-18.02	-26.10	-24.11	0.06
20.0	6.70	1651.02	1642.07	1623.79	7.96	7.93	7.72	-18.68	-27.90	-26.63	0.46
20.5	5.89	1654.37	1645.43	1626.99	7.99	7.97	7.74	-18.84	-27.94	-27.81	0.59
21.5	4.81	1660.08	1651.02	1632.51	7.99	8.04	7.73	-18.29	-27.11	-24.66	0.81
22.0	4.81	1662.64	1653.42	1634.98	7.96	8.02	7.71	-17.81	-26.78	-23.95	0.90

FREQ OFFSET (KHz)	PHASE NOISE (dBc/Hz)
1	-73
10	-102
100	-125
1000	-146

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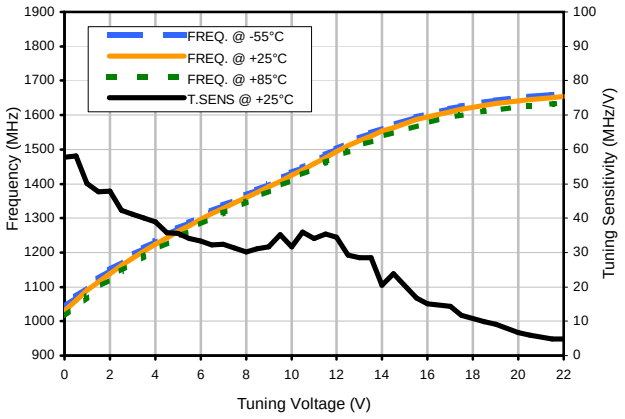
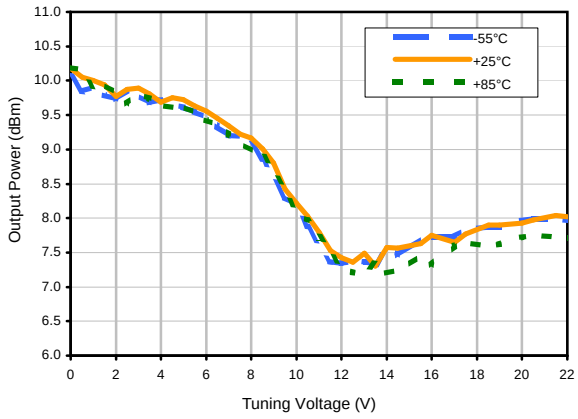
Voltage Controlled Oscillator JTOS-1550+

Typical Performance Data

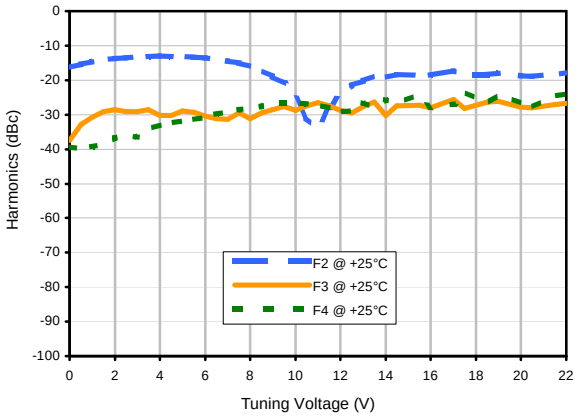
Frequency and Tuning Sensitivity



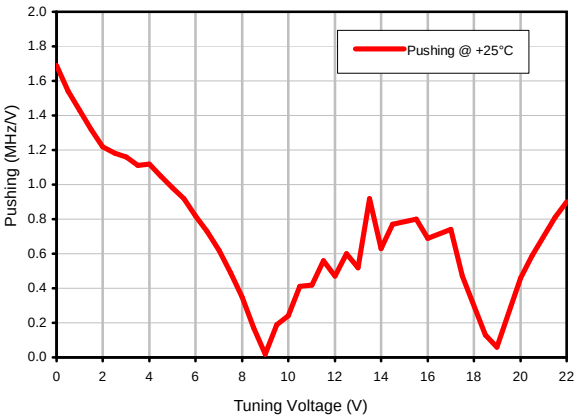
Power Output



Harmonics Level



Frequency Pushing



Phase Noise

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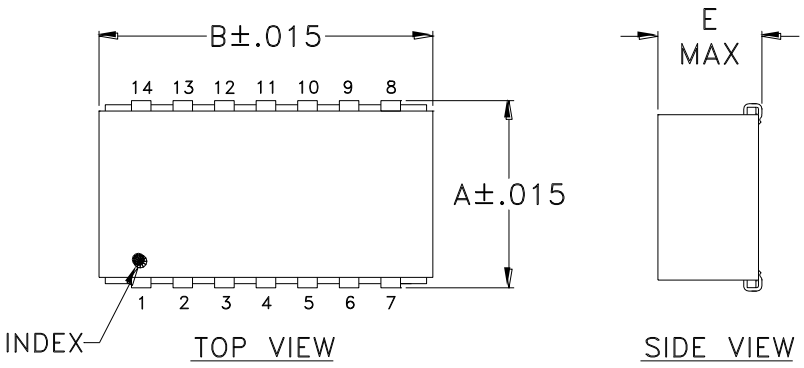
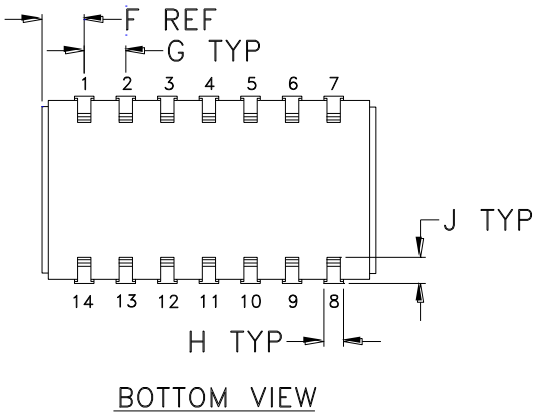
Case Style BK

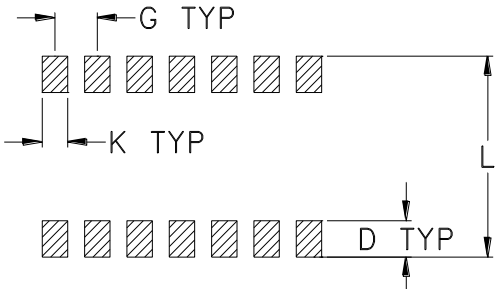
BK377

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAM
BK377	.505 (12.83)	.800 (20.32)	-- --	.100 (2.54)	.250 (6.35)	.100 (2.54)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.525 (13.34)	2.0 MAX.

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

Notes:

1. Case material: Copper Nickel alloy.
2. Base material: Printed wiring laminate.
3. 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.

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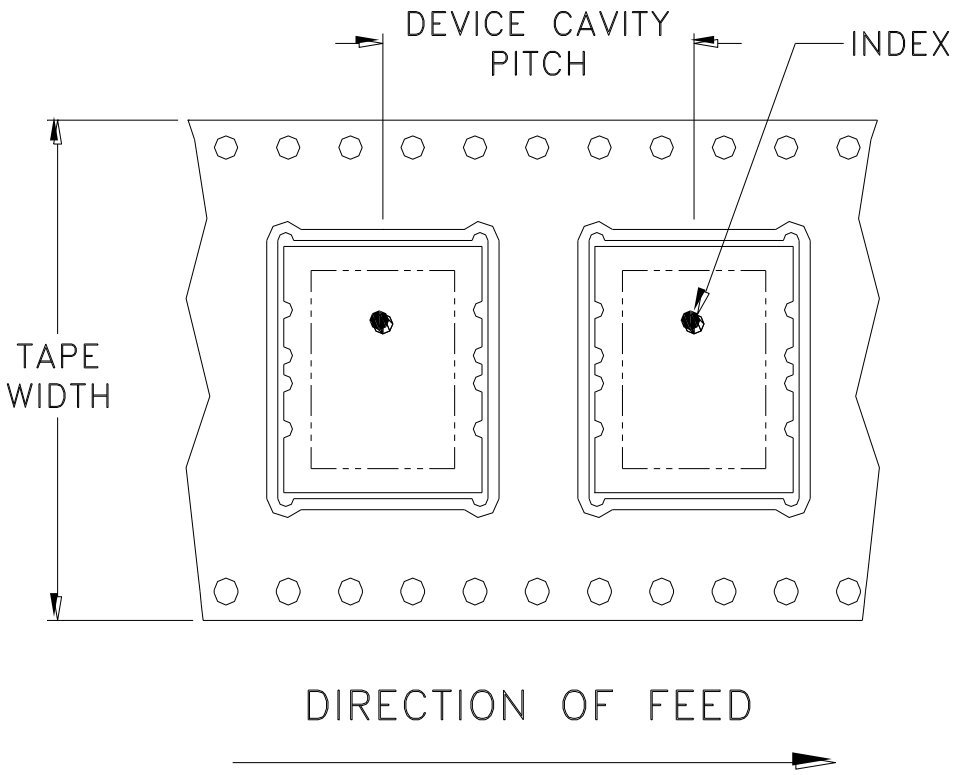
Tape & Reel Packaging TR-F107

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
32	20	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200

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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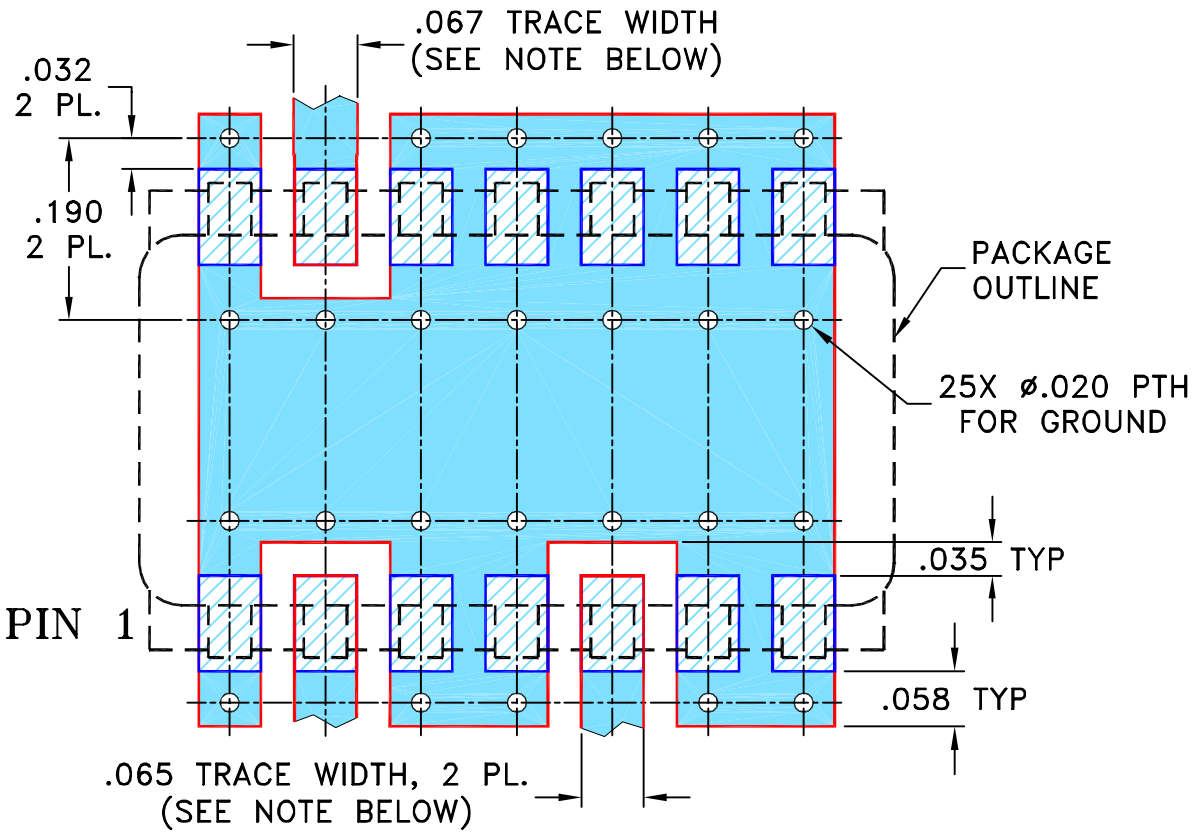
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
B	M76077	UPDATED DRAWING	04/01	GF	MM
C	M82575	UPDATED DRAWING	08/08/02	IL	MM
D	M102713	UPDATED DIMENSIONS & NOTES	01/17/06	MMG	IL
E	M115059	CORRECTED NOTE 2	12/18/07	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR BK377 CASE STYLE, "jc" PIN CONNECTION



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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	FB	05/20/00
TOLERANCES ON:	CHECKED	MM	05/24/00
2 PL DECIMALS ±	APPROVED	DB	05/24/00
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

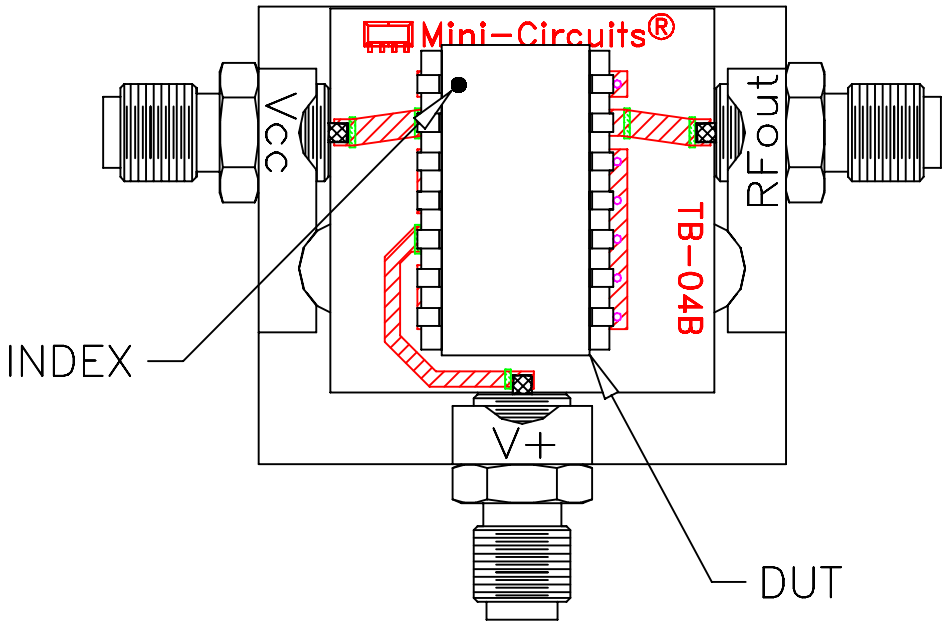
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, jc, BK377, JTOS, TB-04

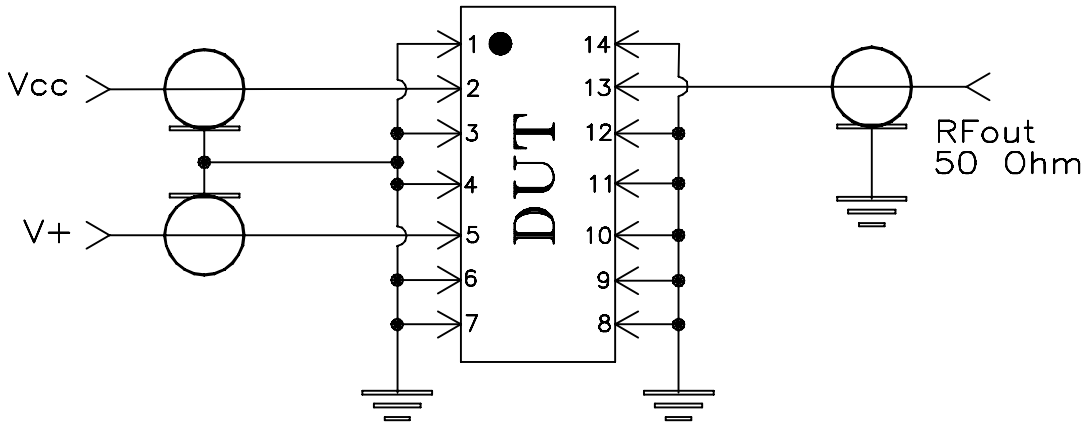
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-005	E

FILE:	SCALE:	SHEET:
98PL005	5:1	1 OF 1

Evaluation Board and Circuit



TB-04



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV65

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	-55° 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 Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
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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