Non-Catalog Model

Frequency Mixer LRMS-3

Level 7 (LO Power + 7 dBm)

Important Note

This is a non-catalog model and can be manufactured on specific request. Pricing and delivery information can be supplied upon request.

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

CASE STYLE : QQQ130

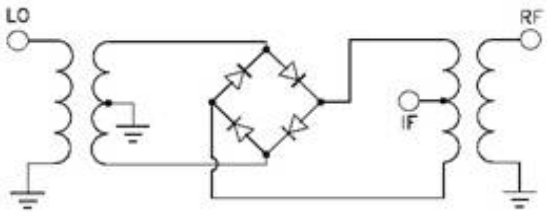
ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency	**LO** (f_L to f_U)	.04		400	MHz
	RF (f_L to f_U)	.04		400	MHz
	IF	DC		400	MHz
Conversion Loss	**mid band**		4.95	7	dB
	Total Range		5.35	8	dB
LO-RF Isolation	**Low Range**	50	60		dB
	Mid Range	35	54		dB
	Upper Range	25	41		dB
LO-IF Isolation	**Low Range**	40	48		dB
	Mid Range	30	40		dB
	Upper Range	15	26		dB

Note: Low Range = [f_L to $10f_L$] Mid Range = [$10f_L$ to $f_U/2$] Upper Range = [$f_U/2$ to f_U]
mid band = [$2f_L$ to $f_U/2$]

MAXIMUM RATINGS	
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C

PIN CONNECTIONS	
LO	1
RF	4
IF	5
GROUND	2,3,6

Electrical Schematics



Frequency Mixer LRMS-3

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB) @LO (dBm)		
		+4	+7	+10
0.1	30.0	6.26	5.80	5.82
6.4	36.4	4.93	4.73	4.64
10.0	40.0	5.00	3.99	4.24
24.8	54.8	4.92	4.74	4.71
39.5	69.5	5.36	4.93	4.65
54.3	84.3	5.04	4.96	4.74
69.0	99.0	5.33	4.74	4.86
83.8	113.8	5.10	4.79	4.70
98.5	128.5	5.06	5.02	4.79
113.3	143.3	5.20	4.94	4.81
128.0	158.0	5.40	5.04	4.87
142.8	172.8	5.38	5.05	5.02
157.5	187.5	5.48	5.06	5.06
172.3	202.3	5.38	5.12	4.86
187.0	217.0	5.49	5.18	4.98
201.8	231.8	5.58	5.21	5.04
216.5	246.5	5.67	5.27	5.13
231.3	261.3	5.71	5.39	5.20
246.0	276.0	5.74	5.42	5.22
260.8	290.8	5.72	5.40	5.27
275.5	305.5	5.73	5.36	5.09
290.3	320.3	5.84	5.37	5.18
305.0	335.0	6.09	5.46	5.25
319.8	349.8	6.26	5.47	5.17
334.5	364.5	6.39	5.52	5.22
349.3	379.3	6.74	5.74	5.30
364.0	394.0	6.95	5.85	5.33
378.8	408.8	7.11	6.03	5.52
393.5	423.5	7.41	6.42	5.85
408.3	438.3	7.52	6.58	5.96
423.0	453.0	7.33	6.60	6.11
437.8	467.8	7.43	6.96	6.59
452.5	482.5	7.69	7.21	6.86
467.3	497.3	7.54	7.20	6.93
482.0	512.0	7.60	7.33	7.12
496.8	526.8	7.64	7.35	7.10
526.3	556.3	7.86	7.73	7.61
541.0	571.0	8.08	7.91	7.77
555.8	585.8	8.24	8.14	8.06
570.5	600.5	8.60	8.51	8.48
600.0	630.0	9.18	9.11	9.10

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10
30.0	61.70	61.84	62.06
36.4	60.04	60.37	60.66
40.0	59.87	60.79	62.09
54.8	59.32	58.16	61.20
69.5	56.59	56.70	58.93
84.3	55.23	56.26	58.40
99.0	53.71	54.92	56.56
113.8	52.99	55.35	56.85
128.5	50.92	52.59	53.74
143.3	49.83	51.39	52.76
158.0	51.09	52.20	53.91
172.8	52.07	54.14	55.94
187.5	51.27	53.50	56.26
202.3	48.79	50.84	53.73
217.0	45.53	48.06	50.19
231.8	43.70	46.21	48.34
246.5	42.02	43.95	45.46
261.3	41.24	42.65	43.75
276.0	40.63	41.82	42.54
290.8	40.35	41.07	41.19
305.5	40.54	41.23	41.38
320.3	40.77	40.65	40.60
335.0	40.57	39.89	39.36
349.8	40.09	39.29	39.03
364.5	39.46	38.94	38.88
379.3	38.97	38.99	39.04
394.0	38.76	39.38	40.20
408.8	38.93	40.42	41.99
423.5	39.05	40.89	42.60
438.3	39.53	42.48	44.62
453.0	40.88	45.24	44.15
467.8	41.79	47.69	43.71
482.5	44.49	47.00	39.58
497.3	53.93	38.95	34.68
512.0	48.10	35.30	32.14
526.8	41.22	32.60	30.13
556.3	33.23	28.14	26.26
571.0	30.49	26.30	24.78
585.8	27.95	24.51	23.13
600.5	26.18	23.41	22.21
630.0	22.91	20.90	20.62

LO (MHz)	LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10
30.0	50.52	49.36	49.28
36.4	48.75	47.64	47.80
40.0	50.27	49.08	50.22
54.8	47.37	46.49	47.68
69.5	44.84	44.18	45.39
84.3	43.64	43.31	44.60
99.0	42.28	42.12	43.24
113.8	41.41	41.17	42.29
128.5	41.33	40.66	41.72
143.3	40.31	39.67	40.65
158.0	40.55	39.42	40.14
172.8	39.65	38.44	39.14
187.5	38.95	38.02	38.86
202.3	37.81	36.81	37.69
217.0	36.86	34.86	35.64
231.8	35.08	32.93	33.62
246.5	35.54	33.17	33.14
261.3	34.91	32.64	32.61
276.0	34.11	31.72	31.64
290.8	33.20	30.56	30.20
305.5	32.18	28.72	28.40
320.3	30.37	27.05	26.99
335.0	30.07	26.36	26.10
349.8	28.73	25.06	25.08
364.5	28.05	24.25	24.28
379.3	28.13	24.31	23.79
394.0	27.42	23.78	22.99
408.8	26.33	23.05	22.48
423.5	25.84	23.17	22.25
438.3	25.00	22.44	21.46
453.0	24.14	21.41	20.51
467.8	23.47	21.12	20.38
482.5	22.54	19.86	19.01
497.3	21.33	18.44	17.62
512.0	20.19	17.09	16.16
526.8	19.10	16.33	15.25
541.5	17.22	14.67	13.97
556.3	16.33	13.98	13.32
571.0	15.51	13.48	12.79
585.8	14.74	12.89	12.43
600.5	13.43	11.90	10.63
615.3			
630.0			

LO (MHz)	RF (MHz)	IP3 Input (dBm) @LO (dBm)
		+7
40.0	10.0	15.46
54.8	24.8	18.14
69.5	39.5	18.34
84.3	54.3	18.07
99.0	69.0	17.40
113.8	83.8	16.87
128.5	98.5	15.17
143.3	113.3	13.11
158.0	128.0	12.52
172.8	142.8	11.89
187.5	157.5	10.36
202.3	172.3	11.46
217.0	187.0	13.69
231.8	201.8	14.86
246.5	216.5	12.24
261.3	231.3	9.29
276.0	246.0	7.86
290.8	260.8	7.32
305.5	275.5	7.85
320.3	290.3	9.10
335.0	305.0	10.71
349.8	319.8	13.08
364.5	334.5	16.24
379.3	349.3	11.96
394.0	364.0	9.04
408.8	378.8	8.32
423.5	393.5	8.08
438.3	408.3	7.85
453.0	423.0	8.65
467.8	437.8	8.96
482.5	452.5	11.37
497.3	467.3	14.83
512.0	482.0	18.37
526.8	496.8	16.81
541.5	511.5	14.00
556.3	526.3	12.90
571.0	541.0	11.83
585.8	555.8	11.97
600.5	570.5	12.57
615.3	585.3	11.17
630.0	600.0	9.94

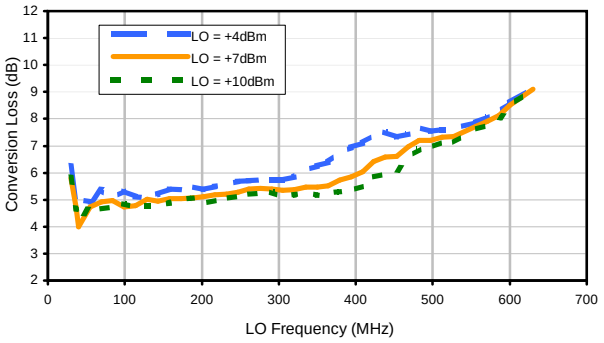
Frequency Mixer LRMS-3

Typical Performance Data

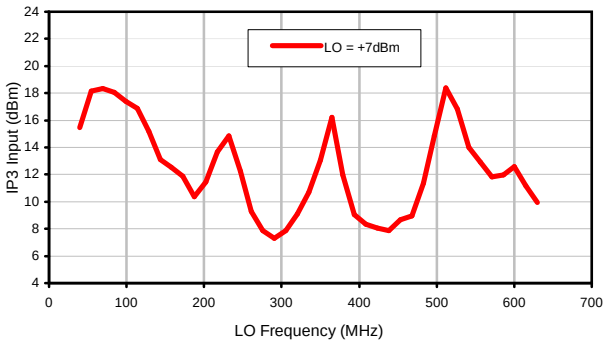
RF/LO (MHz)	RF VSWR (:1) @LO (dBm)			LO VSWR (:1) @LO (dBm)			IF (MHz)	IF VSWR (:1) @LO (dBm)		
	+4	+7	+10	+4	+7	+10		+4	+7	+10
0.1	2.70	2.50	2.39	1.68	2.47	3.41	10.0	1.11	1.04	1.19
6.4	1.38	1.28	1.21	1.67	2.46	3.40	24.8	1.11	1.09	1.20
10.0	1.34	1.23	1.15	1.48	2.02	2.63	39.5	1.14	1.13	1.24
24.8	1.34	1.23	1.16	1.48	2.02	2.61	54.3	1.17	1.19	1.28
39.5	1.33	1.23	1.16	1.48	2.01	2.60	69.0	1.18	1.22	1.31
54.3	1.32	1.22	1.16	1.47	2.01	2.60	83.8	1.23	1.28	1.36
69.0	1.31	1.22	1.15	1.49	2.01	2.59	98.5	1.27	1.35	1.43
83.8	1.30	1.21	1.15	1.50	2.04	2.62	113.3	1.26	1.38	1.48
98.5	1.29	1.21	1.15	1.51	2.07	2.65	128.0	1.28	1.41	1.52
113.3	1.28	1.20	1.15	1.53	2.09	2.68	142.8	1.31	1.46	1.58
128.0	1.27	1.20	1.15	1.55	2.11	2.70	157.5	1.31	1.49	1.62
142.8	1.28	1.19	1.15	1.56	2.12	2.70	172.3	1.33	1.51	1.65
157.5	1.27	1.20	1.15	1.60	2.14	2.74	187.0	1.38	1.58	1.72
172.3	1.24	1.17	1.14	1.62	2.19	2.80	201.8	1.38	1.61	1.76
187.0	1.21	1.15	1.12	1.64	2.22	2.85	216.5	1.35	1.58	1.74
201.8	1.19	1.13	1.12	1.69	2.27	2.89	231.3	1.35	1.59	1.76
216.5	1.19	1.13	1.13	1.73	2.32	2.92	246.0	1.37	1.61	1.80
233.0	1.18	1.14	1.13	1.74	2.33	2.93	260.8	1.36	1.61	1.81
246.0	1.17	1.15	1.15	1.77	2.35	2.96	275.5	1.37	1.63	1.82
260.8	1.17	1.15	1.15	1.80	2.39	3.02	290.3	1.38	1.66	1.86
275.5	1.17	1.14	1.14	1.83	2.44	3.10	305.0	1.35	1.62	1.83
290.3	1.17	1.13	1.12	1.86	2.48	3.15	319.8	1.31	1.57	1.78
305.0	1.18	1.12	1.09	1.91	2.51	3.14	334.5	1.33	1.59	1.81
319.8	1.19	1.10	1.05	1.95	2.53	3.14	349.3	1.33	1.60	1.82
334.5	1.20	1.09	1.02	2.00	2.57	3.17	364.0	1.30	1.56	1.77
349.3	1.26	1.12	1.07	2.06	2.65	3.25	378.8	1.33	1.59	1.80
364.0	1.33	1.19	1.14	2.11	2.72	3.34	393.5	1.33	1.60	1.81
378.8	1.39	1.26	1.20	2.15	2.78	3.39	408.3	1.26	1.51	1.71
393.5	1.47	1.34	1.28	2.14	2.76	3.35	423.0	1.27	1.51	1.70
408.3	1.57	1.46	1.41	2.13	2.73	3.31	437.8	1.29	1.55	1.74
423.0	1.64	1.56	1.53	2.14	2.73	3.28	452.5	1.25	1.49	1.67
437.8	1.70	1.65	1.63	2.17	2.76	3.31	467.3	1.24	1.46	1.64
452.5	1.82	1.79	1.78	2.20	2.80	3.34	482.0	1.27	1.50	1.68
467.3	1.93	1.91	1.92	2.21	2.80	3.32	496.8	1.26	1.46	1.62
482.0	2.01	2.01	2.02	2.17	2.73	3.21	511.5	1.25	1.42	1.56
496.8	2.14	2.12	2.14	2.13	2.65	3.10	526.3	1.25	1.43	1.56
526.3	2.25	2.23	2.24	2.17	2.66	3.14	541.0	1.27	1.42	1.54
541.0	2.33	2.30	2.31	2.19	2.69	3.18	555.8	1.23	1.41	1.50
555.8	2.43	2.39	2.40	2.21	2.69	3.19	570.5	1.27	1.41	1.49
570.5	2.50	2.46	2.47	2.21	2.64	3.10	585.3	1.33	1.43	1.50
600.0	2.56	2.50	2.50	2.26	2.64	3.08	600.0	1.37	1.44	1.50

Typical Performance Curves

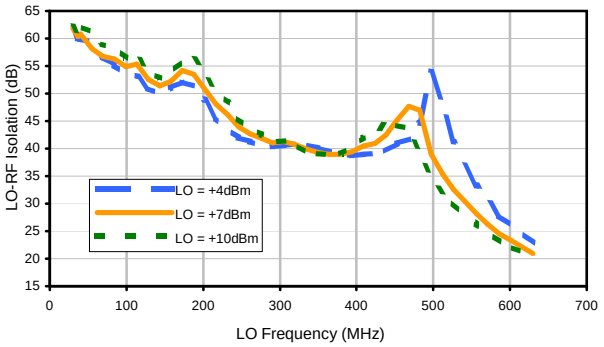
Conversion Loss



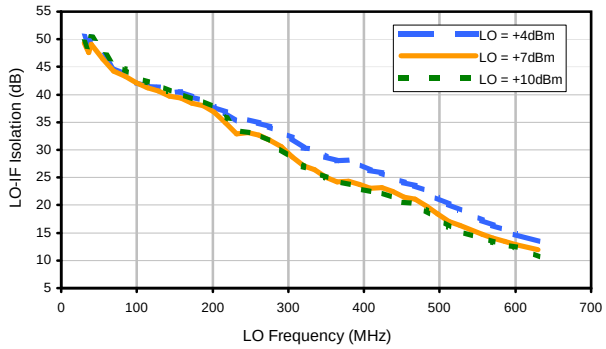
IP3 Input



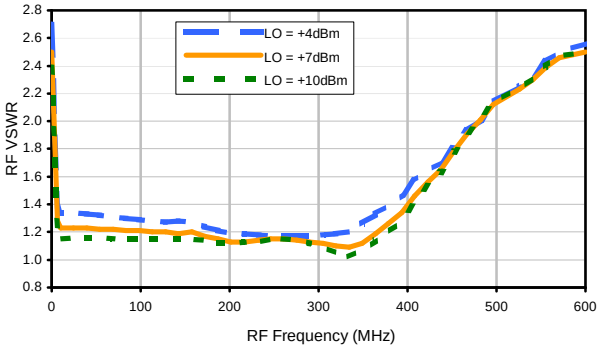
LO-RF Isolation



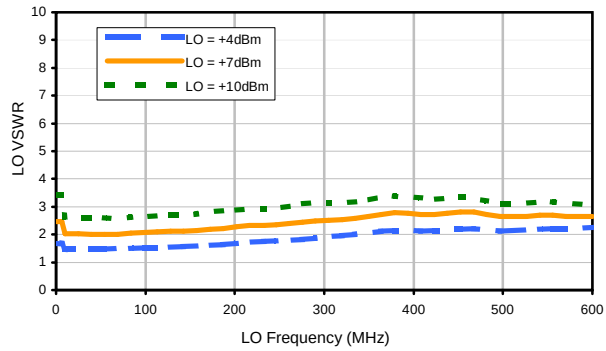
LO-IF Isolation



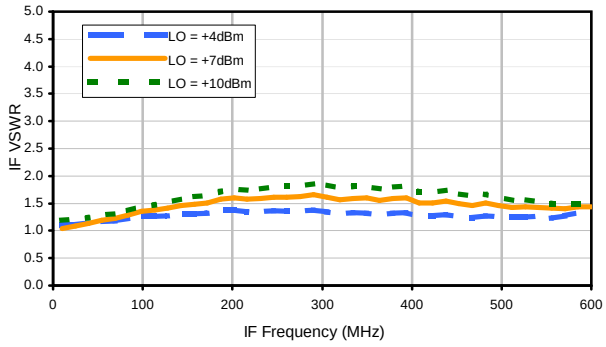
RF VSWR



LO VSWR



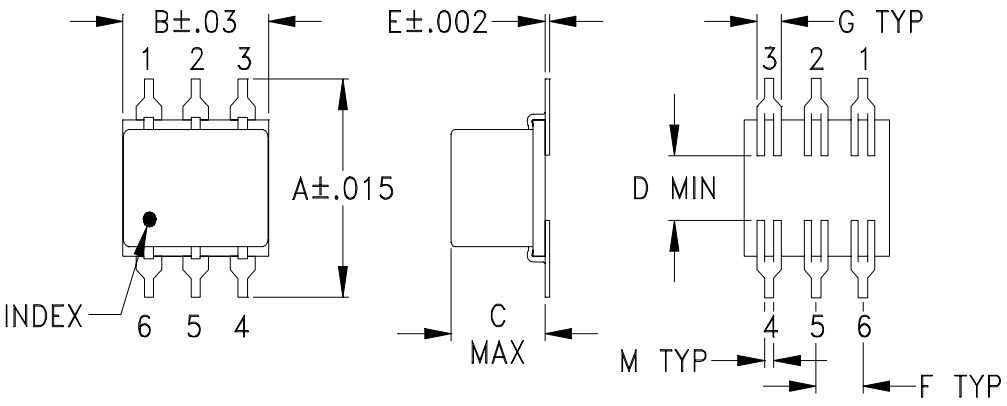
IF VSWR



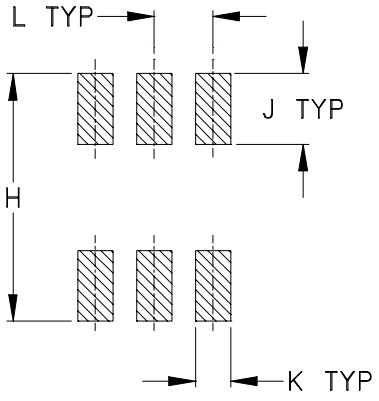
Case Style QQQ

QQQ130 (non-waterproof)
QQQ828 (washable)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
QQQ130	.400 (10.16)	.31 (7.87)	.200 (5.08)	.10 (2.54)	.010 (.25)	.100 (2.54)	.050 (1.27)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	.020 (.51)	.55
QQQ828			.050 (1.27)										.20

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

Notes:

1. Case material: Ceramic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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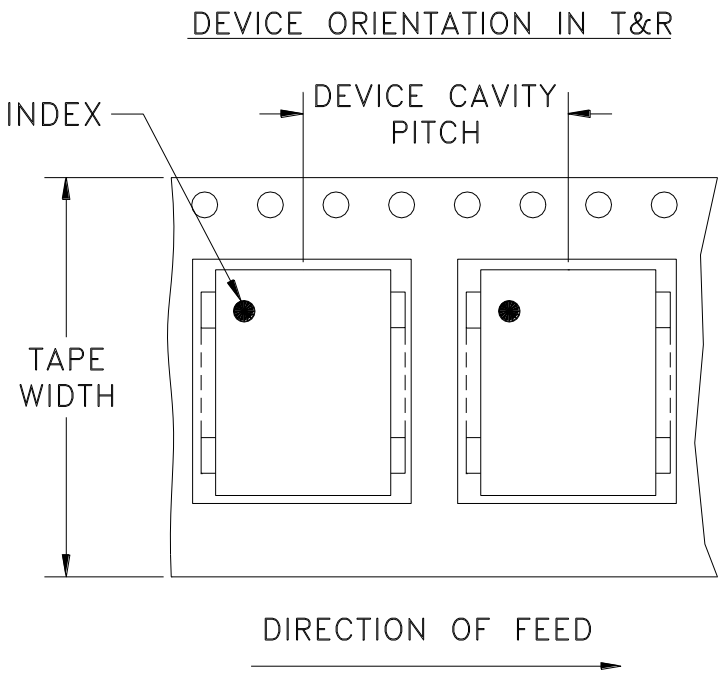
Tape & Reel Packaging TR-F10



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

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

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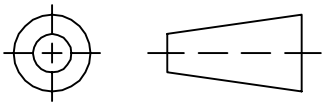
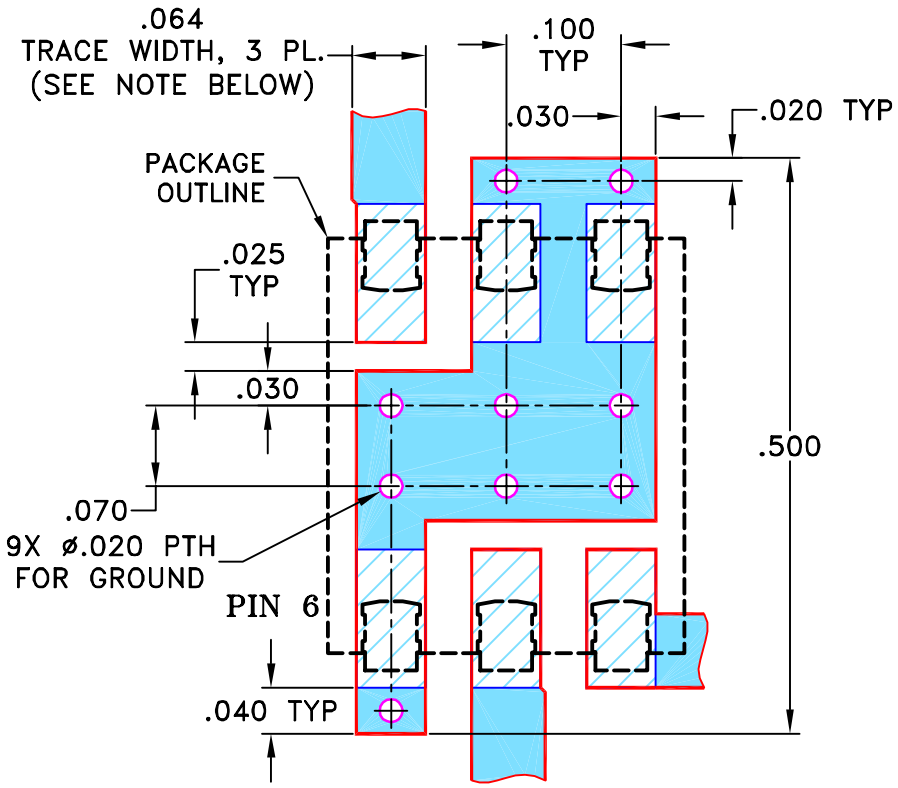
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/02/02	AV	DJ
A	M102713	UPDATED NOTES	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "w" PIN CONNECTION



NOTES: 1.TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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	07/19/02
TOLERANCES ON:	CHECKED	WL	08/02/02
2 PL DECIMALS ±	APPROVED	DJ	08/02/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

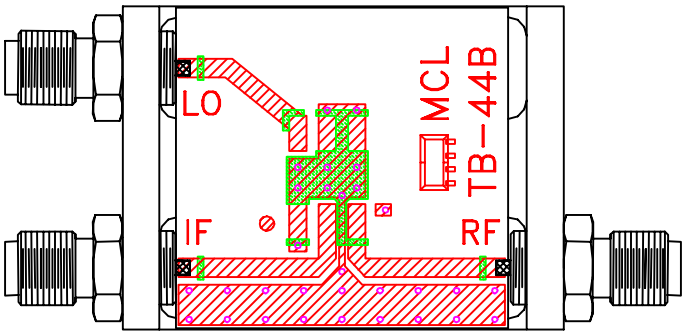
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, w, QQQ569, LRMS-J, TB-44

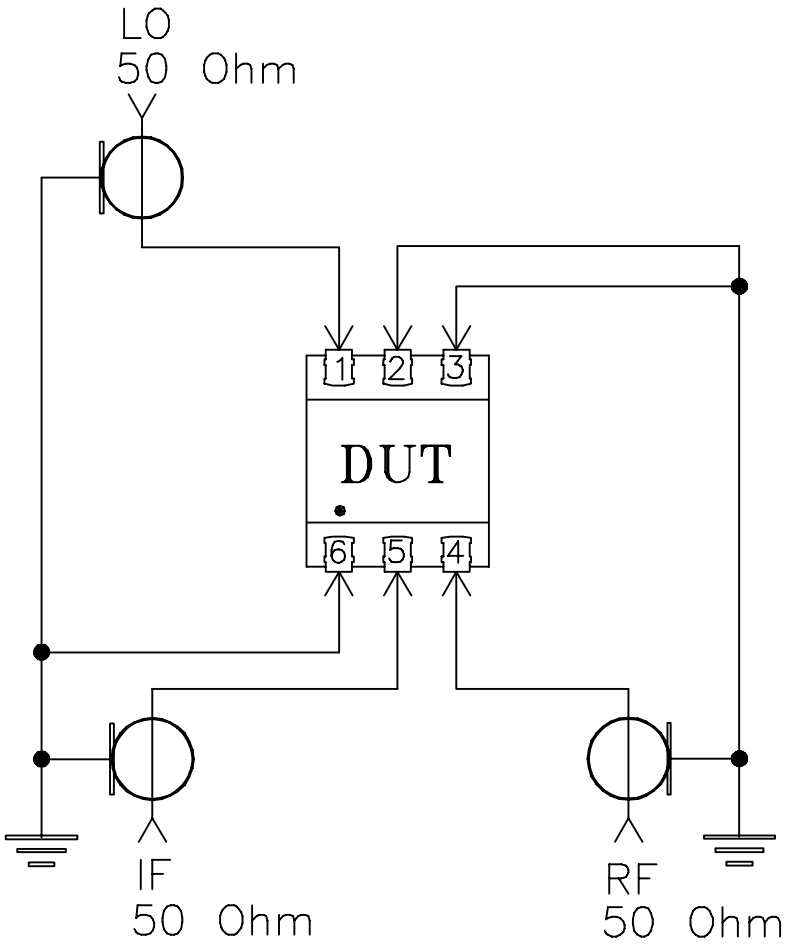
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-083	A

FILE:	SCALE:	SHEET:
98PL083	6:1	1 OF 1

Evaluation Board and Circuit



TB-44+



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 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