

X2 Frequency Multiplier

50Ω Output 3400 to 7200 MHz

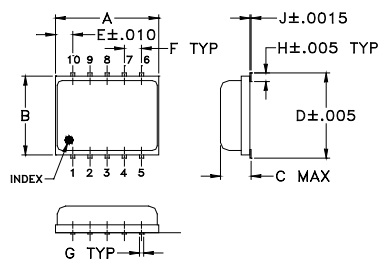
Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Input, 25°C	200mW
Permanent damage may occur if any of these limits are exceeded.	

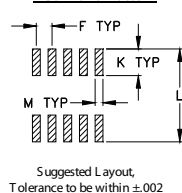
Pin Connections

INPUT	10
OUTPUT	5
50Ω TERMINATE EXT.	3
GROUND	1,2,4,6,7,8,9

Outline Drawing



PCB Land Pattern

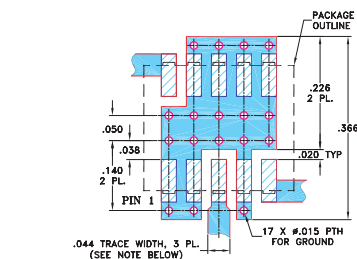


Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.30	.250	.085	.266	.050	.050	.012
7.62	6.35	2.16	6.76	1.27	1.27	0.30
H	J	K	L	M		wt
.029	.004	.085	.296	.030		grams
0.74	0.10	2.16	7.52	0.76		0.25

Demo Board MCL P/N: TB-144

Suggested PCB Layout (PL-045)



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

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

Features

- low conversion loss, 11 dB typ.
- LTCC design
- low profile, 0.085"
- low cost

Applications

- synthesizers
- local oscillators

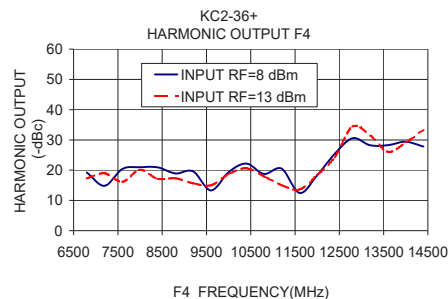
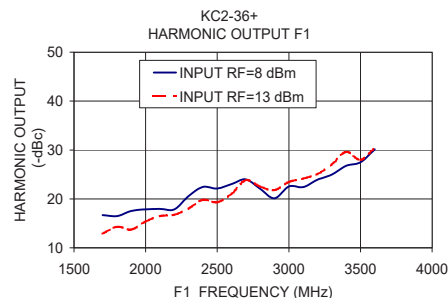
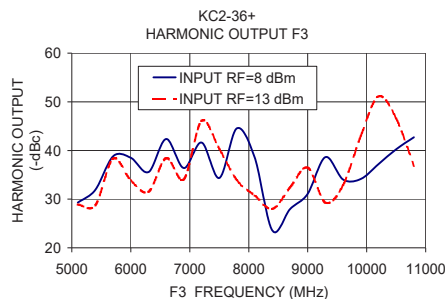
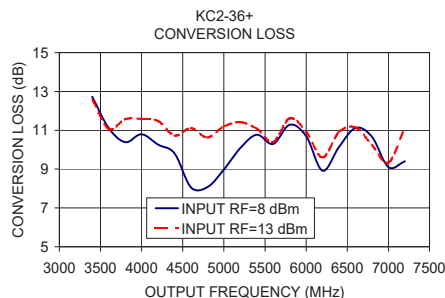
Electrical Specifications

MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)	*HARMONIC OUTPUT (dBc)					
	F1 Input	F2 Output	Min.	Max.		F1 Typ.	F1 Min.	F3 Typ.	F3 Min.	F4 Typ.	F4 Min.
2	1700-3600	3400-7200	8	13	11.0 15.5	18	9	30	17	17	8
	2100-2700	4200-5400	8	13	11.0 14.8	20	12	35	17	17	8

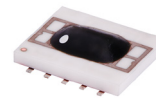
* Harmonics of input frequency below the power level of F2

Typical Performance Data

INPUT RF= 8 dBm					INPUT RF= 13 dBm			
Input Frequency (MHz)	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
		F1	F3	F4		F1	F3	F4
1700.00	12.73	16.68	29.28	19.21	12.59	12.88	28.90	17.27
1900.00	10.39	17.55	38.81	20.40	11.57	13.73	38.30	16.13
2100.00	10.26	17.96	35.56	20.93	11.48	16.50	31.51	17.12
2300.00	8.06	20.57	36.41	19.59	11.11	18.03	34.08	15.65
2500.00	8.97	22.13	34.37	19.35	11.20	19.32	40.32	18.67
2700.00	10.77	24.00	38.60	18.73	11.08	23.82	30.77	17.97
2900.00	11.29	20.11	27.97	12.47	11.61	21.78	32.40	13.59
3100.00	8.92	22.40	38.64	25.49	9.60	24.16	29.28	24.36
3300.00	11.12	24.98	34.14	28.23	11.15	27.05	43.00	31.47
3500.00	9.10	27.48	40.25	29.40	9.34	28.00	46.57	29.15
3600.00	9.40	30.15	42.70	27.81	11.14	30.40	36.82	33.33



KC2-36+



Generic photo used for illustration purposes only

CASE STYLE: DZ885

+RoHS Compliant

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

Frequency Multiplier (Doubler)

KC2-36+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+8dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT*		
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT		(-dBc)		
				X 2 OUTPUT	X 1 OUTPUT	X 3 OUTPUT	X 4 OUTPUT
1700	3400	5100	6800	12.73	16.68	29.28	19.21
1800	3600	5400	7200	11.11	16.49	31.92	14.84
1900	3800	5700	7600	10.39	17.55	38.81	20.40
2000	4000	6000	8000	10.80	17.85	38.51	20.95
2100	4200	6300	8400	10.26	17.96	35.56	20.93
2200	4400	6600	8800	9.80	17.85	42.34	18.89
2300	4600	6900	9200	8.06	20.57	36.41	19.59
2400	4800	7200	9600	8.08	22.46	41.63	13.30
2500	5000	7500	10000	8.97	22.13	34.37	19.35
2600	5200	7800	10400	10.09	23.03	44.55	22.20
2700	5400	8100	10800	10.77	24.00	38.60	18.73
2800	5600	8400	11200	10.30	22.04	23.54	20.50
2900	5800	8700	11600	11.29	20.11	27.97	12.47
3000	6000	9000	12000	10.70	22.55	31.08	18.26
3100	6200	9300	12400	8.92	22.40	38.64	25.49
3200	6400	9600	12800	10.15	23.92	34.04	30.56
3300	6600	9900	13200	11.12	24.98	34.14	28.23
3400	6800	10200	13600	10.67	26.76	37.17	28.28
3500	7000	10500	14000	9.10	27.48	40.25	29.40
3600	7200	10800	14400	9.40	30.15	42.70	27.81

*Harmonic Output below power level of X 2 Output .

FREQUENCY (MHz)				RF IN=+13dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT*		
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT		(-dBc)		
				X 2 OUTPUT	X 1 OUTPUT	X 3 OUTPUT	X 4 OUTPUT
1700	3400	5100	6800	12.59	12.88	28.90	17.27
1800	3600	5400	7200	11.07	14.32	28.74	18.96
1900	3800	5700	7600	11.57	13.73	38.30	16.13
2000	4000	6000	8000	11.59	15.36	33.83	20.12
2100	4200	6300	8400	11.48	16.50	31.51	17.12
2200	4400	6600	8800	10.73	16.75	38.41	17.30
2300	4600	6900	9200	11.11	18.03	34.08	15.65
2400	4800	7200	9600	10.63	19.84	46.09	14.99
2500	5000	7500	10000	11.20	19.32	40.32	18.67
2600	5200	7800	10400	11.42	21.03	33.90	20.60
2700	5400	8100	10800	11.08	23.82	30.77	17.97
2800	5600	8400	11200	10.40	22.50	28.00	15.03
2900	5800	8700	11600	11.61	21.78	32.40	13.59
3000	6000	9000	12000	10.92	23.47	36.46	18.39
3100	6200	9300	12400	9.60	24.16	29.28	24.36
3200	6400	9600	12800	10.91	25.07	32.87	34.43
3300	6600	9900	13200	11.15	27.05	43.00	31.47
3400	6800	10200	13600	10.24	29.62	51.12	26.03
3500	7000	10500	14000	9.34	28.00	46.57	29.15
3600	7200	10800	14400	11.14	30.40	36.82	33.33

*Harmonic Output below power level of X 2 Output .



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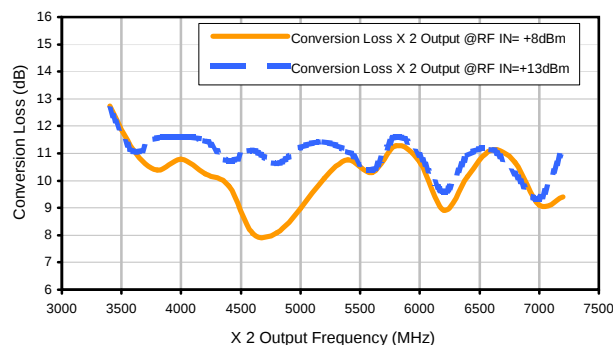
REV. X1
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 Page 1 of 1

Frequency Multiplier (Doubler)

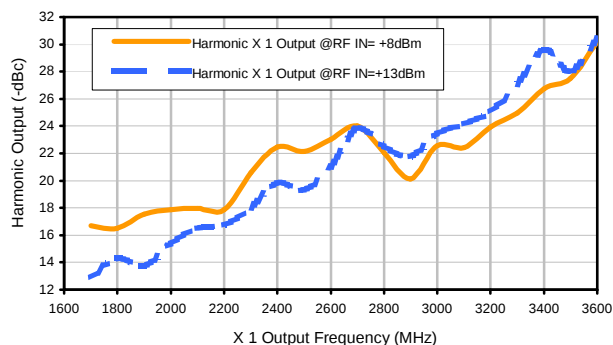
KC2-36+

Typical Performance Curves

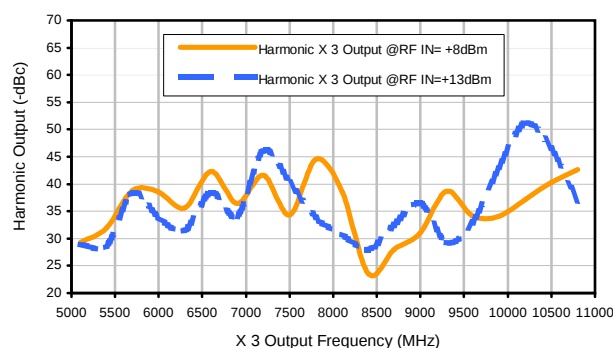
Conversion Loss X 2 Output



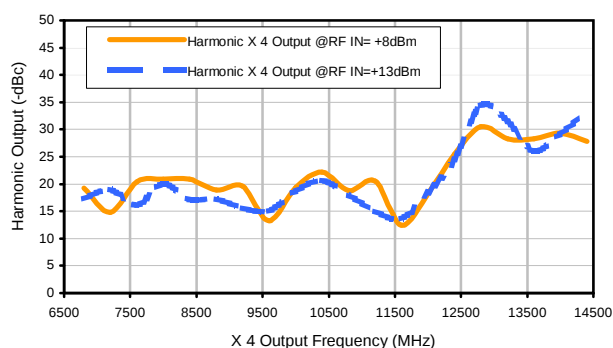
Harmonic X 1 Output



Harmonic X 3 Output

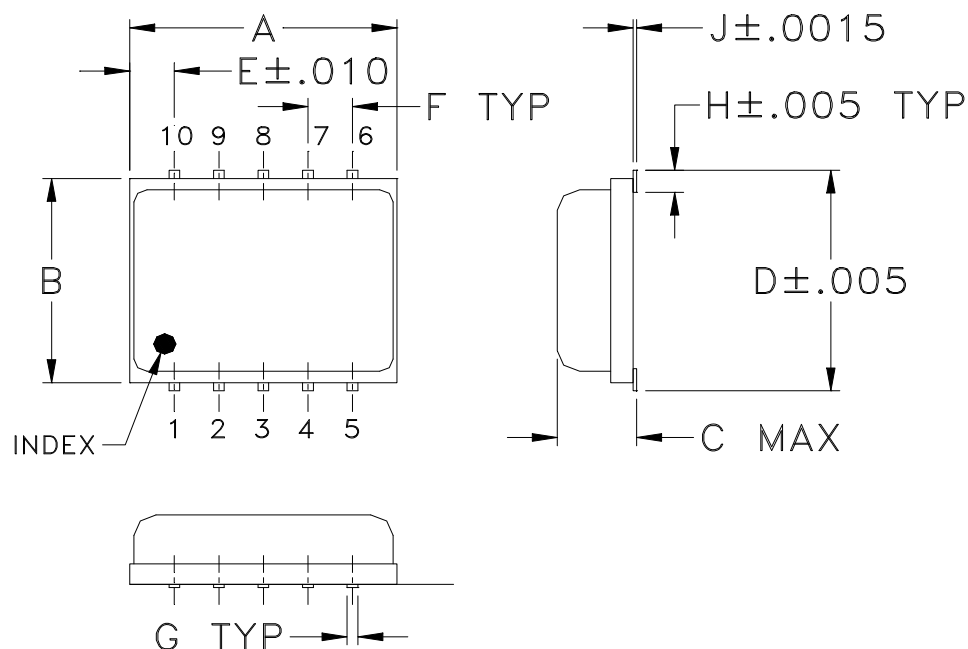


Harmonic X 4 Output

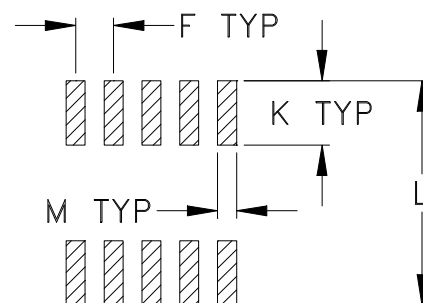


Outline Dimensions

DZ885
DZ1034



PCB Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAMS
DZ885	.30 (7.62)	.250 (6.35)	.085 (2.16)	.266 (6.76)	.050 (1.27)	.050 (1.27)	.012 (0.30)	.029 (0.74)	.004 (0.10)	.085 (2.16)	.296 (7.52)	.030 (0.76)	0.25
DZ1034			.105 (2.67)										0.3

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

Notes:

- Case material: Plastic encapsulation on Ceramic base.
- Termination finish:
 - For RoHS Case Styles: Tin plate. All models, (+) suffix.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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Tape & Reel Packaging TR-F34



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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.

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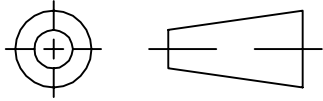
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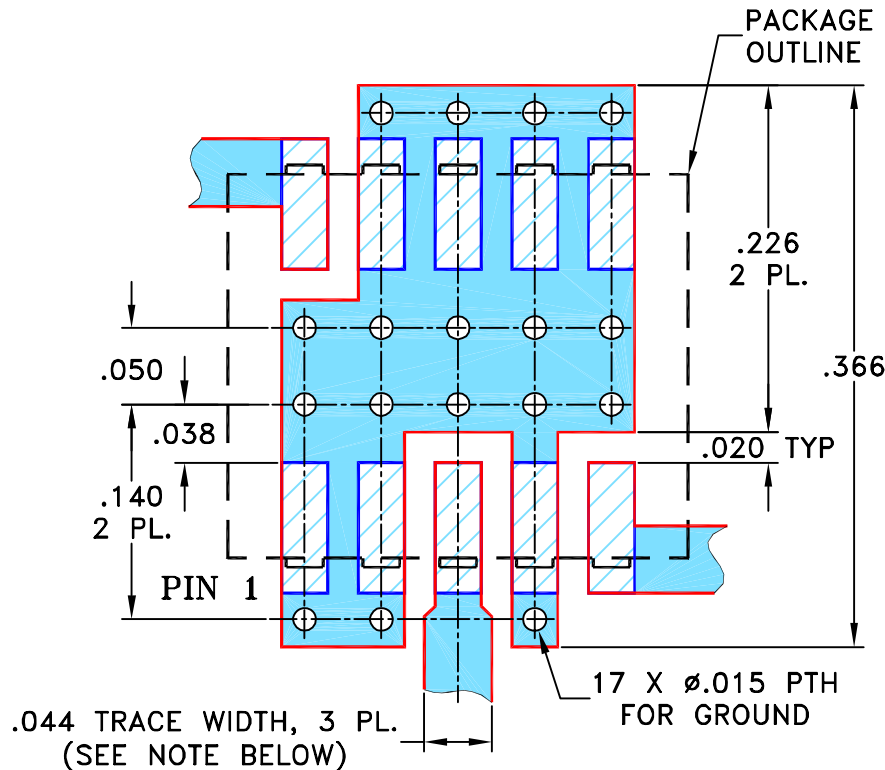
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M81781	UPDATED PCB LAYOUT	06/07/02	GF	DJ
B	M82377	UPDATED DRAWING	07/31/02	AV	WL
C	M102713	ADDED NOTE 2 & "...WITH SMOBC"	01/17/06	MMG	IL
D	M135488	ADDED DZ1650, CHANGED PIN CONN.	02/02/12	GF	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DZ883, DZ885 & DZ1650 CASE STYLES, "10MX01" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" $\pm$.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.



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

TOLERANCES ON:
2 PL DECIMALS $\pm$
3 PL DECIMALS $\pm$.005
ANGLES $\pm$
FRACTIONS $\pm$

DRAWN

AV

05/08/02

CHECKED

DB

05/16/02

APPROVED

WL

05/16/02

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



Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, 10MX01, DZ883/885/1650, TB-144

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-045

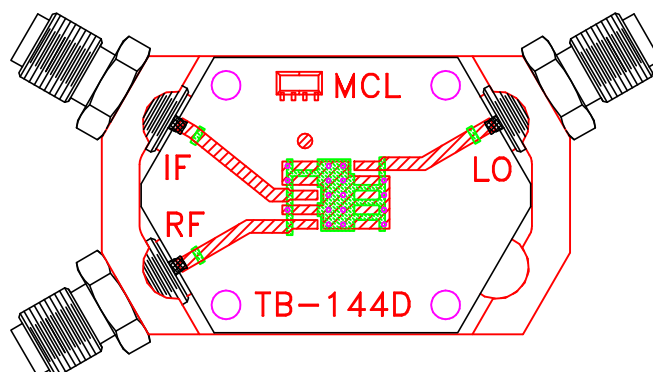
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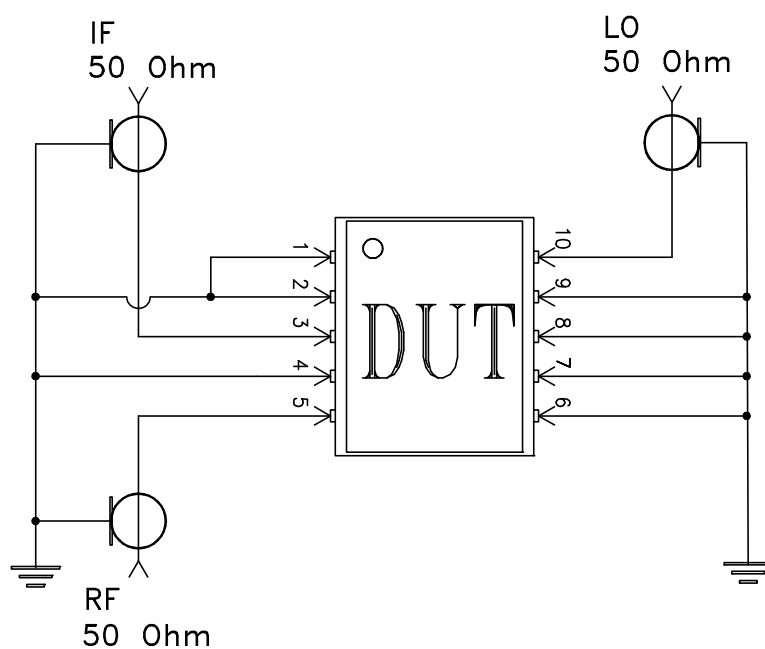
SCALE: 8:1

SHEET: 1 OF 1

Evaluation Board and Circuit



TB-144



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 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	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
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: 250°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, 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