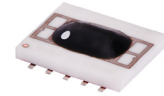


X2 Frequency Multiplier

KC2-50+

50Ω Output 7000 to 10000 MHz



Generic photo used for illustration purposes only

CASE STYLE: DZ885

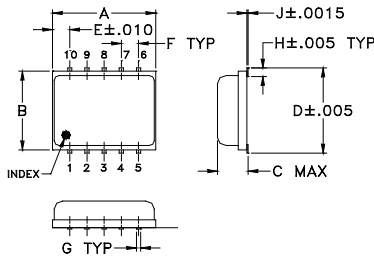
Maximum Ratings

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.	

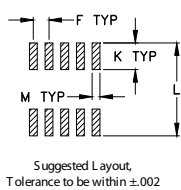
Pin Connections

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

Outline Drawing



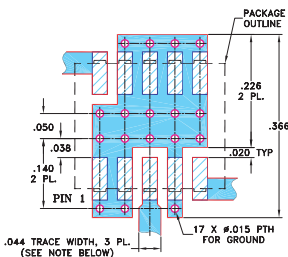
PCB Land Pattern



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

Features

- low conversion loss, 12.5 dB typ.
- LTCC design
- low profile, 0.085"
- low cost

Applications

- synthesizers
- local oscillators

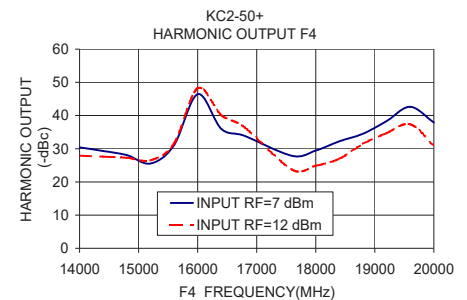
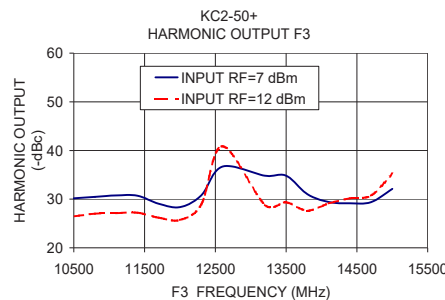
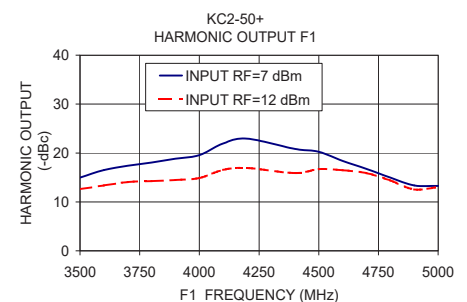
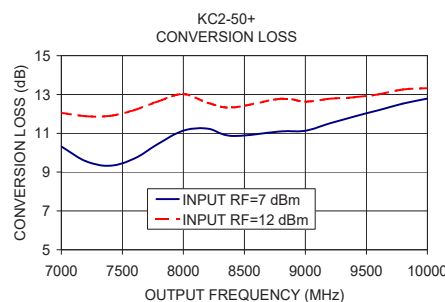
Electrical Specifications

MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		*HARMONIC OUTPUT (dBc)					
	F1 Input	F2 Output	Min.	Max.	Typ.	Max.	F1 Typ.	F1 Min.	F3 Typ.	F3 Min.	F4 Typ.	F4 Min.
2	3500-5000	7000-10000	7	12	12.5	16.0	15	8	28	20	30	17
	3800-4500	7600-9000	7	12	11.3	14.8	20	10	30	20	30	17

* Harmonics of input frequency below the power level of F2

Typical Performance Data

Input Frequency (MHz)	INPUT RF= 7 dBm				INPUT RF= 12 dBm			
	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
	F2	F1	F3	F4	F2	F1	F3	F4
3500.00	10.32	14.96	30.18	30.40	12.06	12.62	26.45	27.92
3600.00	9.56	16.50	30.47	29.30	11.88	13.35	27.01	27.62
3700.00	9.33	17.40	30.75	28.08	11.90	14.05	27.10	27.25
3800.00	9.70	18.06	30.71	25.52	12.20	14.25	27.20	26.48
3900.00	10.48	18.85	29.06	31.04	12.66	14.48	26.19	31.51
4000.00	11.14	19.55	28.37	46.43	13.02	14.86	25.74	48.15
4100.00	11.24	21.94	30.76	35.98	12.57	16.55	28.84	40.09
4200.00	10.86	22.93	36.69	33.86	12.33	16.93	40.86	36.40
4400.00	11.10	20.85	34.82	27.84	12.78	15.90	28.80	23.70
4500.00	11.13	20.24	34.83	29.44	12.63	16.71	29.36	24.84
4600.00	11.51	18.37	31.04	32.23	12.78	16.48	27.63	26.98
4700.00	11.86	16.75	29.43	34.50	12.86	15.88	29.13	31.46
4800.00	12.19	14.98	29.14	38.31	13.01	14.38	30.17	34.73
4900.00	12.53	13.36	29.37	42.60	13.26	12.55	30.72	37.35
5000.00	12.79	13.28	32.10	37.90	13.32	13.00	35.23	30.94



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



Frequency Multiplier (Doublers)

KC2-50+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+7dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT	X2 OUTPUT	X1 OUTPUT	X3 OUTPUT	X4 OUTPUT
3500.00	7000.00	10500.00	14000.00	10.32	14.96	30.18	30.40
3550.00	7100.00	10650.00	14200.00	9.92	15.95	30.32	29.86
3600.00	7200.00	10800.00	14400.00	9.56	16.50	30.47	29.30
3650.00	7300.00	10950.00	14600.00	9.36	16.95	31.22	29.39
3700.00	7400.00	11100.00	14800.00	9.33	17.40	30.75	28.08
3750.00	7500.00	11250.00	15000.00	9.50	17.65	30.36	26.61
3800.00	7600.00	11400.00	15200.00	9.70	18.06	30.71	25.52
3850.00	7700.00	11550.00	15400.00	9.97	18.49	30.63	26.09
3900.00	7800.00	11700.00	15600.00	10.48	18.85	29.06	31.04
3950.00	7900.00	11850.00	15800.00	10.80	19.10	28.38	40.84
4000.00	8000.00	12000.00	16000.00	11.14	19.55	28.37	46.43
4050.00	8100.00	12150.00	16200.00	11.20	20.63	28.70	39.62
4100.00	8200.00	12300.00	16400.00	11.24	21.94	30.76	35.98
4150.00	8300.00	12450.00	16600.00	11.11	22.18	31.52	34.10
4200.00	8400.00	12600.00	16800.00	10.86	22.93	36.69	33.86
4250.00	8500.00	12750.00	17000.00	11.06	22.96	39.40	32.56
4300.00	8600.00	12900.00	17200.00	10.94	22.29	38.29	30.85
4350.00	8700.00	13050.00	17400.00	10.91	21.55	36.06	28.94
4400.00	8800.00	13200.00	17600.00	11.10	20.85	34.82	27.84
4450.00	8900.00	13350.00	17800.00	10.93	20.68	34.43	28.26
4500.00	9000.00	13500.00	18000.00	11.13	20.24	34.83	29.44
4550.00	9100.00	13650.00	18200.00	11.27	19.40	33.30	30.63
4600.00	9200.00	13800.00	18400.00	11.51	18.37	31.04	32.23
4650.00	9300.00	13950.00	18600.00	11.65	17.51	29.86	33.45
4700.00	9400.00	14100.00	18800.00	11.86	16.75	29.43	34.50
4750.00	9500.00	14250.00	19000.00	12.08	15.76	29.22	36.28
4800.00	9600.00	14400.00	19200.00	12.19	14.98	29.14	38.31
4850.00	9700.00	14550.00	19400.00	12.46	14.10	29.43	40.85
4900.00	9800.00	14700.00	19600.00	12.53	13.36	29.37	42.60
4950.00	9900.00	14850.00	19800.00	12.63	13.07	30.45	39.44
5000.00	10000.00	15000.00	20000.00	12.79	13.28	32.10	37.90

* Harmonic Output below power level of X2 Output.



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RF/MICROWAVE COMPONENTS

REV. X1

KC2-50+

8/1/2007

Page 1 of 2

Frequency Multiplier (Doublers)

KC2-50+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+12dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT	X2 OUTPUT	X1 OUTPUT	X3 OUTPUT	X4 OUTPUT
3500.00	7000.00	10500.00	14000.00	12.06	12.62	26.45	27.92
3550.00	7100.00	10650.00	14200.00	11.93	13.22	26.23	27.25
3600.00	7200.00	10800.00	14400.00	11.88	13.35	27.01	27.62
3650.00	7300.00	10950.00	14600.00	11.86	13.53	26.23	28.56
3700.00	7400.00	11100.00	14800.00	11.90	14.05	27.10	27.25
3750.00	7500.00	11250.00	15000.00	12.04	13.77	27.24	27.03
3800.00	7600.00	11400.00	15200.00	12.20	14.25	27.20	26.48
3850.00	7700.00	11550.00	15400.00	12.34	14.44	27.85	27.71
3900.00	7800.00	11700.00	15600.00	12.66	14.48	26.19	31.51
3950.00	7900.00	11850.00	15800.00	12.84	14.71	26.03	40.01
4000.00	8000.00	12000.00	16000.00	13.02	14.86	25.74	48.15
4050.00	8100.00	12150.00	16200.00	12.77	15.46	26.13	43.78
4100.00	8200.00	12300.00	16400.00	12.57	16.55	28.84	40.09
4150.00	8300.00	12450.00	16600.00	12.50	16.40	30.88	37.05
4200.00	8400.00	12600.00	16800.00	12.33	16.93	40.86	36.40
4250.00	8500.00	12750.00	17000.00	12.58	16.83	36.67	35.84
4300.00	8600.00	12900.00	17200.00	12.56	16.60	29.41	32.35
4350.00	8700.00	13050.00	17400.00	12.52	16.51	28.92	29.67
4400.00	8800.00	13200.00	17600.00	12.78	15.90	28.80	23.70
4450.00	8900.00	13350.00	17800.00	12.61	16.46	28.29	24.47
4500.00	9000.00	13500.00	18000.00	12.63	16.71	29.36	24.84
4550.00	9100.00	13650.00	18200.00	12.82	16.74	28.63	25.19
4600.00	9200.00	13800.00	18400.00	12.78	16.48	27.63	26.98
4650.00	9300.00	13950.00	18600.00	12.71	16.13	28.38	24.90
4700.00	9400.00	14100.00	18800.00	12.86	15.88	29.13	31.46
4750.00	9500.00	14250.00	19000.00	12.91	14.83	29.40	32.63
4800.00	9600.00	14400.00	19200.00	13.01	14.38	30.17	34.73
4850.00	9700.00	14550.00	19400.00	13.09	13.71	30.33	35.90
4900.00	9800.00	14700.00	19600.00	13.26	12.55	30.72	37.35
4950.00	9900.00	14850.00	19800.00	13.35	12.77	33.21	33.61
5000.00	10000.00	15000.00	20000.00	13.32	13.00	35.23	30.94

* Harmonic Output below power level of X2 Output.



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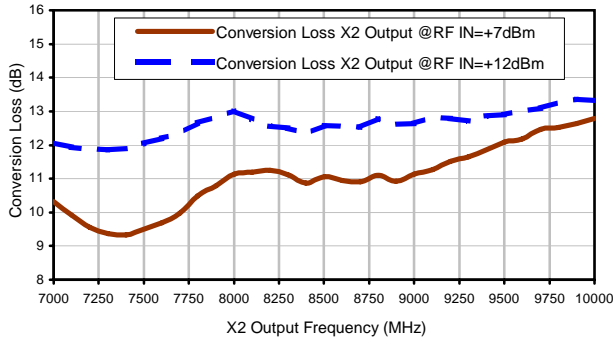
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

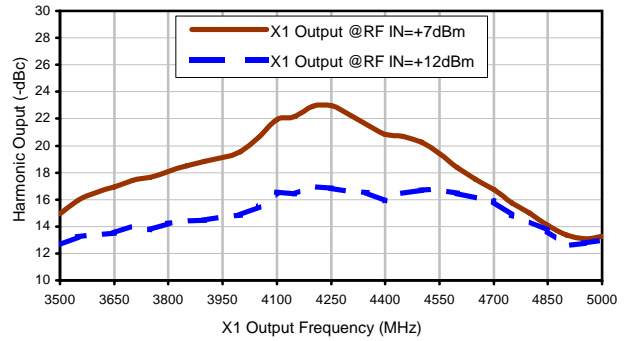
REV. X1
KC2-50+
8/1/2007
Page 2 of 2

Typical Performance Curves

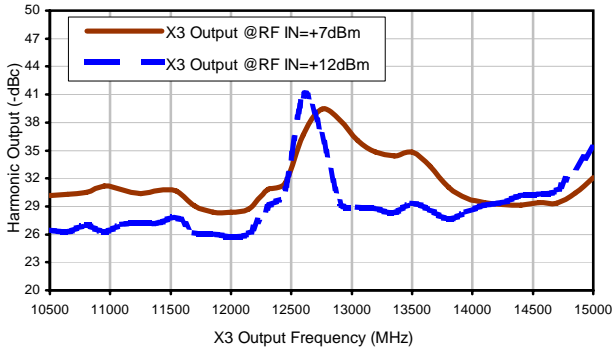
Conversion Loss X2 Output



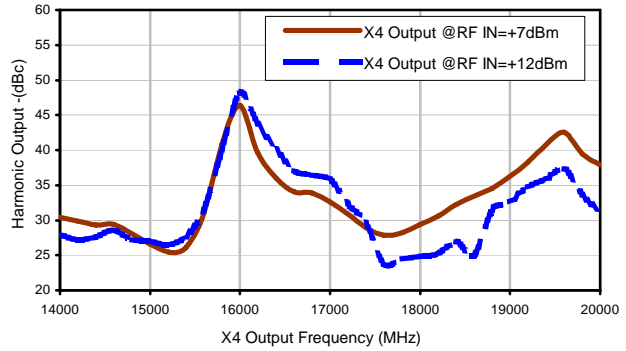
Harmonic X1 Output



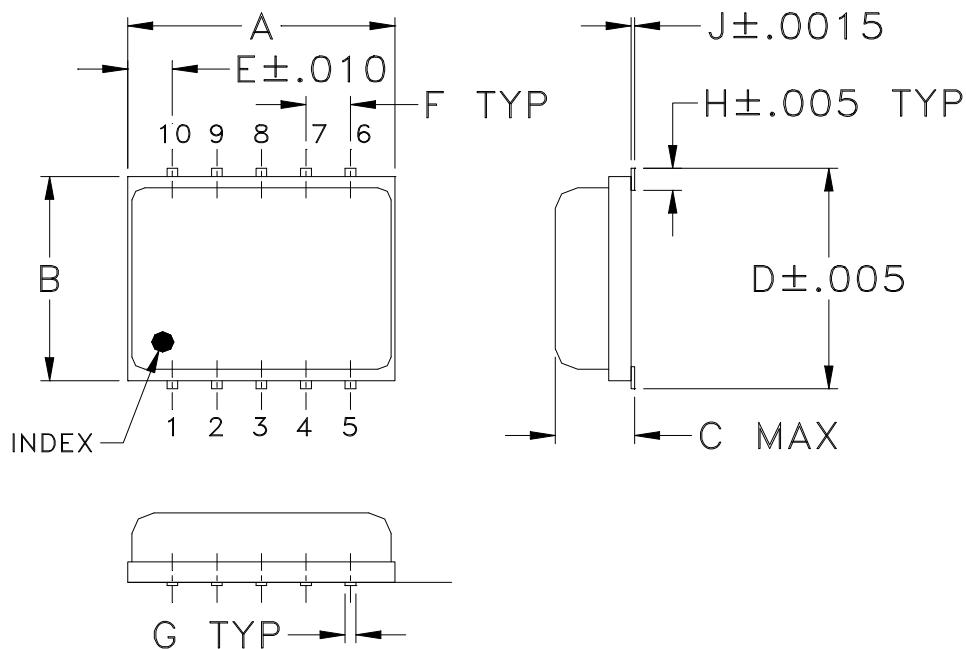
Harmonic X3 Output



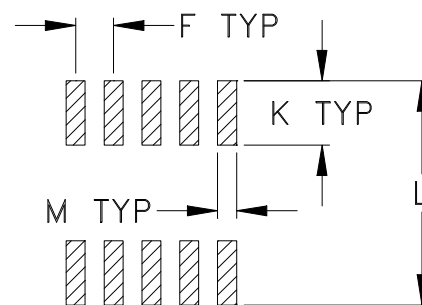
Harmonic X4 Output



Outline Dimensions



PCB Land Pattern



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

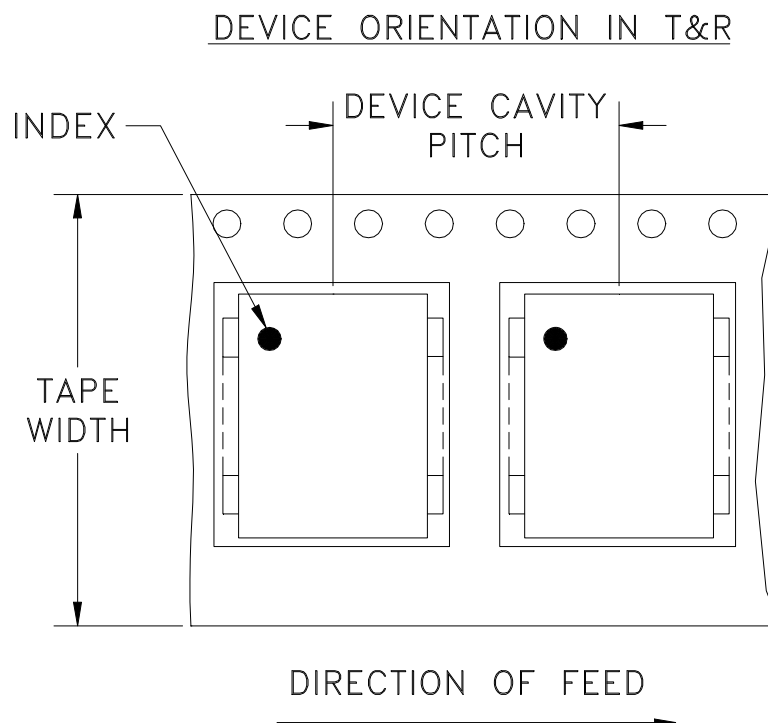
CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAMS
DZ885	.30 (7.62)	.250 (6.35)	.085 (2.16)	.266 (6.76)	.050 (1.27)	.050 (1.27)	.012 (0.30)	.029 (0.74)	.004 (0.10)	.085 (2.16)	.296 (7.52)	.030 (0.76)	0.25
DZ1034			.105 (2.67)										0.3

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.

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.

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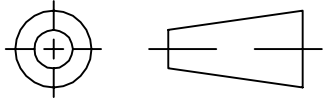
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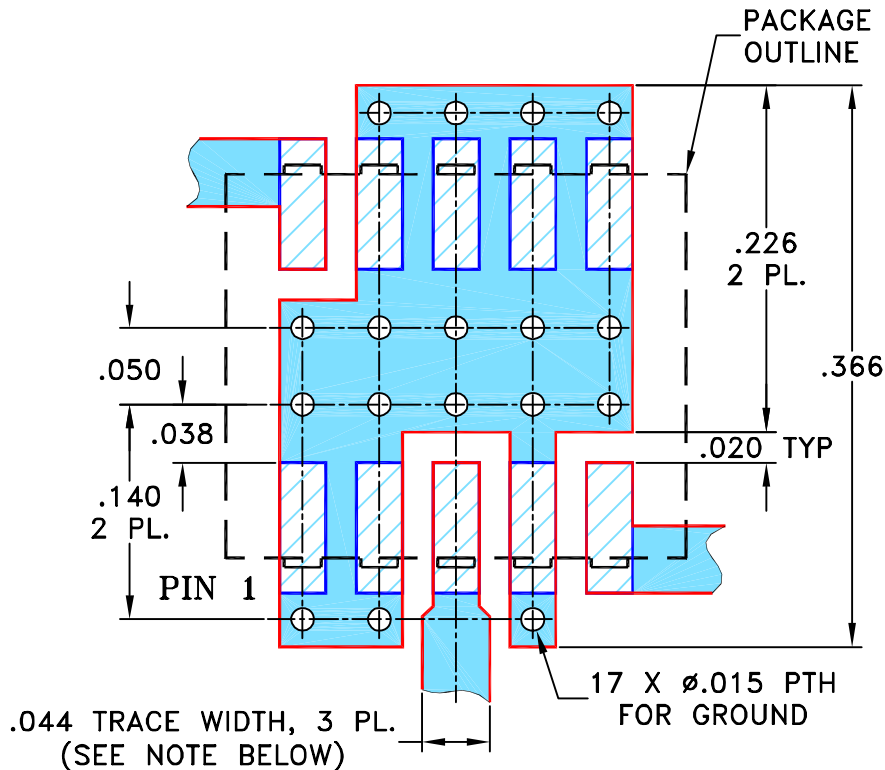
THIRD ANGLE PROJECTION



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 R04350B 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.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

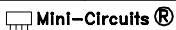


DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	AV	05/08/02
	CHECKED	DB	05/16/02
	APPROVED	WL	05/16/02

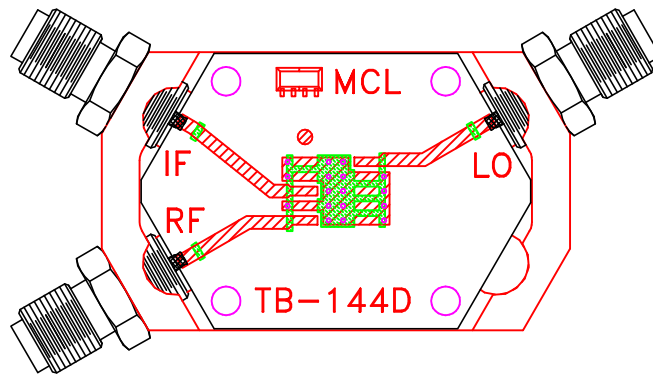
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PL, 10MX01, DZ883/885/1650, TB-144

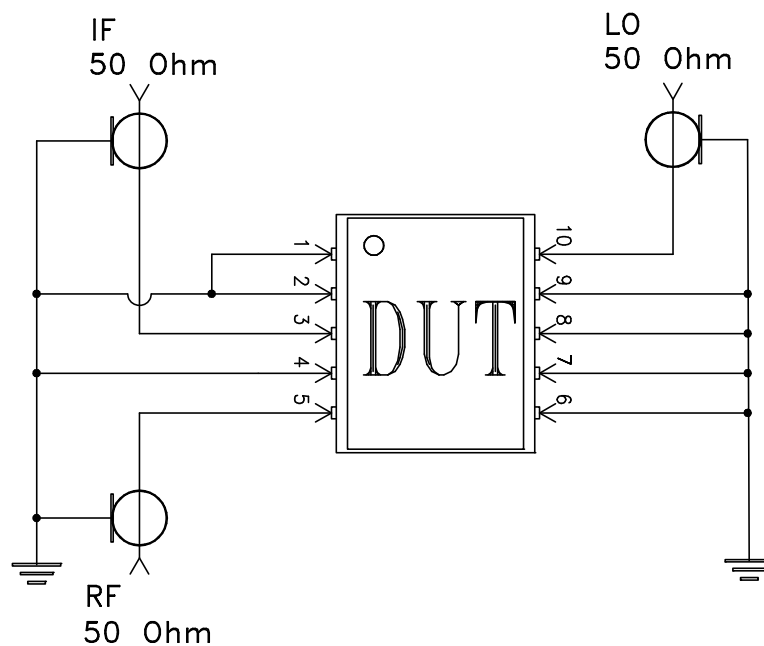
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-045	D
FILE:	98PL045	SCALE:	8:1
		SHEET:	1 OF 1

Evaluation Board and Circuit




TB-144



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 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