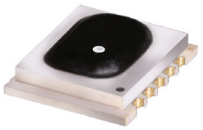
NON-CATALOG

Ceramic

Frequency Mixer WIDE BAND

MCA1T-24MH+

Level 13 (LO Power+13 dBm) 300 to 2400 MHz



CASE STYLE: DZ885-2

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
RF Power	200 mW
IF Current	40 mA

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

Pin Connections

LO	10
RF	5
IF	3
GROUND	1,2,4,6,7,8,9

Features

- wide bandwidth, 300 to 2400 MHz
- low conversion loss, 6.1 dB typ.
- excellent L-R isolation, 40 dB typ.
- LTCC double balanced mixer
- aqueous washable
- low cost
- low profile, 0.095"
- protected by US Patent 7,027,795 & 8,749,989

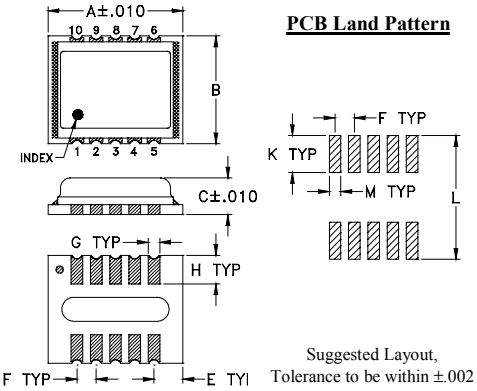
+RoHS Compliant

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

Applications

- cellular
- PCN
- defense & weather radar
- UHF TV
- WCDMA
- defense communications

Outline Drawing

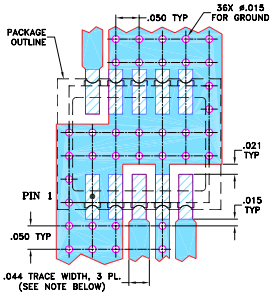


Outline Dimensions (inch / mm)

A	B	C	E	F	G
.350	.280	.095	.075	.050	.030
8.89	7.11	2.41	1.91	1.27	0.76

H	K	L	M	wt
.074	.096	.321	.030	grams
1.88	2.44	8.15	0.76	0.21

Demo Board MCL P/N: TB-493+
Suggested PCB Layout (PL-288)



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

Electrical Specifications (T_{AMB}=-55°C to 100°C)

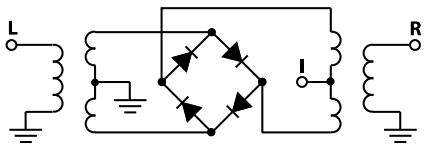
FREQUENCY (MHz)		CONVERSION LOSS (dB)			LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
LO/RF f_L-f_U	IF	$\overline{X}$	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.
300-2400	DC-700	6.1	0.1	8.9	40	20	25	14	13

1 dB COMPR. +9 dBm typ.

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm	LO +13dBm
300.00	330.00	5.82	49.37	21.78	1.81	8.01
400.00	430.00	5.10	42.20	23.99	1.56	2.46
500.00	530.00	6.84	40.15	27.27	3.96	1.34
700.00	730.00	6.58	46.19	27.35	3.69	2.12
1000.00	1030.00	7.41	43.92	24.46	4.01	2.74
1200.00	1230.00	7.45	39.35	31.83	4.28	3.82
1500.00	1530.00	5.74	39.15	28.78	1.91	2.66
1700.00	1730.00	5.13	36.63	25.65	1.04	1.79
2000.00	2030.00	6.17	32.38	21.69	2.26	2.44
2200.00	2230.00	7.25	33.19	20.62	3.48	3.62
2400.00	2430.00	7.16	30.70	25.44	3.42	7.44

Electrical Schematic



Notes

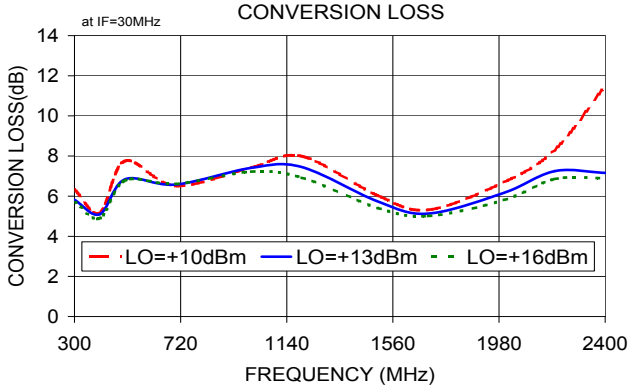
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

NON-CATALOG

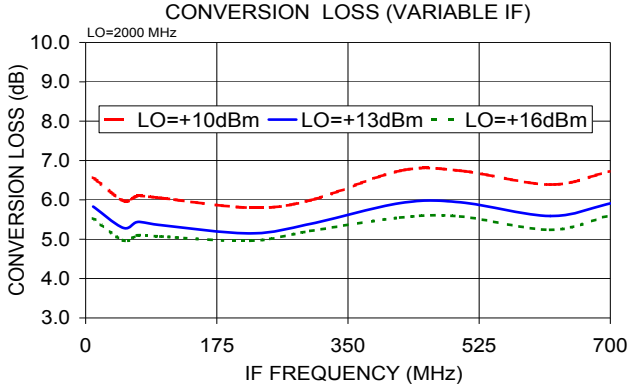
Performance Charts

MCA1T-24MH+

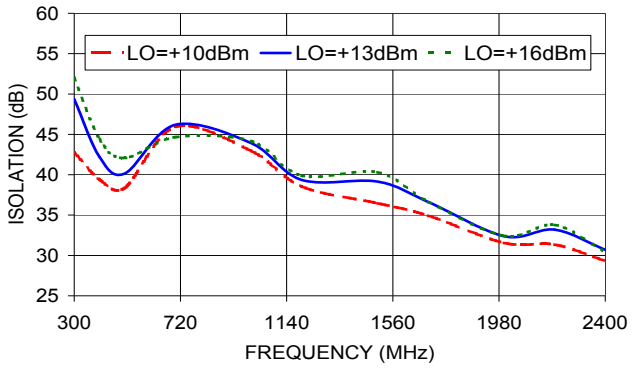
MCA1T-24MH+
CONVERSION LOSS



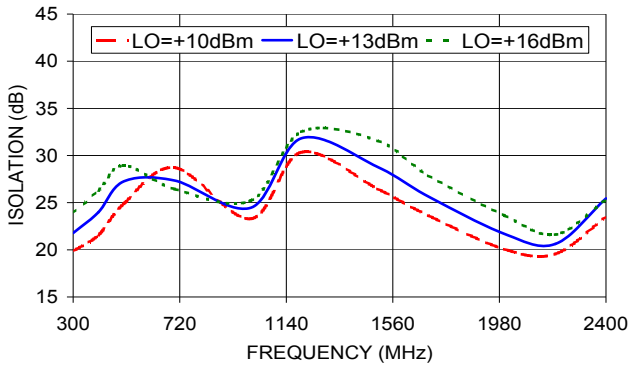
MCA1T-24MH+
CONVERSION LOSS (VARIABLE IF)



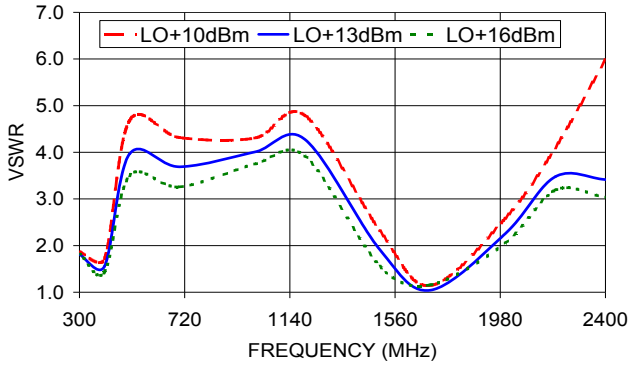
MCA1T-24MH+
L-R ISOLATION



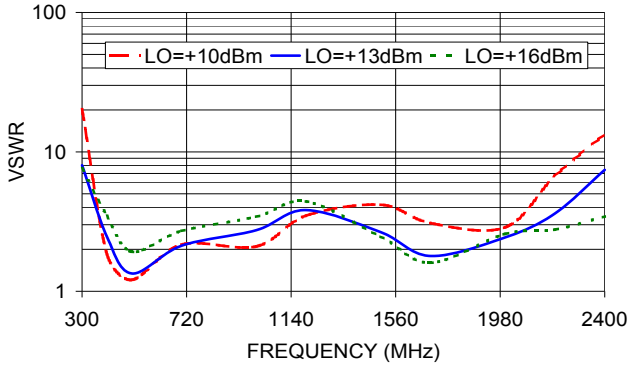
MCA1T-24MH+
L-I ISOLATION



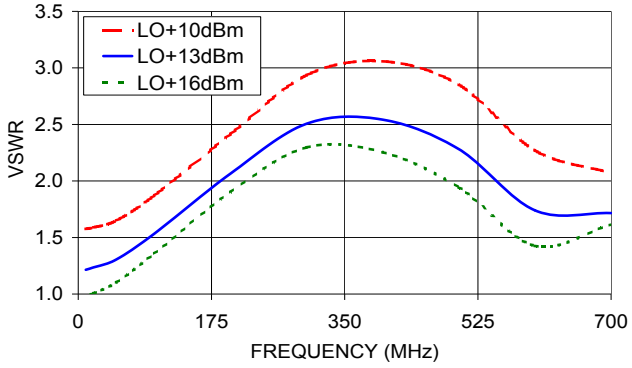
MCA1T-24MH+
RF VSWR



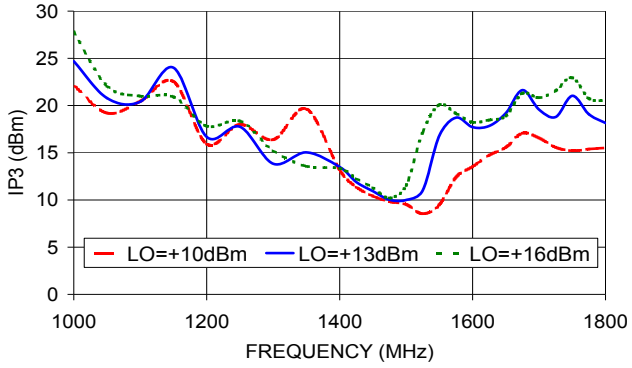
MCA1T-24MH+
LO VSWR



MCA1T-24MH+
IF VSWR



MCA1T-24MH+
IP3



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

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+10	+13	+16
220.0	250.0	27.70	14.43	7.73
300.0	330.0	7.10	5.51	5.29
380.0	410.0	5.25	4.84	4.63
460.0	490.0	6.90	5.93	5.37
540.0	570.0	7.37	6.44	5.97
620.0	650.0	6.40	6.20	6.05
700.0	730.0	6.10	5.83	5.77
780.0	810.0	6.66	6.06	5.79
860.0	890.0	6.97	6.53	6.27
940.0	970.0	6.78	6.41	6.23
1020.0	1050.0	6.70	6.46	6.32
1100.0	1130.0	7.12	6.65	6.41
1180.0	1210.0	7.91	6.91	6.37
1260.0	1290.0	8.74	7.49	6.80
1340.0	1370.0	6.96	6.47	6.18
1420.0	1450.0	6.55	5.85	5.42
1500.0	1530.0	6.23	5.57	5.11
1580.0	1610.0	5.47	4.81	4.71
1660.0	1690.0	5.25	4.85	4.79
1740.0	1770.0	5.34	5.06	5.02
1820.0	1850.0	5.72	5.21	5.11
1900.0	1930.0	5.67	5.09	4.96
1980.0	2010.0	6.90	5.86	5.36
2060.0	2090.0	7.84	6.68	6.04
2140.0	2170.0	8.13	6.83	6.25
2200.0	2230.0	8.08	6.61	6.20
2280.0	2310.0	8.98	6.60	6.14
2340.0	2370.0	10.83	6.53	6.14
2420.0	2450.0	11.80	6.71	6.33
2480.0	2510.0	10.67	7.17	6.88
2560.0	2590.0	11.95	7.87	7.20
2620.0	2650.0	11.56	8.41	7.49
2700.0	2730.0	9.59	8.49	7.97
2760.0	2790.0	8.81	8.48	8.39
2840.0	2870.0	8.50	7.84	7.62
2900.0	2930.0	9.01	8.28	7.87
2980.0	3010.0	8.75	8.24	8.05
3040.0	3070.0	9.52	9.15	8.94
3120.0	3150.0	10.91	10.29	9.92
3180.0	3210.0	11.68	10.85	10.37

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+10	+13	+16
220.0	250.0	-4.93	2.43	12.69
300.0	330.0	8.92	14.10	18.25
380.0	410.0	13.71	18.56	22.38
460.0	490.0	11.04	14.23	16.71
540.0	570.0	13.00	16.37	18.09
620.0	650.0	15.41	14.47	15.50
700.0	730.0	14.93	17.60	16.92
780.0	810.0	20.42	18.36	15.36
860.0	890.0	22.43	27.09	28.04
940.0	970.0	17.00	19.54	22.78
1020.0	1050.0	22.13	23.17	23.99
1100.0	1130.0	22.88	21.12	21.16
1180.0	1210.0	16.21	19.25	21.56
1260.0	1290.0	15.72	16.66	17.23
1340.0	1370.0	19.03	14.93	13.68
1420.0	1450.0	12.63	13.48	13.73
1500.0	1530.0	9.74	10.21	13.51
1580.0	1610.0	14.81	19.63	19.83
1660.0	1690.0	18.08	22.23	20.11
1740.0	1770.0	15.41	20.85	22.60
1820.0	1850.0	23.25	16.18	20.10
1900.0	1930.0	11.77	15.71	21.23
1980.0	2010.0	13.69	15.22	17.24
2060.0	2090.0	13.70	17.17	19.86
2140.0	2170.0	13.08	14.85	16.72
2200.0	2230.0	12.42	14.87	18.19
2280.0	2310.0	11.22	14.52	21.27
2340.0	2370.0	7.40	18.21	21.83
2420.0	2450.0	7.35	22.02	24.51
2480.0	2510.0	9.70	18.89	23.24
2560.0	2590.0	9.01	24.81	23.27
2620.0	2650.0	11.16	25.56	22.04
2700.0	2730.0	15.92	22.84	23.02
2760.0	2790.0	14.95	17.24	25.27
2840.0	2870.0	14.84	15.18	16.06
2900.0	2930.0	19.88	18.57	17.73
2980.0	3010.0	15.65	18.28	20.24
3040.0	3070.0	20.64	23.32	25.27
3120.0	3150.0	20.64	22.47	24.63
3180.0	3210.0	19.47	22.68	24.10

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+9dBm (dB) @LO (dBm)		
		+10	+13	+16
220.0	250.0	-14.43	-3.87	0.55
300.0	330.0	2.65	2.01	1.30
380.0	410.0	3.31	2.83	2.52
460.0	490.0	2.60	2.74	2.70
540.0	570.0	1.55	1.69	1.63
620.0	650.0	1.39	1.18	1.07
700.0	730.0	1.16	0.87	0.63
780.0	810.0	0.87	0.85	0.77
860.0	890.0	0.84	0.59	0.50
940.0	970.0	1.02	0.72	0.54
1020.0	1050.0	0.93	0.63	0.49
1100.0	1130.0	1.21	0.91	0.75
1180.0	1210.0	1.30	1.27	1.16
1260.0	1290.0	1.18	1.36	1.35
1340.0	1370.0	1.96	1.64	1.46
1420.0	1450.0	1.68	1.40	1.39
1500.0	1530.0	1.76	1.60	1.52
1580.0	1610.0	2.01	1.19	0.89
1660.0	1690.0	1.83	1.04	0.74
1740.0	1770.0	1.83	1.01	0.74
1820.0	1850.0	1.77	1.27	0.96
1900.0	1930.0	1.74	1.28	0.91
1980.0	2010.0	1.43	1.47	1.43
2060.0	2090.0	1.12	1.16	1.23
2140.0	2170.0	1.25	0.95	0.88
2200.0	2230.0	1.10	0.85	0.65
2280.0	2310.0	0.45	0.85	0.60
2340.0	2370.0	-0.96	0.95	0.47
2420.0	2450.0	-1.53	0.98	0.46
2480.0	2510.0	-0.42	0.98	0.48
2560.0	2590.0	-0.85	0.82	0.50
2620.0	2650.0	-0.69	0.51	0.50
2700.0	2730.0	0.44	0.34	0.31
2760.0	2790.0	0.98	0.48	0.31
2840.0	2870.0	1.13	0.93	0.76
2900.0	2930.0	0.61	0.59	0.56
2980.0	3010.0	1.22	0.65	0.38
3040.0	3070.0	0.86	0.47	0.33
3120.0	3150.0	0.63	0.34	0.23
3180.0	3210.0	1.00	0.32	0.17

Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1210.1MHz (dB) @LO (dBm) +13
770.1	440.0	9.69
750.1	460.0	9.77
730.1	480.0	9.53
710.1	500.0	9.21
690.1	520.0	8.68
670.1	540.0	8.16
650.1	560.0	7.59
630.1	580.0	6.88
610.1	600.0	6.19
590.1	620.0	5.79
570.1	640.0	5.80
550.1	660.0	5.85
530.1	680.0	6.09
510.1	700.0	6.68
490.1	720.0	7.23
470.1	740.0	8.12
450.1	760.0	8.62
430.1	780.0	8.49
410.1	800.0	8.66
390.1	820.0	8.28
370.1	840.0	8.20
350.1	860.0	7.90
330.1	880.0	7.59
310.1	900.0	7.40
290.1	920.0	7.33
270.1	940.0	7.13
250.1	960.0	6.88
230.1	980.0	6.75
210.1	1000.0	6.65
190.1	1020.0	6.56
170.1	1040.0	6.45
150.1	1060.0	6.38
130.1	1080.0	6.42
110.1	1100.0	6.51
90.1	1120.0	6.57
70.1	1140.0	6.57
50.1	1160.0	6.55
40.1	1170.0	6.60
20.1	1190.0	6.63
10.1	1200.0	6.69

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=289.9MHz (dB) @LO (dBm) +13
10.1	300.0	6.40
30.1	320.0	5.67
50.1	340.0	5.61
70.1	360.0	5.55
90.1	380.0	5.47
110.1	400.0	5.41
130.1	420.0	5.41
150.1	440.0	5.40
170.1	460.0	5.56
190.1	480.0	5.76
210.1	500.0	5.85
230.1	520.0	5.92
250.1	540.0	5.96
270.1	560.0	6.07
290.1	580.0	6.09
310.1	600.0	6.28
330.1	620.0	6.35
350.1	640.0	6.31
370.1	660.0	6.06
390.1	680.0	5.99
410.1	700.0	6.15
430.1	720.0	6.13
450.1	740.0	6.68
470.1	760.0	6.54
490.1	780.0	6.21
510.1	800.0	6.16
530.1	820.0	6.05
550.1	840.0	6.07
570.1	860.0	6.00
590.1	880.0	5.82
610.1	900.0	5.85
630.1	920.0	5.95
670.1	960.0	5.76
690.1	980.0	5.97
730.1	1020.0	6.26
750.1	1040.0	6.46
790.1	1080.0	7.00
810.1	1100.0	7.37
850.1	1140.0	8.54
870.1	1160.0	9.48

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2410.1MHz (dB) @LO (dBm) +13
830.1	1580.0	10.72
810.1	1600.0	9.85
790.1	1620.0	9.51
770.1	1640.0	9.04
750.1	1660.0	8.75
730.1	1680.0	8.59
710.1	1700.0	8.35
690.1	1720.0	8.29
670.1	1740.0	8.30
650.1	1760.0	8.06
630.1	1780.0	7.78
610.1	1800.0	7.69
590.1	1820.0	7.72
570.1	1840.0	7.58
550.1	1860.0	7.54
530.1	1880.0	7.57
510.1	1900.0	7.79
490.1	1920.0	7.94
470.1	1940.0	7.97
450.1	1960.0	8.03
430.1	1980.0	8.09
410.1	2000.0	8.26
390.1	2020.0	8.33
370.1	2040.0	8.37
350.1	2060.0	8.40
330.1	2080.0	8.43
310.1	2100.0	8.49
290.1	2120.0	8.39
270.1	2140.0	8.13
250.1	2160.0	7.91
230.1	2180.0	7.77
210.1	2200.0	7.67
190.1	2220.0	7.31
170.1	2240.0	7.14
150.1	2260.0	7.24
130.1	2280.0	7.34
90.1	2320.0	6.94
70.1	2340.0	6.79
30.1	2380.0	6.84
10.1	2400.0	6.93

Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+10	+13	+16	+10	+13	+16
250.0	49.05	48.55	51.46	25.78	25.90	25.56
330.0	45.23	47.17	45.74	20.21	21.61	23.83
410.0	40.26	41.20	41.68	20.50	23.30	25.54
490.0	39.14	40.22	41.11	22.31	24.57	26.43
570.0	67.09	57.41	53.00	25.41	28.15	29.98
650.0	46.01	44.48	44.18	28.00	28.13	27.49
730.0	43.60	42.39	41.15	27.82	26.55	25.60
810.0	42.47	41.84	41.37	33.45	31.83	30.30
890.0	40.70	41.33	41.71	28.81	30.17	31.18
970.0	40.60	41.25	41.79	23.43	24.93	26.16
1050.0	42.68	42.60	42.60	24.37	25.05	25.22
1130.0	44.11	43.24	42.78	28.42	28.23	27.79
1210.0	43.28	42.96	41.84	32.23	32.48	31.89
1290.0	46.68	45.21	43.16	33.72	35.89	35.91
1370.0	36.97	34.39	34.94	31.33	34.32	37.04
1450.0	50.16	46.47	43.14	29.18	31.75	34.95
1530.0	41.54	39.59	37.23	27.09	29.03	31.96
1610.0	38.36	35.16	33.12	26.12	29.74	33.83
1690.0	36.86	32.92	30.86	26.35	29.03	32.05
1770.0	38.40	36.46	34.41	22.99	25.05	27.45
1850.0	35.62	33.36	31.84	21.30	22.98	25.24
1930.0	34.46	33.07	32.06	20.21	21.95	24.03
2010.0	35.00	32.75	31.40	21.30	22.66	24.63
2090.0	38.53	34.83	32.70	24.25	27.00	29.88
2170.0	36.90	33.59	31.59	21.22	22.56	23.73
2230.0	38.58	34.94	32.17	21.03	22.24	22.95
2310.0	38.85	38.05	35.15	21.32	22.02	22.00
2370.0	37.84	36.82	34.95	23.21	24.84	24.35
2450.0	37.49	35.60	32.35	31.10	32.36	28.52
2510.0	41.15	35.60	30.30	39.48	35.17	29.11
2590.0	45.83	37.00	32.47	40.78	30.64	25.22
2650.0	46.38	36.45	32.55	36.40	27.27	23.35
2730.0	41.93	34.66	32.23	29.52	23.88	21.66
2790.0	36.74	32.21	30.29	25.59	22.62	21.07
2870.0	39.97	35.71	33.33	22.71	22.00	21.38
2930.0	36.78	35.29	34.12	21.91	22.26	22.24
3010.0	32.00	31.69	31.72	20.91	21.78	22.18
3070.0	31.14	31.16	31.42	19.49	20.88	21.99
3150.0	31.11	31.51	31.89	19.09	20.88	22.40
3210.0	32.64	33.11	33.45	19.35	21.31	23.08

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+10	+13	+16
220.0	250.0	32.11	27.24	24.41
300.0	330.0	21.55	18.53	18.01
380.0	410.0	16.33	15.74	15.42
460.0	490.0	14.59	14.15	13.92
540.0	570.0	20.22	19.31	18.65
620.0	650.0	28.73	27.72	26.88
700.0	730.0	31.87	30.82	28.79
780.0	810.0	32.83	30.22	28.19
860.0	890.0	30.43	28.80	27.80
940.0	970.0	31.48	30.68	30.18
1020.0	1050.0	38.55	38.17	38.02
1100.0	1130.0	31.26	30.75	30.41
1180.0	1210.0	27.04	26.65	26.38
1260.0	1290.0	23.18	22.41	22.26
1340.0	1370.0	23.65	21.46	19.97
1420.0	1450.0	22.25	21.91	21.78
1500.0	1530.0	23.44	22.50	21.97
1580.0	1610.0	22.94	23.14	23.33
1660.0	1690.0	23.24	22.73	22.56
1740.0	1770.0	23.02	22.74	22.51
1820.0	1850.0	23.42	22.80	22.59
1900.0	1930.0	22.07	20.97	20.68
1980.0	2010.0	30.30	28.83	27.37
2060.0	2090.0	26.56	25.79	25.12
2140.0	2170.0	28.80	24.28	22.65
2200.0	2230.0	40.08	40.57	32.20
2280.0	2310.0	26.28	25.15	23.74
2340.0	2370.0	26.15	24.46	23.20
2420.0	2450.0	30.11	28.13	25.78
2480.0	2510.0	21.93	21.70	20.76
2560.0	2590.0	17.83	18.96	18.53
2620.0	2650.0	17.82	18.06	17.72
2700.0	2730.0	17.69	16.95	16.55
2760.0	2790.0	16.97	16.21	15.74
2840.0	2870.0	16.63	16.15	15.75
2900.0	2930.0	16.82	16.37	15.92
2980.0	3010.0	15.84	15.42	15.07
3040.0	3070.0	15.09	14.81	14.58
3120.0	3150.0	14.52	14.23	14.00
3180.0	3210.0	14.35	14.03	13.72

Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+10	+13	+16
220.0	250.0	15.96	8.12	3.93
300.0	330.0	2.26	1.97	1.99
380.0	410.0	1.69	1.55	1.46
460.0	490.0	3.31	2.92	2.68
540.0	570.0	4.42	3.95	3.69
620.0	650.0	3.83	3.63	3.52
700.0	730.0	3.82	3.35	2.99
780.0	810.0	4.16	3.67	3.31
860.0	890.0	4.24	3.88	3.65
940.0	970.0	3.94	3.63	3.47
1020.0	1050.0	3.76	3.55	3.42
1100.0	1130.0	4.23	3.88	3.65
1180.0	1210.0	4.55	4.09	3.80
1260.0	1290.0	4.67	4.10	3.83
1340.0	1370.0	3.46	3.01	2.62
1420.0	1450.0	2.97	2.63	2.32
1500.0	1530.0	2.41	1.93	1.50
1580.0	1610.0	1.48	1.17	1.07
1660.0	1690.0	1.34	1.11	1.06
1740.0	1770.0	1.21	1.09	1.14
1820.0	1850.0	1.50	1.32	1.32
1900.0	1930.0	1.65	1.36	1.26
1980.0	2010.0	2.27	1.94	1.72
2060.0	2090.0	2.86	2.49	2.25
2140.0	2170.0	3.26	2.83	2.59
2200.0	2230.0	3.26	2.75	2.57
2280.0	2310.0	3.63	2.71	2.47
2340.0	2370.0	4.23	2.72	2.52
2420.0	2450.0	4.50	2.74	2.49
2480.0	2510.0	3.72	2.58	2.34
2560.0	2590.0	4.33	3.35	3.09
2620.0	2650.0	4.78	3.91	3.60
2700.0	2730.0	4.45	4.01	3.79
2760.0	2790.0	4.15	3.89	3.76
2840.0	2870.0	4.18	3.84	3.62
2900.0	2930.0	4.34	3.97	3.68
2980.0	3010.0	3.81	3.51	3.33
3040.0	3070.0	4.03	3.82	3.67
3120.0	3150.0	4.50	4.27	4.09
3180.0	3210.0	4.70	4.43	4.23

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+10	+13	+16
250.0	28.96	28.03	20.95
330.0	13.49	7.00	6.28
410.0	2.59	2.95	3.82
490.0	1.34	1.88	2.62
570.0	1.36	1.38	1.93
650.0	1.77	1.62	2.09
730.0	1.99	2.08	2.65
810.0	2.31	2.78	3.58
890.0	2.58	3.27	4.25
970.0	2.40	3.31	4.45
1050.0	2.47	3.43	4.62
1130.0	3.23	3.92	4.91
1210.0	3.97	4.24	4.95
1290.0	4.63	4.31	4.61
1370.0	4.66	4.20	4.32
1450.0	4.32	3.43	3.52
1530.0	3.56	2.31	2.23
1610.0	3.54	2.21	2.03
1690.0	3.11	1.92	1.78
1770.0	2.48	1.56	1.59
1850.0	2.50	1.84	1.88
1930.0	2.70	2.21	2.28
2010.0	3.30	2.59	2.59
2090.0	4.35	3.00	2.77
2170.0	5.97	3.30	2.63
2230.0	7.02	3.63	2.63
2310.0	8.95	4.41	2.63
2370.0	10.31	5.95	2.98
2450.0	10.96	6.07	3.02
2510.0	10.31	5.10	2.71
2590.0	9.58	4.63	2.75
2650.0	8.68	4.08	2.72
2730.0	6.03	3.33	2.92
2790.0	4.30	3.20	3.24
2870.0	3.31	3.21	3.58
2930.0	2.92	3.23	3.73
3010.0	2.52	2.98	3.53
3070.0	2.26	2.82	3.38
3150.0	2.41	2.85	3.27
3210.0	2.75	3.06	3.36

IF (OUT) (MHz)	IF VSWR @LO=2400MHz (:1) @LO (dBm)		
	+10	+13	+16
10.0	2.49	1.08	1.22
30.0	2.56	1.10	1.21
50.0	2.62	1.14	1.18
70.0	2.55	1.17	1.23
90.0	2.65	1.21	1.21
110.0	2.69	1.25	1.25
130.0	2.84	1.31	1.24
150.0	2.91	1.36	1.28
170.0	3.03	1.42	1.32
190.0	3.09	1.43	1.34
210.0	3.28	1.50	1.36
230.0	3.44	1.56	1.38
250.0	3.60	1.64	1.44
270.0	3.72	1.64	1.42
290.0	3.91	1.71	1.45
310.0	4.13	1.77	1.44
330.0	4.35	1.88	1.52
350.0	4.48	1.92	1.52
370.0	4.59	1.96	1.54
390.0	4.70	2.03	1.55
410.0	4.79	2.09	1.60
430.0	4.98	2.17	1.65
450.0	4.93	2.15	1.63
470.0	5.07	2.21	1.66
490.0	5.10	2.20	1.65
510.0	5.27	2.28	1.71
530.0	5.19	2.21	1.66
550.0	5.19	2.24	1.69
570.0	5.17	2.18	1.66
590.0	5.19	2.20	1.69
610.0	5.12	2.16	1.70
630.0	5.04	2.12	1.70
650.0	4.98	2.11	1.76
670.0	4.84	2.10	1.83
690.0	4.78	2.17	1.97
710.0	4.53	2.16	2.08
730.0	4.39	2.28	2.29
750.0	4.14	2.42	2.58
790.0	3.77	2.92	3.30
810.0	3.64	3.19	3.63

Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	9	21	8	24	20	26	40	46	44	51
1	-	16	+0	21	39	27	39	46	35	46	41	48
2	66	51	60	42	53	55	48	54	57	61	63	57
3	>90	51	68	56	67	53	57	68	66	69	62	65
4	>90	>78	>78	>78	>78	71	73	>78	>78	>78	78	76
5	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
6	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
7	>90	>78	>78	>78	>78	>78	>78	>78	>78	77	>78	>78
8	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
9	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
10	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 1350 MHz; -6.00 dBm.
LO IN: 1380 MHz; +13.00 dBm
IF OUT: 30 MHz; -12.21 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	20	35	20	38	32	37	57	66	55	67
1	-	15	+0	26	33	30	45	54	46	62	55	61
2	46	41	53	37	44	46	41	50	52	55	77	61
3	>90	33	41	41	30	39	51	56	69	65	56	57
4	>90	66	57	56	57	51	53	67	56	62	64	72
5	>90	55	59	46	61	58	44	52	53	58	61	67
6	>90	60	62	81	67	61	67	69	60	83	63	78
7	>90	64	60	71	71	59	63	79	54	65	60	63
8	>90	77	81	60	71	73	81	71	>88	67	69	83
9	>90	78	86	>88	71	74	75	73	71	87	62	78
10	>90	>88	87	>88	>88	76	87	81	83	84	>88	82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

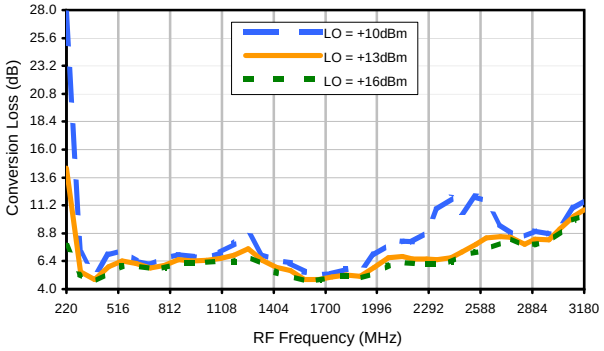
Test conditions: RF IN: 1350 MHz; 4.00 dBm.
LO IN: 1380 MHz; +13.00 dBm
IF OUT: 30 MHz; -2.3 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

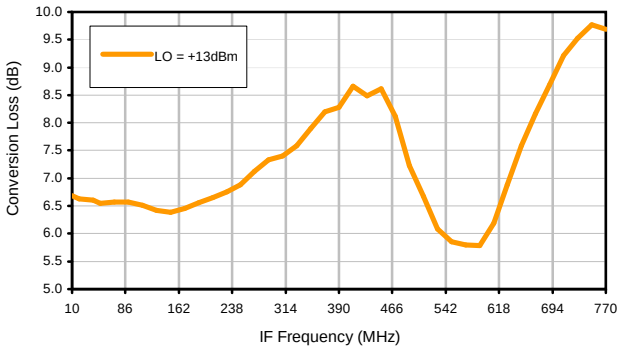
Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Typical Performance Curves

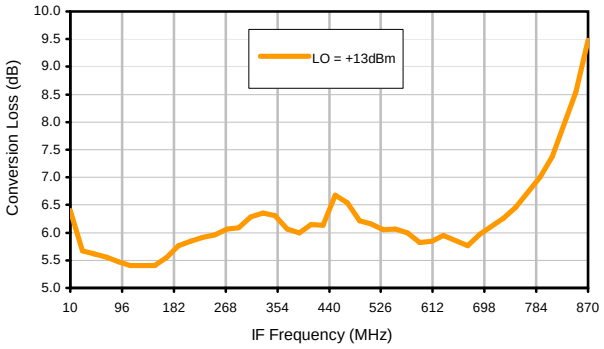
Conversion Loss @ IF=30MHz



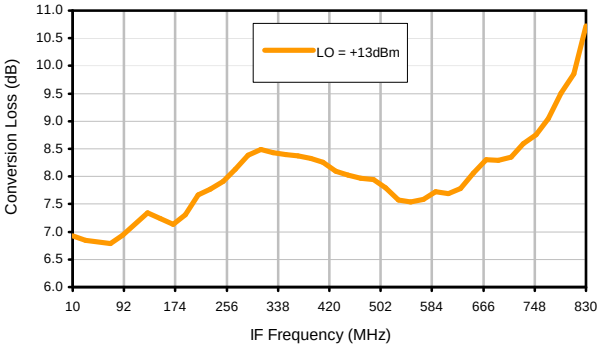
Conversion Loss vs. IF @ RF=1210.1MHz



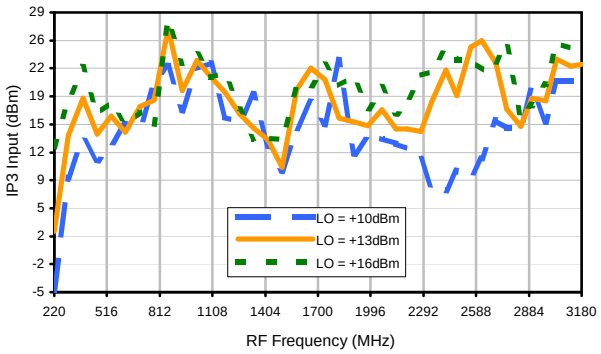
Conversion Loss vs. IF @ RF=289.9MHz



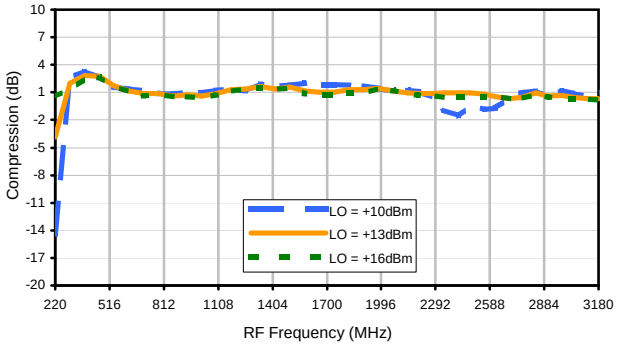
Conversion Loss vs. IF @ RF=2410.1MHz



IP3 Input



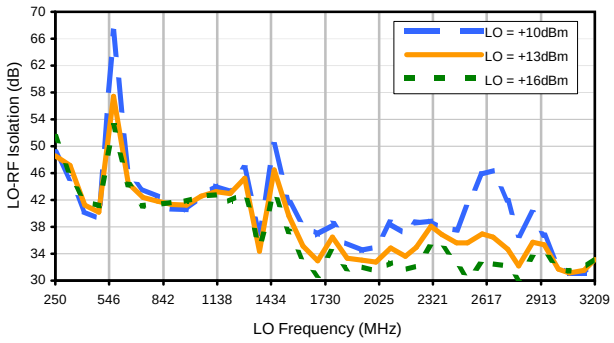
Compression @ RF IN=+9dBm



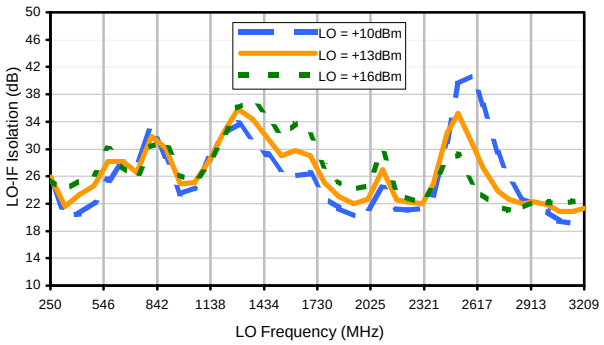
Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Typical Performance Curves

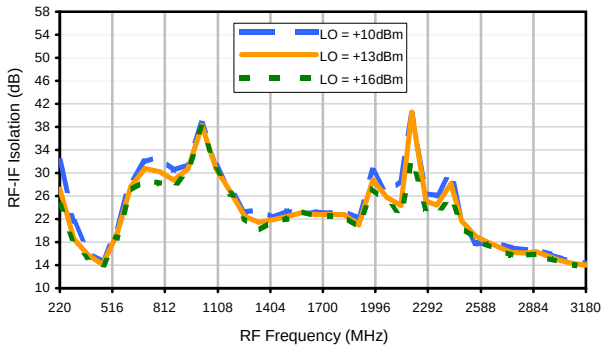
LO-RF Isolation



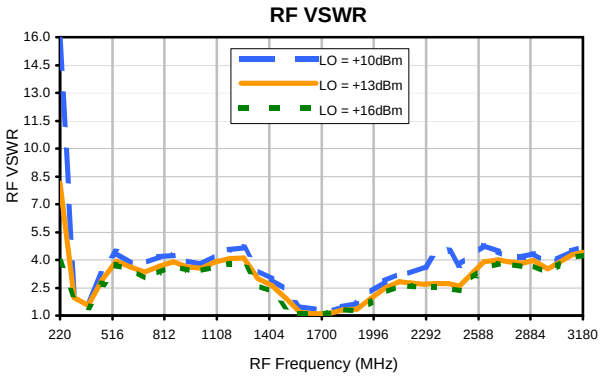
LO-IF Isolation



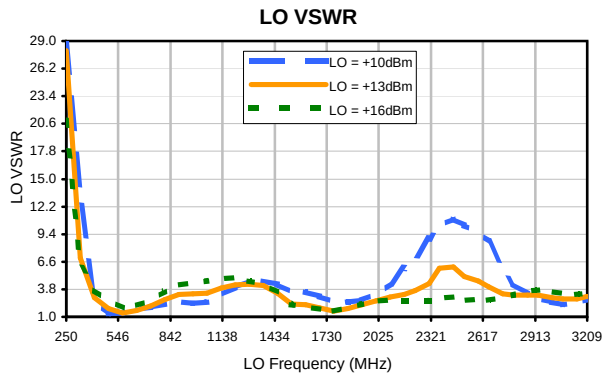
RF-IF Isolation



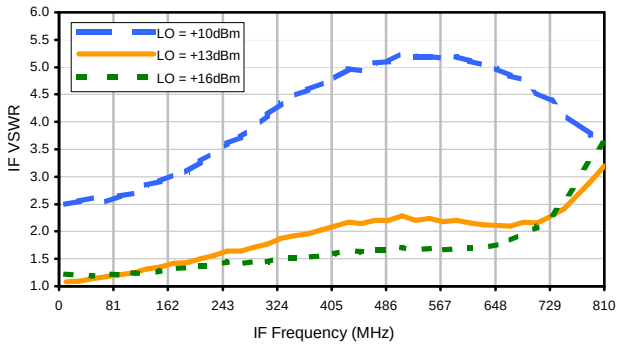
RF VSWR



LO VSWR



IF VSWR



Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	9	21	8	24	20	26	40	46	44	51
1	-	16	+0	21	39	27	39	46	35	46	41	48
2	66	51	60	42	53	55	48	54	57	61	63	57
3	>90	51	68	56	67	53	57	68	66	69	62	65
4	>90	>78	>78	>78	>78	71	73	>78	>78	>78	78	76
5	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
6	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
7	>90	>78	>78	>78	>78	>78	>78	>78	>78	77	>78	>78
8	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
9	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
10	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 1350 MHz; -6.00 dBm.
LO IN: 1380 MHz; +13.00 dBm
IF OUT: 30 MHz; -12.21 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	20	35	20	38	32	37	57	66	55	67
1	-	15	+0	26	33	30	45	54	46	62	55	61
2	46	41	53	37	44	46	41	50	52	55	77	61
3	>90	33	41	41	30	39	51	56	69	65	56	57
4	>90	66	57	56	57	51	53	67	56	62	64	72
5	>90	55	59	46	61	58	44	52	53	58	61	67
6	>90	60	62	81	67	61	67	69	60	83	63	78
7	>90	64	60	71	71	59	63	79	54	65	60	63
8	>90	77	81	60	71	73	81	71	>88	67	69	83
9	>90	78	86	>88	71	74	75	73	71	87	62	78
10	>90	>88	87	>88	>88	76	87	81	83	84	>88	82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1350 MHz; 4.00 dBm.
LO IN: 1380 MHz; +13.00 dBm
IF OUT: 30 MHz; -2.3 dBm

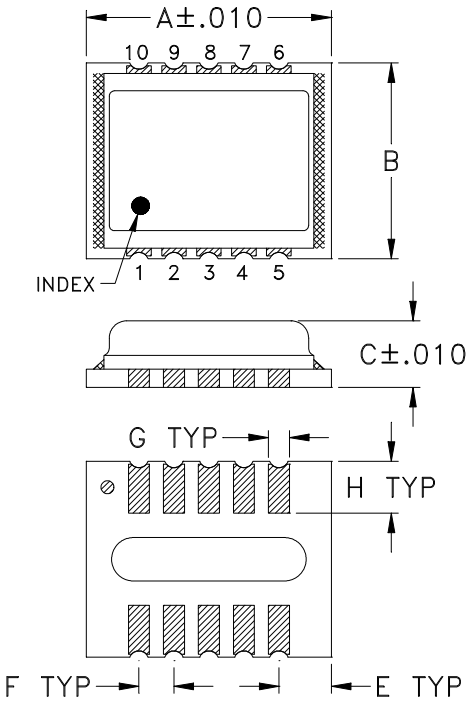
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Mini-Circuits®
ISO 9001 ISO 14001 AS9100 CERTIFIED
minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
IF/RF MICROWAVE COMPONENTS

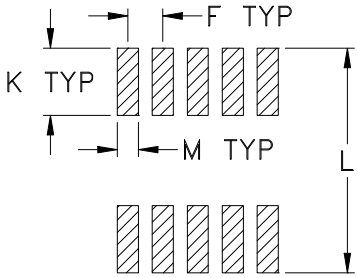
Case Style DZ

DZ885-2

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. GRAMS
DZ885-2	.350 (8.89)	.280 (7.11)	.095 (2.41)	-- --	.075 (1.91)	.050 (1.27)	.030 (0.76)	.074 (1.88)	-- --	.096 (2.44)	.321 (8.15)	.030 (0.76)	0.21

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

Notes:

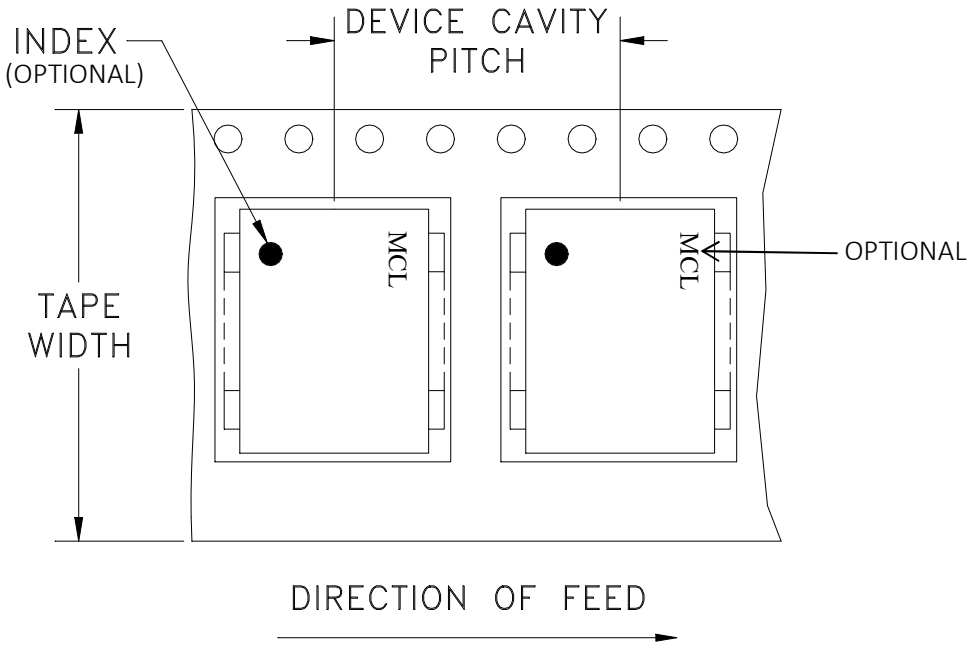
1. Case material: Plastic encapsulation on Ceramic base, mounted on PCB carrier board.
2. Termination finish:
   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.

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

This document and its contents are the property of Mini-Circuits.

Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

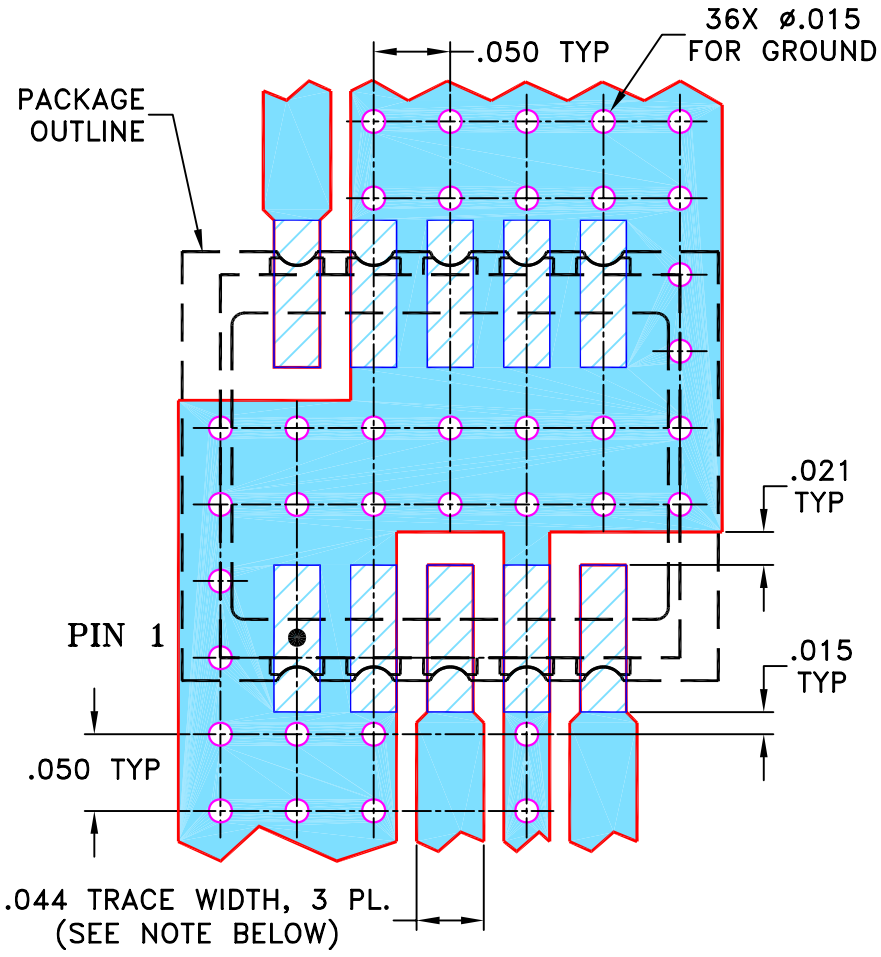
Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

This document and its contents are the property of Mini-Circuits.

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M119455	NEW RELEASE	09/08/08	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DZ885-2/DZ1383-2 CASE STYLES "10MX01" PIN CODE



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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	09/05/08
TOLERANCES ON:	CHECKED	MMG	09/08/08
2 PL DECIMALS ±	APPROVED	DJ	09/08/08
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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.

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

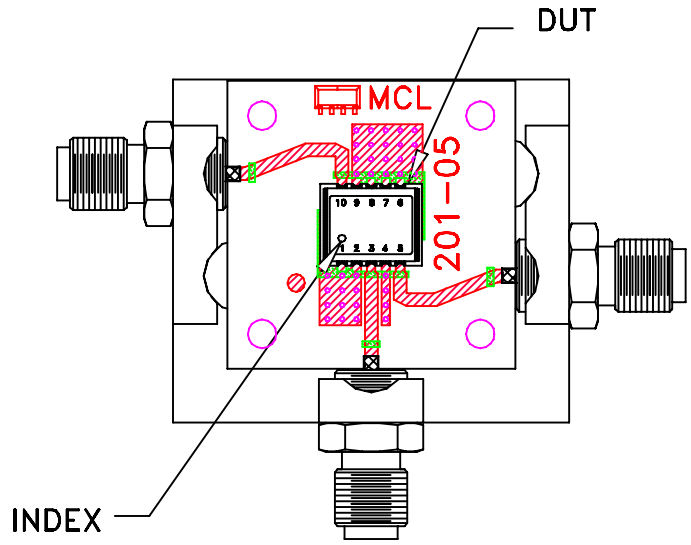
PL, 10MX01, DZ885-2/DZ1383-2, TB-493

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-288	OR

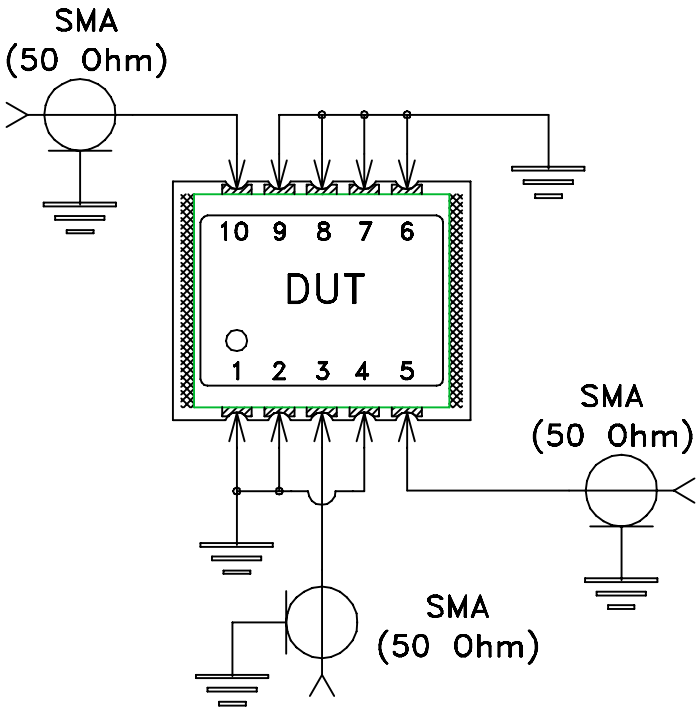
FILE:	SCALE:	SHEET:
98PL288	8:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-493+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS.

Mini-Circuits

Environmental Specifications ENV10T2

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 Case Temperature	Individual Model Data Sheet
Storage Temperature	-40° to 85° 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

This document and its contents are the property of Mini-Circuits.