

Coaxial Frequency Mixer

Level 23 (LO Power +23 dBm) 10 to 1000 MHz

Maximum Ratings

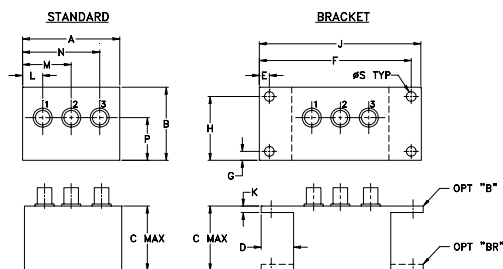
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	350mW
IF Current	40mA

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

Coaxial Connections

LO	1
RF	3
IF	2

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.50	1.13	1.00	.50	.155	2.345	.138	.987
38.10	28.70	25.40	12.70	3.94	59.56	3.51	25.07

J	K	L	M	N	P	S	wt
2.50	.10	.31	.75	1.19	.66	.150	grams
63.50	2.54	7.87	19.05	30.23	16.76	3.81	40.0

Features

- low conversion loss, 6.89 dB typ.
- high isolation, 40 dB typ. L-R, 35 dB typ. L-I
- wideband, 10 to 1000 MHz

Applications

- VHF/UHF
- cellular
- instrumentation



CASE STYLE: M21

Connectors Model Price Qty.
Contact Sales Dept.

+RoHS Compliant

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

NON-CATALOG

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF	IF	Mid-Band		Total		L		M		U		L		M		U	
f_L - f_U		$\bar{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
10-1000	DC-1000	6.89	0.22	8.5	10.0	50	35	40	30	35	25	50	35	35	25	25	20

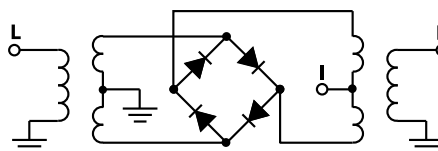
1 dB COMP.: +15 dBm typ.

L = low range [f_L to 10 f_L] M = mid range [10 f_L to $f_U/2$] U = upper range [$f_U/2$ to f_U]
m = mid band [$2f_L$ to $f_U/2$]

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 +23dBm	LO +23dBm	LO +23dBm	LO +23dBm	LO +23dBm
10.00	40.00	7.24	62.69	65.25	1.1	2.2
39.12	69.12	7.31	59.37	63.70	1.1	1.9
68.24	98.24	7.27	56.74	61.14	1.1	2.2
126.47	96.47	7.14	53.84	56.28	1.2	1.8
184.71	154.71	7.22	48.58	50.62	1.2	1.9
213.83	183.83	7.24	45.40	47.73	1.2	1.8
272.06	242.06	7.23	42.61	45.47	1.2	1.8
330.30	300.30	7.29	41.54	44.13	1.2	2.0
388.53	358.53	7.36	40.25	42.56	1.2	2.2
446.77	416.77	7.64	38.45	40.78	1.2	2.2
505.01	475.01	7.63	36.69	39.32	1.1	2.3
534.12	504.12	7.90	35.83	37.92	1.1	2.3
592.36	562.36	8.08	35.57	36.44	1.2	2.2
650.60	620.60	7.76	36.21	34.53	1.2	2.0
708.83	678.83	7.65	36.58	34.06	1.4	1.8
767.07	737.07	7.45	36.95	33.05	1.6	1.5
825.30	795.30	7.70	36.19	31.58	1.8	1.5
883.54	853.54	8.40	35.85	30.60	2.0	1.6
941.78	911.78	9.21	34.74	29.37	2.2	2.1
1000.00	970.00	9.87	34.25	29.56	2.7	4.9

Electrical Schematic



Mini-Circuits
ISO 9001 ISO 14001 AS 9100 CERTIFIED

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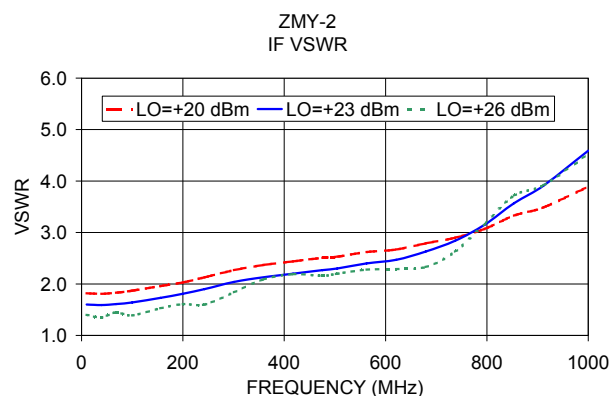
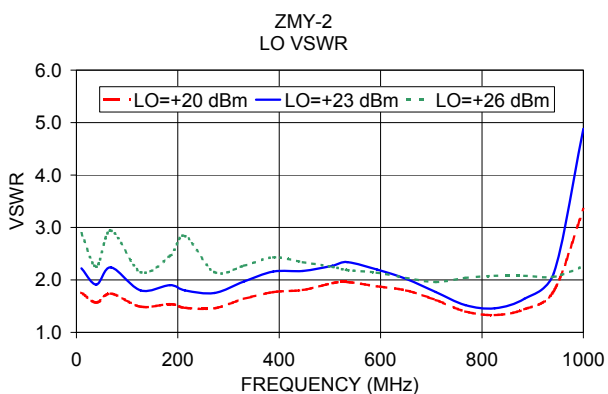
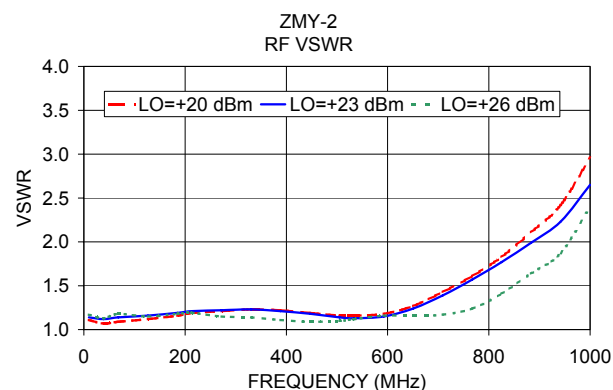
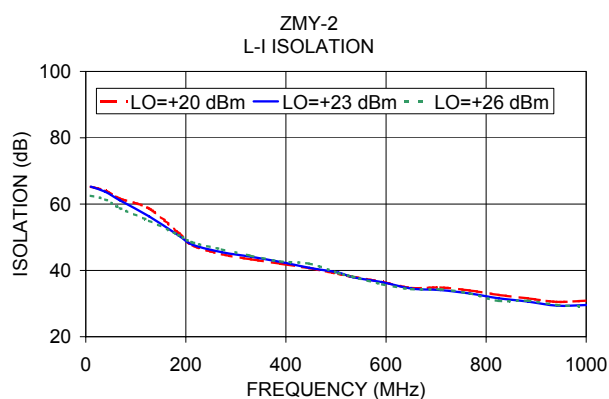
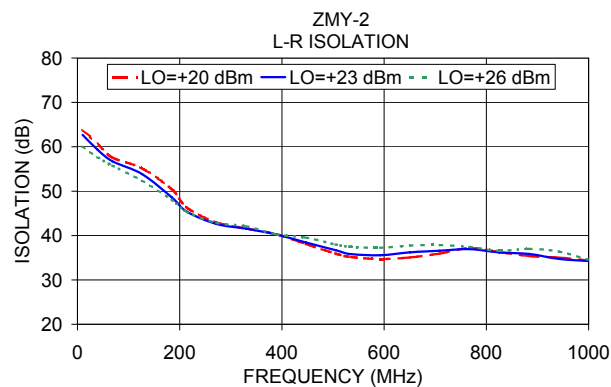
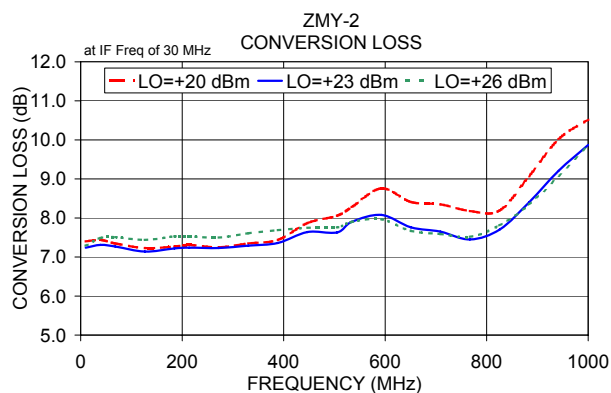
For detailed performance specs & shopping online see web site

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

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Performance Charts

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ZMY-2**



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Frequency Mixer

ZMY-2+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+20	+23	+26
10.1	40.1	6.20	6.01	5.91
20.1	50.1	6.10	5.96	5.90
30.1	60.1	6.19	6.04	5.97
40.1	70.1	6.22	6.07	6.01
60.1	90.1	6.21	6.11	6.07
80.1	110.1	6.27	6.16	6.11
100.1	130.1	6.28	6.16	6.11
125.1	155.1	6.27	6.19	6.15
150.1	180.1	6.33	6.25	6.21
175.1	205.1	6.37	6.27	6.22
200.1	230.1	6.34	6.25	6.20
225.1	255.1	6.32	6.24	6.20
250.1	280.1	6.41	6.33	6.29
275.1	305.1	6.47	6.35	6.29
300.1	330.1	6.47	6.33	6.27
325.1	355.1	6.48	6.37	6.28
350.1	380.1	6.58	6.47	6.40
400.1	430.1	6.58	6.47	6.43
450.1	480.1	6.87	6.70	6.58
500.1	530.1	7.06	6.84	6.68
550.1	580.1	6.94	6.70	6.54
600.1	630.1	6.93	6.70	6.57
650.1	680.1	7.07	6.69	6.47
700.1	730.1	7.56	6.99	6.70
750.1	780.1	8.61	7.57	6.89
800.1	830.1	9.04	8.25	7.50
850.1	880.1	9.13	8.26	7.72
900.1	930.1	8.81	8.17	7.87
950.1	980.1	8.52	8.14	7.94
1000.1	1030.1	8.83	8.60	8.45
1050.1	1080.1	9.14	8.86	8.69
1100.1	1130.1	9.79	9.55	9.39
1150.1	1180.1	10.17	9.89	9.69
1200.1	1230.1	10.85	10.60	10.41
1250.1	1280.1	11.10	10.88	10.72
1300.1	1330.1	11.87	11.64	11.46
1350.1	1380.1	12.36	12.15	11.99
1400.1	1430.1	13.20	13.03	12.91
1450.1	1480.1	13.46	13.28	13.17
1500.1	1530.1	14.16	14.01	13.92

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+20	+23	+26
10.1	40.1	28.96	30.91	30.54
20.1	50.1	30.43	29.58	37.34
30.1	60.1	27.99	28.37	41.13
40.1	70.1	28.54	30.04	30.62
60.1	90.1	28.98	29.89	29.83
80.1	110.1	33.29	27.66	29.79
100.1	130.1	32.48	26.98	28.99
125.1	155.1	26.44	27.75	29.13
150.1	180.1	25.79	28.17	29.33
175.1	205.1	25.57	27.93	28.96
200.1	230.1	25.44	26.86	28.32
225.1	255.1	25.70	27.20	29.01
250.1	280.1	24.93	26.03	28.33
275.1	305.1	25.42	26.55	29.77
300.1	330.1	24.44	26.85	30.35
325.1	355.1	24.43	25.79	28.42
350.1	380.1	26.13	26.46	29.24
400.1	430.1	26.14	28.60	32.26
450.1	480.1	20.58	22.83	26.77
500.1	530.1	21.57	23.42	25.99
550.1	580.1	24.36	27.28	32.24
600.1	630.1	26.79	31.19	35.10
650.1	680.1	25.08	31.32	31.44
700.1	730.1	24.57	29.44	29.33
750.1	780.1	19.18	23.53	27.59
800.1	830.1	20.78	23.18	26.10
850.1	880.1	18.54	22.46	25.43
900.1	930.1	22.86	26.18	25.92
950.1	980.1	30.71	29.16	28.17
1000.1	1030.1	32.23	31.78	30.47
1050.1	1080.1	30.32	32.85	35.21
1100.1	1130.1	28.39	30.61	33.08
1150.1	1180.1	29.49	29.18	33.03
1200.1	1230.1	32.90	31.05	33.03
1250.1	1280.1	32.78	33.68	33.06
1300.1	1330.1	35.21	36.03	35.62
1350.1	1380.1	32.23	33.13	34.22
1400.1	1430.1	31.59	32.16	33.78
1450.1	1480.1	33.64	33.85	34.51
1500.1	1530.1	36.16	38.17	40.10

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+15dBm (dB)		
		@LO (dBm)		
		+20	+23	+26
10.1	40.1	0.23	0.13	0.05
20.1	50.1	0.27	0.12	0.03
30.1	60.1	0.24	0.14	0.05
40.1	70.1	0.23	0.10	0.02
60.1	90.1	0.16	0.05	0.00
80.1	110.1	0.14	0.01	-0.03
100.1	130.1	0.15	0.04	-0.01
125.1	155.1	0.14	0.04	0.00
150.1	180.1	0.15	0.06	0.03
175.1	205.1	0.13	0.05	0.03
200.1	230.1	0.11	0.05	0.02
225.1	255.1	0.14	0.08	0.04
250.1	280.1	0.16	0.11	0.08
275.1	305.1	0.16	0.12	0.08
300.1	330.1	0.16	0.12	0.09
325.1	355.1	0.15	0.12	0.09
350.1	380.1	0.24	0.19	0.14
400.1	430.1	0.38	0.23	0.14
450.1	480.1	0.59	0.41	0.23
500.1	530.1	0.76	0.55	0.36
550.1	580.1	0.91	0.69	0.48
600.1	630.1	1.08	0.83	0.58
650.1	680.1	1.10	0.85	0.60
700.1	730.1	1.16	0.95	0.71
750.1	780.1	0.10	0.46	0.53
800.1	830.1	0.13	0.23	0.39
850.1	880.1	-0.33	0.01	0.10
900.1	930.1	0.31	0.34	0.21
950.1	980.1	0.26	0.17	0.10
1000.1	1030.1	0.30	0.15	0.05
1050.1	1080.1	0.10	0.06	0.03
1100.1	1130.1	0.04	0.01	0.00
1150.1	1180.1	-0.04	-0.03	-0.01
1200.1	1230.1	-0.02	-0.03	-0.02
1250.1	1280.1	-0.03	-0.04	-0.05
1300.1	1330.1	-0.01	-0.01	-0.02
1350.1	1380.1	-0.07	-0.06	-0.05
1400.1	1430.1	-0.05	-0.05	-0.05
1450.1	1480.1	-0.07	-0.06	-0.06
1500.1	1530.1	-0.04	-0.04	-0.04

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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+23			+23			+23
0.5	499.6	6.91	0.5	10.6	6.11	0.5	999.6	8.39
0.8	499.4	6.86	1.0	11.1	6.03	1.0	999.1	8.31
1.0	499.1	6.83	2.0	12.1	6.01	2.0	998.1	8.30
2.0	498.1	6.81	5.0	15.1	6.02	5.0	995.1	8.32
3.0	497.1	6.81	10.0	20.1	6.03	10.0	990.1	8.35
4.0	496.1	6.80	20.0	30.1	6.07	20.0	980.1	8.44
5.0	495.1	6.80	30.0	40.1	6.08	30.0	970.1	8.52
6.0	494.1	6.80	40.0	50.1	6.03	40.0	960.1	8.63
8.0	492.1	6.82	50.0	60.1	6.07	50.0	950.1	8.67
10.0	490.1	6.82	70.0	80.1	6.06	70.0	930.1	8.66
15.0	485.1	6.82	90.0	100.1	6.10	90.0	910.1	8.85
20.0	480.1	6.83	110.0	120.1	6.07	110.0	890.1	9.22
25.0	475.1	6.82	130.0	140.1	6.11	130.0	870.1	9.50
30.0	470.1	6.80	150.0	160.1	6.11	150.0	850.1	9.53
35.0	465.1	6.79	175.0	185.1	6.09	175.0	825.1	9.15
40.0	460.1	6.78	200.0	210.1	6.10	200.0	800.1	9.13
45.0	455.1	6.76	225.0	235.1	6.14	225.0	775.1	9.02
50.0	450.1	6.77	250.0	260.1	6.16	250.0	750.1	8.78
70.0	430.1	6.74	275.0	285.1	6.14	275.0	725.1	8.42
90.0	410.1	6.73	300.0	310.1	6.14	300.0	700.1	8.41
110.0	390.1	6.79	330.0	340.1	6.21	330.0	670.1	8.44
130.0	370.1	6.84	360.0	370.1	6.28	360.0	640.1	8.39
150.0	350.1	6.81	390.0	400.1	6.25	390.0	610.1	8.16
170.0	330.1	6.80	420.0	430.1	6.29	420.0	580.1	8.41
190.0	310.1	6.76	450.0	460.1	6.38	450.0	550.1	8.69
210.0	290.1	6.78	480.0	490.1	6.32	480.0	520.1	8.83
230.0	270.1	6.84	510.0	520.1	6.33	510.0	490.1	8.82
250.0	250.1	6.51	540.0	550.1	6.24	540.0	460.1	8.72
270.0	230.1	6.81	570.0	580.1	6.12	570.0	430.1	8.46
290.0	210.1	6.75	600.0	610.1	6.05	600.0	400.1	8.52
310.0	190.1	6.75	630.0	640.1	6.02	630.0	370.1	9.19
330.0	170.1	6.77	660.0	670.1	6.04	660.0	340.1	9.05
350.0	150.1	6.74	690.0	700.1	6.01	690.0	310.1	8.79
370.0	130.1	6.70	720.0	730.1	6.08	720.0	280.1	9.05
390.0	110.1	6.70	750.0	760.1	6.14	750.0	250.1	9.02
410.0	90.1	6.64	790.0	800.1	6.23	790.0	210.1	9.07
430.0	70.1	6.61	840.0	850.1	6.39	840.0	160.1	9.26
450.0	50.1	6.65	890.0	900.1	6.51	890.0	110.1	9.07
470.0	30.1	6.77	940.0	950.1	6.83	940.0	60.1	8.93
490.0	10.1	6.85	990.0	1000.1	7.23	990.0	10.1	8.65

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Frequency Mixer

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+20	+23	+26	+20	+23	+26
10.1	85.80	85.20	85.49	62.70	61.55	60.85
20.1	79.79	79.60	84.61	57.43	56.52	55.77
30.1	76.70	76.48	82.15	54.40	53.61	53.00
40.1	74.32	74.32	75.26	52.23	51.53	51.19
60.1	71.07	71.06	71.69	48.93	48.17	48.01
80.1	68.95	68.93	77.82	46.17	45.53	44.92
100.1	67.84	67.78	85.64	44.27	43.61	42.87
125.1	65.71	65.68	73.17	43.93	43.23	42.31
150.1	63.17	63.10	63.53	43.66	42.77	42.32
175.1	62.15	62.09	74.92	42.27	41.14	39.91
200.1	62.60	62.56	86.66	40.67	39.36	37.96
225.1	61.19	61.15	69.65	40.73	39.45	38.08
250.1	61.95	61.90	62.29	40.00	39.01	38.38
275.1	61.79	61.76	73.71	39.59	38.44	36.84
300.1	61.80	61.75	70.54	37.46	36.49	35.06
325.1	59.48	59.41	64.08	36.78	35.67	34.85
350.1	57.26	57.19	58.43	37.99	36.99	36.12
400.1	59.83	59.79	63.59	34.91	34.01	32.78
450.1	61.60	61.51	67.47	33.73	33.16	33.13
500.1	58.56	58.50	60.27	35.02	33.51	31.43
550.1	58.31	58.23	61.10	34.90	35.01	33.26
600.1	52.59	52.54	54.00	31.36	31.12	30.23
650.1	49.77	49.69	59.12	29.70	30.81	30.77
700.1	47.85	47.77	49.96	28.19	28.94	29.10
750.1	46.18	46.12	53.48	28.46	28.71	29.28
800.1	46.66	46.64	49.34	30.97	29.97	28.74
850.1	46.49	46.46	48.53	32.62	35.82	34.61
900.1	47.54	47.54	53.00	32.79	37.90	34.45
950.1	46.88	46.87	46.57	33.74	37.96	37.15
1000.1	48.78	48.77	51.92	34.34	37.48	37.60
1050.1	46.36	46.33	44.49	34.05	38.38	41.24
1100.1	48.73	48.71	49.51	35.05	40.46	45.22
1150.1	47.08	47.07	43.61	36.47	43.13	55.33
1200.1	49.23	49.22	48.46	39.10	49.79	49.68
1250.1	46.81	46.78	44.47	44.95	53.40	42.39
1300.1	48.17	48.15	48.22	52.95	42.08	37.30
1350.1	46.27	46.25	44.46	41.39	35.94	33.12
1400.1	47.71	47.69	47.63	38.44	33.88	31.56
1450.1	45.36	45.36	44.11	32.50	29.85	28.13
1500.1	46.48	46.47	46.69	32.25	29.64	27.93

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+20	+23	+26
10.1	40.1	55.59	48.31	38.74
20.1	50.1	49.41	44.46	36.67
30.1	60.1	46.81	44.20	38.22
40.1	70.1	44.58	43.68	42.95
60.1	90.1	41.74	41.66	42.22
80.1	110.1	39.50	39.36	39.69
100.1	130.1	37.73	37.41	36.42
125.1	155.1	35.93	35.65	33.28
150.1	180.1	35.27	35.56	35.82
175.1	205.1	34.33	34.55	34.90
200.1	230.1	34.07	34.05	33.36
225.1	255.1	33.89	34.00	33.43
250.1	280.1	33.66	34.05	34.57
275.1	305.1	33.36	33.88	34.43
300.1	330.1	33.58	33.99	33.95
325.1	355.1	33.52	33.94	34.09
350.1	380.1	33.78	34.22	34.41
400.1	430.1	34.56	35.98	37.66
450.1	480.1	31.82	32.39	32.21
500.1	530.1	29.86	30.47	31.36
550.1	580.1	27.77	27.43	26.85
600.1	630.1	26.56	26.52	26.95
650.1	680.1	25.62	25.18	24.64
700.1	730.1	25.61	25.39	25.67
750.1	780.1	25.75	24.98	24.22
800.1	830.1	26.25	25.92	25.72
850.1	880.1	26.50	26.14	24.99
900.1	930.1	25.16	24.82	24.63
950.1	980.1	24.00	23.75	23.25
1000.1	1030.1	22.44	22.33	22.20
1050.1	1080.1	21.89	21.77	21.68
1100.1	1130.1	20.82	20.66	20.54
1150.1	1180.1	20.40	20.20	20.08
1200.1	1230.1	19.37	19.22	19.11
1250.1	1280.1	18.92	18.82	18.80
1300.1	1330.1	18.02	17.94	17.90
1350.1	1380.1	17.43	17.34	17.32
1400.1	1430.1	16.87	16.81	16.78
1450.1	1480.1	16.27	16.19	16.15
1500.1	1530.1	15.94	15.87	15.84

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Frequency Mixer

ZMY-2+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1000.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+20	+23	+26		+20	+23	+26		+20	+23	+26
10.1	40.1	1.06	1.10	1.15	10.1	1.68	2.58	3.86	0.5	1.32	1.34	1.37
20.1	50.1	1.05	1.11	1.16	20.1	1.59	2.27	2.97	1.0	1.19	1.08	1.05
30.1	60.1	1.03	1.10	1.16	30.1	1.51	2.05	2.38	2.0	1.28	1.15	1.09
40.1	70.1	1.05	1.12	1.18	40.1	1.47	1.96	2.21	5.0	1.23	1.11	1.06
60.1	90.1	1.11	1.17	1.22	60.1	1.55	2.17	2.61	10.0	1.19	1.08	1.03
80.1	110.1	1.13	1.20	1.23	80.1	1.71	2.67	3.95	20.0	1.19	1.08	1.02
100.1	130.1	1.13	1.20	1.24	100.1	1.66	2.54	3.72	30.0	1.20	1.09	1.02
125.1	155.1	1.17	1.22	1.26	125.1	1.48	1.99	2.23	40.0	1.21	1.09	1.03
150.1	180.1	1.19	1.24	1.28	150.1	1.53	2.09	2.52	50.0	1.22	1.10	1.04
175.1	205.1	1.20	1.26	1.30	175.1	1.71	2.66	4.03	70.0	1.23	1.11	1.06
200.1	230.1	1.22	1.27	1.31	200.1	1.59	2.29	2.84	90.0	1.24	1.12	1.07
225.1	255.1	1.25	1.30	1.33	225.1	1.49	1.97	2.25	110.0	1.25	1.14	1.09
250.1	280.1	1.25	1.30	1.33	250.1	1.64	2.33	3.10	130.0	1.25	1.14	1.10
275.1	305.1	1.26	1.31	1.35	275.1	1.78	2.71	3.93	150.0	1.26	1.15	1.12
300.1	330.1	1.28	1.33	1.36	300.1	1.60	2.16	2.42	175.0	1.28	1.17	1.13
325.1	355.1	1.29	1.33	1.37	325.1	1.56	2.06	2.43	200.0	1.29	1.18	1.15
350.1	380.1	1.32	1.37	1.40	350.1	1.80	2.67	3.94	225.0	1.30	1.20	1.16
400.1	430.1	1.37	1.41	1.43	400.1	1.62	2.13	2.46	250.0	1.30	1.20	1.17
450.1	480.1	1.31	1.35	1.38	450.1	1.91	2.79	3.85	275.0	1.31	1.21	1.18
500.1	530.1	1.28	1.31	1.33	500.1	1.67	2.17	2.55	300.0	1.32	1.22	1.19
550.1	580.1	1.34	1.37	1.40	550.1	1.94	2.71	3.33	330.0	1.31	1.22	1.20
600.1	630.1	1.55	1.57	1.59	600.1	1.77	2.31	2.70	360.0	1.31	1.22	1.20
650.1	680.1	1.84	1.86	1.88	650.1	2.01	2.70	3.21	390.0	1.30	1.21	1.20
700.1	730.1	2.28	2.28	2.27	700.1	1.98	2.56	3.01	420.0	1.28	1.20	1.19
750.1	780.1	2.95	2.87	2.83	750.1	2.17	2.82	3.33	450.0	1.26	1.18	1.18
800.1	830.1	3.70	3.60	3.50	800.1	2.20	2.84	3.42	480.0	1.25	1.16	1.16
850.1	880.1	4.63	4.41	4.29	850.1	2.29	3.00	3.60	510.0	1.22	1.13	1.15
900.1	930.1	5.36	5.10	4.98	900.1	2.21	2.83	3.35	540.0	1.19	1.10	1.13
950.1	980.1	5.79	5.59	5.47	950.1	2.37	3.20	4.08	570.0	1.16	1.07	1.12
1000.1	1030.1	6.35	6.17	6.03	1000.1	2.23	2.89	3.41	600.0	1.14	1.03	1.12
1050.1	1080.1	6.89	6.66	6.51	1050.1	2.43	3.30	4.12	630.0	1.12	1.02	1.13
1100.1	1130.1	7.20	7.00	6.83	1100.1	2.41	3.09	3.51	660.0	1.12	1.06	1.16
1150.1	1180.1	7.53	7.28	7.11	1150.1	2.46	3.11	3.61	690.0	1.13	1.11	1.20
1200.1	1230.1	7.60	7.38	7.20	1200.1	2.74	3.48	4.09	720.0	1.16	1.17	1.26
1250.1	1280.1	8.08	7.87	7.73	1250.1	2.44	2.88	3.19	750.0	1.21	1.24	1.32
1300.1	1330.1	8.43	8.20	7.97	1300.1	3.16	4.09	5.47	790.0	1.28	1.34	1.43
1350.1	1380.1	9.04	8.81	8.64	1350.1	2.48	2.78	3.00	840.0	1.41	1.49	1.59
1400.1	1430.1	8.95	8.72	8.55	1400.1	3.69	4.77	6.91	890.0	1.56	1.67	1.78
1450.1	1480.1	8.77	8.51	8.39	1450.1	2.69	2.89	3.02	940.0	1.74	1.87	2.00
1500.1	1530.1	8.35	8.16	8.01	1500.1	4.16	5.03	6.21	990.0	1.92	2.07	2.22

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	7	21	12	45	7	37	25	43	41	46
1	-	24	+0	41	12	39	35	54	33	59	38	64
2	94	60	49	60	48	62	64	87	56	76	62	83
3	105	74	55	71	54	71	56	81	70	88	67	85
4	>123	107	94	100	83	94	80	91	94	102	99	99
5	>122	111	114	105	94	98	91	97	91	111	101	118
6	>122	>122	110	>125	106	110	99	109	98	110	114	121
7	>120	>124	>125	>124	>127	>126	>120	>122	116	>121	120	>127
8	>122	124	>124	>126	>126	125	>124	>122	>119	>120	>118	>125
9	>121	>122	>125	>125	>126	>125	>125	>127	>122	>121	>123	>122
10	>120	>125	>123	>125	>125	>124	>124	>125	>126	>122	>122	>122
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; .05.00 dBm.
LO IN: 530.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; -6.76 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	32	22	58	18	46	37	50	51	56
1	-	24	+0	38	12	39	38	52	39	57	42	70
2	87	50	38	51	37	54	63	72	44	67	56	71
3	97	55	35	55	35	55	37	64	52	71	50	70
4	110	84	78	71	59	65	52	65	69	82	66	80
5	>119	83	81	85	64	77	56	71	55	76	67	97
6	>122	88	85	95	89	75	70	72	64	73	79	86
7	>121	94	87	91	93	99	78	79	70	74	70	87
8	>120	105	107	101	105	108	90	86	79	84	73	82
9	>121	109	98	112	95	108	117	96	90	105	86	92
10	>122	112	108	106	113	103	104	107	97	96	97	92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; 10.05.00 dBm.
LO IN: 530.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; 3.25 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.

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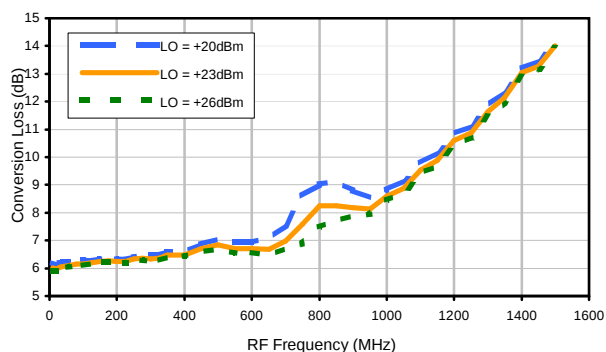


Frequency Mixer

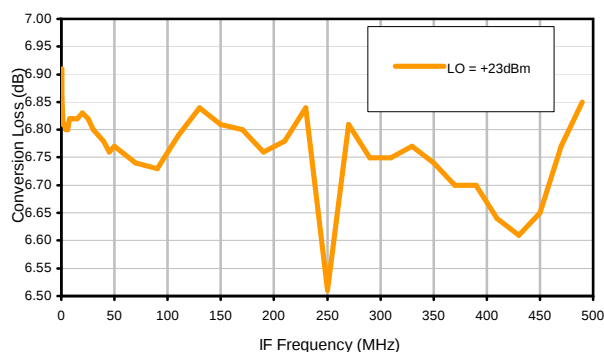
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Typical Performance Curves

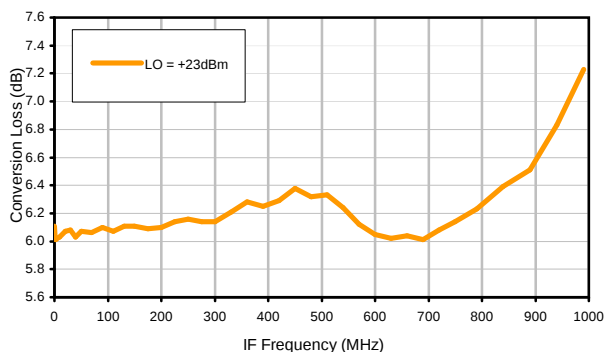
Conversion Loss @ IF=30MHz



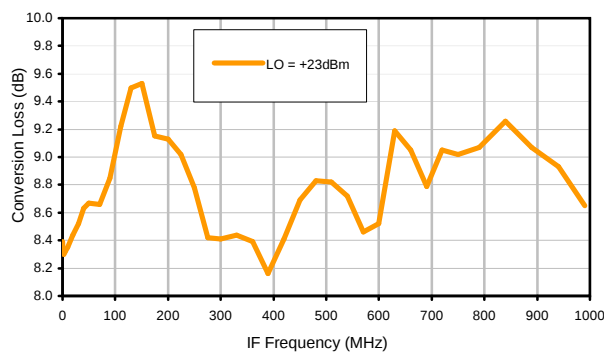
Conversion Loss vs. IF @ RF=500.1MHz



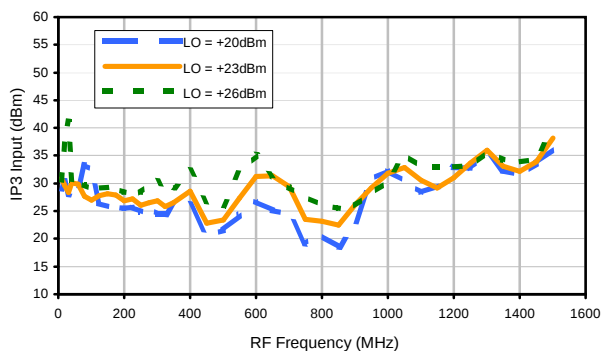
Conversion Loss vs. IF @ RF=10.1MHz



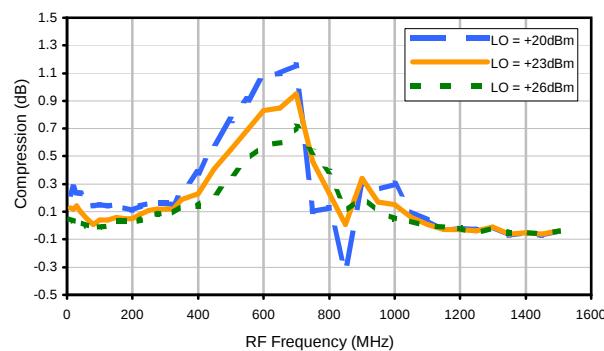
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input



Compression @ RF IN=+15dBm



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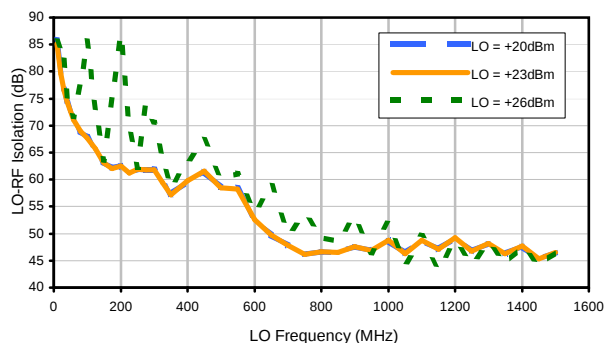


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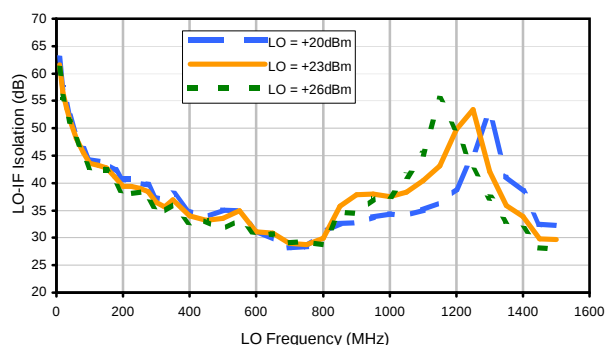


Typical Performance Curves

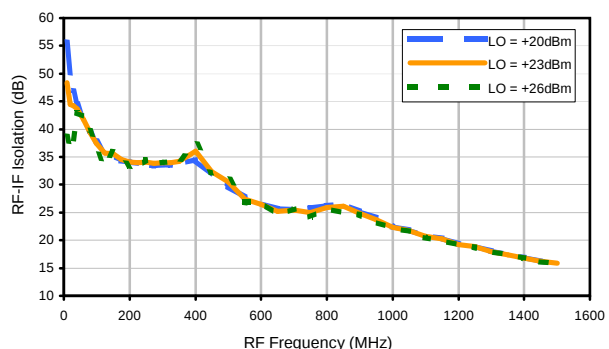
LO-RF Isolation



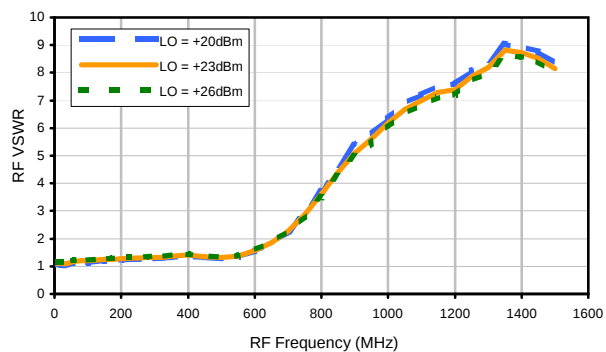
LO-IF Isolation



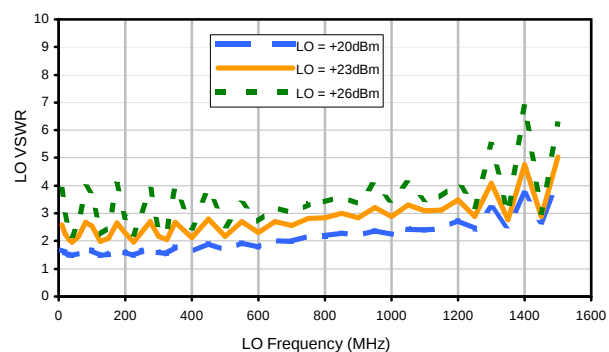
RF-IF Isolation



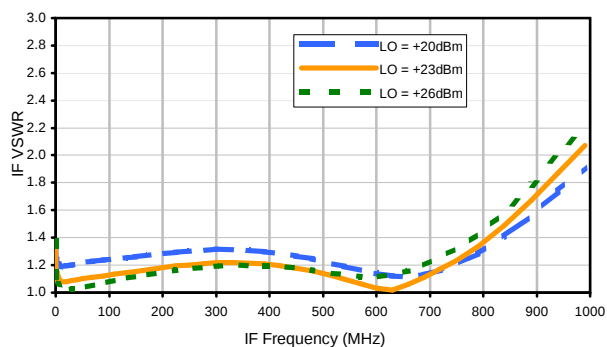
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	7	21	12	45	7	37	25	43	41	46
1	-	24	+0	41	12	39	35	54	33	59	38	64
2	94	60	49	60	48	62	64	87	56	76	62	83
3	105	74	55	71	54	71	56	81	70	88	67	85
4	>123	107	94	100	83	94	80	91	94	102	99	99
5	>122	111	114	105	94	98	91	97	91	111	101	118
6	>122	>122	110	>125	106	110	99	109	98	110	114	121
7	>120	>124	>125	>124	>127	>126	>120	>122	116	>121	120	>127
8	>122	124	>124	>126	>126	125	>124	>122	>119	>120	>118	>125
9	>121	>122	>125	>125	>126	>125	>125	>127	>122	>121	>123	>122
10	>120	>125	>123	>125	>125	>124	>124	>125	>126	>122	>122	>122
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; .05.00 dBm.
LO IN: 530.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; -6.76 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	32	22	58	18	46	37	50	51	56
1	-	24	+0	38	12	39	38	52	39	57	42	70
2	87	50	38	51	37	54	63	72	44	67	56	71
3	97	55	35	55	35	55	37	64	52	71	50	70
4	110	84	78	71	59	65	52	65	69	82	66	80
5	>119	83	81	85	64	77	56	71	55	76	67	97
6	>122	88	85	95	89	75	70	72	64	73	79	86
7	>121	94	87	91	93	99	78	79	70	74	70	87
8	>120	105	107	101	105	108	90	86	79	84	73	82
9	>121	109	98	112	95	108	117	96	90	105	86	92
10	>122	112	108	106	113	103	104	107	97	96	97	92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; 10.05.00 dBm.
LO IN: 530.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; 3.25 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.

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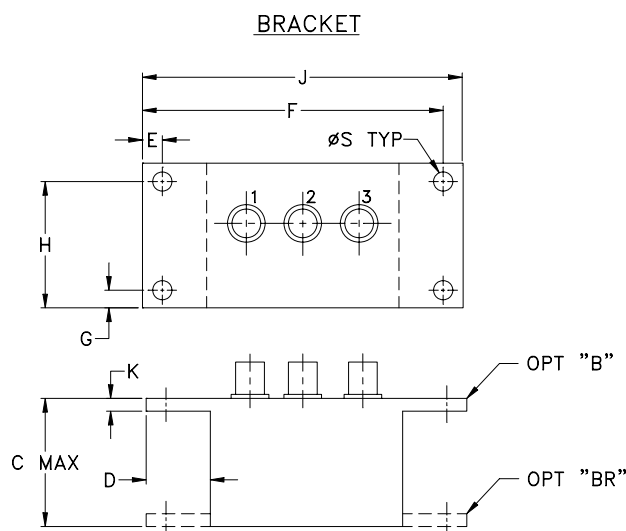
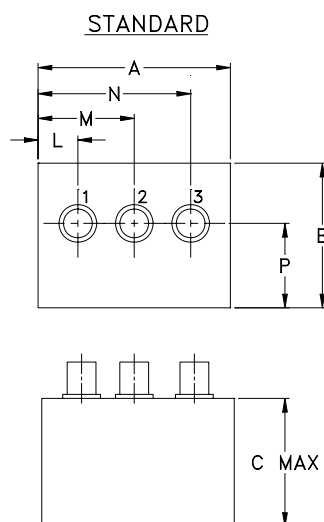


Outline Dimensions

M21

M22

M23



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
M21	1.50 (38.10)	1.13 (28.70)	1.00 (25.40)	.50 (12.70)	.155 (3.94)	2.345 (59.56)	.138 (3.51)	.987 (25.07)	2.50 (63.50)	.10 (2.54)	.31 (7.87)	.75 (19.05)	1.19 (30.23)
M22	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.40 (10.16)	1.15 (29.21)	1.86 (47.24)
M23	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.63 (16.00)	1.06 (26.92)	1.63 (41.40)

CASE#	P	Q	R	S	WT. GRAMS
M21	.66 (16.76)	--	--	.150 (3.81)	40.0
M22	.64 (16.26)	--	--		74.0
M23	.69 (17.53)	--	--		70.0

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3 Pl. $\pm .015$

Notes:

- Case material: Aluminum alloy.
- Case finish:
 - For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
 - For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.

Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
- Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add \$5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add \$1.50 to unit cost.



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
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
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	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I