

# Coaxial Frequency Mixer

Level 7 (LO Power +7 dBm) 0.04 to 400 MHz

## ZFM-3+



Generic photo used for illustration purposes only

CASE STYLE: K18

Connectors	Model
BNC	ZFM-3+
SMA	ZFM-3-S+
<b>BRACKET (OPTION "B")</b>	

**+RoHS Compliant**

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

### Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

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

### Coaxial Connections

LO	1
RF	2
IF	3

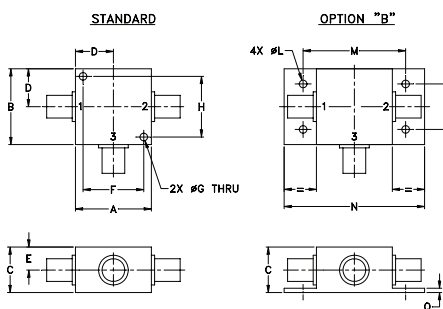
### Features

- low conversion loss, 4.78 dB typ.
- high L-R isolation, 50 dB typ, L-I, 45 dB typ.
- rugged shielded case

### Applications

- VHF
- FM radio
- defense & federal communications
- instrumentation

### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.25	1.25	.75	.63	.38	1.00	.125	1.000
31.75	31.75	19.05	16.00	9.65	25.40	3.18	25.40
J	K	L	M	N	P	Q	wt
--	--	.125	1.688	2.18	.75	.07	grams
--	--	3.18	42.88	55.37	19.05	1.78	70.0

### Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF	IF	Mid-Band		Total Range	Max.	L		M		U		L		M		U	
$f_L$ - $f_U$	$\bar{X}$	$\sigma$	Max.			Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
0.04-400	DC-400	4.78	0.03	7.0	8.0	60	50	50	35	35	25	55	40	45	30	35	25

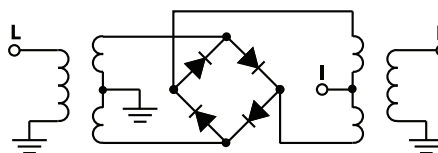
1 dB COMP: +1 dBm typ.

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 [ $2 f_L$  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 +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
0.04	30.04	6.15	>67.00	>67.00	1.24	2.69
0.05	30.05	5.52	>67.00	>67.00	1.25	2.55
0.07	30.07	5.12	>67.00	>67.00	1.25	2.67
0.10	30.10	4.92	>67.00	>67.00	1.24	2.63
0.50	30.50	4.77	>67.00	>67.00	1.23	2.55
1.00	31.00	4.76	>67.00	63.53	1.23	2.45
5.00	35.00	4.75	>67.00	60.91	1.21	2.48
10.00	40.00	4.75	>67.00	60.97	1.21	2.42
20.00	50.00	4.74	>67.00	58.52	1.19	2.42
60.87	90.87	4.73	50.40	49.37	1.18	2.36
100.00	70.00	4.63	44.80	44.05	1.16	2.38
162.61	132.61	4.79	39.22	39.87	1.15	2.46
200.00	170.00	4.95	37.18	37.86	1.13	2.40
230.44	200.44	4.89	35.78	37.67	1.13	2.42
281.31	251.31	5.05	33.68	35.71	1.13	2.41
315.23	285.23	5.25	34.22	33.98	1.14	2.56
349.14	319.14	5.32	35.64	34.07	1.14	2.63
366.10	336.10	5.37	35.56	34.58	1.14	2.68
383.05	353.05	5.44	35.25	34.26	1.15	2.69
400.00	370.00	5.56	34.72	32.46	1.15	2.76

### Electrical Schematic



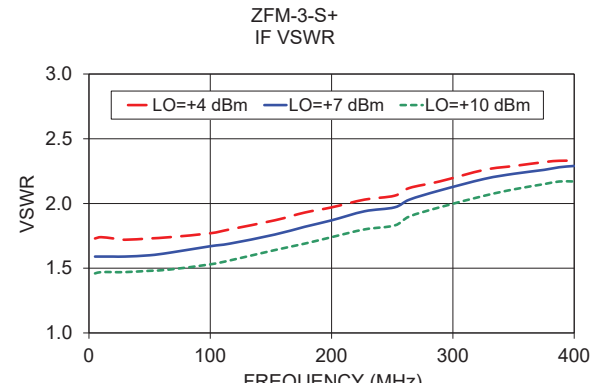
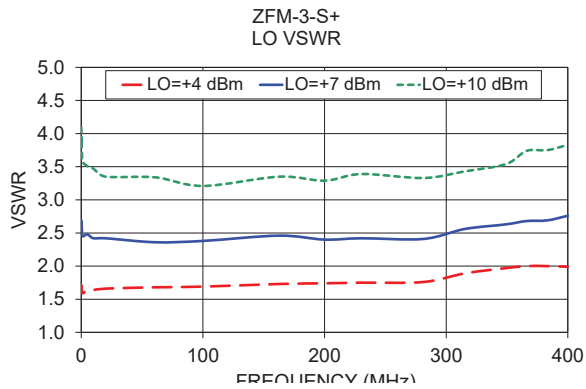
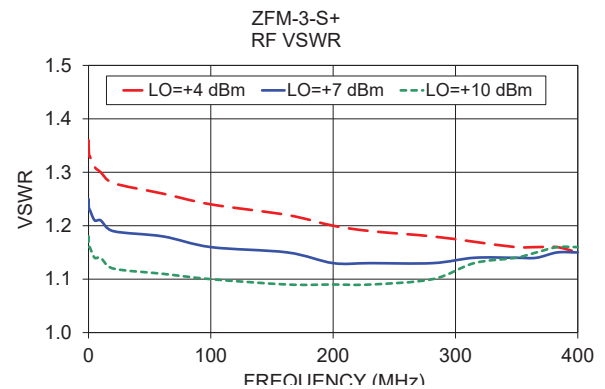
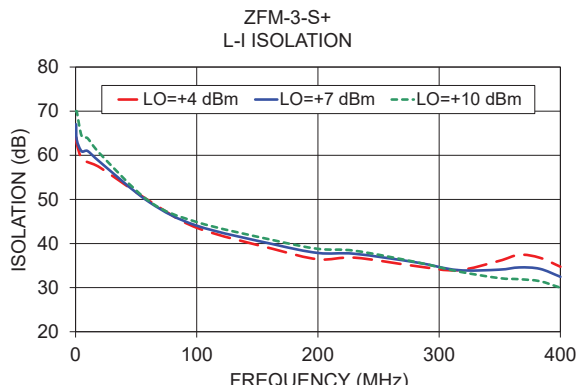
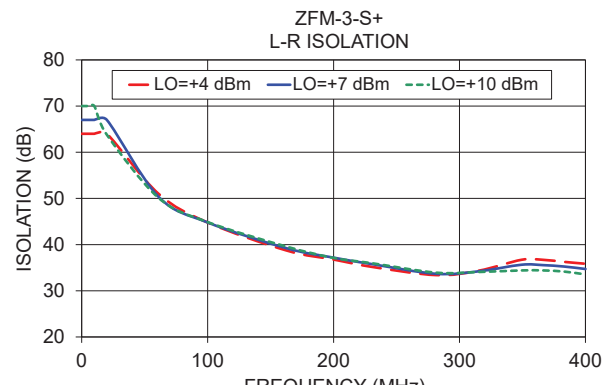
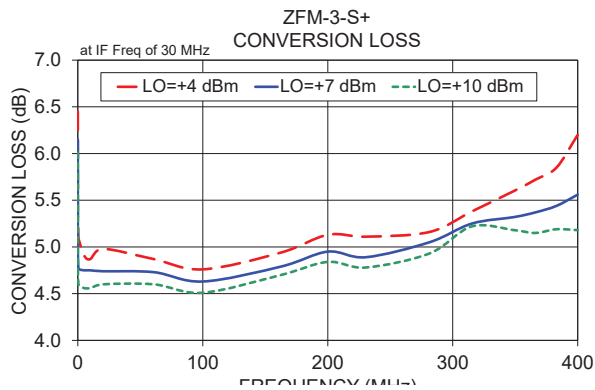
### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)

**Mini-Circuits**

[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. D  
M151107  
ZFM-3+  
DJ/TD/CP/AM  
200811  
Page 1 of 2



**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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Frequency Mixer

# ZFM-3+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+4	+7	+10			+4	+7	+10			+4	+7	+10
0.04	30.04	6.45	6.15	6.01	10.1	40.1	18.34	18.12	19.29	10.1	40.1	1.41	1.12	0.86
0.05	30.05	5.82	5.52	5.36	26.5	56.5	15.46	16.47	17.00	26.5	56.5	1.37	1.07	0.83
0.07	30.07	5.44	5.12	4.99	42.9	72.9	15.83	16.32	18.84	42.9	72.9	1.42	1.09	0.85
0.1	30.1	5.30	4.92	4.76	59.3	89.3	14.90	17.08	26.69	59.3	89.3	1.37	1.06	0.81
0.5	30.5	5.10	4.77	4.60	75.7	105.7	15.53	20.21	21.09	75.7	105.7	1.29	1.00	0.76
1.0	31.0	5.07	4.76	4.59	92.2	122.2	15.69	21.92	19.52	92.2	122.2	1.29	0.97	0.75
5.0	35.0	4.91	4.75	4.56	108.6	138.6	17.27	19.72	15.31	108.6	138.6	1.32	1.03	0.81
10.0	40.0	4.87	4.75	4.56	125.0	155.0	15.96	19.66	15.62	125.0	155.0	1.25	0.96	0.75
26.5	56.5	4.95	4.75	4.64	141.4	171.4	16.57	18.74	15.23	141.4	171.4	1.19	0.88	0.68
59.3	89.3	4.90	4.72	4.61	157.8	187.8	14.48	13.78	14.60	157.8	187.8	1.16	0.89	0.67
75.7	105.7	4.89	4.71	4.61	174.2	204.2	10.86	9.57	9.61	174.2	204.2	1.13	0.86	0.68
92.2	122.2	4.93	4.76	4.66	190.6	220.6	13.18	11.49	11.69	190.6	220.6	1.12	0.85	0.67
108.6	138.6	4.96	4.78	4.68	207.0	237.0	21.67	16.79	15.17	207.0	237.0	1.12	0.87	0.67
125.0	155.0	4.98	4.82	4.72	223.4	253.4	18.96	26.39	21.19	223.4	253.4	1.06	0.85	0.65
157.8	187.8	5.02	4.86	4.77	239.8	269.8	12.73	11.76	13.59	239.8	269.8	1.07	0.85	0.67
174.2	204.2	5.01	4.85	4.77	256.3	286.3	10.71	10.03	9.84	256.3	286.3	1.17	0.91	0.71
190.6	220.6	5.09	4.92	4.82	272.7	302.7	10.27	9.73	9.89	272.7	302.7	1.29	0.99	0.78
207.0	237.0	5.21	4.99	4.85	289.1	319.1	9.58	8.94	9.57	289.1	319.1	1.46	1.10	0.83
239.8	269.8	5.37	5.19	5.03	305.5	335.5	9.68	9.46	11.23	305.5	335.5	1.62	1.16	0.85
256.3	286.3	5.36	5.21	5.10	321.9	351.9	9.85	10.88	13.21	321.9	351.9	1.74	1.19	0.87
272.7	302.7	5.36	5.22	5.14	338.3	368.3	9.46	12.39	14.57	338.3	368.3	1.90	1.28	0.94
289.1	319.1	5.42	5.27	5.21	354.7	384.7	7.04	11.87	16.12	354.7	384.7	2.04	1.45	1.07
305.5	335.5	5.51	5.34	5.26	371.1	401.1	3.90	9.26	14.09	371.1	401.1	2.11	1.65	1.23
338.3	368.3	5.72	5.50	5.41	387.5	417.5	1.59	4.94	9.88	387.5	417.5	2.18	1.80	1.42
354.7	384.7	5.90	5.60	5.44	403.9	433.9	0.63	2.54	6.03	403.9	433.9	2.18	1.82	1.55
371.1	401.1	6.15	5.74	5.47	420.4	450.4	0.62	1.91	4.57	420.4	450.4	2.04	1.75	1.55
387.5	417.5	6.37	5.97	5.58	436.8	466.8	0.90	1.96	4.13	436.8	466.8	1.97	1.73	1.54
403.9	433.9	6.60	6.23	5.76	453.2	483.2	1.51	2.36	4.19	453.2	483.2	1.80	1.58	1.41
436.8	466.8	6.96	6.54	6.09	469.6	499.6	3.21	3.85	5.69	469.6	499.6	1.56	1.36	1.18
453.2	483.2	7.22	6.80	6.38	486.0	516.0	4.63	5.15	7.03	486.0	516.0	1.50	1.29	1.06
469.6	499.6	7.55	7.13	6.75	502.4	532.4	6.23	6.75	9.10	502.4	532.4	1.52	1.29	1.02
486.0	516.0	7.70	7.28	6.97	518.8	548.8	8.20	9.20	13.44	518.8	548.8	1.49	1.19	0.93
502.4	532.4	7.82	7.39	7.11	535.2	565.2	8.50	10.98	24.22	535.2	565.2	1.53	1.19	1.00
535.2	565.2	7.89	7.55	7.27	551.6	581.6	8.72	11.06	13.65	551.6	581.6	1.50	1.15	1.01
551.6	581.6	8.05	7.74	7.43	568.0	598.0	8.40	10.17	12.17	568.0	598.0	1.45	1.08	0.91
568.0	598.0	8.22	7.98	7.75	584.5	614.5	7.91	9.30	11.52	584.5	614.5	1.46	1.10	0.88
584.5	614.5	8.39	8.15	8.00	600.9	630.9	7.55	9.15	11.65	600.9	630.9	1.45	1.05	0.80
600.9	630.9	8.67	8.47	8.39	617.3	647.3	7.68	9.57	12.27	617.3	647.3	1.34	0.93	0.68
633.7	663.7	9.39	9.26	9.30	633.7	663.7	8.04	10.37	12.57	633.7	663.7	1.25	0.87	0.67
650.1	680.1	9.84	9.74	9.79	650.1	680.1	8.83	11.29	12.78	650.1	680.1	1.15	0.81	0.67

# Frequency Mixer

# ZFM-3+

## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=200.1MHz (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)=400.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
190.0	10.1	5.22	10.0	20.1	4.68	390.0	10.1	6.77
185.4	14.7	5.19	19.7	29.8	4.72	380.3	19.8	6.67
180.8	19.3	5.17	29.5	39.6	4.74	370.5	29.6	6.60
176.2	23.9	5.14	39.2	49.3	4.73	360.8	39.3	6.52
171.5	28.6	5.12	49.0	59.1	4.76	351.0	49.1	6.46
166.9	33.2	5.09	58.7	68.8	4.79	341.3	58.8	6.41
162.3	37.8	5.07	68.5	78.6	4.80	331.5	68.6	6.36
157.7	42.4	5.05	78.2	88.3	4.81	321.8	78.3	6.33
153.1	47.0	5.02	87.9	98.0	4.84	312.1	88.0	6.34
148.5	51.6	5.00	97.7	107.8	4.87	302.3	97.8	6.36
143.8	56.3	4.99	107.4	117.5	4.91	292.6	107.5	6.34
139.2	60.9	4.99	117.2	127.3	4.93	282.8	117.3	6.31
134.6	65.5	4.98	126.9	137.0	4.92	273.1	127.0	6.30
130.0	70.1	4.97	136.7	146.8	4.96	263.3	136.8	6.28
125.4	74.7	4.96	146.4	156.5	5.00	253.6	146.5	6.25
120.8	79.3	4.96	156.2	166.3	5.01	243.8	156.3	6.25
116.2	83.9	4.96	165.9	176.0	5.00	234.1	166.0	6.26
111.5	88.6	4.95	175.6	185.7	5.03	224.4	175.7	6.26
106.9	93.2	4.95	185.4	195.5	5.07	214.6	185.5	6.28
102.3	97.8	4.94	195.1	205.2	5.06	204.9	195.2	6.28
97.7	102.4	4.94	204.9	215.0	5.06	195.1	205.0	6.33
93.1	107.0	4.94	214.6	224.7	5.06	185.4	214.7	6.34
88.5	111.6	4.93	224.4	234.5	5.07	175.6	224.5	6.31
83.8	116.3	4.93	234.1	244.2	5.14	165.9	234.2	6.28
79.2	120.9	4.94	243.8	253.9	5.24	156.2	243.9	6.23
74.6	125.5	4.94	253.6	263.7	5.35	146.4	253.7	6.17
70.0	130.1	4.96	263.3	273.4	5.46	136.7	263.4	6.11
65.4	134.7	4.95	273.1	283.2	5.52	126.9	273.2	6.08
60.8	139.3	4.94	282.8	292.9	5.50	117.2	282.9	6.05
56.2	143.9	4.94	292.6	302.7	5.50	107.4	292.7	6.07
51.5	148.6	4.92	302.3	312.4	5.47	97.7	302.4	6.05
46.9	153.2	4.92	312.1	322.2	5.37	87.9	312.2	6.01
42.3	157.8	4.91	321.8	331.9	5.34	78.2	321.9	5.96
37.7	162.4	4.90	331.5	341.6	5.29	68.5	331.6	5.90
33.1	167.0	4.90	341.3	351.4	5.26	58.7	341.4	5.83
28.5	171.6	4.88	351.0	361.1	5.27	49.0	351.1	5.75
23.8	176.3	4.88	360.8	370.9	5.27	39.2	360.9	5.70
19.2	180.9	4.88	370.5	380.6	5.28	29.5	370.6	5.69
14.6	185.5	4.89	380.3	390.4	5.30	19.7	380.4	5.71
10.0	190.1	4.89	390.0	400.1	5.33	10.0	390.1	5.74

# Frequency Mixer

# ZFM-3+

## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+4	+7	+10	+4	+7	+10			+4	+7	+10
0.04	64.00	67.00	70.00	64.00	67.00	70.00	10.1	40.1	38.99	37.34	36.05
0.05	64.00	67.00	70.00	64.00	67.00	70.00	26.5	56.5	32.65	32.27	31.88
0.07	64.00	67.00	70.00	64.00	67.00	70.00	42.9	72.9	29.18	29.08	29.02
0.1	64.00	67.00	70.00	64.00	67.00	70.00	59.3	89.3	26.91	26.99	26.92
0.5	64.00	67.00	70.00	64.00	67.00	70.00	75.7	105.7	25.62	25.69	25.71
1.0	64.00	67.00	70.00	62.64	63.53	70.00	92.2	122.2	24.42	24.73	24.91
5.0	64.00	67.00	70.00	59.16	60.91	64.41	108.6	138.6	23.61	23.78	23.94
10.0	64.00	67.00	70.00	58.46	60.97	63.86	125.0	155.0	23.72	23.91	24.00
26.5	63.64	63.74	64.07	68.51	67.00	63.99	141.4	171.4	23.61	24.14	24.42
59.3	56.40	57.07	57.61	59.54	58.60	57.92	157.8	187.8	23.25	24.08	24.81
75.7	54.38	55.00	55.47	56.44	56.36	55.91	174.2	204.2	23.05	23.69	24.29
92.2	52.53	53.30	53.92	54.83	55.18	54.58	190.6	220.6	23.19	23.62	24.05
108.6	51.42	52.05	52.43	53.51	53.60	52.81	207.0	237.0	23.97	24.32	24.74
125.0	49.40	50.12	50.74	52.77	53.18	52.24	223.4	253.4	25.47	25.88	26.25
157.8	49.08	49.80	50.11	50.76	49.69	48.46	239.8	269.8	26.73	27.52	28.43
174.2	47.15	48.30	48.92	53.73	50.60	47.63	256.3	286.3	25.99	26.76	27.68
190.6	44.41	45.24	46.10	53.19	52.00	48.69	272.7	302.7	23.49	24.02	24.51
207.0	43.23	43.82	44.60	52.99	49.95	47.58	289.1	319.1	20.80	21.11	21.40
239.8	44.72	44.69	44.95	44.98	43.33	42.13	305.5	335.5	19.00	19.18	19.25
256.3	46.05	45.83	45.40	41.80	40.57	39.69	321.9	351.9	17.53	17.59	17.61
272.7	47.71	47.16	46.28	40.85	39.28	38.38	338.3	368.3	16.54	16.48	16.47
289.1	47.80	47.00	46.10	39.90	38.12	37.25	354.7	384.7	15.82	15.76	15.78
305.5	47.46	46.56	45.14	41.22	37.98	36.35	371.1	401.1	15.40	15.28	15.33
338.3	42.22	42.40	41.90	44.60	36.27	32.98	387.5	417.5	15.02	14.91	14.98
354.7	40.09	40.42	40.36	43.95	35.36	32.12	403.9	433.9	14.87	14.73	14.80
371.1	38.65	39.37	39.91	42.50	35.06	31.48	420.4	450.4	14.83	14.75	14.76
387.5	37.78	38.46	39.13	39.02	33.74	30.49	436.8	466.8	14.68	14.60	14.67
403.9	37.12	37.45	37.86	37.78	33.32	29.88	453.2	483.2	14.55	14.45	14.48
436.8	37.33	37.91	38.27	34.50	32.98	29.63	469.6	499.6	14.28	14.16	14.21
453.2	37.59	38.29	38.74	32.59	31.50	29.11	486.0	516.0	13.70	13.60	13.71
469.6	37.67	38.56	39.14	31.17	30.32	28.26	502.4	532.4	13.15	13.12	13.21
486.0	37.37	37.94	38.03	29.85	29.15	27.16	518.8	548.8	12.51	12.54	12.63
502.4	36.40	36.96	36.68	28.92	28.54	26.31	535.2	565.2	12.03	12.05	12.02
535.2	35.20	35.15	33.64	26.51	25.98	23.22	551.6	581.6	11.51	11.47	11.36
551.6	34.46	33.90	31.90	25.22	24.26	21.47	568.0	598.0	10.92	10.80	10.63
568.0	33.13	32.03	29.87	24.06	22.70	19.99	584.5	614.5	10.41	10.27	10.03
584.5	31.32	29.94	27.94	22.91	21.36	18.92	600.9	630.9	9.83	9.63	9.32
600.9	29.98	28.61	26.77	21.70	20.24	18.10	617.3	647.3	9.14	8.88	8.53
633.7	26.75	25.67	24.23	19.21	18.24	16.61	633.7	663.7	8.45	8.16	7.82
650.1	25.12	24.22	22.91	17.99	17.19	15.72	650.1	680.1	7.79	7.47	7.19



# Frequency Mixer

# ZFM-3+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
5.0	35.0	1.36	1.24	1.18
10.0	40.0	1.36	1.25	1.18
26.5	56.5	1.36	1.25	1.17
42.9	72.9	1.33	1.22	1.15
59.3	89.3	1.32	1.21	1.14
75.7	105.7	1.27	1.17	1.11
92.2	122.2	1.25	1.15	1.09
108.6	138.6	1.24	1.15	1.09
125.0	155.0	1.22	1.13	1.08
141.4	171.4	1.18	1.09	1.05
157.8	187.8	1.17	1.07	1.04
174.2	204.2	1.14	1.06	1.03
190.6	220.6	1.11	1.04	1.02
207.0	237.0	1.10	1.04	1.07
223.4	253.4	1.10	1.06	1.12
239.8	269.8	1.06	1.07	1.13
256.3	286.3	1.05	1.10	1.16
272.7	302.7	1.09	1.17	1.23
289.1	319.1	1.14	1.23	1.30
305.5	335.5	1.16	1.26	1.33
321.9	351.9	1.17	1.26	1.32
338.3	368.3	1.15	1.24	1.29
354.7	384.7	1.09	1.18	1.23
371.1	401.1	1.01	1.10	1.16
387.5	417.5	1.06	1.03	1.11
403.9	433.9	1.15	1.08	1.08
420.4	450.4	1.26	1.20	1.16
436.8	466.8	1.34	1.28	1.24
453.2	483.2	1.46	1.40	1.36
469.6	499.6	1.64	1.58	1.55
486.0	516.0	1.74	1.70	1.69
502.4	532.4	1.88	1.86	1.85
518.8	548.8	2.03	2.02	2.03
535.2	565.2	2.13	2.13	2.13
551.6	581.6	2.28	2.29	2.26
568.0	598.0	2.43	2.42	2.39
584.5	614.5	2.53	2.52	2.48
600.9	630.9	2.65	2.61	2.58
617.3	647.3	2.72	2.68	2.65
633.7	663.7	2.76	2.71	2.68
650.1	680.1	2.80	2.73	2.69

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
5.0	1.71	2.69	4.09
10.0	1.64	2.55	3.82
26.5	1.66	2.44	3.42
42.9	1.62	2.34	3.25
59.3	1.60	2.30	3.18
75.7	1.62	2.34	3.24
92.2	1.67	2.43	3.36
108.6	1.68	2.43	3.35
125.0	1.66	2.36	3.22
141.4	1.63	2.30	3.12
157.8	1.65	2.32	3.14
174.2	1.69	2.39	3.24
190.6	1.74	2.46	3.34
207.0	1.74	2.44	3.29
223.4	1.74	2.38	3.18
239.8	1.74	2.36	3.14
256.3	1.77	2.43	3.23
272.7	1.83	2.52	3.37
289.1	1.87	2.57	3.43
305.5	1.88	2.54	3.36
321.9	1.87	2.48	3.26
338.3	1.89	2.48	3.24
354.7	1.96	2.55	3.33
371.1	2.06	2.67	3.46
387.5	2.15	2.79	3.58
403.9	2.18	2.84	3.61
420.4	2.15	2.82	3.59
436.8	2.14	2.81	3.59
453.2	2.17	2.86	3.67
469.6	2.22	2.95	3.79
486.0	2.27	3.00	3.85
502.4	2.27	2.97	3.79
518.8	2.25	2.91	3.70
535.2	2.25	2.90	3.67
551.6	2.28	2.92	3.68
568.0	2.32	2.96	3.71
584.5	2.34	2.97	3.72
600.9	2.35	2.95	3.67
617.3	2.36	2.93	3.63
633.7	2.39	2.94	3.62
650.1	2.46	2.99	3.65

IF (OUT) (MHz)	IF VSWR @LO=400.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
5.0	1.73	1.59	1.46
10.0	1.74	1.59	1.47
20.0	2.01	1.60	1.39
30.0	2.02	1.61	1.40
40.0	2.02	1.61	1.41
50.0	2.03	1.63	1.43
60.0	2.04	1.64	1.45
70.0	2.05	1.66	1.47
80.0	2.06	1.67	1.48
90.0	2.06	1.68	1.50
100.0	2.07	1.70	1.52
110.0	2.09	1.73	1.55
120.0	2.11	1.75	1.57
130.0	2.10	1.76	1.59
140.0	2.11	1.77	1.61
150.0	2.11	1.79	1.64
160.0	2.13	1.80	1.66
170.0	2.14	1.82	1.68
180.0	2.14	1.84	1.70
190.0	2.15	1.86	1.73
200.0	2.17	1.88	1.75
210.0	2.17	1.89	1.77
220.0	2.16	1.89	1.78
230.0	2.15	1.90	1.79
240.0	2.15	1.90	1.81
250.0	2.16	1.92	1.82
260.0	2.18	1.93	1.83
270.0	2.18	1.94	1.85
280.0	2.19	1.96	1.87
290.0	2.18	1.96	1.88
300.0	2.17	1.95	1.88
310.0	2.15	1.94	1.86
320.0	2.12	1.92	1.85
330.0	2.11	1.91	1.84
340.0	2.11	1.90	1.84
350.0	2.11	1.90	1.84
360.0	2.11	1.90	1.84
370.0	2.11	1.90	1.84
380.0	2.10	1.90	1.84
390.0	2.09	1.89	1.83
400.0	2.26	2.09	2.06

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	20	30	13	34	17	36	27	38	38	44
1	-	19	+0	25	11	39	23	43	39	40	37	42
2	>100	59	55	56	56	58	49	61	54	77	62	79
3	>100	68	64	66	68	71	66	69	73	72	65	69
4	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	78	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	66	>81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	61	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	51	>81	>81
10	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	79	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; -14.00 dBm.  
 LO IN: 230.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -19.03 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	29	39	24	52	28	50	39	52	52	58
1	-	20	+0	26	12	36	24	50	38	48	46	50
2	97	55	51	53	51	54	46	56	50	70	55	62
3	>100	52	39	45	41	45	37	54	49	54	54	51
4	>100	67	68	65	64	64	65	64	56	72	65	80
5	>100	71	60	67	55	74	52	84	53	63	63	67
6	>100	89	82	82	81	81	75	80	78	79	78	85
7	>100	>91	89	84	82	76	70	74	65	72	62	89
8	>100	>91	>91	>91	>91	87	>91	>91	75	87	87	91
9	>100	>91	89	89	88	>91	78	86	82	67	83	87
10	>100	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; -4.00 dBm.  
 LO IN: 230.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -9.07 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.

REV. X2  
 ZFM-3+  
 100818

Page 5 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661

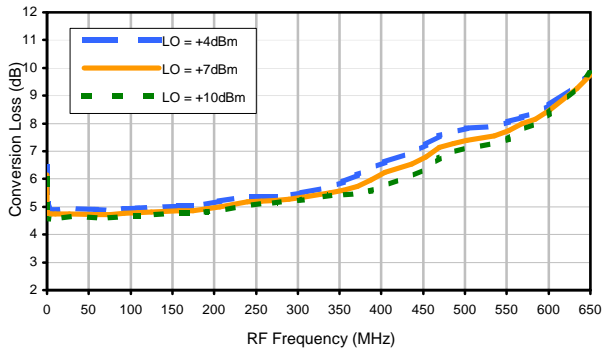


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

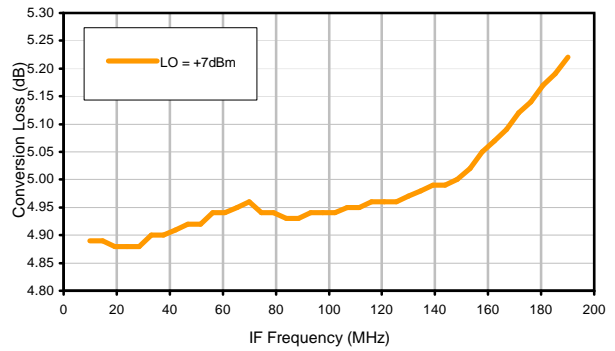


## Typical Performance Curves

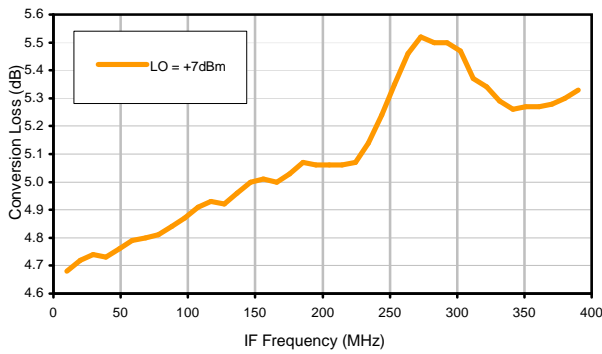
Conversion Loss @ IF=30MHz



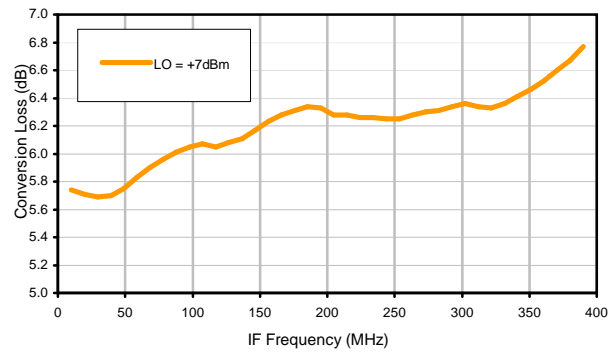
Conversion Loss vs. IF @ RF=200.1MHz



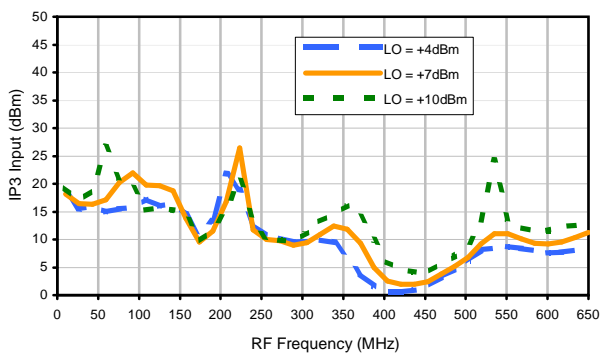
Conversion Loss vs. IF @ RF=10.1MHz



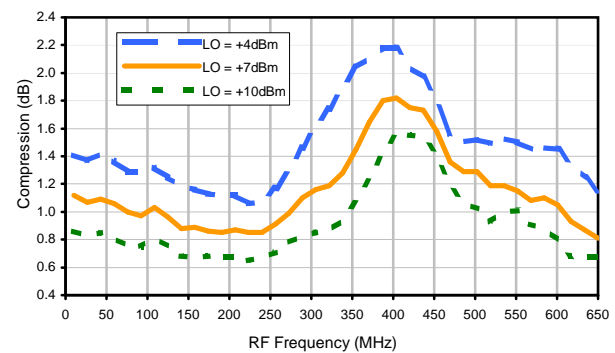
Conversion Loss vs. IF @ RF=400.1MHz



IP3 Input



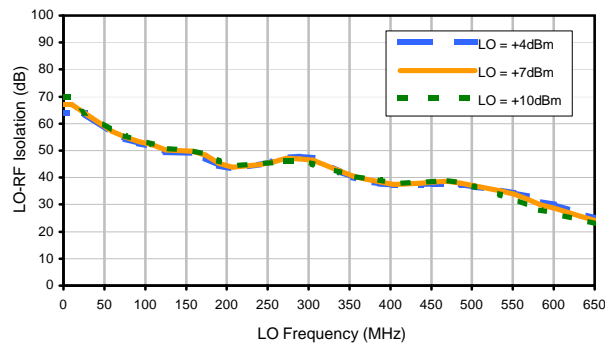
Compression @ RF IN=+1dBm



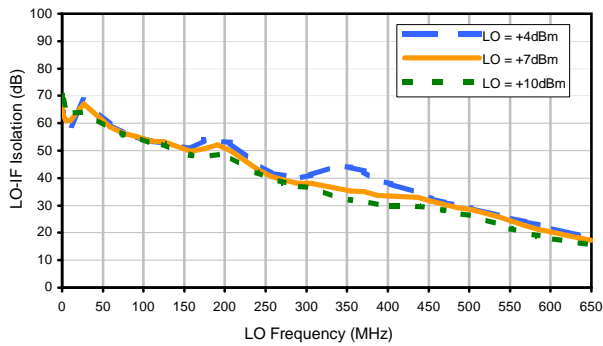


## Typical Performance Curves

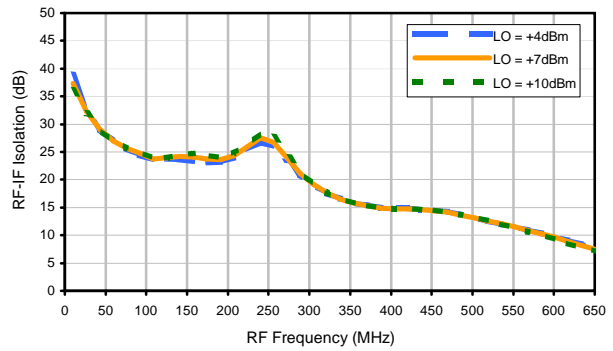
LO-RF Isolation



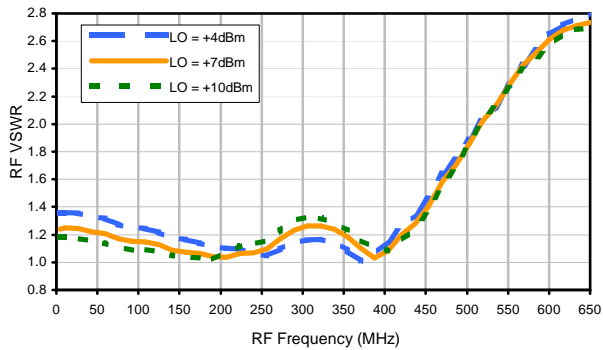
LO-IF Isolation



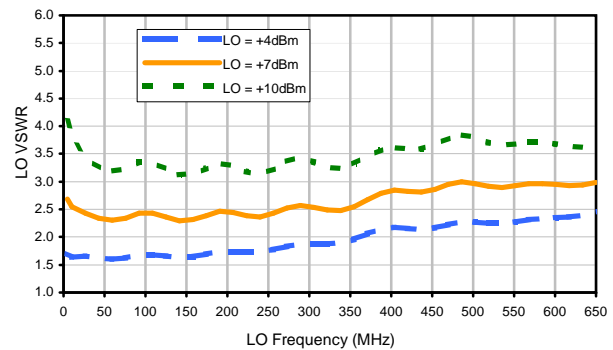
RF-IF Isolation



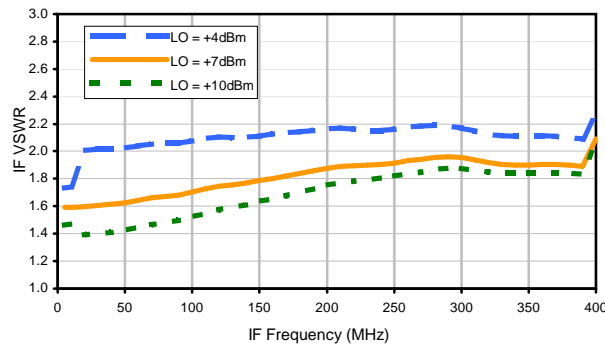
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	20	30	13	34	17	36	27	38	38	44
1	-	19	+0	25	11	39	23	43	39	40	37	42
2	>100	59	55	56	56	58	49	61	54	77	62	79
3	>100	68	64	66	68	71	66	69	73	72	65	69
4	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	78	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	66	>81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	61	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	51	>81	>81
10	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	79	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; -14.00 dBm.  
 LO IN: 230.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -19.03 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	29	39	24	52	28	50	39	52	52	58
1	-	20	+0	26	12	36	24	50	38	48	46	50
2	97	55	51	53	51	54	46	56	50	70	55	62
3	>100	52	39	45	41	45	37	54	49	54	54	51
4	>100	67	68	65	64	64	65	64	56	72	65	80
5	>100	71	60	67	55	74	52	84	53	63	63	67
6	>100	89	82	82	81	81	75	80	78	79	78	85
7	>100	>91	89	84	82	76	70	74	65	72	62	89
8	>100	>91	>91	>91	>91	87	>91	>91	75	87	87	91
9	>100	>91	89	89	88	>91	78	86	82	67	83	87
10	>100	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91	>91
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; -4.00 dBm.  
 LO IN: 230.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -9.07 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.

REV. X2  
 ZFM-3+  
 100818

Page 3 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661



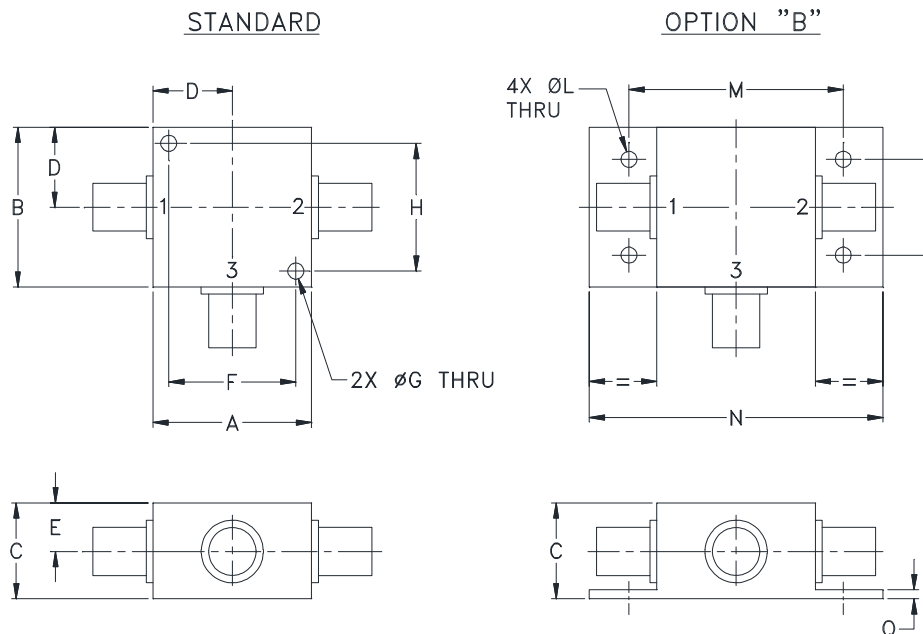
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see [minicircuits.com](http://www.minicircuits.com)

# Case Style

# K

## K18

### Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
K18	1.25 (31.75)	1.25 (31.75)	.75 (19.05)	.63 (16.00)	.38 (9.65)	1.000 (25.40)	.125 (3.18)	1.000 (25.40)	--	--	.125 (3.18)	1.688 (42.88)	2.18 (55.37)

CASE#	P	Q	WT. GRAMS
K18	.75 (19.05)	.07 (1.78)	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.
- Mounting bracket available on request. Add suffix B to part number.
- For port marking 1, 2, and 3 see specifications data sheet.
- For bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
- Refer to the individual model data sheet for the type of connectors available.

**Mini-Circuits**<sup>®</sup>

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

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
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