NON-CATALOG

Coaxial

Frequency Mixer

Level 7 (LO Power +7 dBm) 5 to 1250 MHz

ZFM-4+

SMA version shown

CASE STYLE: K18

Connectors	Model
BNC	ZFM-4+
SMA	ZFM-4-S+
BRACKET (OPTION "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

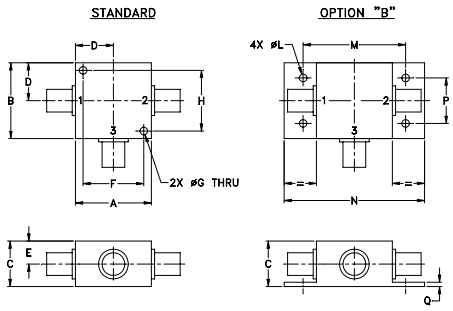
Features

- low conversion loss, 5.70 dB typ.
- high L-R isolation, 40 dB typ, L-I, 35 dB typ.
- phase detection, positive polarity
- rugged shielded case

Applications

- VHF/UHF
- cellular
- instrumentation
- federal & defense communications

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 m			Total Range	L		M		U		L		M		U	
f_L-f_U		$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
5-1250	DC-1250	5.70	0.34	7.5	8.5	50	45	40	30	30	25	45	40	35	25	25	20

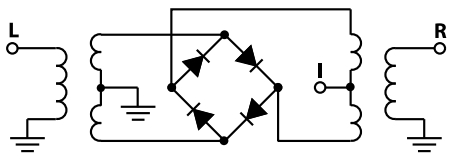
1 dB COMP.: +1 dBm typ.
For phase detection: DC output has positive with in-phase LO and RF signals

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 +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
5.00	35.00	7.08	67.00	62.10	1.54	3.00
20.00	50.00	6.84	67.00	59.11	1.42	2.83
50.00	80.00	6.64	50.64	49.95	1.34	2.85
100.00	70.00	6.48	44.54	43.90	1.31	2.72
138.39	108.39	6.51	38.97	38.26	1.26	2.49
227.32	197.32	6.59	37.28	36.56	1.25	2.44
271.78	241.78	6.44	34.49	34.10	1.20	2.33
360.71	330.71	6.47	32.40	32.75	1.17	2.23
449.64	419.64	6.57	31.70	31.16	1.13	2.19
538.57	508.57	6.45	31.48	30.87	1.12	2.17
583.03	553.03	6.54	30.37	30.53	1.12	2.14
671.96	641.96	6.82	29.62	29.00	1.13	2.05
760.89	730.89	6.83	29.45	27.36	1.16	2.02
849.82	819.82	6.86	29.60	26.76	1.18	2.05
894.28	864.28	7.01	30.37	25.36	1.22	2.12
983.21	953.21	7.24	29.78	23.67	1.24	2.11
1027.70	997.70	7.43	29.36	22.34	1.31	2.17
1116.60	1086.60	7.58	28.75	21.27	1.43	2.24
1200.00	1170.00	7.70	28.39	20.82	1.52	2.32
1250.00	1220.00	7.80	28.05	20.19	1.62	2.36

Electrical Schematic



Notes
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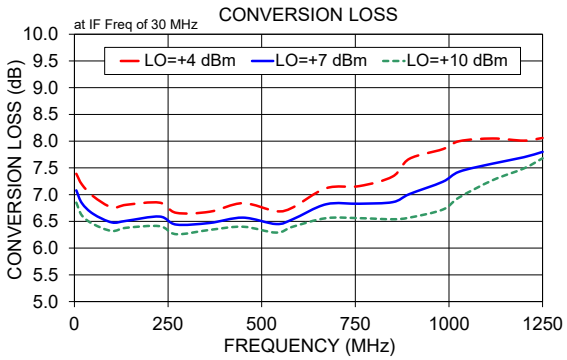
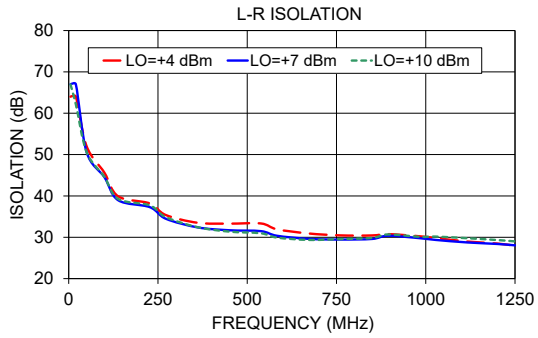
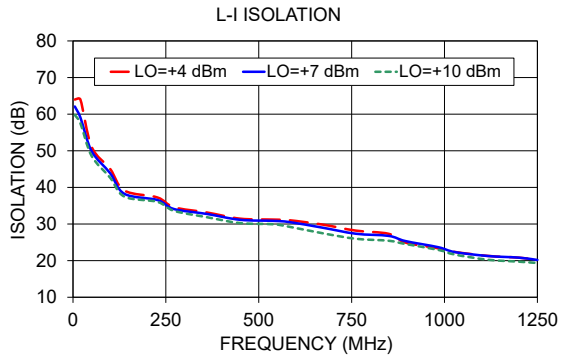
NON-CATALOG

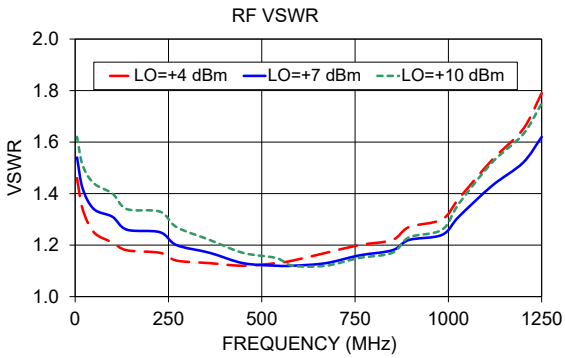
Performance Charts

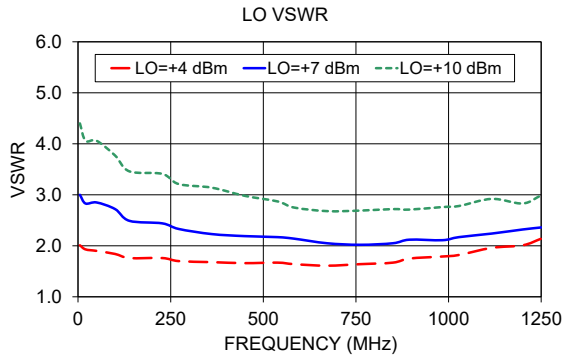
ZFM-4+

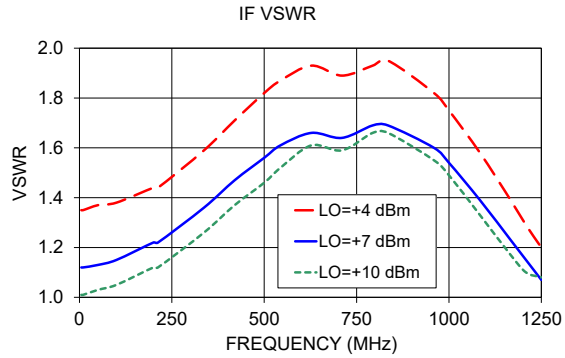












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Frequency Mixer ZFM-4+

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB) @LO (dBm)		
		+4	+7	+10
5.0	35.0	7.39	7.08	6.85
20.0	50.0	7.19	6.84	6.61
50.0	80.0	6.97	6.64	6.45
100.0	70.0	6.76	6.48	6.32
138.4	108.4	6.81	6.51	6.38
227.3	197.3	6.85	6.59	6.41
271.8	241.8	6.66	6.44	6.26
360.7	330.7	6.68	6.47	6.34
449.6	419.6	6.84	6.57	6.40
538.6	508.6	6.69	6.45	6.29
583.0	553.0	6.76	6.54	6.40
672.0	642.0	7.12	6.82	6.56
760.9	730.9	7.16	6.83	6.56
849.8	819.8	7.34	6.86	6.54
894.3	864.3	7.67	7.01	6.57
983.2	953.2	7.85	7.24	6.72
1027.7	997.7	8.00	7.43	6.95
1116.6	1086.6	8.05	7.58	7.27
1200.0	1170.0	8.01	7.70	7.49
1250.0	1220.0	8.06	7.80	7.68

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
5.0	64.00	67.00	66.97	64.00	62.10	59.80
20.0	64.00	67.00	62.16	64.00	59.11	57.53
50.0	52.06	50.64	50.62	51.15	49.95	48.63
100.0	45.63	44.54	44.61	45.08	43.90	42.67
138.4	39.91	38.97	39.28	39.15	38.26	37.49
227.3	38.18	37.28	37.71	37.26	36.56	36.05
271.8	35.39	34.49	34.87	34.59	34.10	33.61
360.7	33.51	32.40	32.45	33.15	32.75	31.86
449.6	33.30	31.70	31.37	31.47	31.16	30.26
538.6	33.34	31.48	30.96	31.22	30.87	29.94
583.0	31.94	30.37	29.93	31.03	30.53	29.24
672.0	30.92	29.62	29.36	29.85	29.00	27.48
760.9	30.46	29.45	29.56	28.21	27.36	25.98
849.8	30.45	29.60	29.84	27.33	26.76	25.43
894.3	30.77	30.37	30.69	24.95	25.36	24.55
983.2	30.24	29.78	30.11	23.37	23.67	22.94
1027.7	29.82	29.36	30.17	22.38	22.34	21.66
1116.6	28.97	28.75	29.77	21.30	21.27	20.25
1200.0	28.49	28.39	29.34	20.82	20.82	19.72
1250.0	27.96	28.05	29.00	20.23	20.19	19.35

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Typical Performance Data

RF/LO (MHz)	RF VSWR (:1) @LO (dBm)			LO VSWR (:1) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
5.0	1.46	1.54	1.62	2.01	3.00	4.40
10.0	1.34	1.42	1.51	1.93	2.83	4.06
50.0	1.25	1.34	1.44	1.90	2.85	4.06
100.0	1.21	1.31	1.40	1.84	2.72	3.77
200.0	1.18	1.26	1.34	1.76	2.49	3.46
212.5	1.17	1.25	1.33	1.76	2.44	3.41
337.0	1.14	1.20	1.27	1.70	2.33	3.21
420.0	1.13	1.17	1.22	1.68	2.23	3.14
500.0	1.12	1.13	1.17	1.66	2.19	2.98
544.0	1.13	1.12	1.15	1.67	2.17	2.87
627.5	1.14	1.12	1.12	1.64	2.14	2.75
710.5	1.17	1.13	1.12	1.61	2.05	2.68
793.5	1.20	1.16	1.15	1.64	2.02	2.69
835.0	1.22	1.18	1.17	1.67	2.05	2.72
959.5	1.27	1.22	1.23	1.75	2.12	2.71
1000.0	1.30	1.24	1.26	1.79	2.11	2.76
1084.0	1.38	1.31	1.36	1.82	2.17	2.78
1167.0	1.53	1.43	1.52	1.96	2.24	2.92
1208.5	1.65	1.52	1.63	2.01	2.32	2.83
1250.0	1.79	1.62	1.75	2.14	2.36	2.99

IF (MHz)	IF VSWR (:1) @LO (dBm)		
	+4	+7	+10
5.0	1.35	1.12	1.01
10.0	1.35	1.12	1.01
50.0	1.37	1.13	1.03
100.0	1.38	1.15	1.05
200.0	1.44	1.22	1.12
212.5	1.44	1.22	1.12
337.0	1.59	1.36	1.26
420.0	1.71	1.47	1.37
500.0	1.82	1.56	1.46
544.0	1.87	1.61	1.52
627.5	1.93	1.66	1.61
710.5	1.89	1.64	1.59
793.5	1.93	1.69	1.66
835.0	1.95	1.69	1.66
959.5	1.82	1.60	1.55
1000.0	1.75	1.54	1.49
1084.0	1.58	1.39	1.33
1167.0	1.39	1.23	1.17
1208.5	1.29	1.15	1.10
1250.0	1.20	1.07	1.08

LO/RF (MHz)	max. DC output (mV)	DC Offset (mV)
@LO (dBm)		
+7		
5.00	218.1	0.00
10.00	219.4	0.00
50.00	216.5	0.00
100.00	219.7	0.02
120.00	223.8	0.06
185.73	226.9	0.24
230.91	226.8	0.41
321.27	233.3	0.34
411.64	207.8	0.06
500.00	211.1	0.34
547.18	219.1	0.10
637.55	217.0	-0.76
727.91	198.4	-0.04
818.28	191.8	0.63
863.46	189.3	0.69
953.82	174.3	0.44
1000.00	169.1	0.67
1100.00	167.3	0.89
1200.00	156.9	-2.15
1250.00	152.8	-4.81

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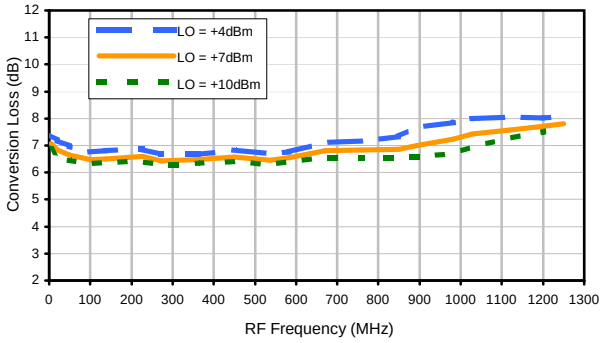
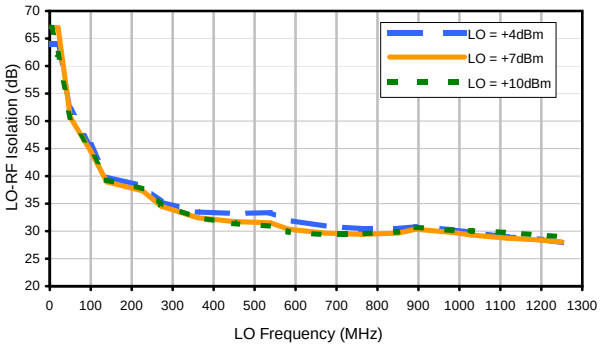
Frequency Mixer ZFM-4+

Typical Performance Curves

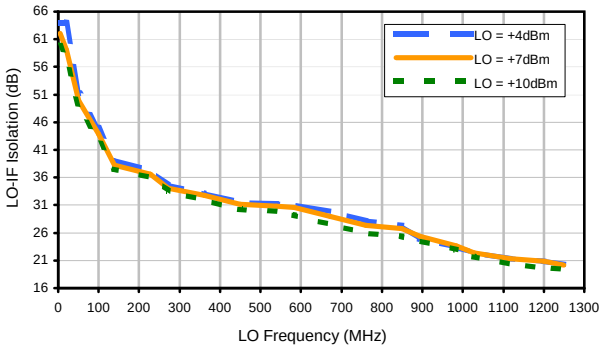
Conversion Loss



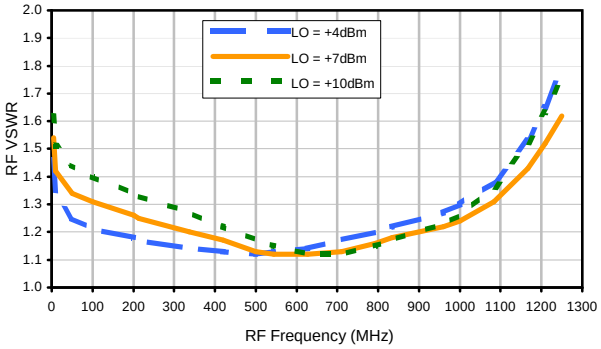
LO-RF Isolation



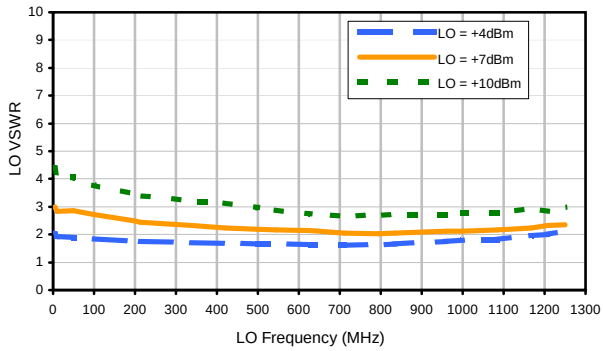
LO-IF Isolation



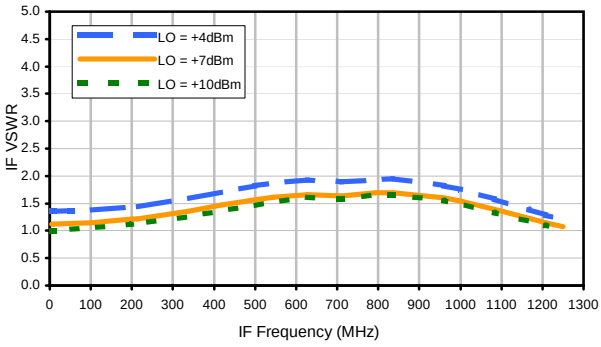
RF VSWR



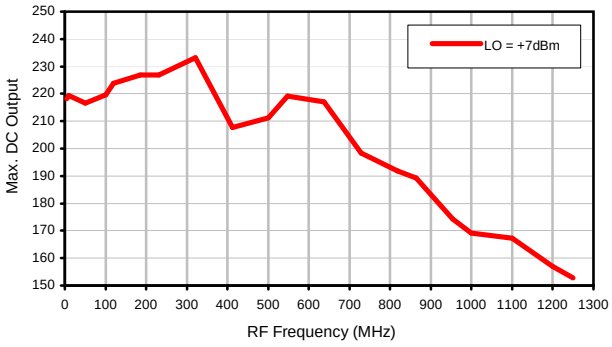
LO VSWR



IF VSWR



Max. DC Output



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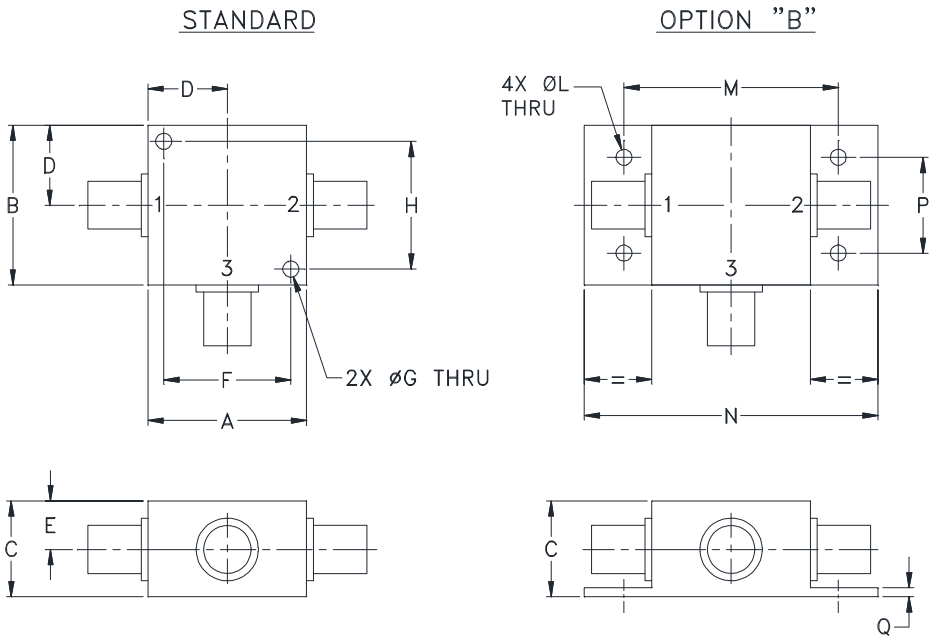
Case Style K

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. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Mounting bracket available on request. Add suffix B to part number.
4. For port marking 1, 2, and 3 see specifications data sheet.
5. For bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
6. Refer to the individual model data sheet for the type of connectors available.

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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
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

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