

Coaxial Frequency Mixer

Level 13 (LO Power +13 dBm) 0.5 to 600 MHz

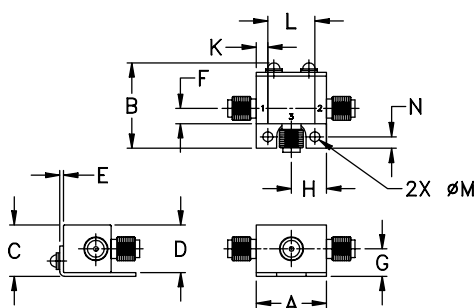
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	200mW
IF Current	40mA

Coaxial Connections

LO	1
RF	2
IF	3

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.74	.90	.54	.50	.04	.16	.29
18.80	22.86	13.72	12.70	1.02	4.06	7.37

H	J	K	L	M	N	wt
.37	--	.122	.496	.106	.122	grams
9.40	--	3.10	12.60	2.69	3.10	20.0

Features

- rugged construction
- small size
- low conversion loss
- high L-R isolation
- protected by US Patents 6,133,525 & 6,790,049

Applications

- cellular
- PCS
- instrumentation
- satellite communication

ZX05-1MHW+
ZX05-1MHW



CASE STYLE: FL905

Connectors	Model	Price	Qty.
SMA	ZX05-1MHW-S(+)	\$39.95 ea.	(1-24)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

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

Electrical Specifications (T_{AMB}=25°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	Mid-Band m			Total Range Max.	L		M		U		L		M		U		
		X̄	σ	Max.		Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.			
																Typ.	Min.	
0.5-600	DC-600	5.2	0.1	6.9	8.0	63	50	53	32	43	20	56	40	44	25	30	20	17

1 dB COMP.: +9 dBm typ.

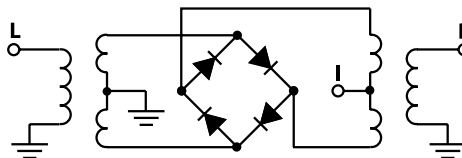
L = low range [f_L to 10 f_L]
m= mid band [2f_L to f_U/2]

M = mid range [10 f_L to f_U/2]
U = upper range [f_U/2 to f_U]

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
0.51	30.51	6.90	65.03	59.15	1.94	2.72
35.10	65.10	5.20	57.24	54.53	1.07	2.37
75.10	45.10	5.20	51.59	49.29	1.09	2.32
100.10	70.10	5.21	49.55	46.80	1.10	2.34
136.65	106.65	5.14	47.71	44.52	1.13	2.36
186.31	156.31	5.20	45.43	42.16	1.17	2.37
219.41	189.41	5.21	44.63	41.28	1.20	2.43
252.51	222.51	5.25	43.63	40.19	1.23	2.44
285.62	255.62	5.27	42.50	39.17	1.26	2.44
318.72	288.72	5.26	42.63	38.66	1.28	2.53
351.82	321.82	5.35	41.96	37.65	1.31	2.44
384.93	354.93	5.41	40.38	36.31	1.34	2.52
418.03	388.03	5.39	39.35	34.63	1.39	2.58
451.13	421.13	5.53	37.97	34.45	1.43	2.52
484.24	454.24	5.58	36.94	33.38	1.45	2.63
500.79	470.79	5.58	36.54	33.15	1.45	2.59
533.89	503.89	5.69	35.79	32.80	1.43	2.46
550.45	520.45	5.74	35.31	32.18	1.41	2.49
583.55	553.55	5.74	35.05	30.26	1.38	2.66
600.10	570.10	5.72	35.01	29.30	1.38	2.64

Electrical Schematic



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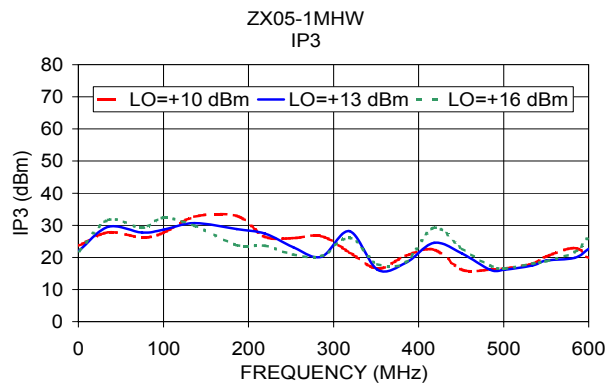
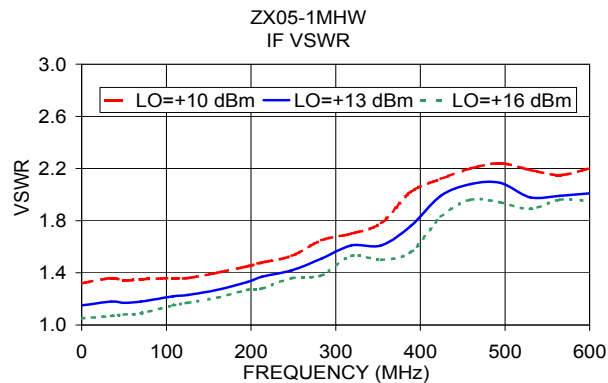
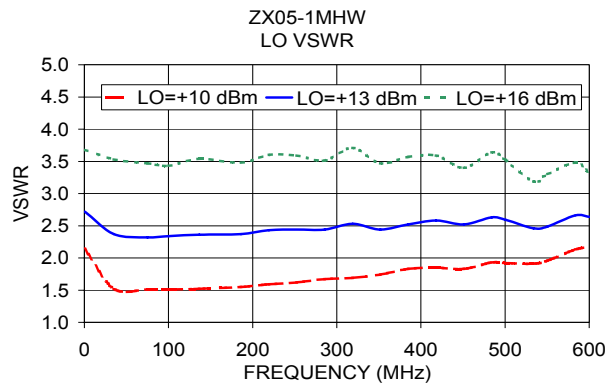
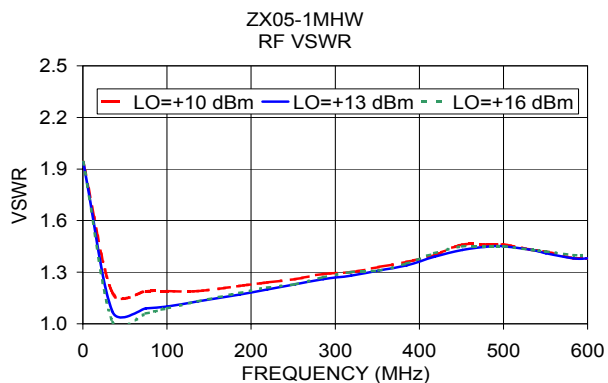
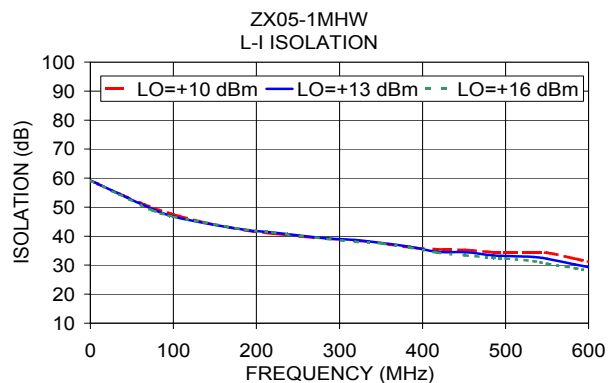
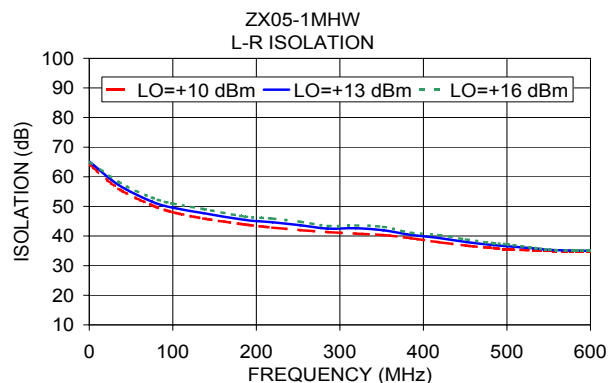
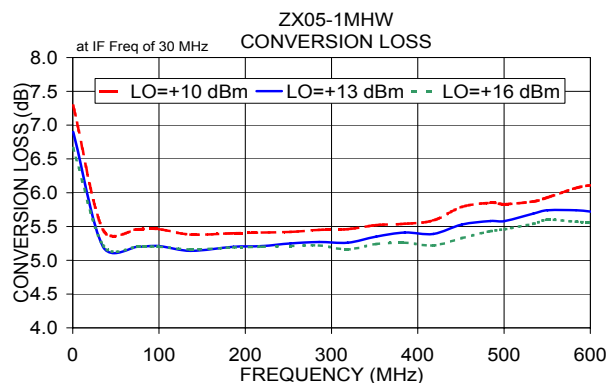
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RF/IF MICROWAVE COMPONENTS

REV. C
M100492
ZX05-1MHW
RVN/TD/CP
070612

Performance Charts

ZX05-1MHW+ ZX05-1MHW



Frequency Mixer

ZX05-1MHW

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			LO (MHz)	RF (MHz)	IP-3 Input (dBm)
		@LO (dBm)				@LO (dBm)			@LO (dBm)					@LO (dBm)
		+10	+13	+16		+10	+13	+16	+10	+13	+16			+13
0.5	30.5	7.29	6.90	6.66	30.5	64.13	65.03	65.15	59.13	59.15	59.12	30.5	0.5	22.10
0.8	30.8	6.83	6.46	6.24	30.8	63.87	64.46	64.83	58.53	58.83	58.90	30.8	0.8	30.60
1.0	31.0	6.63	6.25	6.05	31.0	63.30	64.24	64.51	58.19	58.62	58.75	31.0	1.0	26.40
5.1	35.1	5.74	5.41	5.32	35.1	61.84	62.71	63.25	57.47	58.01	58.29	35.1	5.1	27.90
10.1	40.1	5.53	5.20	5.28	40.1	61.21	62.13	62.59	57.31	57.70	57.86	40.1	10.1	28.10
20.1	50.1	5.45	5.11	5.20	45.1	50.37	51.59	52.94	49.76	49.29	48.84	50.1	20.1	33.30
35.1	65.1	5.45	5.20	5.22	50.1	58.98	60.05	60.91	56.48	56.64	56.65	65.1	35.1	29.50
50.1	80.1	5.46	5.19	5.23	65.1	55.94	57.24	58.22	54.55	54.53	54.37	80.1	50.1	31.00
75.1	105.1	5.46	5.20	5.20	70.1	48.04	49.55	50.93	47.50	46.80	46.70	105.1	75.1	27.70
100.1	130.1	5.46	5.21	5.20	80.1	53.43	54.86	55.92	52.74	52.44	52.25	130.1	100.1	28.60
120.1	150.1	5.42	5.17	5.15	90.1	46.73	48.44	49.82	45.87	45.38	45.44	150.1	120.1	30.80
136.7	166.7	5.38	5.14	5.16	106.7	45.91	47.71	49.10	44.77	44.52	44.74	166.7	136.7	30.70
153.2	183.2	5.41	5.18	5.18	123.2	45.12	46.94	48.33	43.67	43.64	43.89	183.2	153.2	33.90
169.8	199.8	5.38	5.17	5.15	139.8	44.53	46.28	47.43	42.90	42.98	43.18	199.8	169.8	31.00
186.3	216.3	5.40	5.20	5.19	156.3	43.88	45.43	46.54	42.03	42.16	42.24	216.3	186.3	28.80
202.9	232.9	5.36	5.18	5.20	172.9	43.40	45.09	46.03	41.45	41.67	41.66	232.9	202.9	25.30
219.4	249.4	5.41	5.21	5.20	189.4	42.86	44.63	45.88	40.90	41.28	41.36	249.4	219.4	27.40
236.0	266.0	5.39	5.21	5.21	206.0	42.46	44.22	45.43	40.32	40.56	40.73	266.0	236.0	21.70
252.5	282.5	5.42	5.25	5.21	222.5	41.97	43.63	44.79	39.87	40.19	40.14	282.5	252.5	23.20
269.1	299.1	5.43	5.25	5.20	239.1	41.48	42.91	43.98	39.53	39.67	39.57	299.1	269.1	25.20
285.6	315.6	5.45	5.27	5.22	255.6	41.33	42.50	43.39	39.15	39.17	39.06	315.6	285.6	20.20
300.1	330.1	5.42	5.25	5.19	270.1	41.25	42.41	43.16	39.10	38.90	38.48	330.1	300.1	22.70
318.7	348.7	5.46	5.26	5.16	288.7	40.82	42.63	43.57	38.49	38.66	38.04	348.7	318.7	28.20
335.3	365.3	5.47	5.31	5.16	305.3	40.54	42.30	43.61	38.36	38.50	38.10	365.3	335.3	20.90
351.8	381.8	5.52	5.35	5.24	321.8	40.32	41.96	43.08	37.47	37.65	37.49	381.8	351.8	16.20
368.4	398.4	5.56	5.41	5.28	338.4	39.77	41.27	42.16	37.40	37.46	37.15	398.4	368.4	16.60
384.9	414.9	5.54	5.41	5.26	354.9	39.26	40.38	41.08	36.10	36.31	36.03	414.9	384.9	18.30
401.5	431.5	5.55	5.39	5.25	371.5	38.52	39.73	40.56	35.99	35.77	35.26	431.5	401.5	22.30
418.0	448.0	5.59	5.39	5.22	388.0	37.94	39.35	40.31	35.49	34.63	34.33	448.0	418.0	24.50
434.6	464.6	5.65	5.43	5.27	404.6	37.23	38.70	39.85	35.78	34.80	33.72	464.6	434.6	20.20
451.1	481.1	5.79	5.53	5.33	421.1	36.76	37.97	38.84	35.24	34.45	33.41	481.1	451.1	21.20
467.7	497.7	5.84	5.57	5.41	437.7	36.33	37.42	38.12	35.19	34.20	33.17	497.7	467.7	16.70
484.2	514.2	5.85	5.58	5.43	454.2	35.88	36.94	37.55	34.44	33.38	32.54	514.2	484.2	16.10
500.8	530.8	5.83	5.58	5.46	470.8	35.52	36.54	37.17	34.38	33.15	32.26	530.8	500.8	16.20
517.3	547.3	5.82	5.62	5.49	487.3	35.29	36.20	36.78	34.27	32.98	32.06	547.3	517.3	16.40
533.9	563.9	5.87	5.69	5.54	503.9	35.12	35.79	35.93	34.40	32.80	31.36	563.9	533.9	17.50
550.5	580.5	5.93	5.74	5.60	520.5	34.98	35.31	35.36	34.23	32.18	30.43	580.5	550.5	19.00
567.0	597.0	5.97	5.74	5.59	537.0	34.94	35.16	35.13	33.61	31.50	29.76	597.0	567.0	19.60
583.6	613.6	6.07	5.74	5.57	553.6	34.90	35.05	35.01	32.28	30.26	28.93	613.6	583.6	19.80
600.1	630.1	6.11	5.72	5.56	570.1	34.80	35.01	34.95	31.20	29.30	28.13	630.1	600.1	22.70

Frequency Mixer

ZX05-1MHW

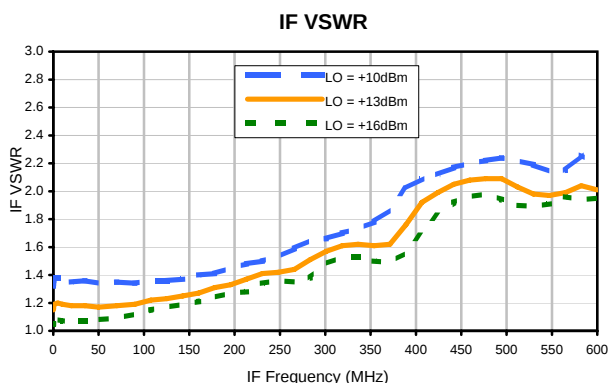
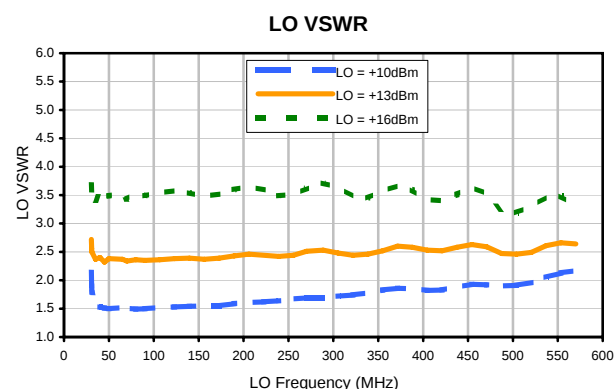
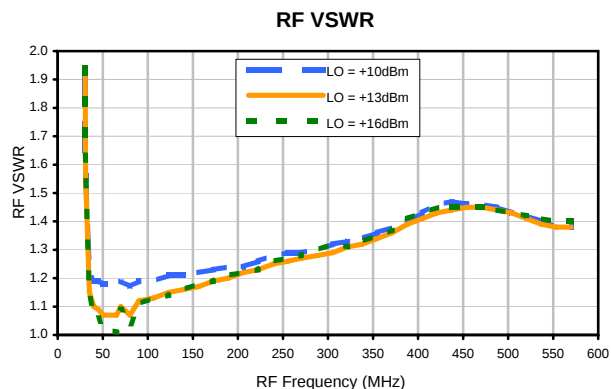
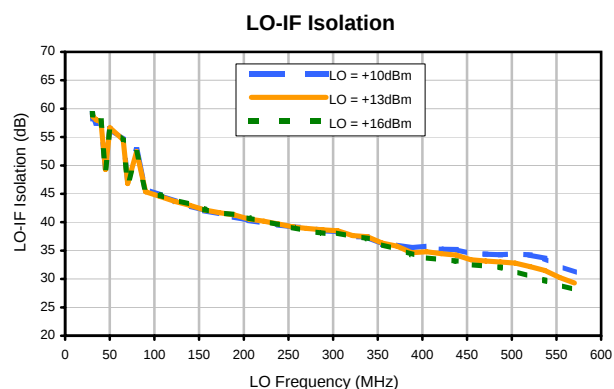
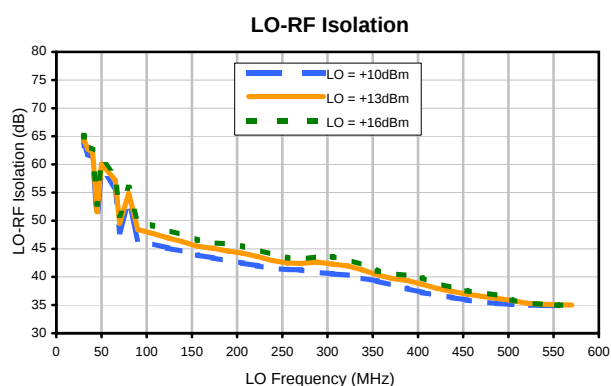
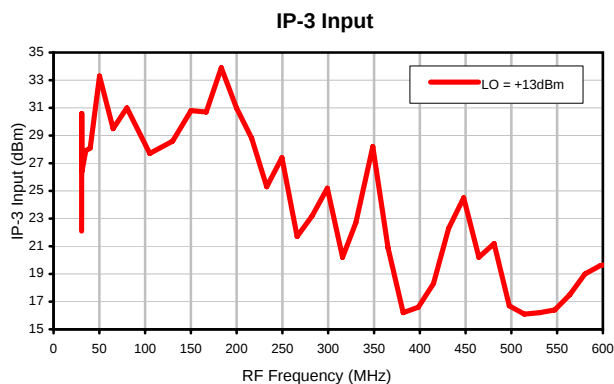
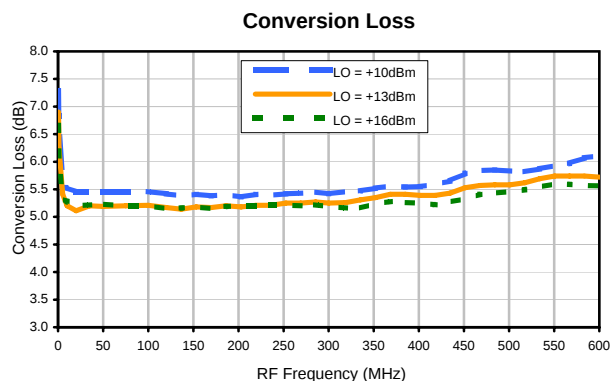
Typical Performance Data

RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)		
	@LO (dBm)			@LO (dBm)				@LO (dBm)		
	+10	+13	+16	+10	+13	+16		+10	+13	+16
30.5	1.94	1.94	1.94	2.14	2.72	3.68	0.1	1.32	1.15	1.05
30.8	1.66	1.66	1.66	1.90	2.56	3.55	0.3	1.34	1.16	1.05
31.0	1.55	1.55	1.56	1.79	2.50	3.48	0.5	1.36	1.18	1.07
35.1	1.22	1.15	1.14	1.53	2.37	3.41	1.0	1.38	1.19	1.08
40.1	1.19	1.10	1.07	1.53	2.40	3.55	5.0	1.38	1.20	1.08
45.1	1.19	1.09	1.06	1.51	2.32	3.47	10.0	1.38	1.19	1.07
50.1	1.18	1.07	1.02	1.50	2.38	3.49	20.0	1.35	1.18	1.07
65.1	1.18	1.07	1.01	1.52	2.37	3.53	35.0	1.36	1.18	1.07
70.1	1.19	1.10	1.09	1.51	2.34	3.43	50.0	1.34	1.17	1.08
80.1	1.17	1.07	1.03	1.49	2.36	3.53	70.0	1.35	1.18	1.09
90.1	1.19	1.12	1.11	1.50	2.35	3.49	90.0	1.34	1.19	1.12
106.7	1.19	1.13	1.13	1.52	2.36	3.54	107.6	1.36	1.22	1.15
123.2	1.21	1.15	1.14	1.53	2.38	3.58	125.2	1.36	1.23	1.17
139.8	1.21	1.16	1.16	1.54	2.39	3.54	142.8	1.37	1.25	1.19
156.3	1.22	1.17	1.18	1.55	2.37	3.48	160.4	1.40	1.27	1.21
172.9	1.23	1.19	1.19	1.55	2.39	3.52	177.9	1.41	1.31	1.24
189.4	1.24	1.20	1.21	1.59	2.43	3.60	195.5	1.45	1.33	1.27
206.0	1.24	1.22	1.22	1.61	2.46	3.65	213.1	1.48	1.37	1.28
222.5	1.26	1.23	1.23	1.62	2.44	3.59	230.7	1.50	1.41	1.34
239.1	1.28	1.25	1.26	1.64	2.42	3.49	248.3	1.53	1.42	1.36
255.6	1.29	1.26	1.27	1.67	2.44	3.51	265.9	1.59	1.44	1.35
270.1	1.29	1.27	1.28	1.69	2.51	3.62	283.5	1.65	1.51	1.38
288.7	1.30	1.28	1.30	1.69	2.53	3.71	301.0	1.66	1.57	1.48
305.3	1.32	1.29	1.32	1.72	2.48	3.64	318.6	1.70	1.61	1.53
321.8	1.33	1.31	1.31	1.74	2.44	3.47	336.2	1.73	1.62	1.53
338.4	1.34	1.32	1.33	1.78	2.46	3.45	353.8	1.78	1.61	1.50
354.9	1.36	1.34	1.35	1.83	2.52	3.57	371.4	1.87	1.62	1.49
371.5	1.38	1.36	1.37	1.86	2.60	3.67	389.0	2.02	1.76	1.56
388.0	1.40	1.39	1.41	1.85	2.58	3.59	406.6	2.09	1.92	1.70
404.6	1.43	1.41	1.43	1.82	2.53	3.42	424.1	2.12	1.99	1.83
421.1	1.46	1.43	1.45	1.83	2.52	3.40	441.7	2.17	2.05	1.92
437.7	1.47	1.44	1.45	1.88	2.58	3.51	459.3	2.20	2.08	1.96
454.2	1.46	1.45	1.45	1.93	2.63	3.64	476.9	2.22	2.09	1.98
470.8	1.46	1.45	1.45	1.92	2.59	3.52	494.5	2.24	2.09	1.94
487.3	1.45	1.44	1.44	1.90	2.47	3.24	512.1	2.22	2.03	1.90
503.9	1.43	1.43	1.43	1.91	2.46	3.19	529.7	2.19	1.98	1.89
520.5	1.42	1.41	1.42	1.96	2.49	3.30	547.2	2.14	1.97	1.91
537.0	1.40	1.39	1.41	2.05	2.61	3.47	564.8	2.15	1.99	1.96
553.6	1.38	1.38	1.40	2.13	2.66	3.48	582.4	2.26	2.04	1.94
570.1	1.38	1.38	1.40	2.17	2.64	3.32	600.0	2.20	2.01	1.95

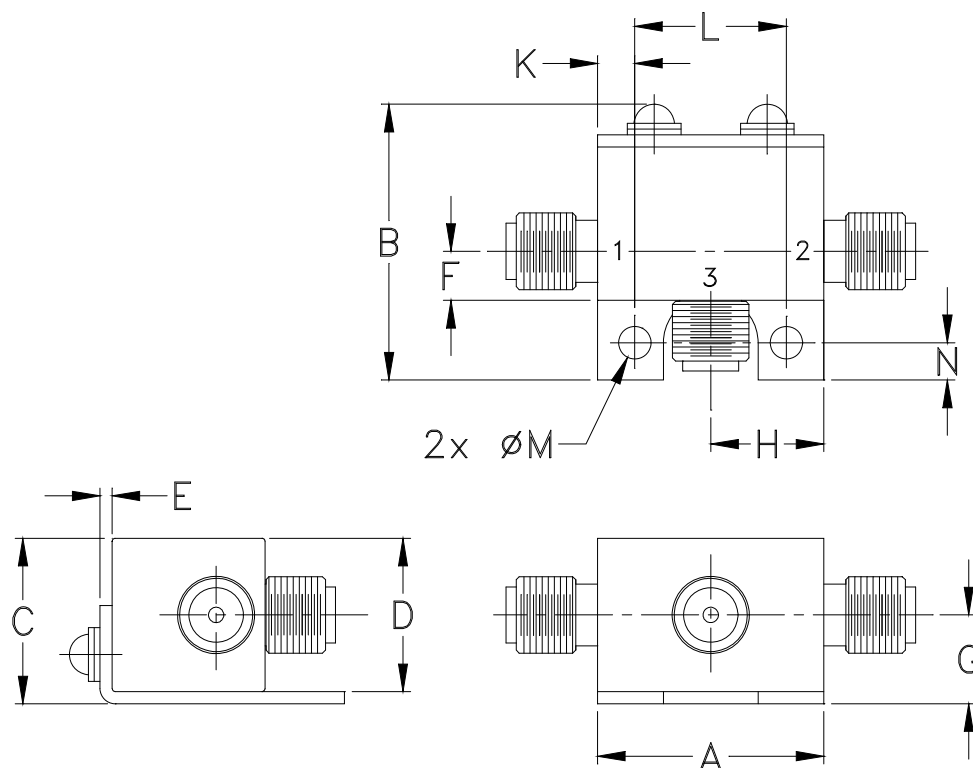
Frequency Mixer

ZX05-1MHW

Typical Performance Curves



Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
FL905	.74 (18.80)	.90 (22.86)	.54 (13.72)	.50 (12.70)	.04 (1.02)	.16 (4.06)	.29 (7.37)	.37 (9.40)	- -	.122 (3.10)	.496 (12.60)	.106 (2.69)	.122 (3.10)	20.0

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

Tolerance on hole size and interaxes dimensions to be $\pm .005$.

Notes:

- Case material: Brass.
- Case finish: Nickel plate.



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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.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C	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