

Coaxial Frequency Mixer

Level 10 (LO Power +10 dBm) 20 to 1500 MHz

NON-CATALOG

ZP-5LH+
ZP-5LH



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	L
RF	R
IF	X

Features

- low conversion loss, 6.9 dB typ.
- excellent L-R isolation, 42 dB typ.
- wideband, 20 to 1500 MHz
- rugged shielded case

Applications

- VHF/UHF
- satellite distribution
- instrumentation

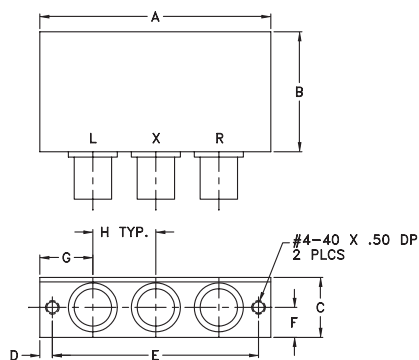
BNC version shown
CASE STYLE: GG60

Connectors	Model
BNC	ZP-5LH-(+)
SMA	ZP-5LH-S+

+RoHS Compliant

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

Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F	G	H	wt
2.31	1.20	.60	.125	2.062	.30	.53	.63	grams
58.67	30.48	15.24	3.18	52.37	7.62	13.46	16.00	75.0

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF f_L - f_U	IF	Mid-Band m		Total Range		L		M		U		L		M		U	
		$\bar{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
20-1500	DC-1000	6.9	0.27	8.5	9.0	53	40	42	30	38	25	40	25	30	18	22	8

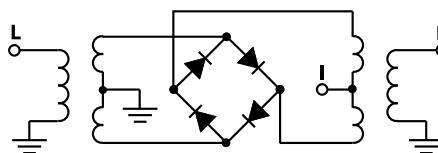
1 dB COMP.: +5 dBm typ.

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 +10dBm	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm
20.00	50.00	5.60	62.84	53.91	1.43	2.57
50.00	80.00	5.38	57.81	46.30	1.32	2.51
100.00	70.00	5.25	52.60	40.86	1.31	2.50
158.75	128.75	5.20	49.11	38.29	1.34	2.38
200.00	170.00	5.25	47.45	36.98	1.48	2.28
297.50	267.50	5.37	44.43	34.13	1.59	2.36
436.25	406.25	5.54	42.14	31.89	1.91	2.34
500.00	470.00	5.74	41.47	30.68	2.36	2.36
575.00	545.00	5.89	40.90	30.02	2.49	2.36
713.75	683.75	6.61	40.16	28.61	2.97	2.45
750.00	720.00	6.80	39.71	28.48	3.40	2.46
760.00	730.00	6.83	39.62	28.42	3.53	2.48
852.50	822.50	7.07	39.30	28.00	3.80	2.56
991.25	961.25	6.99	38.97	26.26	3.86	2.67
1000.00	970.00	7.07	38.98	26.16	3.95	2.70
1130.00	1100.00	7.19	35.93	24.11	3.91	2.73
1222.50	1192.50	7.02	38.98	22.14	3.77	2.73
1361.25	1331.25	6.88	39.21	19.23	3.65	2.77
1453.75	1423.75	6.78	38.09	16.51	3.54	2.78
1500.00	1470.00	6.66	37.95	16.08	3.47	2.77

Electrical Schematic



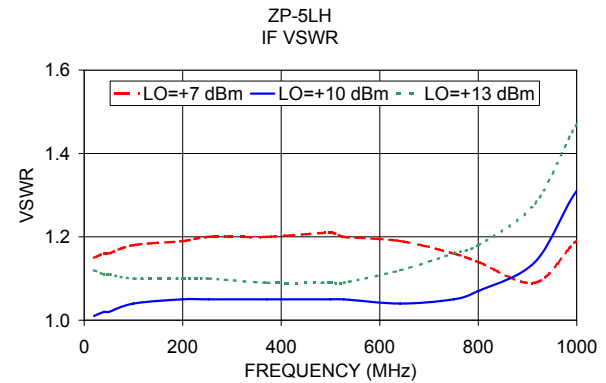
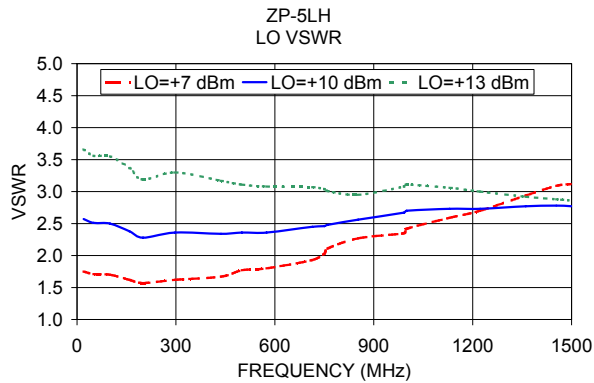
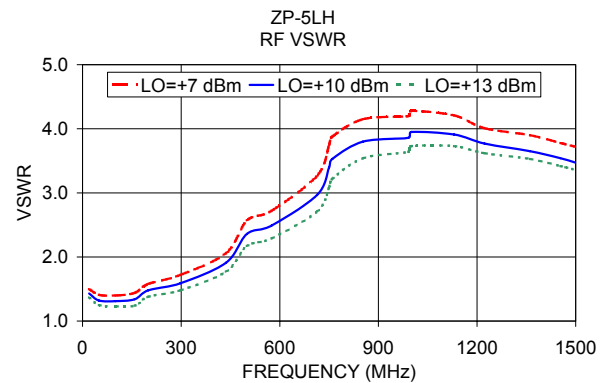
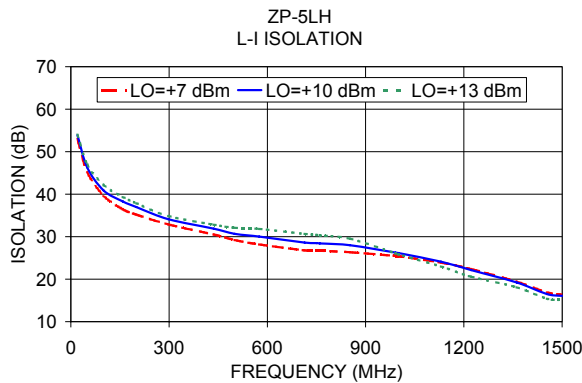
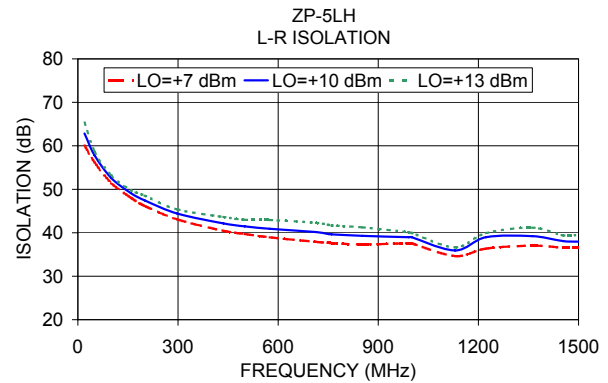
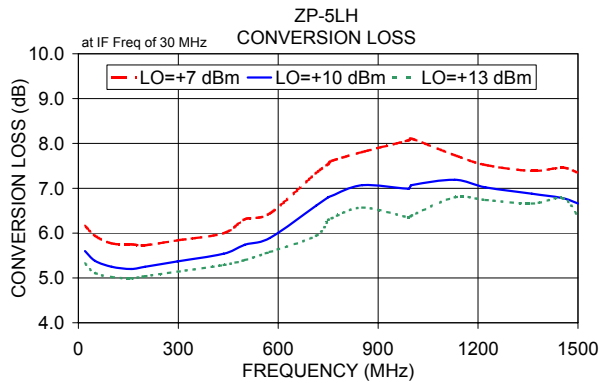
Notes

- 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



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

REV. C
M160892
ZP-5LH
DJ/CP/AM
171108
Page 1 of 2



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-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp



Frequency Mixer

ZP-5LH+

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=+5dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+7	+10	+13			+7	+10	+13			+7	+10	+13
10.1	40.1	6.53	6.09	5.88	10.1	40.1	16.87	18.73	21.05	10.1	40.1	0.92	0.71	0.55
90.9	120.9	5.97	5.61	5.44	90.9	120.9	18.15	21.01	17.27	90.9	120.9	1.28	1.06	0.79
171.8	201.8	5.98	5.61	5.45	171.8	201.8	16.22	14.62	15.91	171.8	201.8	1.35	1.04	0.78
252.6	282.6	5.98	5.65	5.49	252.6	282.6	12.46	14.25	17.11	252.6	282.6	1.38	0.98	0.74
333.5	363.5	6.06	5.75	5.55	333.5	363.5	12.51	14.39	16.56	333.5	363.5	1.35	0.99	0.78
414.3	444.3	6.14	5.82	5.62	414.3	444.3	12.47	14.12	16.58	414.3	444.3	1.33	1.04	0.81
495.1	525.1	6.29	5.90	5.63	495.1	525.1	11.73	15.25	21.60	495.1	525.1	1.41	1.14	0.93
576.0	606.0	6.43	6.04	5.81	576.0	606.0	12.16	13.94	15.52	576.0	606.0	1.71	1.32	1.09
656.8	686.8	6.72	6.13	5.74	656.8	686.8	11.54	17.55	25.27	656.8	686.8	1.78	1.59	1.36
737.7	767.7	7.22	6.61	6.16	737.7	767.7	10.11	12.18	16.23	737.7	767.7	1.59	1.39	1.32
818.5	848.5	7.69	7.04	6.59	818.5	848.5	11.08	13.29	15.17	818.5	848.5	1.35	1.23	1.15
899.3	929.3	7.84	6.95	6.40	899.3	929.3	10.88	13.00	16.22	899.3	929.3	1.31	1.34	1.30
980.2	1010.2	7.82	6.78	6.32	980.2	1010.2	11.45	13.78	15.43	980.2	1010.2	1.45	1.55	1.37
1061.0	1091.0	7.94	6.99	6.43	1061.0	1091.0	10.52	11.85	13.32	1061.0	1091.0	1.16	1.32	1.26
1141.8	1171.8	7.72	7.12	6.56	1141.8	1171.8	10.74	10.47	11.14	1141.8	1171.8	1.13	1.13	1.12
1202.5	1232.5	7.54	6.99	6.57	1202.5	1232.5	11.08	10.91	10.54	1202.5	1232.5	1.23	1.13	1.06
1283.3	1313.3	7.34	6.91	6.51	1283.3	1313.3	11.59	10.56	10.15	1283.3	1313.3	1.23	1.09	1.02
1343.9	1373.9	7.24	6.80	6.49	1343.9	1373.9	11.45	10.05	9.27	1343.9	1373.9	1.24	1.05	0.98
1424.8	1454.8	7.22	6.80	6.53	1424.8	1454.8	10.79	9.70	9.29	1424.8	1454.8	1.23	0.99	0.90
1485.4	1515.4	7.20	6.77	6.42	1485.4	1515.4	10.34	10.89	14.16	1485.4	1515.4	1.31	1.04	0.91
1566.3	1596.3	7.18	6.50	6.08	1566.3	1596.3	11.30	15.47	15.69	1566.3	1596.3	1.33	1.13	0.86
1626.9	1656.9	6.93	6.24	5.96	1626.9	1656.9	13.83	14.04	15.41	1626.9	1656.9	1.54	1.15	0.74
1707.7	1737.7	6.71	6.14	5.97	1707.7	1737.7	11.74	15.56	18.85	1707.7	1737.7	1.70	0.95	0.61
1768.4	1798.4	6.70	6.21	6.02	1768.4	1798.4	12.81	17.65	19.34	1768.4	1798.4	1.75	0.90	0.61
1849.2	1879.2	6.80	6.33	6.11	1849.2	1879.2	14.66	19.11	20.78	1849.2	1879.2	1.71	0.90	0.62
1909.8	1939.8	7.04	6.46	6.24	1909.8	1939.8	14.71	20.60	22.18	1909.8	1939.8	1.80	1.00	0.70
1990.7	2020.7	7.47	6.63	6.30	1990.7	2020.7	13.19	18.70	24.39	1990.7	2020.7	1.91	1.18	0.85
2051.3	2081.3	7.75	6.75	6.38	2051.3	2081.3	12.97	16.85	19.92	2051.3	2081.3	1.92	1.30	0.95
2132.1	2162.1	8.17	6.76	6.34	2132.1	2162.1	13.73	14.36	17.75	2132.1	2162.1	1.68	1.46	1.07
2192.8	2222.8	9.09	7.09	6.37	2192.8	2222.8	11.44	11.99	16.53	2192.8	2222.8	1.37	1.52	1.21
2273.6	2303.6	9.84	7.53	6.52	2273.6	2303.6	9.75	12.45	13.89	2273.6	2303.6	1.13	1.45	1.32
2334.2	2364.2	9.77	7.63	6.56	2334.2	2364.2	10.86	15.12	14.18	2334.2	2364.2	1.20	1.33	1.28
2415.1	2445.1	10.13	7.85	6.74	2415.1	2445.1	10.44	14.45	15.97	2415.1	2445.1	1.33	1.31	1.23
2475.7	2505.7	10.81	8.26	7.09	2475.7	2505.7	9.03	13.19	14.39	2475.7	2505.7	1.33	1.47	1.20
2556.5	2586.5	11.28	8.44	7.21	2556.5	2586.5	8.96	12.18	13.95	2556.5	2586.5	1.20	1.57	1.24
2617.2	2647.2	11.36	8.53	7.36	2617.2	2647.2	10.21	11.56	13.06	2617.2	2647.2	1.27	1.56	1.24
2698.0	2728.0	12.34	9.24	7.63	2698.0	2728.0	7.67	12.39	13.25	2698.0	2728.0	1.13	1.60	1.39
2758.6	2788.6	12.84	9.75	7.92	2758.6	2788.6	5.44	11.05	13.85	2758.6	2788.6	0.77	1.45	1.46
2839.5	2869.5	13.08	10.01	8.20	2839.5	2869.5	3.41	8.66	12.86	2839.5	2869.5	0.38	1.25	1.54
2900.1	2930.1	14.48	10.69	8.45	2900.1	2930.1	1.92	6.77	12.16	2900.1	2930.1	-0.43	0.88	1.52

REV. X2

ZP-5LH+

100818

Page 1 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (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



Frequency Mixer

ZP-5LH+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=750.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=20.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
710.0	40.1	6.11	10.0	30.1	6.00	1000.0	500.1	7.76
692.1	58.0	6.13	30.2	50.3	5.99	979.8	520.3	7.76
674.1	76.0	6.20	50.4	70.5	6.05	959.6	540.5	7.68
656.2	93.9	6.19	70.6	90.7	6.11	939.4	560.7	7.75
638.2	111.9	6.21	90.8	110.9	6.04	919.2	580.9	7.65
620.3	129.8	6.20	111.0	131.1	6.01	899.0	601.1	7.64
602.3	147.8	6.26	131.2	151.3	6.04	878.8	621.3	7.61
584.4	165.7	6.26	151.4	171.5	6.08	858.6	641.5	7.58
566.4	183.7	6.35	171.6	191.7	6.04	838.4	661.7	7.56
548.5	201.6	6.36	191.8	211.9	6.00	818.2	681.9	7.44
530.5	219.6	6.37	212.0	232.1	6.00	798.0	702.1	7.52
512.6	237.5	6.32	232.2	252.3	5.99	777.8	722.3	7.51
494.6	255.5	6.39	252.4	272.5	6.03	757.6	742.5	7.58
476.7	273.4	6.37	272.7	292.8	6.02	737.3	762.8	7.39
458.7	291.4	6.43	292.9	313.0	6.01	717.1	783.0	7.47
440.8	309.3	6.46	313.1	333.2	6.00	696.9	803.2	7.47
422.8	327.3	6.39	333.3	353.4	6.00	676.7	823.4	7.38
404.9	345.2	6.36	353.5	373.6	6.05	656.5	843.6	7.39
386.9	363.2	6.34	373.7	393.8	6.02	636.3	863.8	7.34
369.0	381.1	6.31	393.9	414.0	6.03	616.1	884.0	7.28
351.0	399.1	6.41	434.3	454.4	6.04	575.7	924.4	7.08
333.1	417.0	6.42	454.5	474.6	6.07	555.5	944.6	7.03
315.1	435.0	6.43	494.9	515.0	6.06	515.1	985.0	6.79
297.2	452.9	6.41	515.1	535.2	6.01	494.9	1005.2	6.72
279.2	470.9	6.41	555.5	575.6	6.11	454.5	1045.6	6.66
261.3	488.8	6.45	575.7	595.8	6.07	434.3	1065.8	6.57
243.3	506.8	6.40	616.1	636.2	6.08	393.9	1106.2	6.54
225.4	524.7	6.46	636.3	656.4	6.14	373.7	1126.4	6.56
207.4	542.7	6.47	676.7	696.8	6.17	333.3	1166.8	6.54
189.5	560.6	6.49	696.9	717.0	6.21	313.1	1187.0	6.62
171.5	578.6	6.48	737.3	757.4	6.40	272.7	1227.4	6.72
153.6	596.5	6.52	757.6	777.7	6.35	252.4	1247.7	6.74
135.6	614.5	6.45	798.0	818.1	6.46	212.0	1288.1	6.81
117.7	632.4	6.46	818.2	838.3	6.46	191.8	1308.3	6.81
99.7	650.4	6.38	858.6	878.7	6.54	151.4	1348.7	6.80
81.8	668.3	6.41	878.8	898.9	6.59	131.2	1368.9	6.79
63.8	686.3	6.37	919.2	939.3	6.58	90.8	1409.3	6.80
45.9	704.2	6.46	939.4	959.5	6.65	70.6	1429.5	6.85
27.9	722.2	6.49	979.8	999.9	6.77	30.2	1469.9	6.82
10.0	740.1	6.59	1000.0	1020.1	6.82	10.0	1490.1	7.03

REV. X2

ZP-5LH+

100818

Page 2 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (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 Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
10.1	66.48	65.32	64.64	56.15	59.28	58.27
90.9	56.08	56.42	56.76	40.10	41.45	42.69
171.8	50.94	51.49	52.07	35.33	37.07	38.39
252.6	47.83	48.74	49.41	33.24	34.73	35.68
333.5	45.81	46.85	47.61	31.37	32.66	33.61
414.3	44.19	45.17	45.87	29.89	31.18	32.21
495.1	43.25	44.32	45.13	28.42	29.91	31.16
576.0	42.54	44.01	45.28	26.90	28.54	30.11
656.8	41.08	42.44	43.59	25.84	27.67	29.24
737.7	40.18	41.81	43.12	24.58	26.39	28.28
818.5	39.52	41.38	42.96	23.95	25.51	27.05
899.3	39.34	41.44	43.30	23.46	24.79	25.99
980.2	38.45	40.29	41.77	22.58	23.50	24.11
1061.0	37.40	38.59	39.65	21.66	22.30	22.59
1141.8	36.81	37.71	38.25	20.70	20.97	20.91
1202.5	36.41	37.09	37.62	20.10	20.21	19.98
1283.3	35.83	36.50	36.82	19.31	19.22	18.81
1343.9	35.44	36.06	36.38	18.80	18.54	17.99
1424.8	34.91	35.40	35.84	18.11	17.84	17.28
1485.4	34.45	34.79	35.03	17.47	17.02	16.33
1566.3	33.64	33.88	34.20	16.14	15.43	14.50
1626.9	33.01	33.47	34.09	15.15	14.33	13.75
1707.7	32.71	33.60	34.34	14.04	13.45	12.85
1768.4	32.88	33.33	34.03	13.38	12.78	12.41
1849.2	32.85	33.29	33.71	12.51	12.23	11.93
1909.8	32.98	33.23	33.55	12.02	11.78	11.55
1990.7	32.89	33.09	33.37	11.44	11.26	11.09
2051.3	32.65	33.01	33.29	10.94	11.02	10.85
2132.1	32.52	32.71	32.98	10.60	10.63	10.73
2192.8	32.51	33.64	34.10	10.31	10.48	10.60
2273.6	32.81	34.60	35.68	10.08	10.20	10.40
2334.2	32.54	34.36	36.32	9.89	10.14	10.41
2415.1	32.75	34.23	36.25	9.75	10.00	10.28
2475.7	33.24	35.17	37.06	9.62	10.02	10.34
2556.5	33.66	36.27	38.69	9.63	10.09	10.51
2617.2	33.73	36.72	40.38	9.53	9.97	10.58
2698.0	34.50	38.17	42.69	9.52	10.05	10.72
2758.6	35.24	39.75	46.59	9.72	10.24	10.86
2839.5	35.79	40.53	49.40	9.83	10.43	11.13
2900.1	36.70	41.00	47.61	9.87	10.50	11.22

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	51.97	57.02	46.63
90.9	120.9	48.39	45.32	44.97
171.8	201.8	42.30	41.64	40.83
252.6	282.6	39.43	38.42	38.15
333.5	363.5	37.19	36.26	35.55
414.3	444.3	34.78	34.16	33.79
495.1	525.1	32.51	31.91	31.80
576.0	606.0	30.99	30.54	30.20
656.8	686.8	29.93	29.25	28.78
737.7	767.7	28.17	27.77	27.26
818.5	848.5	27.19	26.94	26.68
899.3	929.3	27.29	26.88	26.45
980.2	1010.2	28.81	28.23	28.04
1061.0	1091.0	30.47	30.30	30.01
1141.8	1171.8	30.41	30.70	30.78
1202.5	1232.5	29.21	29.57	29.90
1283.3	1313.3	27.18	27.38	27.80
1343.9	1373.9	26.17	26.39	26.67
1424.8	1454.8	24.43	24.90	25.16
1485.4	1515.4	23.63	24.03	24.33
1566.3	1596.3	22.93	23.34	23.49
1626.9	1656.9	22.67	22.97	23.11
1707.7	1737.7	22.30	22.80	23.05
1768.4	1798.4	22.02	22.46	22.83
1849.2	1879.2	21.42	21.87	22.23
1909.8	1939.8	20.86	21.35	21.71
1990.7	2020.7	20.15	20.67	21.06
2051.3	2081.3	19.80	20.42	20.83
2132.1	2162.1	19.45	20.24	20.68
2192.8	2222.8	19.06	20.06	20.64
2273.6	2303.6	19.05	20.07	20.93
2334.2	2364.2	19.39	20.29	21.13
2415.1	2445.1	19.79	20.79	21.52
2475.7	2505.7	19.98	21.20	22.00
2556.5	2586.5	20.69	22.09	23.03
2617.2	2647.2	21.27	22.84	23.82
2698.0	2728.0	21.79	23.37	24.85
2758.6	2788.6	22.41	23.74	25.30
2839.5	2869.5	23.61	24.69	26.11
2900.1	2930.1	24.86	25.72	26.54

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	1.89	1.85	1.83
90.9	120.9	1.17	1.07	1.05
171.8	201.8	1.19	1.09	1.07
252.6	282.6	1.26	1.19	1.16
333.5	363.5	1.34	1.28	1.25
414.3	444.3	1.42	1.36	1.32
495.1	525.1	1.54	1.46	1.41
576.0	606.0	1.72	1.64	1.59
656.8	686.8	2.01	1.87	1.77
737.7	767.7	2.41	2.27	2.14
818.5	848.5	2.81	2.65	2.52
899.3	929.3	3.16	2.91	2.73
980.2	1010.2	3.47	3.15	2.98
1061.0	1091.0	3.67	3.37	3.15
1141.8	1171.8	3.53	3.31	3.10
1202.5	1232.5	3.36	3.18	3.00
1283.3	1313.3	3.22	3.06	2.88
1343.9	1373.9	3.18	2.99	2.81
1424.8	1454.8	3.08	2.85	2.61
1485.4	1515.4	2.94	2.66	2.41
1566.3	1596.3	2.65	2.30	2.09
1626.9	1656.9	2.38	2.07	1.93
1707.7	1737.7	2.20	1.96	1.84
1768.4	1798.4	2.17	1.95	1.83
1849.2	1879.2	2.14	1.93	1.81
1909.8	1939.8	2.15	1.94	1.80
1990.7	2020.7	2.21	1.97	1.84
2051.3	2081.3	2.29	2.02	1.88
2132.1	2162.1	2.40	2.06	1.89
2192.8	2222.8	2.51	2.06	1.85
2273.6	2303.6	2.45	2.00	1.74
2334.2	2364.2	2.26	1.90	1.66
2415.1	2445.1	2.20	1.86	1.66
2475.7	2505.7	2.28	1.91	1.71
2556.5	2586.5	2.26	1.85	1.67
2617.2	2647.2	2.12	1.74	1.58
2698.0	2728.0	2.03	1.66	1.49
2758.6	2788.6	2.02	1.67	1.50
2839.5	2869.5	2.09	1.74	1.56
2900.1	2930.1	2.30	1.88	1.60

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+7	+10	+13
10.1	1.65	2.34	3.19
90.9	1.68	2.42	3.35
171.8	1.68	2.39	3.29
252.6	1.70	2.43	3.34
333.5	1.72	2.44	3.32
414.3	1.73	2.42	3.25
495.1	1.75	2.40	3.17
576.0	1.79	2.41	3.15
656.8	1.88	2.47	3.14
737.7	1.93	2.51	3.18
818.5	1.96	2.50	3.14
899.3	1.98	2.45	3.02
980.2	2.06	2.48	3.01
1061.0	2.16	2.59	3.09
1141.8	2.20	2.64	3.11
1202.5	2.21	2.63	3.10
1283.3	2.25	2.65	3.10
1343.9	2.28	2.66	3.08
1424.8	2.27	2.60	3.00
1485.4	2.28	2.58	2.95
1566.3	2.25	2.50	2.87
1626.9	2.22	2.47	2.85
1707.7	2.30	2.55	2.91
1768.4	2.48	2.69	3.02
1849.2	2.75	2.87	3.16
1909.8	2.94	2.97	3.20
1990.7	3.24	3.15	3.29
2051.3	3.47	3.31	3.46
2132.1	3.76	3.50	3.51
2192.8	4.07	3.68	3.62
2273.6	4.35	3.99	3.86
2334.2	4.60	4.23	4.10
2415.1	4.88	4.45	4.35
2475.7	5.16	4.72	4.55
2556.5	5.46	5.00	4.80
2617.2	5.75	5.36	5.04
2698.0	6.11	5.72	5.39
2758.6	6.39	6.03	5.68
2839.5	6.73	6.32	6.03
2900.1	6.94	6.56	6.24

IF (OUT) (MHz)	IF VSWR @LO=1500.1MHz (:1)		
	@LO (dBm)		
	+7	+10	+13
10.0	1.55	1.33	1.17
30.2	1.45	1.22	1.04
50.4	1.40	1.20	1.08
70.6	1.41	1.21	1.00
90.8	1.43	1.22	1.04
111.0	1.47	1.25	1.04
131.2	1.52	1.30	1.09
151.4	1.47	1.26	1.05
171.6	1.42	1.22	1.03
191.8	1.49	1.27	1.07
212.0	1.53	1.31	1.09
232.2	1.48	1.27	1.07
252.4	1.48	1.27	1.10
272.7	1.51	1.30	1.10
292.9	1.50	1.28	1.07
313.1	1.50	1.29	1.10
333.3	1.55	1.33	1.14
353.5	1.54	1.32	1.12
373.7	1.51	1.29	1.11
393.9	1.55	1.33	1.16
434.3	1.57	1.34	1.15
454.5	1.57	1.35	1.18
494.9	1.64	1.40	1.20
515.1	1.62	1.39	1.20
555.5	1.69	1.45	1.24
575.7	1.68	1.44	1.23
616.1	1.75	1.50	1.29
636.3	1.72	1.47	1.25
676.7	1.81	1.55	1.32
696.9	1.82	1.56	1.33
737.3	1.79	1.54	1.33
757.6	1.84	1.58	1.35
798.0	1.90	1.63	1.41
818.2	1.91	1.65	1.42
858.6	1.88	1.62	1.40
878.8	1.96	1.68	1.45
919.2	1.96	1.70	1.48
939.4	1.92	1.68	1.48
979.8	1.98	1.71	1.49
1000.0	2.02	1.75	1.54

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	10	39	26	46	24	43	38	62	47	79
1	-	21	+0	38	19	44	37	49	49	59	57	69
2	86	74	38	58	38	67	51	70	42	56	55	76
3	>100	49	40	52	36	52	43	53	43	63	55	67
4	>100	83	76	80	50	70	52	71	65	67	64	68
5	>100	65	59	63	53	79	47	83	56	75	56	73
6	>100	77	78	85	79	83	66	79	63	79	78	82
7	>100	82	74	82	72	85	63	71	60	71	69	82
8	>100	>93	>93	>93	83	87	88	91	70	>93	71	88
9	>100	>93	>93	>93	91	92	92	86	80	>93	71	90
10	>100	>93	>93	>93	>93	>93	90	>93	>93	>93	83	>93
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; 0.00 dBm.

LO IN: 780.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -6.67 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	27	15	34	11	31	24	48	37	67
1	-	22	+0	36	20	37	36	46	47	50	53	60
2	>100	74	44	65	44	67	57	68	47	60	66	73
3	>100	74	55	68	50	69	56	76	56	76	62	80
4	>100	>83	>83	>83	81	>83	76	>83	>83	>83	76	>83
5	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
6	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
7	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
8	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
9	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
10	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; -10.00 dBm.

LO IN: 780.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -16.9 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

ZP-5LH+

100818

Page 5 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (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

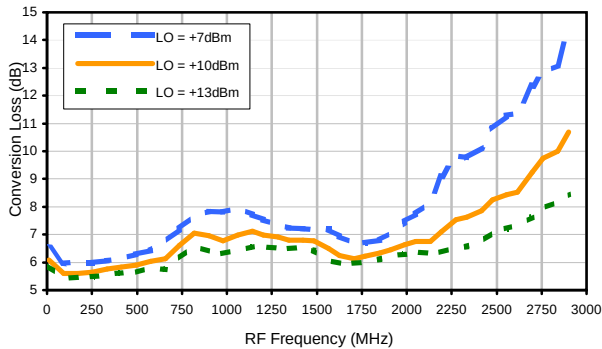


Frequency Mixer

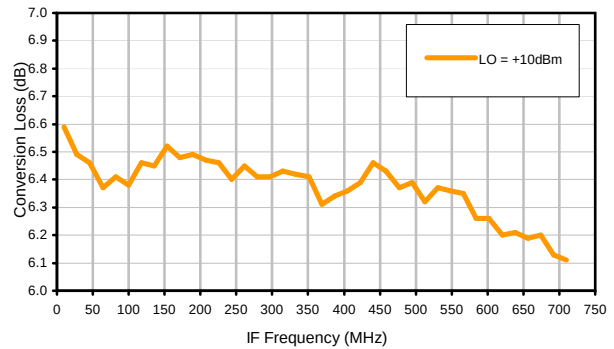
ZP-5LH+

Typical Performance Curves

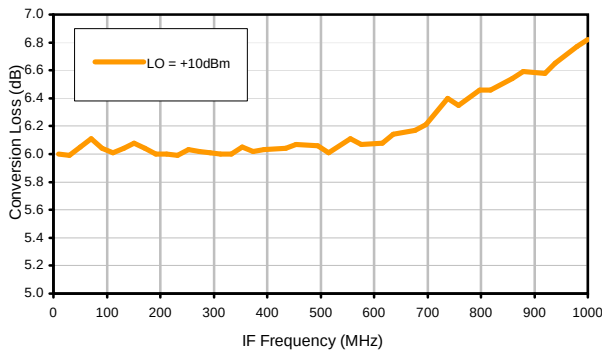
Conversion Loss @ IF=30MHz



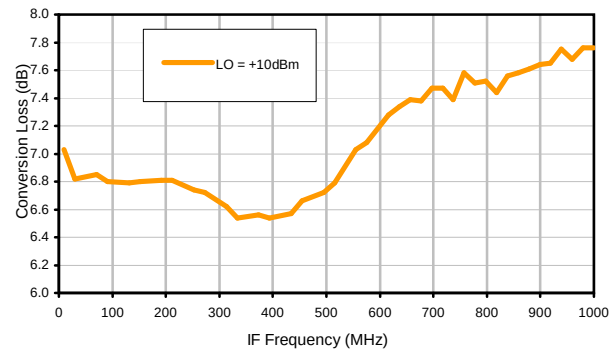
Conversion Loss vs. IF @ RF=750.1MHz



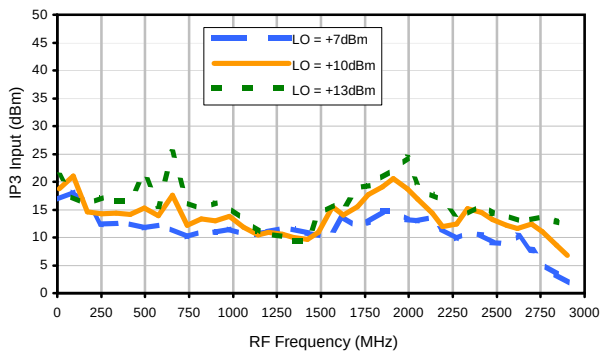
Conversion Loss vs. IF @ RF=20.1MHz



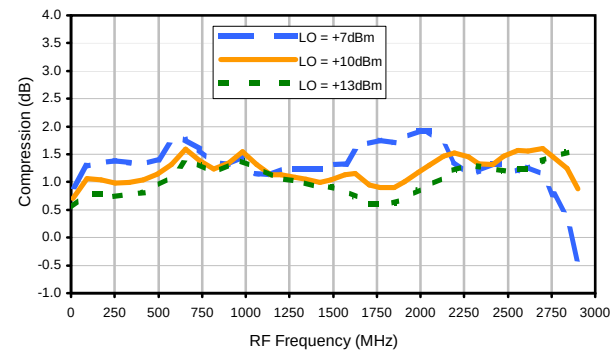
Conversion Loss vs. IF @ RF=1500.1MHz



IP3 Input



Compression @ RF IN=+5dBm



REV. X2

ZP-5LH+

100818

Page 1 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

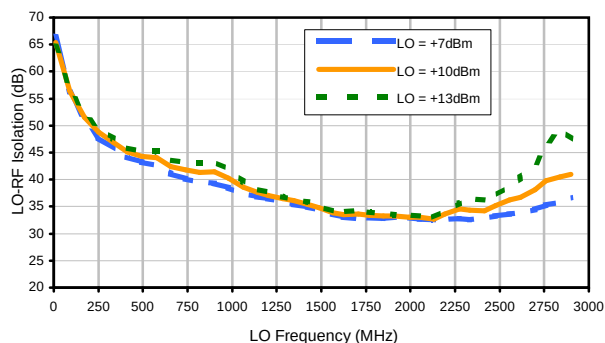


The Design Engineers Search Engine finds the model you need, instantly • For detailed performance specs & shopping online see

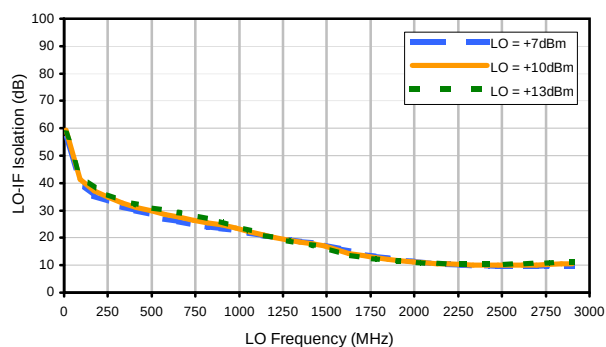


Typical Performance Curves

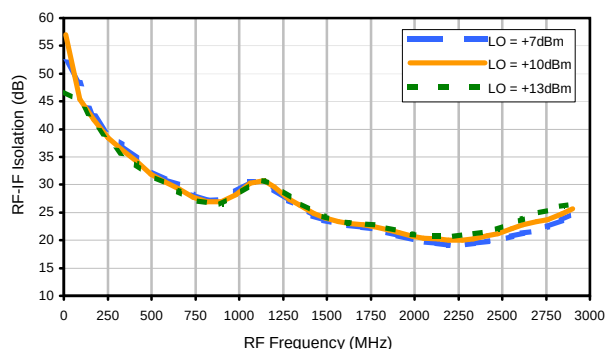
LO-RF Isolation



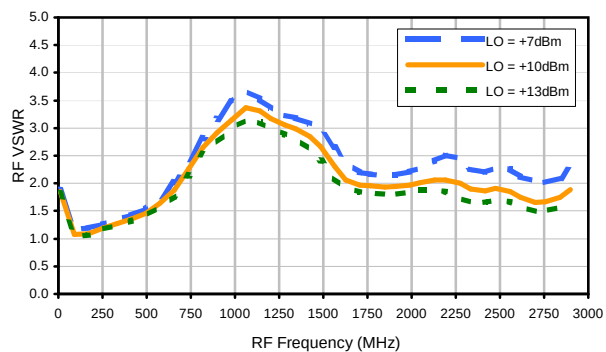
LO-IF Isolation



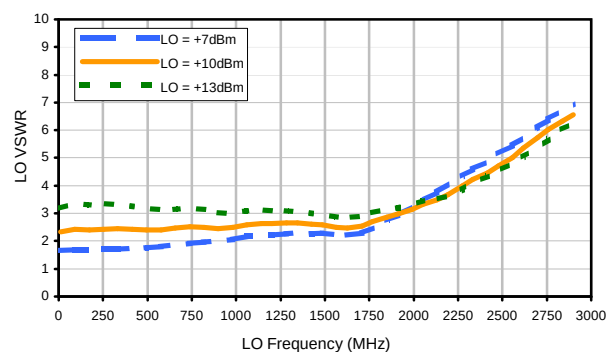
RF-IF Isolation



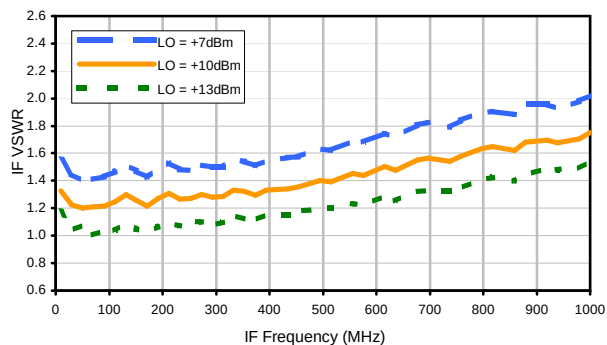
RF VSWR



LO VSWR



IF VSWR



REV. X2

ZP-5LH+

100818

Page 2 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (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



Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	10	39	26	46	24	43	38	62	47	79
1	-	21	+0	38	19	44	37	49	49	59	57	69
2	86	74	38	58	38	67	51	70	42	56	55	76
3	>100	49	40	52	36	52	43	53	43	63	55	67
4	>100	83	76	80	50	70	52	71	65	67	64	68
5	>100	65	59	63	53	79	47	83	56	75	56	73
6	>100	77	78	85	79	83	66	79	63	79	78	82
7	>100	82	74	82	72	85	63	71	60	71	69	82
8	>100	>93	>93	>93	83	87	88	91	70	>93	71	88
9	>100	>93	>93	>93	91	92	92	86	80	>93	71	90
10	>100	>93	>93	>93	>93	>93	90	>93	>93	>93	83	>93
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; 0.00 dBm.

LO IN: 780.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -6.67 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	27	15	34	11	31	24	48	37	67
1	-	22	+0	36	20	37	36	46	47	50	53	60
2	>100	74	44	65	44	67	57	68	47	60	66	73
3	>100	74	55	68	50	69	56	76	56	76	62	80
4	>100	>83	>83	>83	81	>83	76	>83	>83	>83	76	>83
5	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
6	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
7	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
8	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
9	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
10	>100	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 750.1 MHz; -10.00 dBm.

LO IN: 780.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -16.9 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

ZP-5LH+

100818

Page 3 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

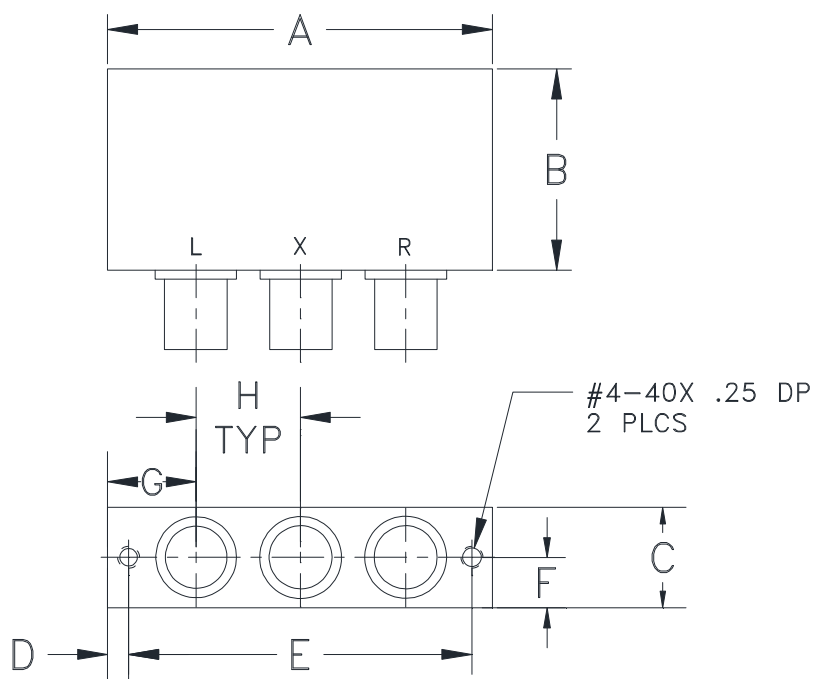


The Design Engineers Search Engine finds the model you need, instantly • For detailed performance specs & shopping online see



Outline Dimensions

GG60



CASE #.	A	B	C	D	E	F	G	H	WT. GRAM
GG60	2.31 (58.67)	1.20 (30.48)	.60 (15.24)	.125 (3.18)	2.062 (52.37)	.30 (7.62)	.53 (13.46)	.63 (16.00)	75.0

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

Notes:

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



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.

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