

Frequency Mixer

Level 7 (LO Power +7 dBm) 1 to 600 MHz

SAM-1+



Generic photo used for illustration purposes only

CASE STYLE: A03

+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.	

Pin Connections

LO	8
RF	1
IF	3,4^
GROUND	2,5,6,7
CASE GROUND	2

^pins must be connected together externally

Features

- low conversion loss, 5.67 dB typ.
- high isolation L-R, 45 dB typ., 40 dB typ. L-I
- hermetically sealed

Applications

- VHF/UHF
- instrumentation
- federal & defense communications

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.	Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1-600	DC-600	5.67	0.05	7.0	8.5	55	45	45	30	35	20	50	40	40	25	30	20

1 dB COMP.: +1 dBm typ.

L = low range [f_L to $10 f_L$]

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

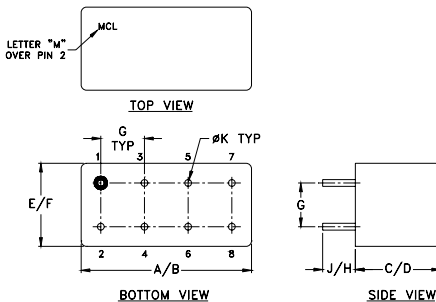
U = upper range [$f_U/2$ to f_U]

m = mid band [$2f_L$ 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
1.00	31.00	7.00	>67.00	>67.00	1.34	2.92
5.00	35.00	5.81	>67.00	>67.00	1.23	2.84
20.00	50.00	5.82	>67.00	63.03	1.20	2.70
39.65	69.65	5.79	60.82	57.34	1.21	2.87
58.97	88.97	5.75	56.81	53.89	1.21	2.73
97.62	67.62	5.72	52.49	49.40	1.20	2.53
136.26	106.26	5.69	49.36	46.66	1.18	2.46
174.91	144.91	5.77	47.07	44.47	1.16	2.46
200.00	170.00	5.87	45.71	43.53	1.15	2.42
232.88	202.88	5.82	44.45	41.92	1.11	2.40
271.52	241.52	5.63	42.63	40.43	1.21	2.40
310.17	280.17	5.69	41.76	39.12	1.29	2.37
348.81	318.81	5.81	40.89	37.24	1.27	2.37
387.46	357.46	5.71	40.87	36.52	1.27	2.39
426.11	396.11	5.99	38.89	35.09	1.29	2.40
464.75	434.75	5.95	37.39	34.88	1.30	2.37
500.00	470.00	5.94	37.14	34.65	1.31	2.41
522.72	492.72	6.05	37.11	33.82	1.32	2.41
561.37	531.37	6.32	37.22	32.34	1.33	2.42
600.00	570.00	6.59	35.63	30.55	1.34	2.37

Outline Drawing



Outline Dimensions (inch mm)

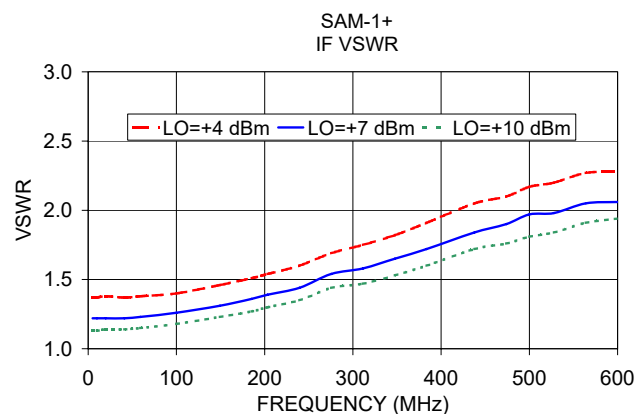
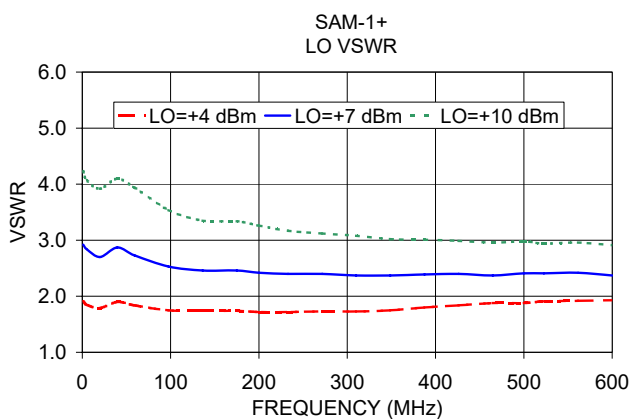
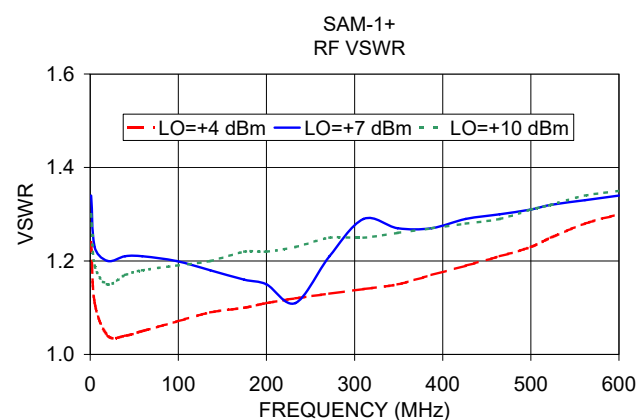
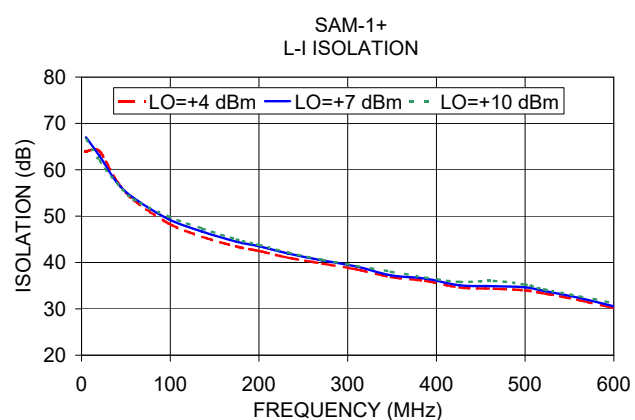
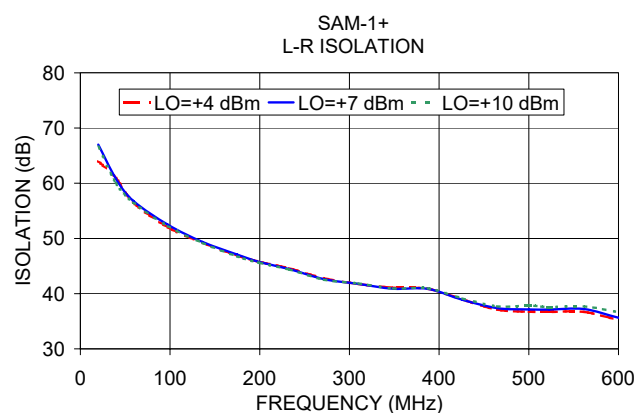
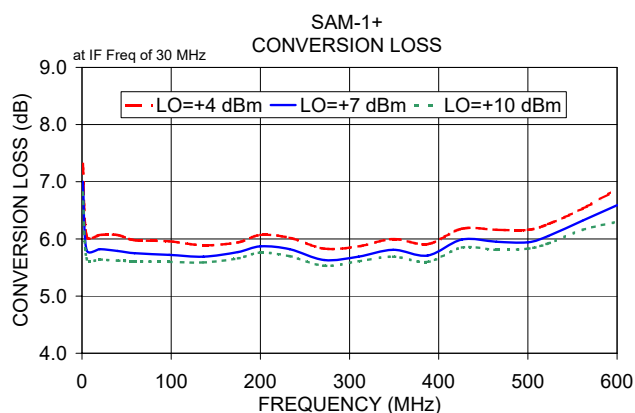
A	B	C	D	E	F
.480	.500	.390	.405	.210	.230
12.19	12.70	9.91	10.29	5.33	5.84

G	H	J	K	wt
.100	.20	.14	.020	grams
2.54	5.08	3.56	0.51	2.3

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





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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
1.0	31.0	7.31	7.00	6.81
5.0	35.0	6.05	5.81	5.66
10.0	40.0	5.70	5.42	5.30
50.3	80.3	6.12	5.85	5.70
90.6	120.6	6.14	5.89	5.70
130.9	160.9	6.12	5.90	5.77
171.2	201.2	6.19	5.89	5.78
211.5	241.5	6.16	5.93	5.81
251.8	281.8	6.24	6.01	5.86
292.0	322.0	6.25	6.02	5.89
332.3	362.3	6.38	6.16	6.03
372.6	402.6	6.45	6.21	6.07
412.9	442.9	6.52	6.20	6.10
453.2	483.2	6.66	6.40	6.21
493.5	523.5	6.77	6.54	6.37
533.8	563.8	6.97	6.72	6.57
574.1	604.1	7.05	6.73	6.55
614.4	644.4	7.19	6.78	6.56
654.7	684.7	7.52	6.94	6.65
695.0	725.0	7.80	7.14	6.66
735.3	765.3	8.19	7.42	6.87
815.9	845.9	8.68	7.99	7.34
856.1	886.1	8.88	8.25	7.67
896.4	926.4	8.87	8.31	7.73
916.6	946.6	8.98	8.40	7.82
956.9	986.9	8.94	8.30	7.72
1017.3	1047.3	8.88	8.32	7.91
1037.5	1067.5	8.87	8.42	8.03
1077.8	1107.8	9.12	8.79	8.47
1097.9	1127.9	9.24	8.92	8.68
1138.2	1168.2	9.45	9.17	8.98
1158.3	1188.3	9.49	9.25	9.09
1198.6	1228.6	9.67	9.42	9.28
1218.8	1248.8	9.79	9.49	9.29
1259.1	1289.1	10.10	9.78	9.62
1279.2	1309.2	10.32	9.97	9.79
1319.5	1349.5	10.50	10.22	10.06
1339.7	1369.7	10.81	10.44	10.21
1380.0	1410.0	11.17	10.73	10.52
1400.1	1430.1	11.33	10.88	10.63

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.0	40.0	20.64	26.26	22.48
50.3	80.3	17.89	22.75	24.44
90.6	120.6	25.93	22.16	26.15
130.9	160.9	24.28	21.58	22.31
171.2	201.2	22.43	22.49	23.86
211.5	241.5	20.75	23.21	25.82
251.8	281.8	25.88	22.31	20.81
292.0	322.0	20.48	22.71	21.40
332.3	362.3	19.10	20.88	25.72
372.6	402.6	20.33	21.30	24.03
412.9	442.9	23.69	23.00	21.64
453.2	483.2	16.98	21.01	20.96
493.5	523.5	16.86	16.27	19.70
533.8	563.8	15.70	15.04	19.63
574.1	604.1	19.06	23.22	24.77
614.4	644.4	16.75	20.57	25.72
654.7	684.7	15.18	22.24	22.82
695.0	725.0	13.36	17.83	24.92
735.3	765.3	12.37	16.36	20.39
775.6	805.6	12.57	15.66	19.35
815.9	845.9	13.04	15.00	18.92
856.1	886.1	13.99	13.82	16.40
896.4	926.4	13.20	15.07	18.93
916.6	946.6	13.23	15.71	19.04
956.9	986.9	16.02	16.99	17.42
977.0	1007.0	16.64	20.92	20.28
1017.3	1047.3	18.08	22.68	21.79
1037.5	1067.5	18.99	18.50	17.66
1077.8	1107.8	23.85	18.88	21.69
1097.9	1127.9	20.02	24.42	21.11
1138.2	1168.2	19.07	21.31	18.32
1158.3	1188.3	23.29	24.37	24.45
1198.6	1228.6	19.11	20.44	20.44
1218.8	1248.8	21.72	21.16	23.77
1259.1	1289.1	18.80	21.38	21.05
1279.2	1309.2	23.84	19.82	21.38
1319.5	1349.5	19.30	17.84	19.08
1339.7	1369.7	19.88	18.66	18.19
1380.0	1410.0	17.55	17.76	22.35
1400.1	1430.1	15.76	23.56	20.53

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.0	40.0	0.84	0.60	0.43
50.3	80.3	1.17	0.81	0.67
90.6	120.6	0.96	0.75	0.55
130.9	160.9	1.00	0.73	0.55
171.2	201.2	0.89	0.70	0.52
211.5	241.5	0.83	0.60	0.47
251.8	281.8	0.89	0.64	0.49
292.0	322.0	0.86	0.64	0.52
332.3	362.3	0.81	0.59	0.45
372.6	402.6	0.86	0.59	0.48
412.9	442.9	0.96	0.74	0.58
453.2	483.2	1.07	0.84	0.65
493.5	523.5	1.21	0.95	0.74
533.8	563.8	1.51	1.13	0.91
574.1	604.1	1.71	1.32	1.12
614.4	644.4	1.88	1.52	1.32
654.7	684.7	1.97	1.72	1.50
695.0	725.0	2.00	1.80	1.54
735.3	765.3	1.77	1.68	1.55
775.6	805.6	1.65	1.62	1.53
815.9	845.9	1.43	1.37	1.34
856.1	886.1	1.33	1.24	1.17
896.4	926.4	1.36	1.24	1.13
916.6	946.6	1.35	1.24	1.14
956.9	986.9	1.50	1.31	1.18
977.0	1007.0	1.51	1.37	1.21
1017.3	1047.3	1.52	1.30	1.13
1037.5	1067.5	1.43	1.19	1.14
1077.8	1107.8	1.10	0.92	0.89
1097.9	1127.9	0.99	0.71	0.75
1138.2	1168.2	0.85	0.57	0.44
1158.3	1188.3	0.85	0.52	0.38
1198.6	1228.6	0.80	0.48	0.39
1218.8	1248.8	0.71	0.46	0.33
1259.1	1289.1	0.77	0.44	0.30
1279.2	1309.2	0.75	0.40	0.29
1319.5	1349.5	0.69	0.39	0.20
1339.7	1369.7	0.77	0.42	0.21
1380.0	1410.0	0.75	0.43	0.26
1400.1	1430.1	0.71	0.44	0.32

Frequency Mixer

SAM-1+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=300.1MHz (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)=600.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
290.0	10.1	6.09	10.0	20.1	5.47	590.0	10.1	6.82
282.8	17.3	6.09	24.9	35.0	5.41	575.1	25.0	6.69
275.6	24.5	6.04	39.7	49.8	5.43	560.3	39.8	6.67
268.5	31.6	6.04	54.6	64.7	5.50	545.4	54.7	6.61
261.3	38.8	5.97	69.5	79.6	5.51	530.5	69.6	6.59
254.1	46.0	5.98	84.4	94.5	5.53	515.6	84.5	6.55
246.9	53.2	5.99	99.2	109.3	5.49	500.8	99.3	6.49
239.7	60.4	5.95	114.1	124.2	5.51	485.9	114.2	6.51
232.6	67.5	5.92	129.0	139.1	5.51	471.0	129.1	6.48
225.4	74.7	5.91	143.8	153.9	5.55	456.2	143.9	6.54
218.2	81.9	5.92	158.7	168.8	5.61	441.3	158.8	6.54
211.0	89.1	5.91	173.6	183.7	5.60	426.4	173.7	6.54
203.8	96.3	5.93	188.5	198.6	5.62	411.5	188.6	6.51
196.7	103.4	5.91	203.3	213.4	5.59	396.7	203.4	6.50
189.5	110.6	5.91	218.2	228.3	5.60	381.8	218.3	6.54
182.3	117.8	5.88	233.1	243.2	5.62	366.9	233.2	6.52
175.1	125.0	5.89	247.9	258.0	5.66	352.1	248.0	6.54
167.9	132.2	5.91	262.8	272.9	5.70	337.2	262.9	6.55
160.8	139.3	5.89	277.7	287.8	5.70	322.3	277.8	6.60
153.6	146.5	5.87	292.6	302.7	5.72	307.4	292.7	6.57
146.4	153.7	5.89	307.4	317.5	5.68	292.6	307.5	6.60
139.2	160.9	5.93	322.3	332.4	5.73	277.7	322.4	6.60
132.1	168.0	5.95	337.2	347.3	5.73	262.8	337.3	6.60
124.9	175.2	5.93	352.1	362.2	5.74	247.9	352.2	6.66
117.7	182.4	5.92	366.9	377.0	5.84	233.1	367.0	6.63
110.5	189.6	5.94	381.8	391.9	5.82	218.2	381.9	6.68
103.3	196.8	5.94	396.7	406.8	5.84	203.3	396.8	6.65
96.2	203.9	5.96	411.5	421.6	5.78	188.5	411.6	6.66
89.0	211.1	5.94	426.4	436.5	5.90	173.6	426.5	6.66
81.8	218.3	5.94	441.3	451.4	5.97	158.7	441.4	6.69
74.6	225.5	5.95	456.2	466.3	6.05	143.8	456.3	6.77
67.4	232.7	5.95	471.0	481.1	6.08	129.0	471.1	6.78
60.3	239.8	5.96	485.9	496.0	6.11	114.1	486.0	6.83
53.1	247.0	5.95	500.8	510.9	6.15	99.2	500.9	6.83
45.9	254.2	5.96	515.6	525.7	6.11	84.4	515.7	6.87
38.7	261.4	5.97	530.5	540.6	6.16	69.5	530.6	6.89
31.5	268.6	6.01	545.4	555.5	6.09	54.6	545.5	6.90
24.4	275.7	6.01	560.3	570.4	6.11	39.7	560.4	6.91
17.2	282.9	6.03	575.1	585.2	6.00	24.9	575.2	6.84
10.0	290.1	6.01	590.0	600.1	5.90	10.0	590.1	6.94

REV. X2

SAM-1+

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

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
1.0	64.00	67.00	70.00	64.00	67.00	67.13
5.0	64.00	67.00	70.00	64.00	67.00	66.56
10.0	73.48	73.31	74.37	72.42	58.67	65.36
50.3	59.60	60.66	61.05	57.68	57.47	56.54
90.6	54.07	55.02	56.11	54.15	53.27	53.01
130.9	50.95	52.27	53.27	50.61	50.55	50.62
171.2	48.52	49.77	50.76	48.24	48.58	48.68
211.5	47.16	48.25	49.12	46.99	47.12	47.27
251.8	45.46	46.60	47.51	46.07	46.46	46.17
292.0	44.30	45.45	46.40	44.85	45.07	44.83
332.3	43.41	44.50	45.58	43.89	43.66	43.22
372.6	42.37	43.74	44.96	42.53	42.41	42.05
412.9	41.79	42.89	43.90	40.86	40.77	40.43
453.2	40.96	42.52	43.64	40.01	39.43	38.72
493.5	40.10	41.84	43.33	39.09	38.25	37.56
533.8	39.68	41.22	42.73	38.18	37.38	36.75
574.1	39.15	40.65	42.30	37.40	36.25	35.39
614.4	38.98	40.70	42.30	35.42	33.94	33.16
654.7	38.32	39.91	41.08	34.28	32.86	31.89
695.0	37.30	38.80	39.82	33.45	32.01	30.85
735.3	35.72	37.37	38.46	32.46	31.34	29.90
815.9	34.39	35.87	37.32	30.22	29.83	29.13
856.1	33.76	35.10	36.59	29.01	28.56	28.18
896.4	33.54	34.63	35.89	28.11	27.43	26.94
916.6	32.92	33.73	34.62	27.63	26.98	26.32
956.9	32.54	32.95	33.55	26.92	26.03	25.07
1017.3	32.04	32.09	32.55	25.31	23.96	22.72
1037.5	32.10	32.02	32.38	24.74	23.44	22.31
1077.8	32.75	32.30	32.55	23.92	22.75	21.67
1097.9	33.32	32.35	32.42	23.42	22.26	21.30
1138.2	34.29	32.90	32.54	22.82	21.69	20.71
1158.3	34.39	33.06	32.85	22.55	21.43	20.53
1198.6	34.26	32.97	32.59	22.03	21.00	20.04
1218.8	33.96	32.77	32.35	21.75	20.86	19.96
1259.1	33.56	32.37	32.01	21.45	20.56	19.67
1279.2	33.39	32.14	31.76	21.28	20.45	19.56
1319.5	33.34	31.85	31.46	20.95	20.17	19.35
1339.7	32.46	31.43	30.99	20.95	20.08	19.19
1380.0	32.74	31.47	30.96	20.65	19.98	19.19
1400.1	32.25	31.34	30.60	20.46	19.91	19.05

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.0	40.0	49.47	45.95	44.25
50.3	80.3	39.14	39.06	40.42
90.6	120.6	34.70	34.94	35.30
130.9	160.9	32.17	32.56	32.57
171.2	201.2	30.58	30.98	31.22
211.5	241.5	29.61	30.02	30.15
251.8	281.8	29.09	29.65	29.95
292.0	322.0	29.03	29.70	30.18
332.3	362.3	28.68	29.21	29.59
372.6	402.6	28.55	29.00	29.20
412.9	442.9	28.49	29.29	29.78
453.2	483.2	28.61	29.51	30.11
493.5	523.5	27.92	28.54	29.08
533.8	563.8	26.21	26.46	26.83
574.1	604.1	24.36	24.33	24.50
614.4	644.4	22.84	22.59	22.62
654.7	684.7	21.96	21.62	21.48
695.0	725.0	21.68	21.41	21.11
735.3	765.3	21.61	21.43	20.92
775.6	805.6	21.74	21.53	21.01
815.9	845.9	22.10	21.73	21.10
856.1	886.1	22.55	21.99	21.31
896.4	926.4	22.52	21.81	21.08
916.6	946.6	22.21	21.52	20.75
956.9	986.9	21.17	20.23	19.34
977.0	1007.0	20.44	19.39	18.61
1017.3	1047.3	18.76	17.76	17.28
1037.5	1067.5	17.76	16.96	16.64
1077.8	1107.8	16.32	15.73	15.63
1097.9	1127.9	15.76	15.23	15.15
1138.2	1168.2	14.64	14.22	14.19
1158.3	1188.3	14.21	13.78	13.74
1198.6	1228.6	13.43	12.94	12.89
1218.8	1248.8	12.93	12.50	12.47
1259.1	1289.1	12.30	11.83	11.81
1279.2	1309.2	12.02	11.51	11.50
1319.5	1349.5	11.33	10.90	10.87
1339.7	1369.7	10.99	10.53	10.53
1380.0	1410.0	10.42	10.08	10.09
1400.1	1430.1	10.12	9.82	9.84

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=600.5MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
1.0	31.0	1.24	1.34	1.30	1.0	1.91	2.92	4.23	5.0	1.37	1.22	1.13
5.0	35.0	1.11	1.23	1.19	5.0	1.85	2.84	4.07	10.0	1.37	1.22	1.13
50.3	80.3	1.02	1.08	1.13	50.3	1.91	2.77	3.86	25.1	1.96	1.71	1.52
90.6	120.6	1.04	1.12	1.18	90.6	1.79	2.52	3.52	40.3	1.84	1.61	1.44
130.9	160.9	1.08	1.15	1.21	130.9	1.85	2.65	3.64	55.4	1.77	1.54	1.38
171.2	201.2	1.11	1.19	1.24	171.2	1.79	2.51	3.39	70.5	1.80	1.58	1.41
211.5	241.5	1.15	1.22	1.27	211.5	1.82	2.55	3.43	85.6	1.84	1.62	1.45
251.8	281.8	1.17	1.24	1.30	251.8	1.84	2.56	3.43	100.8	1.89	1.66	1.49
292.0	322.0	1.19	1.26	1.32	292.0	1.83	2.51	3.33	115.9	1.92	1.68	1.52
332.3	362.3	1.20	1.26	1.31	332.3	1.90	2.59	3.40	131.0	1.92	1.68	1.52
372.6	402.6	1.24	1.30	1.35	372.6	1.89	2.57	3.37	146.2	1.89	1.66	1.50
412.9	442.9	1.29	1.37	1.44	412.9	1.94	2.59	3.34	161.3	1.87	1.65	1.49
453.2	483.2	1.30	1.38	1.43	453.2	1.96	2.59	3.31	176.4	1.88	1.66	1.50
493.5	523.5	1.30	1.36	1.40	493.5	1.99	2.62	3.33	191.5	1.93	1.71	1.55
533.8	563.8	1.28	1.32	1.35	533.8	2.03	2.65	3.35	206.7	1.98	1.76	1.60
574.1	604.1	1.22	1.26	1.29	574.1	2.03	2.61	3.27	221.8	1.98	1.76	1.60
614.4	644.4	1.20	1.22	1.25	614.4	2.09	2.66	3.32	236.9	1.94	1.72	1.57
654.7	684.7	1.28	1.27	1.28	654.7	2.13	2.69	3.31	252.1	1.93	1.72	1.57
695.0	725.0	1.44	1.40	1.39	695.0	2.21	2.76	3.38	267.2	1.97	1.76	1.61
735.3	765.3	1.66	1.58	1.53	735.3	2.27	2.83	3.43	282.3	2.00	1.79	1.64
775.6	805.6	1.87	1.76	1.68	775.6	2.29	2.84	3.42	297.4	2.01	1.81	1.66
815.9	845.9	2.08	1.95	1.84	815.9	2.35	2.90	3.48	312.6	2.02	1.81	1.66
856.1	886.1	2.25	2.12	2.00	856.1	2.36	2.89	3.46	327.7	2.03	1.82	1.68
896.4	926.4	2.33	2.20	2.06	896.4	2.39	2.92	3.48	342.8	2.04	1.84	1.70
916.6	946.6	2.36	2.22	2.08	916.6	2.41	2.92	3.48	357.9	2.04	1.84	1.70
956.9	986.9	2.33	2.20	2.07	956.9	2.41	2.90	3.45	373.1	2.03	1.84	1.70
977.0	1007.0	2.31	2.19	2.08	977.0	2.41	2.89	3.43	388.2	2.03	1.84	1.70
1017.3	1047.3	2.26	2.17	2.07	1017.3	2.46	2.95	3.49	403.3	2.04	1.85	1.71
1037.5	1067.5	2.23	2.15	2.07	1037.5	2.43	2.90	3.43	418.5	2.05	1.86	1.73
1077.8	1107.8	2.19	2.14	2.07	1077.8	2.45	2.91	3.43	433.6	2.07	1.87	1.74
1097.9	1127.9	2.15	2.14	2.08	1097.9	2.48	2.93	3.45	448.7	2.07	1.88	1.75
1138.2	1168.2	2.11	2.13	2.10	1138.2	2.59	3.02	3.54	463.8	2.07	1.88	1.75
1158.3	1188.3	2.10	2.13	2.12	1158.3	2.65	3.07	3.57	479.0	2.07	1.88	1.76
1198.6	1228.6	2.13	2.17	2.17	1198.6	2.73	3.11	3.57	494.1	2.06	1.88	1.75
1218.8	1248.8	2.16	2.21	2.22	1218.8	2.79	3.16	3.61	509.2	2.05	1.86	1.74
1259.1	1289.1	2.24	2.29	2.31	1259.1	2.92	3.25	3.67	524.4	2.05	1.86	1.74
1279.2	1309.2	2.29	2.33	2.35	1279.2	2.96	3.26	3.67	539.5	2.07	1.88	1.76
1319.5	1349.5	2.39	2.43	2.46	1319.5	3.10	3.35	3.73	554.6	2.10	1.91	1.78
1339.7	1369.7	2.45	2.48	2.51	1339.7	3.19	3.45	3.81	569.7	2.12	1.92	1.80
1380.0	1410.0	2.57	2.58	2.62	1380.0	3.27	3.47	3.79	584.9	2.10	1.91	1.78
1400.1	1430.1	2.62	2.65	2.68	1400.1	3.33	3.50	3.81	600.0	1.97	1.81	1.72

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	21	25	38	27	43	35	32	36	35
1	-	23	+0	32	12	46	17	35	44	55	41	58
2	>100	67	58	65	58	66	57	69	64	>80	65	67
3	>100	71	64	71	64	78	59	77	64	77	>80	>80
4	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
5	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
6	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
7	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
8	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -14.00 dBm.
LO IN: 330.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -20.19 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	31	37	47	39	55	50	45	49	49
1	-	24	+0	33	12	42	19	40	46	65	40	66
2	92	70	50	61	52	69	53	68	60	77	61	61
3	>100	51	43	53	47	59	41	63	43	56	69	76
4	>100	69	71	68	70	70	70	72	66	87	75	>90
5	>100	74	70	81	56	74	55	78	55	70	60	86
6	>100	>90	88	84	87	85	86	85	85	84	>90	>90
7	>100	>90	86	88	85	>90	78	87	77	88	68	84
8	>100	>90	>90	>90	>90	>90	>90	89	82	89	>90	>90
9	>100	>90	>90	>90	89	>90	84	>90	85	>90	86	>90
10	>100	>90	>90	>90	>90	>90	>90	>90	>90	>90	84	>90
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -4.00 dBm.
LO IN: 330.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -10.13 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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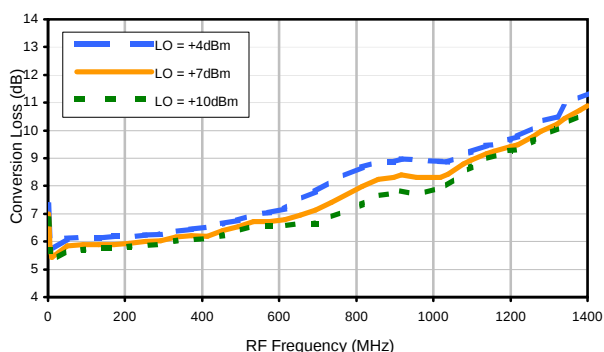


Frequency Mixer

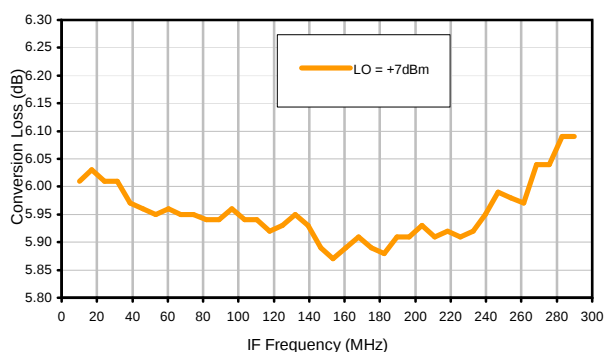
SAM-1+

Typical Performance Curves

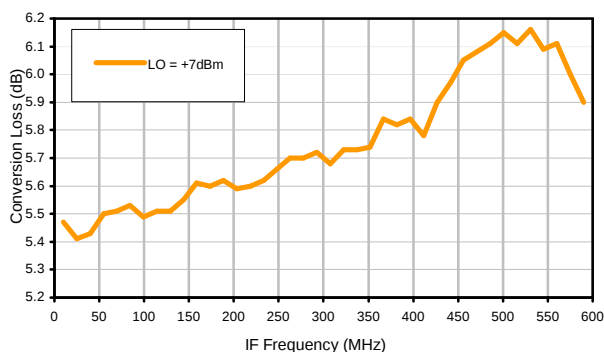
Conversion Loss @ IF=30MHz



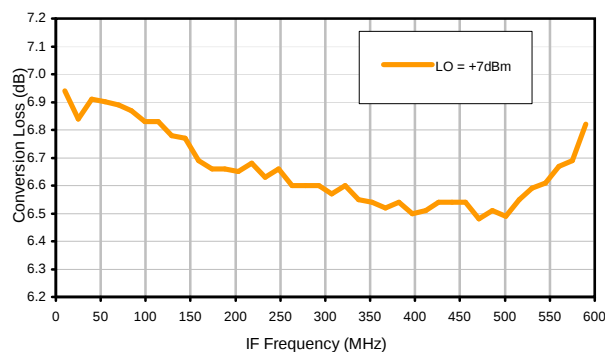
Conversion Loss vs. IF @ RF=300.1MHz



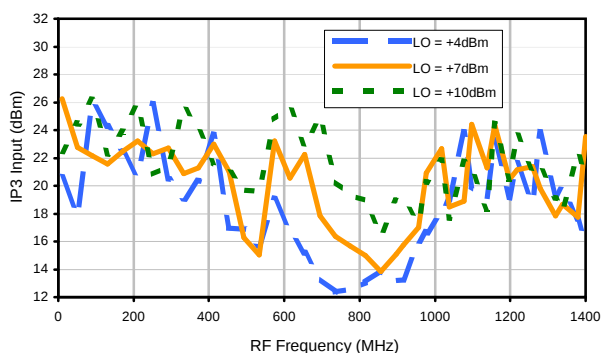
Conversion Loss vs. IF @ RF=10.1MHz



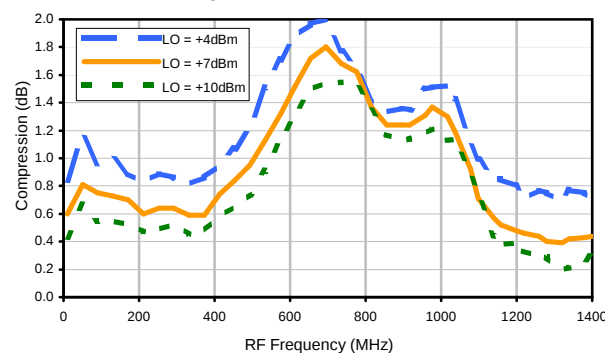
Conversion Loss vs. IF @ RF=600.1MHz



IP3 Input



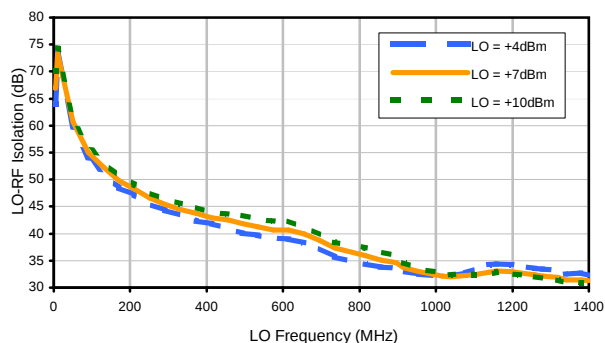
Compression @ RF IN=+1dBm



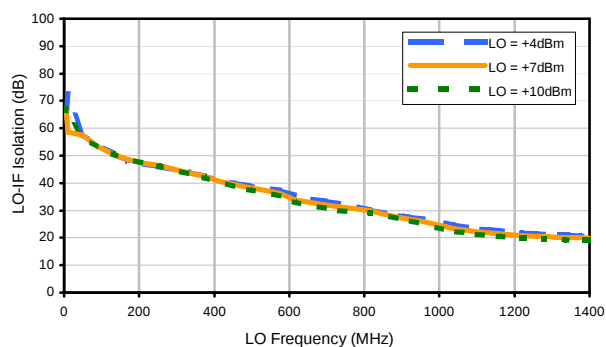
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Typical Performance Curves

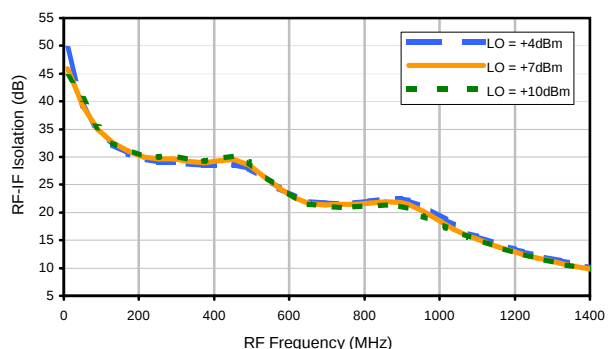
LO-RF Isolation



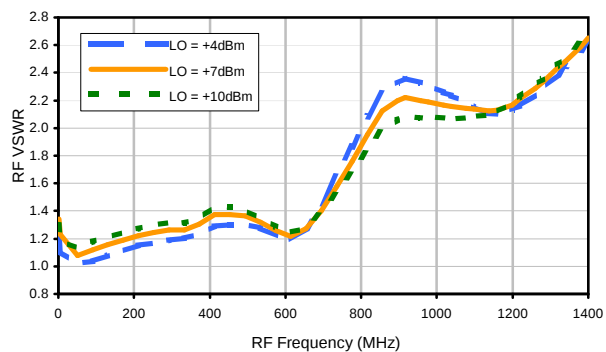
LO-IF Isolation



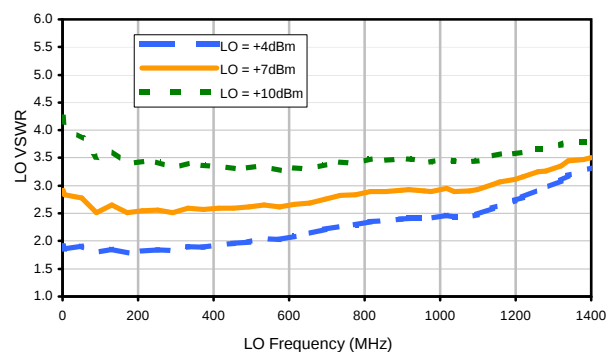
RF-IF Isolation



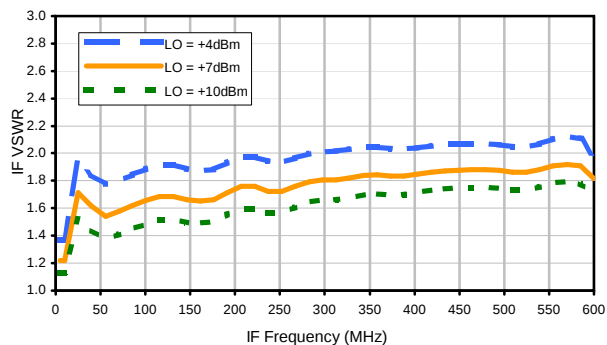
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	21	25	38	27	43	35	32	36	35
1	-	23	+0	32	12	46	17	35	44	55	41	58
2	>100	67	58	65	58	66	57	69	64	>80	65	67
3	>100	71	64	71	64	78	59	77	64	77	>80	>80
4	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
5	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
6	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
7	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
8	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; -14.00 dBm.

LO IN: 330.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -20.19 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	31	37	47	39	55	50	45	49	49
1	-	24	+0	33	12	42	19	40	46	65	40	66
2	92	70	50	61	52	69	53	68	60	77	61	61
3	>100	51	43	53	47	59	41	63	43	56	69	76
4	>100	69	71	68	70	70	70	72	66	87	75	>90
5	>100	74	70	81	56	74	55	78	55	70	60	86
6	>100	>90	88	84	87	85	86	85	85	84	>90	>90
7	>100	>90	86	88	85	>90	78	87	77	88	68	84
8	>100	>90	>90	>90	>90	>90	>90	89	82	89	>90	>90
9	>100	>90	>90	>90	89	>90	84	>90	85	>90	86	>90
10	>100	>90	>90	>90	>90	>90	>90	>90	>90	>90	84	>90
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; -4.00 dBm.

LO IN: 330.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -10.13 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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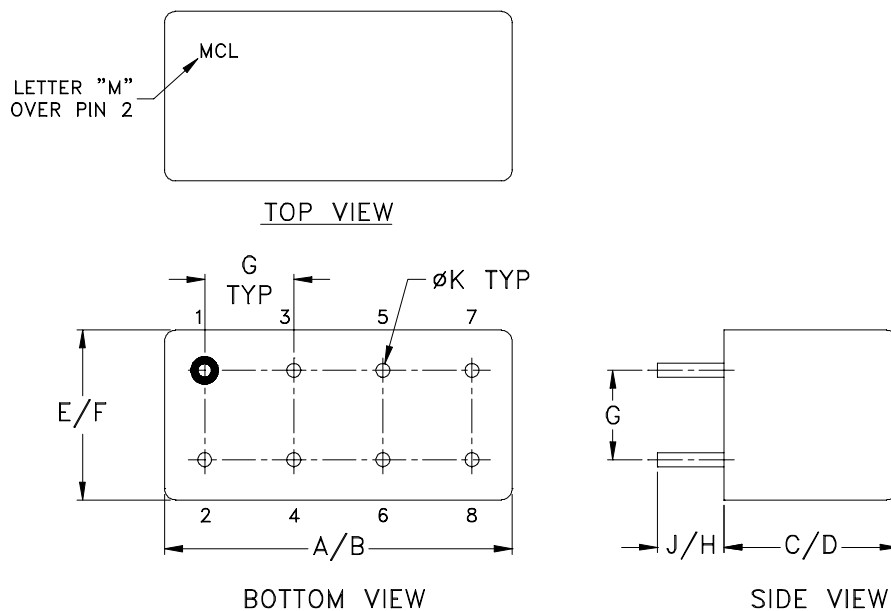
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A03

A11

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A03	.480 (12.19)	.500 (12.70)	.390 (9.91)	.405 (10.29)	.210 (5.33)	.230 (5.84)	.100 (2.54)	.20 (5.08)	.14 (3.56)	.020 (.51)	2.3
A11			.240 (6.10)	.255 (6.48)							1.9

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

Notes:

- Header material: C.R.S.
Pin material: #52 alloy.
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-047-01.
- Tolerance on pin diameter $\pm .005$ inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Moisture Resistance	10 cycles, 24 hours per cycle	MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours
Solderability	10X Magnification	J-STD-002, 95% Coverage
Resistance to Solder Heat	260°C for 10 seconds	MIL-STD-202, Method 210, Condition B
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215
Terminal Strength	4 1/2 Pound Pull	MIL-STD-202, Method 211, Condition A



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Specification	Test/Inspection Condition	Reference/Spec
Gross Leak	125°C Bubble Test	MIL-STD-202, Method 112, Condition D
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D