

# Plug-In Frequency Mixer

## SBL-1-1+

Level 7 (LO Power +7 dBm) 0.1 to 400 MHz



Generic photo used for illustration purposes only

CASE STYLE: A06

**+RoHS Compliant**

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

### Maximum Ratings

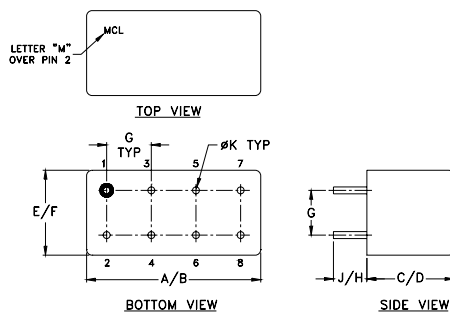
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA
Permanent damage may occur if any of these limits are exceeded.	

### Pin Connections

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

^ pins must be connected together externally

### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F
.770	.800	.285	.310	.370	.400
19.56	20.32	7.24	7.87	9.40	10.16
G	H	J	K	wt	
.200	.20	.14	.031	grams	
5.08	5.08	3.56	0.79	5.2	

### Features

- excellent conversion loss, 4.84 dB typ.
- high L-R isolation, 45 dB typ. L-I isolation, 40 dB typ.
- rugged welded construction

### Applications

- VHF
- defense & federal communications

### Electrical Specifications

FREQUENCY (MHz)	CONVERSION LOSS (dB)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)												
		L	M	U	L	M	U										
LO/RF $f_L$ - $f_U$	Mid-Band m $\bar{X}$ $\sigma$ Max. Total Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.								
0.1-400	DC-400	4.84	.04	7.0	8.0	50	45	45	30	35	25	45	30	40	25	30	20

1 dB COMP.: +1 dBm typ.

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

m = mid band [ $2 f_L$  to  $f_U/2$ ]

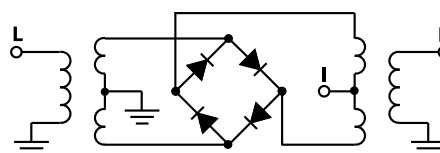
M = mid range [ $10 f_L$  to  $f_U/2$ ]

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 +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
0.10	30.10	5.97	>67.00	>67.00	1.27	2.30
0.20	30.20	5.50	>67.00	>67.00	1.27	2.24
0.50	30.50	5.10	>67.00	>60.77	1.27	2.26
1.00	31.00	5.03	>67.00	61.39	1.25	2.20
2.00	32.00	4.95	>67.00	61.65	1.23	2.16
5.00	35.00	4.94	>67.00	62.29	1.18	2.11
10.00	40.00	4.92	>67.00	61.63	1.15	2.08
20.00	50.00	5.01	>67.00	61.41	1.12	2.09
50.00	80.00	4.95	57.89	55.93	1.09	2.12
69.83	99.83	4.92	53.82	51.57	1.10	2.18
100.00	70.00	4.82	51.38	49.30	1.11	2.22
121.45	91.45	4.86	50.92	48.83	1.15	2.23
155.86	125.36	4.95	48.48	46.32	1.19	2.35
200.00	170.00	5.08	42.54	40.81	1.22	2.38
224.69	194.69	5.23	42.61	40.35	1.27	2.43
241.90	211.90	5.21	43.39	40.85	1.31	2.44
293.52	263.52	5.32	38.74	36.85	1.34	2.56
327.93	297.93	5.57	37.88	36.40	1.35	2.65
379.55	349.55	5.70	36.54	33.55	1.36	2.75
413.97	383.97	5.75	37.59	34.68	1.35	2.83

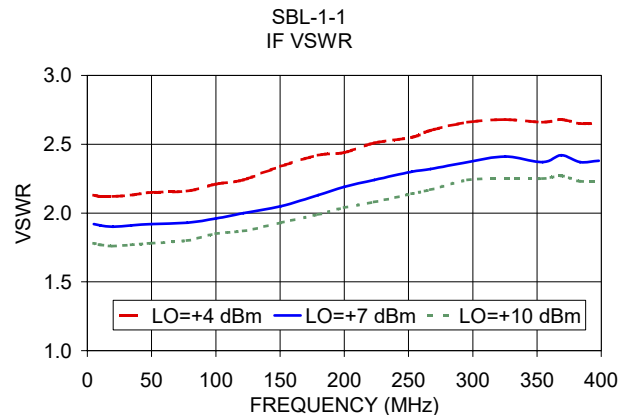
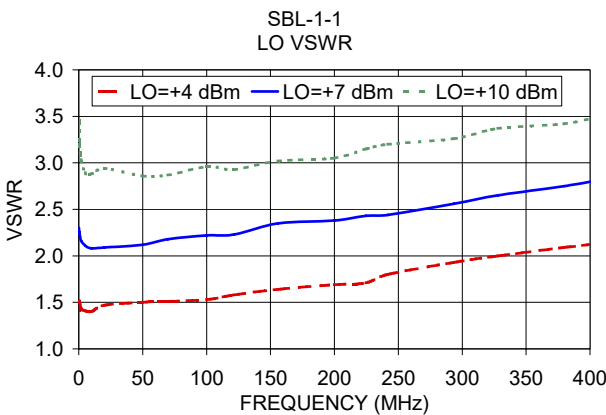
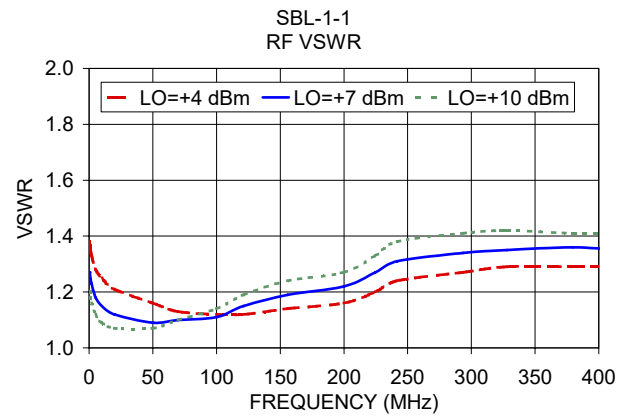
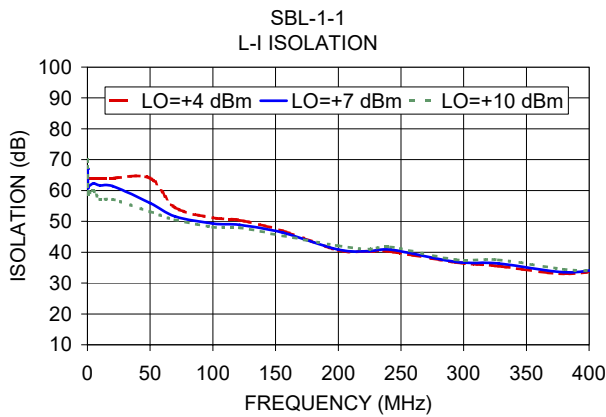
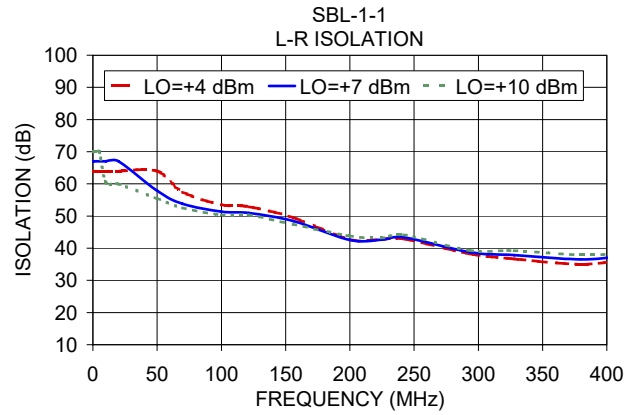
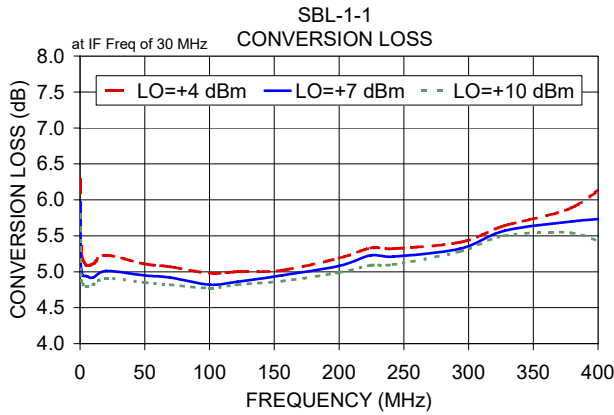
### Electrical Schematic



### 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)





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# Frequency Mixer

# SBL-1-1+

## 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
0.1	30.1	6.29	5.97	5.79	10.1	40.1	15.98	16.69	18.72	10.1	40.1	1.54	1.22	0.95
0.2	30.2	5.79	5.50	5.33	30.4	60.4	15.65	16.88	19.22	30.4	60.4	1.46	1.20	0.91
0.5	30.5	5.39	5.10	4.97	50.6	80.6	16.34	17.23	19.78	50.6	80.6	1.43	1.10	0.85
1.0	31.0	5.26	5.03	4.88	70.9	100.9	16.22	16.60	25.74	70.9	100.9	1.36	1.06	0.87
2.0	32.0	5.17	4.95	4.83	91.1	121.1	15.60	17.78	20.85	91.1	121.1	1.29	1.00	0.79
5.0	35.0	5.09	4.94	4.79	111.4	141.4	19.77	18.46	15.81	111.4	141.4	1.24	0.93	0.75
10.0	40.0	5.11	4.92	4.82	131.6	161.6	14.85	22.74	21.28	131.6	161.6	1.21	0.98	0.78
30.4	60.4	5.30	5.07	4.94	151.9	181.9	18.00	16.72	13.28	151.9	181.9	1.25	0.95	0.76
50.6	80.6	5.28	5.11	4.99	172.2	202.2	18.33	14.66	14.87	172.2	202.2	1.14	0.86	0.70
91.1	121.1	5.28	5.13	5.00	192.4	222.4	11.40	9.90	10.00	192.4	222.4	1.08	0.84	0.68
111.4	141.4	5.27	5.14	5.02	212.7	242.7	15.97	12.92	12.36	212.7	242.7	1.06	0.80	0.66
131.6	161.6	5.34	5.18	5.06	232.9	262.9	16.54	19.02	22.24	232.9	262.9	1.16	0.88	0.68
151.9	181.9	5.37	5.20	5.08	253.2	283.2	16.80	19.06	26.35	253.2	283.2	1.16	0.93	0.75
172.2	202.2	5.38	5.21	5.08	273.4	303.4	10.84	9.95	11.14	273.4	303.4	1.34	1.06	0.84
212.7	242.7	5.54	5.37	5.21	293.7	323.7	8.84	8.15	8.68	293.7	323.7	1.47	1.15	0.95
232.9	262.9	5.61	5.39	5.21	313.9	343.9	7.32	7.33	7.92	313.9	343.9	1.62	1.29	1.08
253.2	283.2	5.70	5.48	5.30	334.2	364.2	7.29	8.48	10.12	334.2	364.2	1.84	1.42	1.16
273.4	303.4	5.73	5.60	5.47	354.5	384.5	9.58	12.33	15.29	354.5	384.5	2.02	1.51	1.25
293.7	323.7	5.80	5.68	5.59	374.7	404.7	8.78	14.76	19.83	374.7	404.7	2.20	1.70	1.44
334.2	364.2	6.03	5.86	5.74	395.0	425.0	6.71	13.21	21.90	395.0	425.0	2.26	1.94	1.65
354.5	384.5	6.17	5.96	5.84	415.2	445.2	3.99	8.35	17.03	415.2	445.2	2.46	2.23	2.02
374.7	404.7	6.39	6.06	5.87	435.5	465.5	3.29	5.93	10.39	435.5	465.5	2.33	2.19	2.08
395.0	425.0	6.66	6.18	5.88	455.7	485.7	3.18	5.15	7.83	455.7	485.7	2.35	2.16	2.08
415.2	445.2	7.03	6.39	5.86	476.0	506.0	4.00	5.92	8.91	476.0	506.0	2.24	2.08	2.02
455.7	485.7	7.48	6.89	6.28	496.3	526.3	4.15	5.79	8.85	496.3	526.3	2.12	1.91	1.83
476.0	506.0	7.56	7.00	6.45	516.5	546.5	5.09	7.03	11.54	516.5	546.5	2.03	1.75	1.60
496.3	526.3	7.80	7.34	6.82	536.8	566.8	6.28	8.80	15.13	536.8	566.8	2.01	1.71	1.47
516.5	546.5	7.87	7.51	7.13	557.0	587.0	7.42	10.24	15.60	557.0	587.0	1.96	1.61	1.33
536.8	566.8	7.81	7.47	7.19	577.3	607.3	7.47	10.89	14.67	577.3	607.3	1.95	1.50	1.24
577.3	607.3	7.76	7.50	7.32	597.5	627.5	7.35	9.86	11.87	597.5	627.5	1.95	1.44	1.14
597.5	627.5	7.76	7.54	7.39	617.8	647.8	7.31	10.04	10.84	617.8	647.8	1.86	1.31	1.00
617.8	647.8	7.84	7.65	7.54	638.0	668.0	7.82	10.22	11.02	638.0	668.0	1.79	1.23	0.93
638.0	668.0	7.91	7.75	7.66	658.3	688.3	8.03	12.18	12.28	658.3	688.3	1.68	1.15	0.84
658.3	688.3	8.07	7.94	7.91	678.6	708.6	8.59	11.59	12.80	678.6	708.6	1.67	1.11	0.80
698.8	728.8	8.65	8.52	8.51	698.8	728.8	8.96	9.74	10.37	698.8	728.8	1.69	1.15	0.83
719.1	749.1	9.03	8.92	8.88	719.1	749.1	8.41	8.25	8.65	719.1	749.1	1.68	1.14	0.87
739.3	769.3	9.41	9.29	9.24	739.3	769.3	7.97	7.36	7.98	739.3	769.3	1.73	1.20	0.97
759.6	789.6	9.86	9.70	9.61	759.6	789.6	8.05	7.86	7.55	759.6	789.6	1.74	1.29	1.10
779.8	809.8	10.37	10.14	9.99	779.8	809.8	7.95	8.10	8.30	779.8	809.8	1.81	1.32	1.14
800.1	830.1	10.98	10.72	10.54	800.1	830.1	8.24	8.58	8.69	800.1	830.1	1.80	1.30	1.08



# Frequency Mixer

# SBL-1-1+

## 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	5.36	10.0	20.1	4.88	390.0	10.1	6.49
185.4	14.7	5.31	19.7	29.8	4.94	380.3	19.8	6.42
180.8	19.3	5.27	29.5	39.6	4.87	370.5	29.6	6.34
176.2	23.9	5.20	39.2	49.3	4.89	360.8	39.3	6.29
171.5	28.6	5.18	49.0	59.1	4.90	351.0	49.1	6.24
166.9	33.2	5.13	58.7	68.8	4.89	341.3	58.8	6.19
162.3	37.8	5.13	68.5	78.6	4.96	331.5	68.6	6.17
157.7	42.4	5.12	78.2	88.3	4.97	321.8	78.3	6.17
153.1	47.0	5.13	87.9	98.0	4.99	312.1	88.0	6.13
148.5	51.6	5.10	97.7	107.8	4.95	302.3	97.8	6.10
143.8	56.3	5.10	107.4	117.5	4.98	292.6	107.5	6.09
139.2	60.9	5.10	117.2	127.3	5.00	282.8	117.3	6.07
134.6	65.5	5.09	126.9	137.0	4.99	273.1	127.0	6.07
130.0	70.1	5.09	136.7	146.8	5.02	263.3	136.8	6.07
125.4	74.7	5.11	146.4	156.5	5.06	253.6	146.5	6.10
120.8	79.3	5.11	156.2	166.3	5.12	243.8	156.3	6.09
116.2	83.9	5.10	165.9	176.0	5.13	234.1	166.0	6.09
111.5	88.6	5.10	175.6	185.7	5.15	224.4	175.7	6.09
106.9	93.2	5.10	185.4	195.5	5.15	214.6	185.5	6.10
102.3	97.8	5.08	195.1	205.2	5.11	204.9	195.2	6.08
97.7	102.4	5.09	204.9	215.0	5.14	195.1	205.0	6.12
93.1	107.0	5.10	214.6	224.7	5.17	185.4	214.7	6.15
88.5	111.6	5.11	224.4	234.5	5.18	175.6	224.5	6.16
83.8	116.3	5.12	234.1	244.2	5.18	165.9	234.2	6.15
79.2	120.9	5.11	243.8	253.9	5.24	156.2	243.9	6.19
74.6	125.5	5.12	253.6	263.7	5.31	146.4	253.7	6.21
70.0	130.1	5.12	263.3	273.4	5.42	136.7	263.4	6.19
65.4	134.7	5.13	273.1	283.2	5.54	126.9	273.2	6.21
60.8	139.3	5.15	282.8	292.9	5.68	117.2	282.9	6.22
56.2	143.9	5.14	292.6	302.7	5.70	107.4	292.7	6.19
51.5	148.6	5.15	302.3	312.4	5.77	97.7	302.4	6.22
46.9	153.2	5.17	312.1	322.2	5.78	87.9	312.2	6.26
42.3	157.8	5.16	321.8	331.9	5.69	78.2	321.9	6.24
37.7	162.4	5.18	331.5	341.6	5.67	68.5	331.6	6.22
33.1	167.0	5.19	341.3	351.4	5.56	58.7	341.4	6.24
28.5	171.6	5.21	351.0	361.1	5.48	49.0	351.1	6.22
23.8	176.3	5.23	360.8	370.9	5.50	39.2	360.9	6.16
19.2	180.9	5.20	370.5	380.6	5.39	29.5	370.6	6.09
14.6	185.5	5.28	380.3	390.4	5.34	19.7	380.4	6.06
10.0	190.1	5.18	390.0	400.1	5.39	10.0	390.1	5.95



# Frequency Mixer

# SBL-1-1+

## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
0.1	64.00	67.00	70.00	64.00	67.00	70.00
0.2	64.00	67.00	70.00	64.00	67.00	70.00
0.5	64.00	67.00	70.00	64.00	60.77	58.85
1.0	64.00	67.00	70.00	64.00	61.39	59.31
2.0	64.00	67.00	70.00	64.00	61.65	59.31
5.0	64.00	67.00	70.00	64.00	62.29	59.84
10.0	64.00	67.00	60.40	64.00	61.63	57.18
30.4	67.24	68.37	69.58	55.68	55.94	55.89
50.6	63.05	64.91	66.87	52.51	52.69	52.74
91.1	58.68	60.49	62.24	48.63	48.58	49.12
111.4	57.43	59.63	61.36	48.00	48.00	47.69
131.6	56.75	58.34	59.81	47.04	47.44	46.32
151.9	56.14	58.55	60.22	46.51	46.08	45.73
172.2	53.81	55.72	57.57	46.45	45.53	44.93
212.7	56.03	58.99	61.12	45.56	44.33	42.74
232.9	54.54	56.65	57.96	43.81	42.81	41.90
253.2	53.09	55.63	57.73	41.72	40.48	39.42
273.4	50.95	53.69	55.70	38.90	37.69	36.74
293.7	48.76	51.45	54.35	38.51	37.08	35.90
334.2	48.48	51.49	53.92	37.09	35.31	34.47
354.5	51.72	55.40	52.42	36.84	34.04	32.13
374.7	55.35	52.94	49.42	35.33	32.26	30.43
395.0	55.95	49.41	46.31	33.86	31.24	29.72
415.2	54.86	49.76	47.32	33.01	30.48	29.06
455.7	53.30	49.28	45.76	30.62	28.48	26.44
476.0	54.83	48.88	44.71	29.64	28.19	26.04
496.3	51.59	47.78	44.07	28.19	27.12	25.41
516.5	50.72	45.74	42.33	27.60	26.89	25.23
536.8	48.83	43.88	40.48	26.59	26.30	24.84
577.3	46.33	40.68	36.64	24.33	23.85	21.81
597.5	44.58	39.00	35.12	23.18	22.55	20.07
617.8	41.05	36.23	32.66	21.89	21.03	18.68
638.0	39.03	34.64	31.52	20.58	19.47	17.44
658.3	35.73	32.25	29.64	19.17	18.12	16.44
698.8	30.20	28.26	26.57	16.32	15.62	14.46
719.1	28.36	26.72	25.39	15.12	14.64	13.71
739.3	26.88	25.61	24.46	14.49	14.04	13.17
759.6	25.73	24.42	23.41	14.04	13.49	12.60
779.8	25.02	23.71	22.70	13.71	12.92	12.05
800.1	24.36	23.23	22.09	13.37	12.67	11.79

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	41.65	41.80	44.05
30.4	60.4	37.05	36.46	36.37
50.6	80.6	32.69	33.29	32.82
70.9	100.9	30.38	30.49	30.59
91.1	121.1	28.98	29.22	29.53
111.4	141.4	27.89	28.09	28.48
131.6	161.6	27.19	27.53	27.60
151.9	181.9	27.27	27.74	27.89
172.2	202.2	26.71	27.61	28.35
192.4	222.4	26.60	27.21	27.79
212.7	242.7	26.02	26.46	26.81
232.9	262.9	26.24	26.71	27.23
253.2	283.2	26.94	27.77	28.49
273.4	303.4	26.77	27.62	28.24
293.7	323.7	26.43	26.99	27.64
313.9	343.9	24.80	25.36	25.72
334.2	364.2	23.03	23.25	23.36
354.5	384.5	21.45	21.43	21.29
374.7	404.7	20.37	20.19	20.06
395.0	425.0	19.71	19.60	19.57
415.2	445.2	19.45	19.54	19.65
435.5	465.5	19.08	19.33	19.57
455.7	485.7	18.94	19.12	19.28
476.0	506.0	19.03	19.04	19.00
496.3	526.3	18.71	18.61	18.38
516.5	546.5	18.43	18.26	18.09
536.8	566.8	17.75	17.35	16.90
557.0	587.0	17.01	16.60	16.34
577.3	607.3	16.22	15.85	15.51
597.5	627.5	15.77	15.42	15.00
617.8	647.8	15.19	14.72	14.05
638.0	668.0	14.51	13.95	13.18
658.3	688.3	13.55	12.94	12.18
678.6	708.6	12.59	11.91	11.26
698.8	728.8	11.63	11.00	10.46
719.1	749.1	10.78	10.20	9.69
739.3	769.3	10.22	9.64	9.13
759.6	789.6	9.63	9.11	8.69
779.8	809.8	9.29	8.87	8.48
800.1	830.1	8.84	8.43	8.12



# Frequency Mixer

# SBL-1-1+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
5.0	35.0	1.38	1.27	1.20
10.0	40.0	1.38	1.27	1.20
30.4	60.4	1.22	1.12	1.06
50.6	80.6	1.21	1.11	1.05
70.9	100.9	1.16	1.08	1.04
91.1	121.1	1.13	1.06	1.04
111.4	141.4	1.10	1.06	1.07
131.6	161.6	1.10	1.07	1.09
151.9	181.9	1.09	1.09	1.12
172.2	202.2	1.11	1.15	1.20
192.4	222.4	1.12	1.15	1.18
212.7	242.7	1.14	1.18	1.22
232.9	262.9	1.16	1.25	1.32
253.2	283.2	1.21	1.30	1.40
273.4	303.4	1.27	1.36	1.43
293.7	323.7	1.34	1.42	1.49
313.9	343.9	1.40	1.49	1.56
334.2	364.2	1.43	1.53	1.59
354.5	384.5	1.45	1.52	1.57
374.7	404.7	1.36	1.42	1.46
395.0	425.0	1.25	1.31	1.34
435.5	465.5	1.06	1.07	1.14
455.7	485.7	1.08	1.04	1.10
476.0	506.0	1.21	1.19	1.21
496.3	526.3	1.34	1.33	1.36
516.5	546.5	1.50	1.53	1.57
536.8	566.8	1.66	1.71	1.77
557.0	587.0	1.86	1.93	2.01
577.3	607.3	2.07	2.17	2.25
597.5	627.5	2.27	2.37	2.45
617.8	647.8	2.49	2.58	2.65
638.0	668.0	2.65	2.72	2.79
658.3	688.3	2.81	2.87	2.93
678.6	708.6	2.95	2.99	3.05
698.8	728.8	3.08	3.11	3.16
719.1	749.1	3.20	3.22	3.25
739.3	769.3	3.29	3.28	3.29
759.6	789.6	3.35	3.30	3.30
779.8	809.8	3.42	3.37	3.35
800.1	830.1	3.54	3.50	3.47

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
5.0	1.50	2.30	3.45
10.0	1.42	2.24	3.20
30.4	1.89	2.79	3.95
50.6	1.80	2.61	3.67
70.9	1.71	2.44	3.37
91.1	1.71	2.43	3.34
111.4	1.78	2.56	3.54
131.6	1.83	2.63	3.63
151.9	1.80	2.56	3.48
172.2	1.79	2.51	3.40
192.4	1.84	2.57	3.48
212.7	1.93	2.71	3.67
232.9	1.97	2.75	3.71
253.2	1.96	2.70	3.60
273.4	2.00	2.73	3.63
293.7	2.09	2.87	3.81
313.9	2.18	2.99	3.96
334.2	2.21	3.00	3.95
354.5	2.21	2.96	3.88
374.7	2.27	3.01	3.94
395.0	2.40	3.16	4.11
435.5	2.59	3.37	4.28
455.7	2.64	3.43	4.34
476.0	2.73	3.56	4.50
496.3	2.84	3.69	4.66
516.5	2.90	3.75	4.72
536.8	2.92	3.75	4.69
557.0	2.96	3.78	4.70
577.3	3.04	3.85	4.77
597.5	3.10	3.89	4.75
617.8	3.10	3.84	4.66
638.0	3.09	3.77	4.55
658.3	3.11	3.76	4.52
678.6	3.19	3.82	4.56
698.8	3.27	3.88	4.59
719.1	3.37	3.93	4.59
739.3	3.48	4.00	4.61
759.6	3.57	4.07	4.63
779.8	3.62	4.10	4.64
800.1	3.62	4.10	4.62

IF (OUT) (MHz)	IF VSWR @LO=400.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.0	1.80	1.55	1.37
20.0	1.86	1.56	1.41
30.0	1.97	1.69	1.52
40.0	2.00	1.72	1.56
50.0	2.03	1.76	1.60
60.0	2.01	1.73	1.59
70.0	2.02	1.73	1.59
80.0	1.99	1.71	1.59
90.0	2.08	1.78	1.63
100.0	2.11	1.82	1.66
110.0	2.12	1.84	1.68
120.0	2.11	1.83	1.69
130.0	2.12	1.85	1.71
140.0	2.13	1.88	1.74
150.0	2.19	1.93	1.80
160.0	2.26	1.99	1.86
170.0	2.29	2.04	1.90
180.0	2.29	2.02	1.89
190.0	2.24	2.00	1.86
200.0	2.23	1.97	1.84
210.0	2.24	1.98	1.86
220.0	2.29	2.03	1.91
230.0	2.33	2.09	1.97
240.0	2.38	2.13	2.01
250.0	2.39	2.15	2.03
260.0	2.37	2.13	2.01
270.0	2.32	2.09	1.97
280.0	2.32	2.09	1.96
290.0	2.36	2.11	1.98
300.0	2.40	2.17	2.04
310.0	2.42	2.19	2.07
320.0	2.42	2.18	2.06
330.0	2.39	2.16	2.05
340.0	2.39	2.16	2.05
350.0	2.40	2.18	2.06
360.0	2.44	2.20	2.08
370.0	2.46	2.23	2.10
380.0	2.48	2.25	2.12
390.0	2.45	2.23	2.11
400.0	2.47	2.29	2.18

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	32	15	36	18	39	25	48	35	55
1	-	22	+0	30	12	48	21	44	34	52	41	51
2	>100	71	50	69	50	67	48	66	57	72	62	74
3	>100	65	54	65	57	70	53	67	68	73	66	80
4	>100	>81	>81	>81	>81	>81	>81	>81	78	>81	>81	>81
5	>100	>81	>81	>81	>81	79	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	76	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	68	81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	57	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	71	>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; -19.3 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	44	27	46	29	51	37	57	49	73
1	-	23	+0	32	12	44	24	52	36	60	46	58
2	99	61	45	65	47	61	50	66	56	65	56	74
3	>100	48	36	48	40	51	35	58	44	57	51	66
4	>100	76	62	84	60	81	59	74	55	75	71	81
5	>100	85	65	74	52	66	50	65	54	63	83	69
6	>100	88	73	86	72	81	81	83	75	87	68	84
7	>100	>91	73	89	66	75	64	78	62	>91	60	76
8	>100	>91	>91	>91	90	>91	90	>91	68	>91	88	>91
9	>100	>91	87	>91	85	90	80	89	83	>91	82	>91
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; -9.42 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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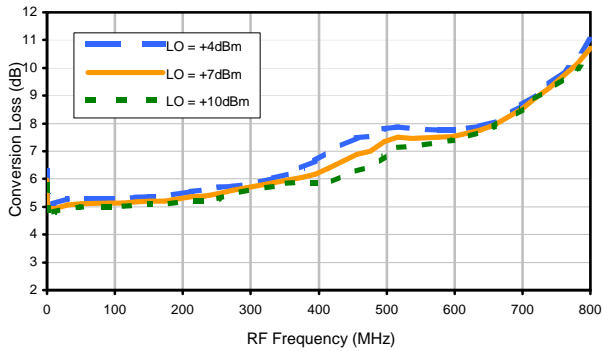


# Frequency Mixer

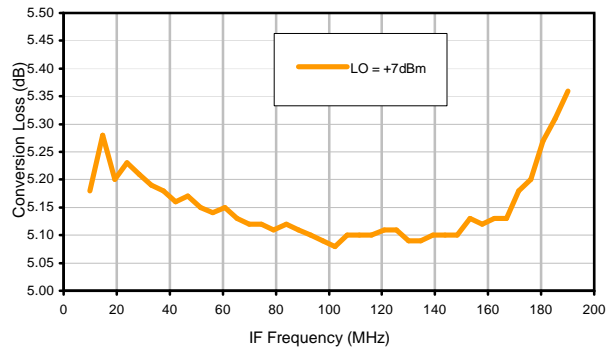
# SBL-1-1+

## Typical Performance Curves

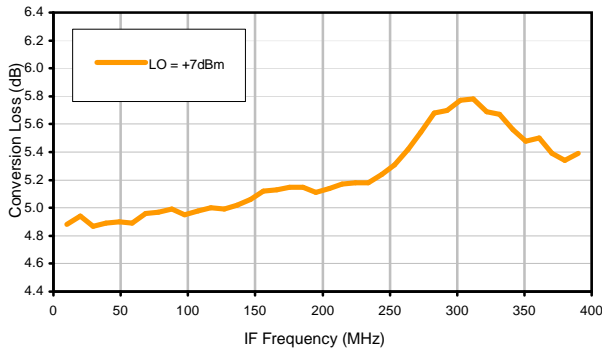
### Conversion Loss @ IF=30MHz



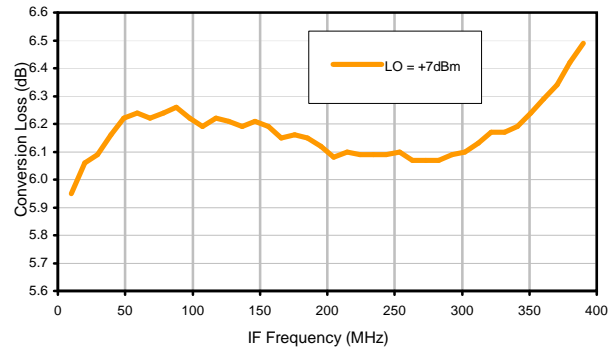
### Conversion Loss vs. IF @ RF=200.1MHz



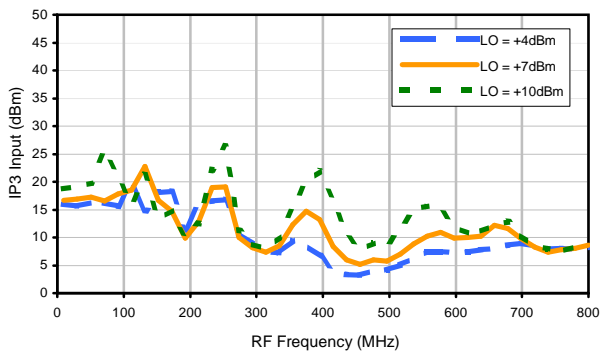
### Conversion Loss vs. IF @ RF=10.1MHz



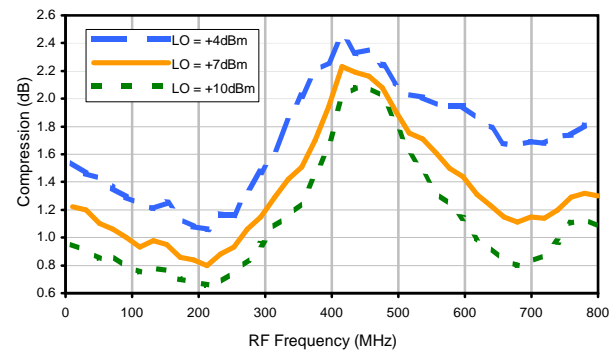
### Conversion Loss vs. IF @ RF=400.1MHz



### IP3 Input



### Compression @ RF IN=+1dBm



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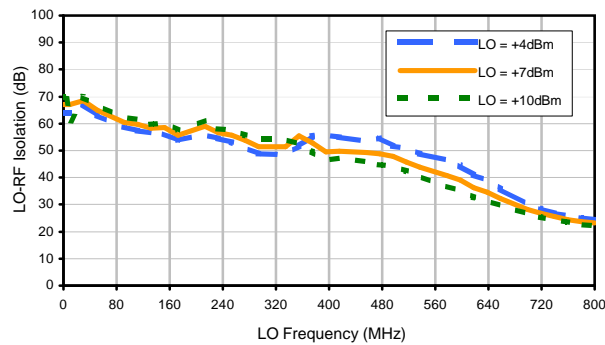
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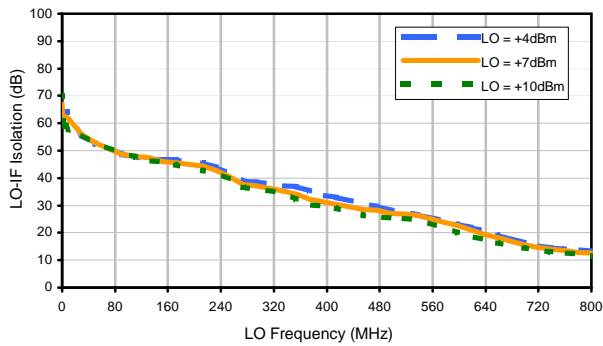


## Typical Performance Curves

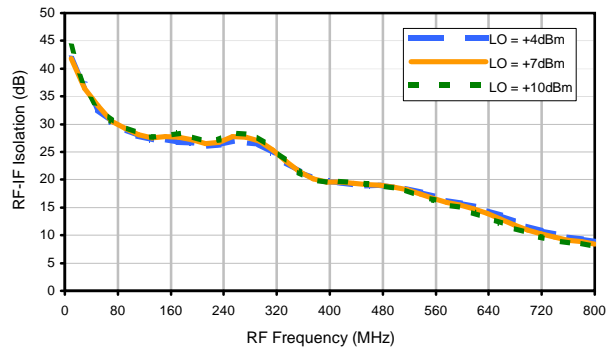
LO-RF Isolation



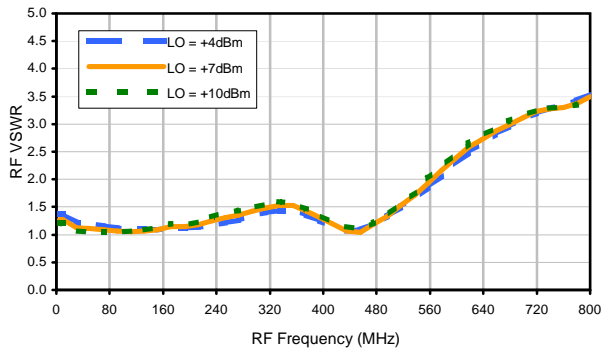
LO-IF Isolation



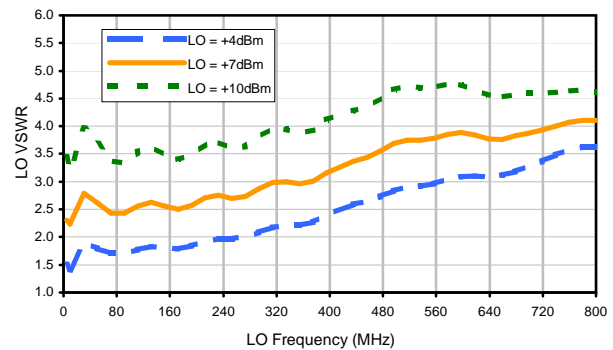
RF-IF Isolation



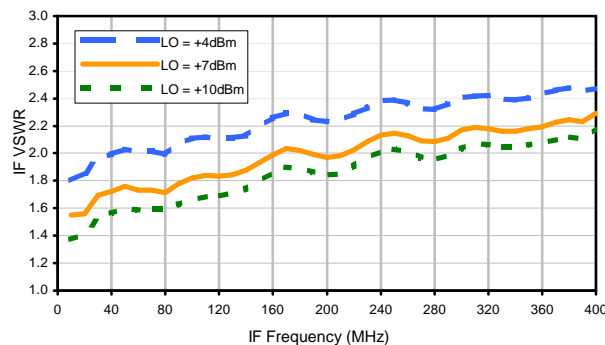
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	32	15	36	18	39	25	48	35	55
1	-	22	+0	30	12	48	21	44	34	52	41	51
2	>100	71	50	69	50	67	48	66	57	72	62	74
3	>100	65	54	65	57	70	53	67	68	73	66	80
4	>100	>81	>81	>81	>81	>81	>81	>81	78	>81	>81	>81
5	>100	>81	>81	>81	>81	79	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	76	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	68	81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	57	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	71	>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; -19.3 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	25	44	27	46	29	51	37	57	49	73
1	-	23	+0	32	12	44	24	52	36	60	46	58
2	99	61	45	65	47	61	50	66	56	65	56	74
3	>100	48	36	48	40	51	35	58	44	57	51	66
4	>100	76	62	84	60	81	59	74	55	75	71	81
5	>100	85	65	74	52	66	50	65	54	63	83	69
6	>100	88	73	86	72	81	81	83	75	87	68	84
7	>100	>91	73	89	66	75	64	78	62	>91	60	76
8	>100	>91	>91	>91	90	>91	90	>91	68	>91	88	>91
9	>100	>91	87	>91	85	90	80	89	83	>91	82	>91
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; -9.42 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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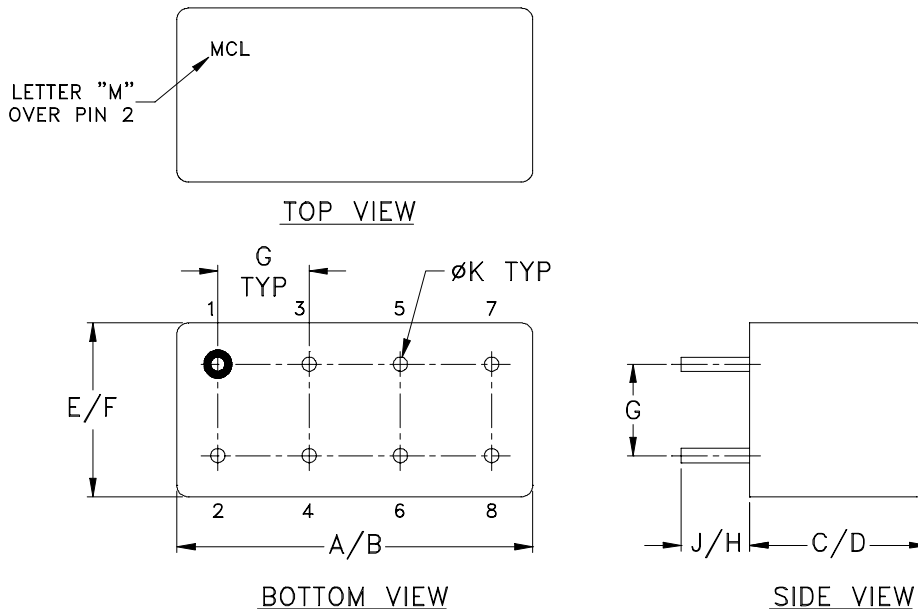


# Case Style

# A

A01  
A04  
A05  
A06

## Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A01			.385 (9.78)	.400 (10.16)							5.2
A04	.770 (19.56)	.800 (20.32)	.200 (5.08)	.210 (5.33)	.370 (9.40)	.400 (10.16)	.200 (5.08)	.20 (5.08)	.14 (3.56)	.031 (.79)	3.7
A05			.240 (6.10)	.250 (6.35)							3.7
A06			.285 (7.24)	.310 (7.87)							5.2

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 B14-045-01.
- 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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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
---------------	---------------------------	----------------

Barometric Pressure

100,000 Feet

MIL-STD-202, Method 105, Condition D