

Frequency Mixer

Level 7 (LO Power +7 dBm) 0.1 to 500 MHz

TSM-3+



CASE STYLE: A11

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

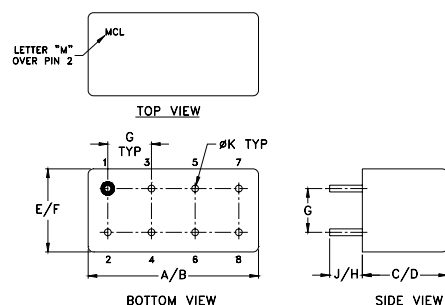
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

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

^ pins must be connected together externally

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F
.480	.500	.240	.255	.210	.230
12.19	12.70	6.10	6.48	5.33	5.84

G	H	J	K	wt
.100	.20	.14	.020	grams
2.54	5.08	3.56	0.51	1.9

Features

- low conversion loss, 4.75 dB typ.
- high L-R isolation, 50 dB typ., L-I isolation, 45 dB typ.
- rugged welded construction
- hermetically sealed

Applications

- VHF/UHF
- FM radio
- defense & federal communications

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF	IF	Mid-Band m		Total Range Max.		L		M		U		L		M		U	
f_L - f_U		$\overline{X}$	σ	Max.		Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
0.1-500	DC-500	4.75	0.04	7.5	8.5	60	50	50	35	35	25	55	45	45	30	35	25

1 dB COMP.: +1 dBm typ.

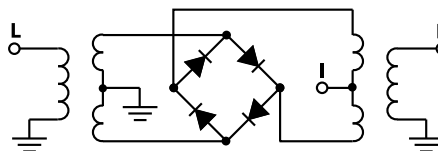
L = low range [f_L to $10 f_L$] M = mid range [$10 f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]

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
0.10	30.10	5.74	>67.00	>67.00	1.11	2.55
0.20	30.20	5.22	>67.00	>67.00	1.11	2.49
0.50	30.50	4.98	>67.00	>67.00	1.11	2.41
1.00	31.00	4.89	>67.00	>67.00	1.09	2.51
2.00	32.00	4.86	>67.00	>67.00	1.09	2.51
5.00	35.00	4.82	>67.00	>67.00	1.09	2.40
10.00	40.00	4.86	>67.00	>67.00	1.08	2.27
20.00	50.00	4.94	58.85	58.01	1.07	2.30
41.47	71.47	4.85	51.90	51.69	1.06	2.31
55.26	85.26	4.89	49.48	49.53	1.05	2.30
100.00	70.00	4.79	44.78	44.91	1.05	2.30
151.79	121.79	4.81	41.85	41.77	1.04	2.30
200.00	170.00	5.01	39.70	39.48	1.04	2.30
220.74	190.74	5.05	39.83	38.88	1.05	2.36
248.32	218.32	5.02	39.44	38.41	1.06	2.38
303.48	273.48	5.11	36.66	36.25	1.08	2.40
331.06	301.06	5.25	36.60	36.25	1.11	2.46
358.64	328.64	5.48	36.34	35.29	1.14	2.47
386.22	356.22	5.50	36.21	33.15	1.17	2.52
400.00	370.00	5.52	36.19	32.27	1.20	2.58

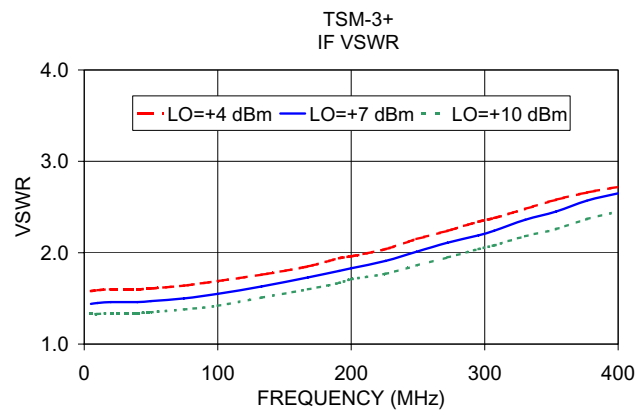
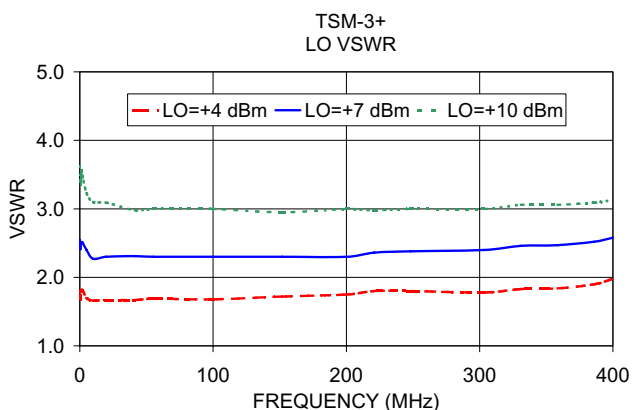
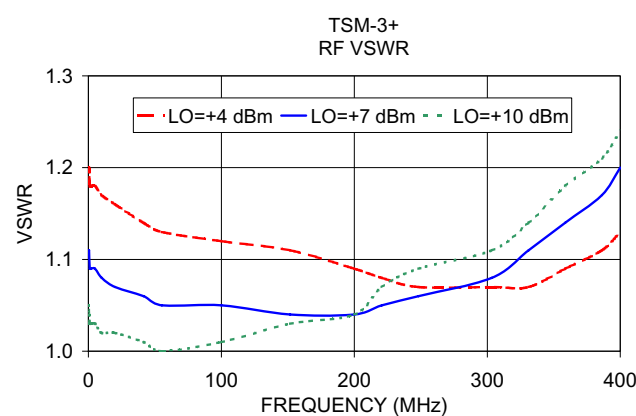
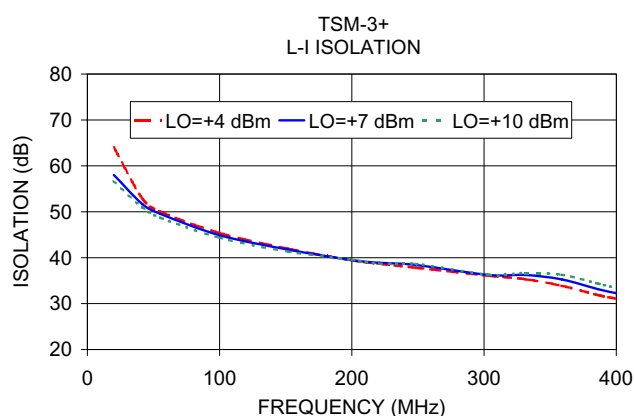
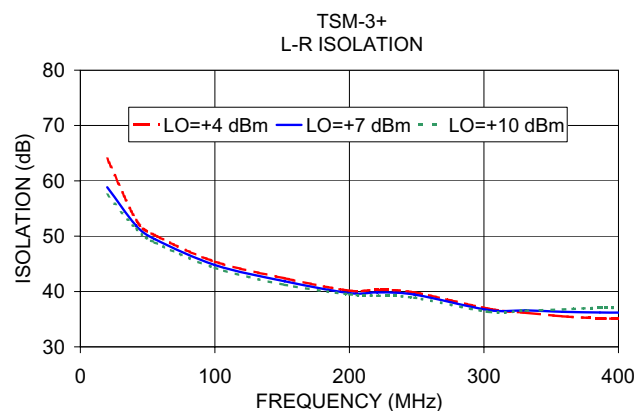
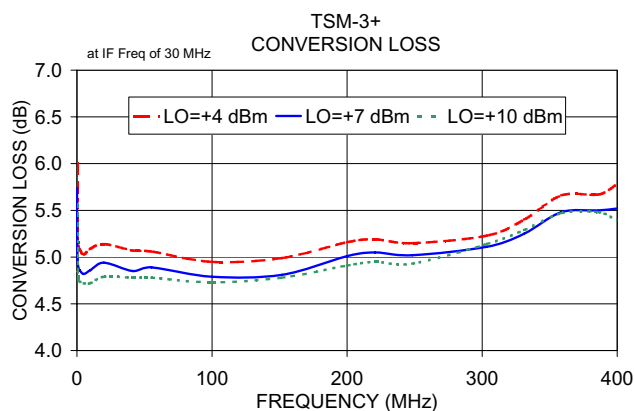
Electrical Schematic



Notes

- A. 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.
 B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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Frequency Mixer

TSM-3+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
0.1	30.1	6.00	5.74	5.57
0.2	30.2	5.45	5.22	5.09
0.5	30.5	5.20	4.98	4.85
1.0	31.0	5.12	4.89	4.76
2.0	32.0	5.08	4.86	4.74
5.0	35.0	5.03	4.82	4.72
10.0	40.0	5.09	4.86	4.72
30.3	60.3	5.12	4.86	4.73
50.5	80.5	5.16	4.88	4.79
70.7	100.7	5.10	4.89	4.79
90.9	120.9	5.09	4.89	4.81
111.1	141.1	5.12	4.90	4.81
151.5	181.5	5.16	4.96	4.88
171.7	201.7	5.19	4.98	4.87
191.9	221.9	5.21	4.99	4.90
212.1	242.1	5.22	5.02	4.94
252.5	282.5	5.35	5.10	5.00
272.8	302.8	5.45	5.16	5.04
293.0	323.0	5.47	5.23	5.08
313.2	343.2	5.52	5.32	5.15
353.6	383.6	5.56	5.30	5.19
373.8	403.8	5.63	5.36	5.22
394.0	424.0	5.73	5.46	5.33
454.6	484.6	6.40	5.91	5.56
495.0	525.0	6.75	6.38	5.91
515.2	545.2	7.00	6.57	6.13
555.6	585.6	7.30	6.74	6.24
575.8	605.8	7.38	6.77	6.22
616.2	646.2	7.17	6.49	6.02
676.8	706.8	6.96	6.40	6.12
697.0	727.0	6.98	6.51	6.28
737.4	767.4	7.32	6.87	6.65
757.7	787.7	7.44	7.02	6.77
798.1	828.1	7.72	7.29	7.10
818.3	848.3	8.04	7.60	7.34
858.7	888.7	8.61	8.21	8.01
878.9	908.9	8.87	8.52	8.37
919.3	949.3	9.70	9.27	9.15
979.9	1009.9	10.79	10.28	10.18
1000.1	1030.1	11.42	10.83	10.56

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	23.94	23.55	24.66
30.3	60.3	23.21	26.57	23.26
50.5	80.5	21.47	26.56	23.91
70.7	100.7	21.54	23.07	22.31
90.9	120.9	22.00	23.18	21.85
111.1	141.1	22.55	26.55	24.18
131.3	161.3	24.82	20.04	22.07
151.5	181.5	21.41	16.93	19.11
171.7	201.7	21.19	18.44	20.61
191.9	221.9	18.29	18.74	20.71
212.1	242.1	16.67	18.36	15.89
232.3	262.3	16.72	16.87	17.11
252.5	282.5	18.22	17.58	20.78
272.8	302.8	18.98	19.11	24.00
293.0	323.0	16.81	17.22	19.90
313.2	343.2	16.50	16.21	18.28
333.4	363.4	14.89	16.75	18.24
353.6	383.6	14.60	16.12	17.49
373.8	403.8	15.54	15.83	20.94
394.0	424.0	15.18	17.11	20.10
434.4	464.4	10.92	15.56	18.49
454.6	484.6	9.03	11.76	16.23
495.0	525.0	7.87	9.10	11.79
515.2	545.2	7.73	8.74	10.28
555.6	585.6	8.90	10.72	13.04
575.8	605.8	10.65	13.09	14.82
616.2	646.2	13.89	17.33	24.37
636.4	666.4	16.35	24.04	25.99
676.8	706.8	20.94	21.81	21.37
697.0	727.0	21.63	20.43	19.15
737.4	767.4	16.97	20.73	18.40
757.7	787.7	16.54	20.10	19.43
798.1	828.1	15.32	15.09	16.35
818.3	848.3	14.87	14.81	15.16
858.7	888.7	17.56	14.06	16.67
878.9	908.9	16.07	18.76	15.80
919.3	949.3	14.88	18.33	20.31
939.5	969.5	21.55	18.75	21.53
979.9	1009.9	21.22	20.33	23.64
1000.1	1030.1	20.75	21.73	17.86

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	1.49	1.17	0.97
30.3	60.3	1.39	1.16	0.90
50.5	80.5	1.36	1.07	0.89
70.7	100.7	1.25	1.06	0.89
90.9	120.9	1.29	0.99	0.83
111.1	141.1	1.20	0.94	0.76
131.3	161.3	1.28	0.95	0.78
151.5	181.5	1.18	0.91	0.75
171.7	201.7	1.13	0.88	0.72
191.9	221.9	1.10	0.86	0.71
212.1	242.1	1.09	0.87	0.71
232.3	262.3	1.10	0.87	0.73
252.5	282.5	1.08	0.84	0.68
272.8	302.8	1.14	0.91	0.75
293.0	323.0	1.15	0.95	0.80
313.2	343.2	1.24	1.01	0.86
333.4	363.4	1.42	1.11	0.93
353.6	383.6	1.64	1.28	1.07
373.8	403.8	1.75	1.36	1.14
394.0	424.0	1.91	1.47	1.26
434.4	464.4	2.23	1.84	1.55
454.6	484.6	2.30	1.97	1.73
495.0	525.0	2.26	1.93	1.77
515.2	545.2	2.17	1.85	1.65
555.6	585.6	2.05	1.80	1.61
575.8	605.8	1.90	1.70	1.58
616.2	646.2	2.04	1.83	1.66
636.4	666.4	2.07	1.85	1.66
676.8	706.8	2.09	1.81	1.56
697.0	727.0	2.05	1.73	1.48
737.4	767.4	1.90	1.59	1.37
757.7	787.7	1.91	1.61	1.41
798.1	828.1	1.81	1.63	1.51
818.3	848.3	1.85	1.61	1.51
858.7	888.7	1.64	1.35	1.27
878.9	908.9	1.54	1.19	1.10
919.3	949.3	1.43	1.01	0.87
939.5	969.5	1.32	0.95	0.84
979.9	1009.9	1.22	0.89	0.82
1000.1	1030.1	1.34	0.91	0.83

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Frequency Mixer

TSM-3+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (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)=500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
240.0	10.1	5.27	10.0	20.1	4.71	490.0	10.1	6.18
234.1	16.0	5.22	22.3	32.4	4.65	477.7	22.4	6.11
228.2	21.9	5.16	34.6	44.7	4.66	465.4	34.7	6.06
222.3	27.8	5.14	46.9	57.0	4.66	453.1	47.0	6.05
216.4	33.7	5.12	59.2	69.3	4.65	440.8	59.3	6.10
210.5	39.6	5.10	71.5	81.6	4.70	428.5	71.6	6.05
204.6	45.5	5.11	83.8	93.9	4.73	416.2	83.9	6.00
198.7	51.4	5.06	96.2	106.3	4.71	403.8	96.3	5.98
192.8	57.3	5.02	108.5	118.6	4.74	391.5	108.6	5.96
186.9	63.2	5.05	120.8	130.9	4.74	379.2	120.9	6.01
181.0	69.1	5.07	133.1	143.2	4.74	366.9	133.2	6.04
175.1	75.0	5.08	145.4	155.5	4.78	354.6	145.5	5.98
169.2	80.9	5.05	157.7	167.8	4.84	342.3	157.8	6.00
163.3	86.8	5.03	170.0	180.1	4.82	330.0	170.1	6.00
157.4	92.7	5.03	182.3	192.4	4.86	317.7	182.4	6.00
151.5	98.6	5.03	194.6	204.7	4.85	305.4	194.7	6.04
145.6	104.5	5.04	206.9	217.0	4.87	293.1	207.0	5.99
139.7	110.4	5.06	219.2	229.3	4.89	280.8	219.3	5.98
133.8	116.3	5.02	231.5	241.6	4.90	268.5	231.6	6.02
127.9	122.2	5.00	243.8	253.9	4.89	256.2	243.9	6.02
122.1	128.0	5.00	256.2	266.3	4.93	243.8	256.3	6.07
116.2	133.9	5.02	268.5	278.6	4.88	231.5	268.6	6.05
110.3	139.8	5.04	280.8	290.9	4.95	219.2	280.9	5.98
104.4	145.7	5.02	293.1	303.2	5.02	206.9	293.2	6.04
98.5	151.6	5.02	305.4	315.5	5.06	194.6	305.5	6.02
92.6	157.5	5.02	317.7	327.8	5.18	182.3	317.8	6.02
86.7	163.4	5.04	330.0	340.1	5.19	170.0	330.1	6.06
80.8	169.3	5.05	342.3	352.4	5.18	157.7	342.4	6.03
74.9	175.2	5.06	354.6	364.7	5.21	145.4	354.7	6.01
69.0	181.1	5.03	366.9	377.0	5.21	133.1	367.0	5.99
63.1	187.0	5.01	379.2	389.3	5.18	120.8	379.3	5.93
57.2	192.9	5.02	391.5	401.6	5.15	108.5	391.6	5.91
51.3	198.8	5.02	403.8	413.9	5.05	96.2	403.9	5.88
45.4	204.7	5.05	416.2	426.3	5.10	83.8	416.3	5.77
39.5	210.6	5.06	428.5	438.6	5.14	71.5	428.6	5.77
33.6	216.5	5.06	440.8	450.9	5.16	59.2	440.9	5.77
27.7	222.4	5.05	453.1	463.2	5.16	46.9	453.2	5.73
21.8	228.3	5.06	465.4	475.5	5.16	34.6	465.5	5.86
15.9	234.2	5.08	477.7	487.8	5.15	22.3	477.8	6.00
10.0	240.1	5.13	490.0	500.1	5.14	10.0	490.1	6.02

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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
0.1	64.00	67.00	70.00	64.00	67.00	66.23
0.2	64.00	67.00	70.00	64.00	67.00	65.77
0.5	64.00	67.00	70.00	64.00	67.00	65.50
1.0	64.00	67.00	70.00	64.00	67.00	65.49
2.0	64.00	67.00	70.00	64.00	67.00	65.24
5.0	64.00	67.00	70.00	64.00	67.00	64.20
10.0	64.00	67.00	64.53	64.00	67.00	60.90
30.3	62.31	63.44	64.26	65.52	65.76	65.95
50.5	57.19	58.94	60.01	64.15	64.54	62.76
70.7	55.00	55.85	56.72	60.57	60.93	60.79
90.9	52.43	53.71	54.57	58.16	59.09	59.29
111.1	50.91	51.93	52.93	55.12	56.77	58.26
151.5	48.23	49.20	49.86	50.64	53.05	54.89
171.7	47.17	48.48	49.29	48.92	51.12	52.75
191.9	46.09	47.15	47.98	47.39	50.05	52.72
212.1	45.26	45.90	46.67	46.24	48.88	51.74
252.5	44.56	45.51	46.31	43.44	45.77	48.34
272.8	45.13	46.49	47.39	42.70	45.07	47.75
293.0	43.46	44.82	45.82	43.49	46.50	49.41
313.2	42.23	43.49	44.69	42.56	45.38	48.19
353.6	40.39	41.98	43.56	40.54	41.85	42.61
373.8	39.60	41.29	42.96	39.54	40.30	40.58
394.0	39.65	41.77	44.10	38.55	38.90	38.83
454.6	40.74	42.60	44.25	37.74	37.64	37.10
495.0	39.86	41.81	43.38	36.85	36.84	35.91
515.2	39.85	41.81	43.35	35.52	35.38	34.55
555.6	39.41	41.01	42.16	33.24	32.44	31.36
575.8	39.08	40.51	41.38	32.12	31.04	29.86
616.2	39.21	39.99	40.00	30.11	28.38	26.32
676.8	37.94	37.62	37.19	27.54	25.05	23.46
697.0	38.80	38.47	38.15	26.52	24.21	22.70
737.4	40.28	38.80	37.35	24.38	22.39	20.89
757.7	42.42	38.73	36.24	23.55	21.79	20.35
798.1	43.93	37.11	33.94	21.37	19.96	18.66
818.3	41.96	35.77	32.89	20.21	19.06	17.94
858.7	37.08	33.15	30.66	18.75	17.81	16.88
878.9	34.21	31.51	29.46	18.09	17.26	16.31
919.3	30.58	28.91	27.37	17.00	16.30	15.42
979.9	26.74	26.34	25.20	16.04	15.81	15.00
1000.1	25.73	25.47	24.57	15.64	15.44	14.73

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	44.57	44.66	38.82
30.3	60.3	34.07	34.76	35.17
50.5	80.5	31.12	31.05	31.34
70.7	100.7	28.37	28.85	28.66
90.9	120.9	26.99	27.02	27.20
111.1	141.1	25.58	25.81	26.04
131.3	161.3	24.74	24.88	25.15
151.5	181.5	24.15	24.43	24.64
171.7	201.7	23.94	24.23	24.53
191.9	221.9	23.80	24.32	24.75
212.1	242.1	23.39	23.93	24.50
232.3	262.3	23.58	24.10	24.67
252.5	282.5	23.82	24.29	24.79
272.8	302.8	23.87	24.19	24.53
293.0	323.0	25.02	25.42	25.82
313.2	343.2	25.30	26.01	26.66
333.4	363.4	25.47	26.62	27.78
353.6	383.6	24.73	25.96	26.99
373.8	403.8	23.08	23.85	24.23
394.0	424.0	21.60	21.86	21.78
434.4	464.4	18.77	18.39	18.11
454.6	484.6	18.09	17.83	17.45
495.0	525.0	16.98	16.84	16.68
515.2	545.2	16.82	16.65	16.51
555.6	585.6	17.04	16.81	16.51
575.8	605.8	17.14	16.83	16.45
616.2	646.2	17.10	16.53	15.98
636.4	666.4	16.84	16.19	15.64
676.8	706.8	15.96	15.37	14.92
697.0	727.0	15.52	15.04	14.69
737.4	767.4	14.55	14.01	13.59
757.7	787.7	13.89	13.42	13.00
798.1	828.1	12.48	12.02	11.56
818.3	848.3	11.88	11.42	10.98
858.7	888.7	10.46	10.04	9.66
878.9	908.9	9.91	9.42	9.09
919.3	949.3	8.95	8.54	8.17
939.5	969.5	8.48	8.08	7.71
979.9	1009.9	7.61	7.29	6.99
1000.1	1030.1	7.35	7.04	6.80

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=500.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	1.20	1.11	1.05	5.0	1.72	2.55	3.62	5.0	0.58	1.44	1.33
10.0	40.0	1.20	1.11	1.05	10.0	1.74	2.49	3.53	10.0	0.59	1.45	1.33
30.3	60.3	1.25	1.14	1.08	30.3	1.79	2.66	3.71	22.6	2.17	1.84	1.57
50.5	80.5	1.23	1.12	1.06	50.5	1.75	2.58	3.65	35.1	2.07	1.74	1.49
70.7	100.7	1.21	1.11	1.05	70.7	1.66	2.40	3.34	47.7	2.06	1.73	1.47
90.9	120.9	1.20	1.09	1.04	90.9	1.66	2.46	3.41	60.3	2.07	1.76	1.48
111.1	141.1	1.15	1.07	1.03	111.1	1.66	2.42	3.36	72.8	2.11	1.79	1.52
131.3	161.3	1.15	1.07	1.03	131.3	1.72	2.50	3.48	85.4	2.10	1.80	1.54
151.5	181.5	1.14	1.06	1.03	151.5	1.70	2.44	3.37	97.9	2.10	1.80	1.56
171.7	201.7	1.12	1.04	1.04	171.7	1.66	2.38	3.24	110.5	2.14	1.83	1.58
191.9	221.9	1.10	1.04	1.06	191.9	1.68	2.38	3.22	123.1	2.19	1.87	1.61
212.1	242.1	1.09	1.01	1.05	212.1	1.73	2.45	3.33	135.6	2.23	1.90	1.63
232.3	262.3	1.08	1.01	1.05	232.3	1.76	2.52	3.39	148.2	2.21	1.90	1.64
252.5	282.5	1.06	1.02	1.07	252.5	1.75	2.44	3.29	160.8	2.20	1.89	1.64
272.8	302.8	1.06	1.02	1.08	272.8	1.80	2.52	3.35	173.3	2.19	1.89	1.65
293.0	323.0	1.04	1.04	1.09	293.0	1.76	2.44	3.25	185.9	2.23	1.93	1.69
313.2	343.2	1.02	1.05	1.10	313.2	1.82	2.52	3.35	198.5	2.28	1.98	1.74
333.4	363.4	1.01	1.08	1.14	333.4	1.84	2.54	3.35	211.0	2.30	2.01	1.77
353.6	383.6	1.04	1.11	1.17	353.6	1.83	2.50	3.28	223.6	2.27	1.99	1.75
373.8	403.8	1.06	1.12	1.17	373.8	1.86	2.54	3.30	236.2	2.26	1.97	1.74
394.0	424.0	1.07	1.12	1.14	394.0	1.87	2.51	3.29	248.7	2.28	1.99	1.74
434.4	464.4	1.14	1.10	1.09	434.4	1.98	2.60	3.36	261.3	2.32	2.03	1.79
454.6	484.6	1.22	1.16	1.12	454.6	2.07	2.72	3.47	273.8	2.34	2.05	1.82
495.0	525.0	1.36	1.29	1.23	495.0	2.09	2.73	3.46	286.4	2.30	2.05	1.83
515.2	545.2	1.46	1.39	1.33	515.2	2.13	2.78	3.51	299.0	2.27	2.01	1.82
555.6	585.6	1.68	1.60	1.53	555.6	2.18	2.83	3.53	311.5	2.25	2.01	1.81
575.8	605.8	1.80	1.70	1.63	575.8	2.14	2.77	3.47	324.1	2.29	2.04	1.83
616.2	646.2	1.93	1.83	1.76	616.2	2.18	2.79	3.48	336.7	2.33	2.08	1.87
636.4	666.4	1.98	1.88	1.81	636.4	2.20	2.82	3.50	349.2	2.34	2.08	1.88
676.8	706.8	2.07	1.99	1.93	676.8	2.19	2.77	3.43	361.8	2.32	2.05	1.86
697.0	727.0	2.16	2.08	2.02	697.0	2.23	2.80	3.46	374.4	2.29	2.03	1.83
737.4	767.4	2.38	2.31	2.22	737.4	2.33	2.92	3.54	386.9	2.28	2.03	1.84
757.7	787.7	2.47	2.39	2.30	757.7	2.31	2.85	3.47	399.5	2.32	2.06	1.86
798.1	828.1	2.60	2.50	2.41	798.1	2.46	2.96	3.55	412.1	2.32	2.07	1.88
818.3	848.3	2.69	2.58	2.49	818.3	2.56	3.05	3.60	424.6	2.28	2.05	1.86
858.7	888.7	2.78	2.70	2.63	858.7	2.72	3.12	3.61	437.2	2.25	2.01	1.83
878.9	908.9	2.81	2.74	2.69	878.9	2.84	3.21	3.66	449.7	2.28	2.01	1.81
919.3	949.3	2.96	2.91	2.87	919.3	3.07	3.41	3.82	462.3	2.33	2.04	1.84
939.5	969.5	2.97	2.93	2.91	939.5	3.09	3.38	3.76	474.9	2.33	2.05	1.85
979.9	1009.9	3.00	2.96	2.96	979.9	3.19	3.48	3.83	487.4	2.31	2.02	1.82
1000.1	1030.1	3.01	2.97	2.97	1000.1	3.22	3.52	3.86	500.0	2.36	2.12	1.96

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	25	14	33	19	37	30	47	45	63
1	-	21	+0	29	12	32	21	40	37	48	50	48
2	>100	67	58	69	59	64	54	65	55	74	64	>81
3	>100	71	59	74	59	>81	56	>81	73	77	77	76
4	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
10	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -14.00 dBm.
LO IN: 280.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -19.18 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	28	35	24	44	31	48	42	59	59	75
1	-	22	+0	30	12	33	23	46	38	53	54	57
2	99	57	52	58	57	57	51	57	52	75	59	78
3	>100	48	37	48	39	51	36	50	46	56	58	59
4	>100	75	66	78	67	84	67	70	61	71	64	83
5	>100	74	75	70	52	73	51	76	53	64	74	70
6	>100	90	81	87	78	84	82	>91	79	84	79	>91
7	>100	>91	79	80	70	74	64	84	63	77	60	73
8	>100	>91	>91	>91	>91	90	>91	>91	82	>91	90	90
9	>100	>91	>91	>91	89	>91	82	>91	84	72	79	>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: 250.1 MHz; -4.00 dBm.
LO IN: 280.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -9.37 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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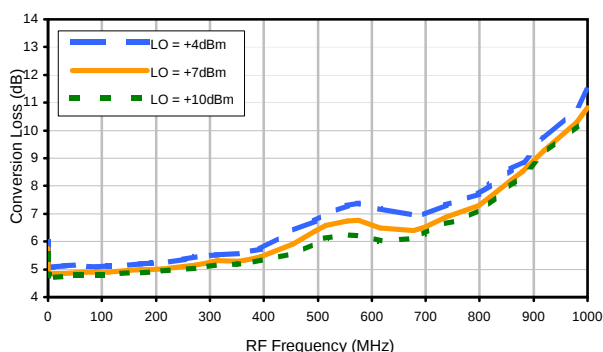


Frequency Mixer

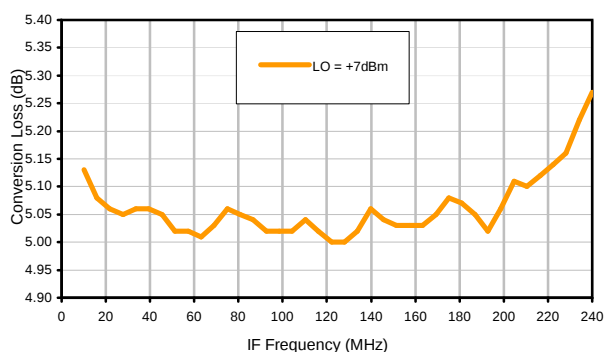
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Typical Performance Curves

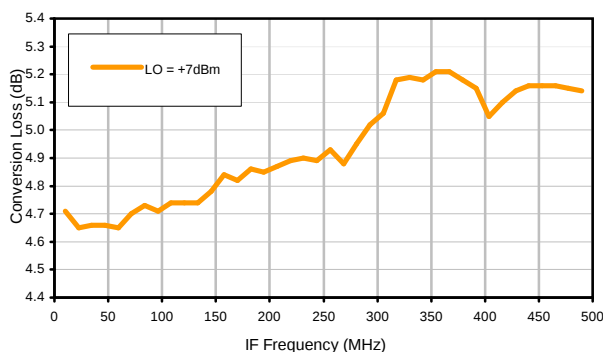
Conversion Loss @ IF=30MHz



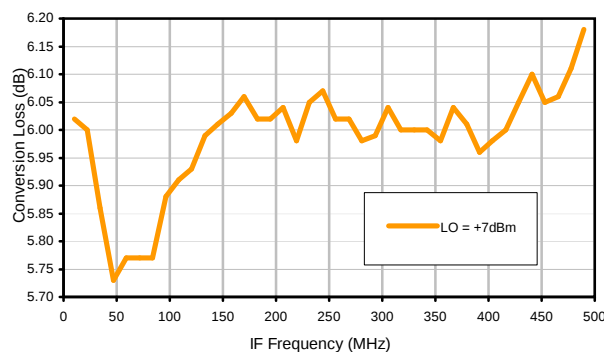
Conversion Loss vs. IF @ RF=250.1MHz



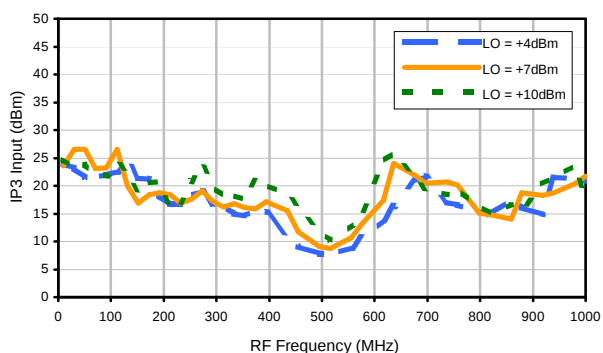
Conversion Loss vs. IF @ RF=10.1MHz



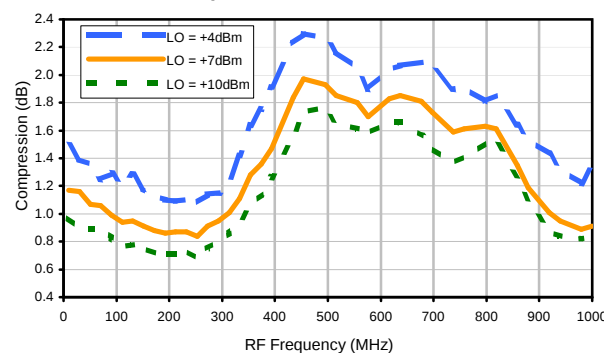
Conversion Loss vs. IF @ RF=500.1MHz



IP3 Input



Compression @ RF IN=+1dBm



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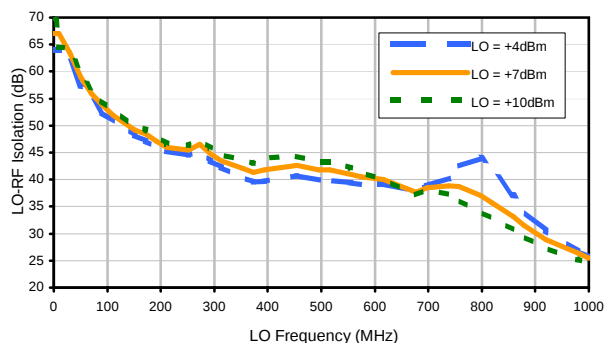


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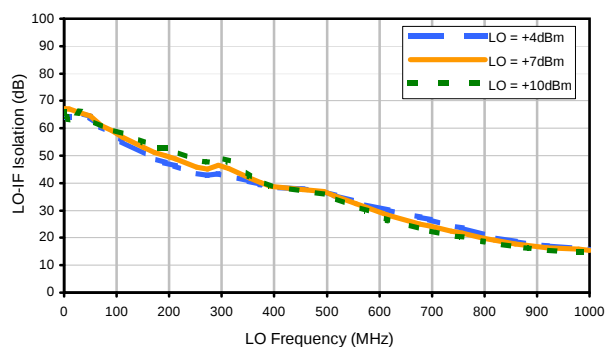


Typical Performance Curves

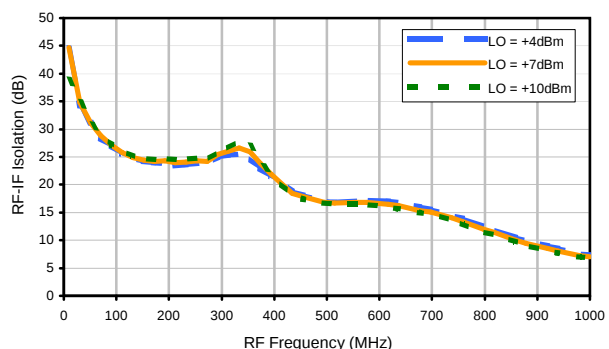
LO-RF Isolation



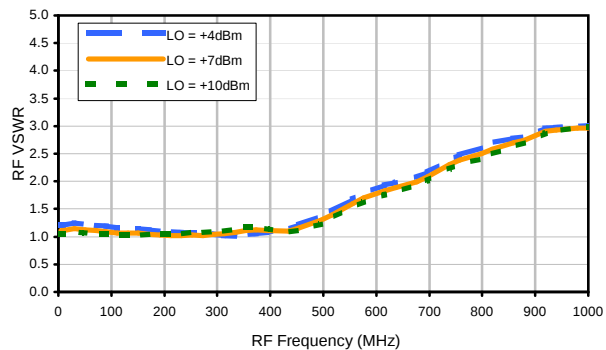
LO-IF Isolation



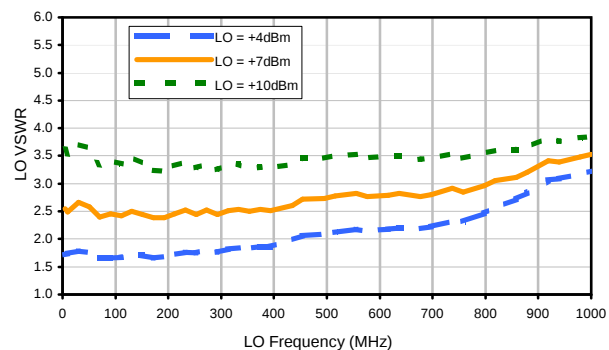
RF-IF Isolation



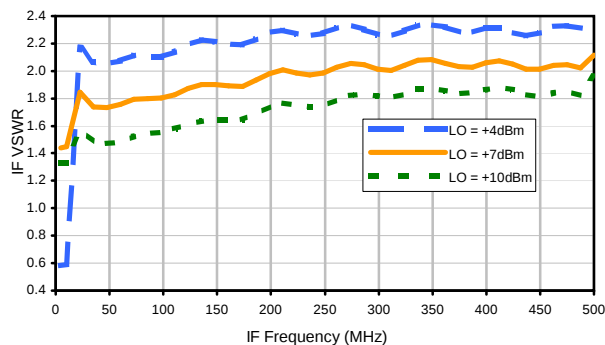
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	25	14	33	19	37	30	47	45	63
1	-	21	+0	29	12	32	21	40	37	48	50	48
2	>100	67	58	69	59	64	54	65	55	74	64	>81
3	>100	71	59	74	59	>81	56	>81	73	77	77	76
4	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
6	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
7	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
8	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
9	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
10	>100	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 250.1 MHz; -14.00 dBm.
LO IN: 280.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -19.18 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	28	35	24	44	31	48	42	59	59	75
1	-	22	+0	30	12	33	23	46	38	53	54	57
2	99	57	52	58	57	57	51	57	52	75	59	78
3	>100	48	37	48	39	51	36	50	46	56	58	59
4	>100	75	66	78	67	84	67	70	61	71	64	83
5	>100	74	75	70	52	73	51	76	53	64	74	70
6	>100	90	81	87	78	84	82	>91	79	84	79	>91
7	>100	>91	79	80	70	74	64	84	63	77	60	73
8	>100	>91	>91	>91	>91	90	>91	>91	82	>91	90	90
9	>100	>91	>91	>91	89	>91	82	>91	84	72	79	>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: 250.1 MHz; -4.00 dBm.
LO IN: 280.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -9.37 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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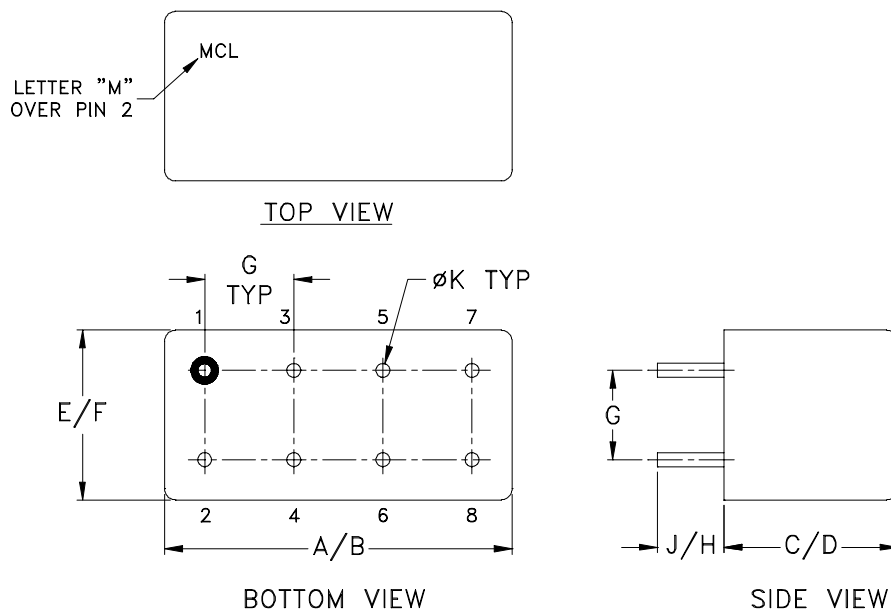
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A03

A11

Outline Dimensions



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