

Plug-In

Frequency Mixer

Level 17 (LO Power +17 dBm) 2 to 600 MHz

TUF-1H+



Generic photo used for illustration purposes only

CASE STYLE: B02

+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	200mW
IF Current	40mA

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

Pin Connections

LO	4
RF	1
IF	2
GROUND	3
CASE GROUND	3

Features

- wideband, 2 to 600 MHz
- low conversion loss, 5.90 dB typ.
- high L-R isolation, 50 dB typ.
- rugged welded construction

Applications

- VHF/UHF
- transmitters/receivers
- defense & federal communications

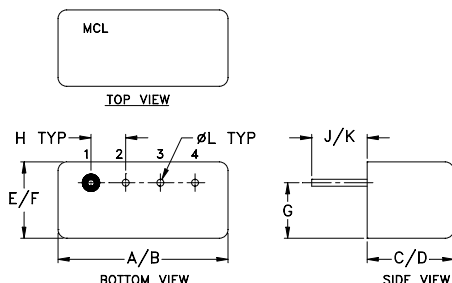
Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/RF f _L -f _U	IF	Mid-Band m			Total Range Max.	L		M		U		L		M		U		
		⌊	⌋	Max.		Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
		⌊	⌋	Max.		Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
2-600	DC-600	5.90	0.18	7.0	8.0	68	50	50	30	43	25	62	45	48	30	33	22	26

1 dB COMP.: +14 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 $f_U/2$]

Outline Drawing



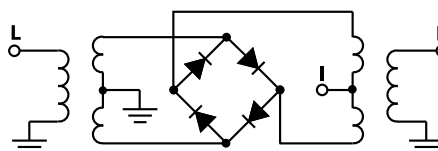
Outline Dimensions (inch/mm)

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	L	wt
.16	.100	.14	.20	.020	grams
4.06	2.54	3.56	5.08	0.51	1.9

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 +17dBm	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm
2.00	32.00	6.30	62.98	52.28	1.22	1.67
5.00	35.00	5.95	62.06	52.79	1.10	1.60
10.00	40.00	5.92	60.47	52.35	1.03	1.63
20.00	50.00	5.91	57.14	51.13	1.02	1.61
34.13	64.13	5.81	53.27	49.30	1.04	1.58
50.00	80.00	5.72	50.24	47.27	1.06	1.57
66.26	96.26	5.66	48.03	45.61	1.07	1.55
82.33	112.33	5.71	46.33	44.27	1.08	1.54
100.00	130.00	5.63	44.99	43.26	1.09	1.57
130.52	165.52	5.61	43.18	41.91	1.10	1.55
162.65	207.65	5.61	41.46	40.45	1.10	1.55
200.00	260.00	5.60	40.12	39.22	1.08	1.60
259.04	328.04	5.42	38.10	37.51	1.07	1.67
307.24	389.24	5.62	37.54	36.13	1.06	1.70
355.43	440.43	5.86	37.41	36.94	1.05	1.76
387.56	479.56	5.92	36.35	35.99	1.04	1.82
435.76	525.76	5.81	35.35	33.91	1.05	1.84
467.89	557.89	5.90	36.34	33.81	1.06	1.85
483.95	573.95	6.08	36.44	33.54	1.08	1.87
500.00	590.00	6.27	36.27	33.21	1.09	1.90
600.00	700.00	6.18	36.36	33.38	1.09	1.89

Electrical Schematic



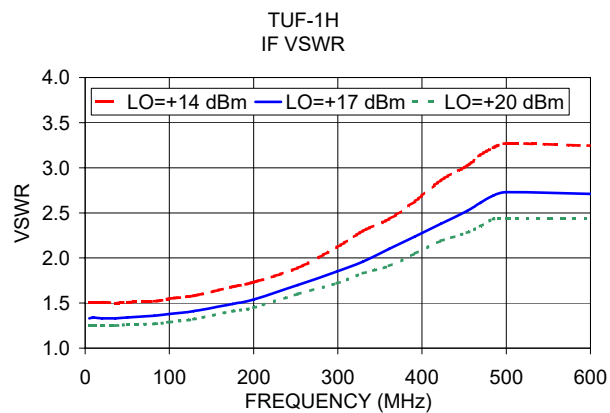
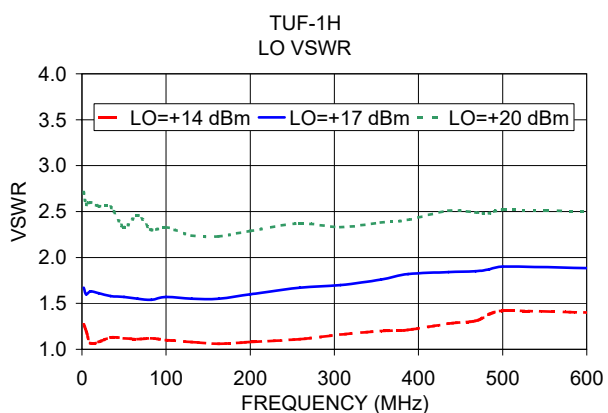
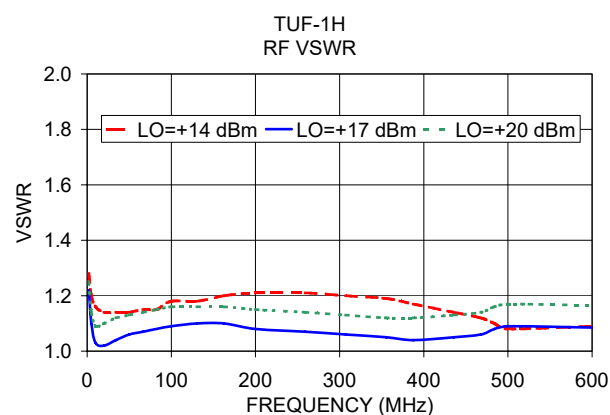
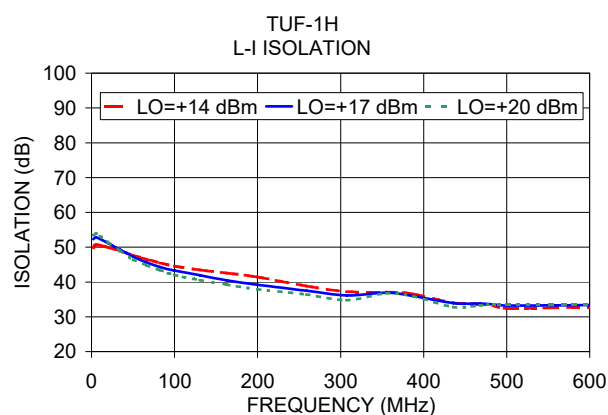
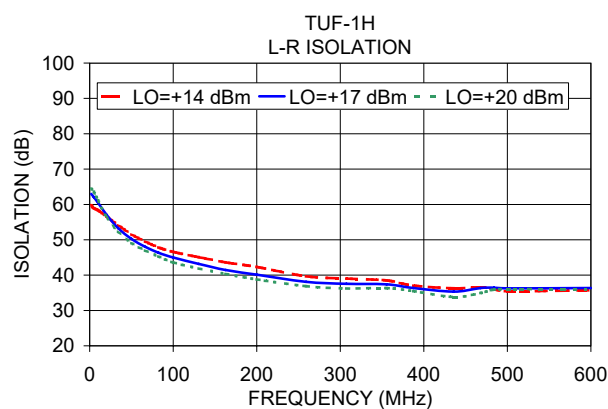
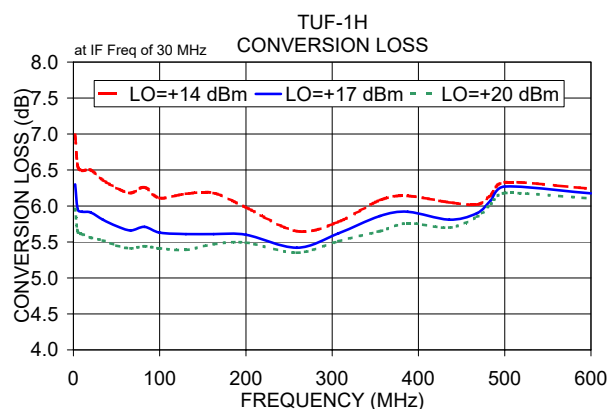
Notes

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

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+14	+17	+20
2.0	32.0	6.99	6.30	5.96
5.0	35.0	6.55	5.95	5.64
10.0	40.0	6.49	5.92	5.61
50.9	80.9	7.00	6.37	6.04
91.7	121.7	7.02	6.33	6.00
132.6	162.6	6.84	6.19	5.91
173.4	203.4	6.94	6.28	5.96
214.2	244.2	6.83	6.16	5.89
255.0	285.0	6.79	6.16	5.92
295.9	325.9	6.82	6.16	5.93
336.7	366.7	6.72	6.17	5.97
377.5	407.5	6.68	6.15	5.98
418.3	448.3	6.67	6.15	5.96
459.1	489.1	6.73	6.24	6.05
500.0	530.0	6.73	6.26	6.05
540.8	570.8	6.87	6.39	6.12
581.6	611.6	6.88	6.43	6.14
622.4	652.4	6.85	6.47	6.21
663.3	693.3	6.89	6.51	6.29
704.1	734.1	6.85	6.48	6.30
785.7	815.7	7.15	6.67	6.42
826.5	856.5	7.37	6.83	6.54
867.4	897.4	7.76	7.03	6.69
908.2	938.2	8.18	7.33	6.76
949.0	979.0	8.75	7.79	6.94
989.8	1019.8	9.23	8.12	7.08
1030.6	1060.6	9.84	8.54	7.51
1071.5	1101.5	10.39	8.96	7.80
1112.3	1142.3	10.77	9.27	7.95
1153.1	1183.1	11.14	9.64	8.19
1193.9	1223.9	11.26	9.81	8.24
1234.8	1264.8	11.23	9.69	8.13
1255.2	1285.2	11.23	9.57	8.03
1296.0	1326.0	11.21	9.47	8.10
1316.4	1346.4	11.17	9.36	8.07
1357.2	1387.2	10.96	9.35	8.33
1377.6	1407.6	10.85	9.46	8.53
1438.9	1468.9	10.91	9.97	9.26
1479.7	1509.7	10.97	10.38	9.80
1500.1	1530.1	11.00	10.52	10.03

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+14	+17	+20
10.1	40.1	25.21	28.66	31.80
50.9	80.9	24.57	27.53	30.56
91.7	121.7	23.70	26.84	28.51
132.6	162.6	26.82	27.64	26.87
173.4	203.4	24.60	25.19	26.14
214.2	244.2	24.45	24.15	32.74
255.0	285.0	23.78	26.63	28.03
295.9	325.9	21.59	26.22	26.21
336.7	366.7	23.97	27.99	25.33
377.5	407.5	24.18	26.21	26.54
418.3	448.3	23.81	23.10	22.85
459.1	489.1	27.30	22.95	22.62
500.0	530.0	24.50	23.68	24.84
540.8	570.8	21.98	21.70	24.62
581.6	611.6	22.23	21.66	23.87
622.4	652.4	22.40	21.78	22.60
663.3	693.3	21.85	22.08	22.33
704.1	734.1	20.92	22.13	23.06
744.9	774.9	19.25	21.14	23.46
785.7	815.7	17.61	20.05	23.17
826.5	856.5	15.96	19.36	23.41
867.4	897.4	14.52	18.37	22.27
908.2	938.2	13.66	16.29	21.08
949.0	979.0	13.25	14.81	20.16
989.8	1019.8	13.21	14.31	19.28
1030.6	1060.6	13.26	14.70	17.01
1071.5	1101.5	13.13	15.35	17.47
1112.3	1142.3	13.50	15.90	19.28
1153.1	1183.1	13.91	15.95	20.05
1193.9	1223.9	14.51	15.70	19.57
1234.8	1264.8	15.07	16.00	20.53
1255.2	1285.2	14.94	15.94	20.72
1296.0	1326.0	15.56	17.15	22.30
1316.4	1346.4	15.71	17.86	22.67
1357.2	1387.2	16.70	19.66	23.42
1377.6	1407.6	17.45	20.42	23.91
1418.5	1448.5	18.75	21.23	24.14
1438.9	1468.9	19.63	21.59	24.23
1479.7	1509.7	21.39	22.27	23.95
1500.1	1530.1	22.01	22.49	24.10

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB)		
		@LO (dBm)		
		+14	+17	+20
10.1	40.1	0.69	0.35	0.19
50.9	80.9	0.58	0.29	0.16
91.7	121.7	0.54	0.27	0.16
132.6	162.6	0.70	0.31	0.17
173.4	203.4	0.51	0.25	0.15
214.2	244.2	0.57	0.32	0.18
255.0	285.0	0.67	0.33	0.18
295.9	325.9	0.64	0.31	0.19
336.7	366.7	0.71	0.30	0.17
377.5	407.5	0.75	0.33	0.18
418.3	448.3	0.76	0.36	0.23
459.1	489.1	0.79	0.31	0.20
500.0	530.0	0.82	0.33	0.21
540.8	570.8	0.78	0.36	0.25
581.6	611.6	0.88	0.40	0.30
622.4	652.4	1.07	0.47	0.32
663.3	693.3	1.15	0.52	0.34
704.1	734.1	1.32	0.62	0.39
744.9	774.9	1.29	0.67	0.39
785.7	815.7	1.35	0.79	0.48
826.5	856.5	1.33	0.88	0.48
867.4	897.4	1.19	0.83	0.46
908.2	938.2	1.08	0.79	0.51
949.0	979.0	0.73	0.55	0.49
989.8	1019.8	0.51	0.37	0.44
1030.6	1060.6	0.13	0.19	0.28
1071.5	1101.5	-0.40	-0.07	0.12
1112.3	1142.3	-0.73	-0.33	0.08
1153.1	1183.1	-1.05	-0.59	0.01
1193.9	1223.9	-1.08	-0.62	0.10
1234.8	1264.8	-0.97	-0.40	0.35
1255.2	1285.2	-0.84	-0.24	0.46
1296.0	1326.0	-0.67	0.05	0.63
1316.4	1346.4	-0.50	0.23	0.71
1357.2	1387.2	-0.16	0.40	0.73
1377.6	1407.6	-0.07	0.41	0.72
1418.5	1448.5	0.08	0.31	0.56
1438.9	1468.9	0.18	0.23	0.44
1479.7	1509.7	0.20	0.05	0.21
1500.1	1530.1	0.26	0.03	0.15

Frequency Mixer

TUF-1H+

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)
		+17			+17			+17
290.0	10.1	6.35	10.0	20.1	6.29	590.0	10.1	6.61
282.8	17.3	6.42	24.9	35.0	6.14	575.1	25.0	6.49
275.6	24.5	6.33	39.7	49.8	6.19	560.3	39.8	6.48
268.5	31.6	6.37	54.6	64.7	6.24	545.4	54.7	6.45
261.3	38.8	6.26	69.5	79.6	6.26	530.5	69.6	6.46
254.1	46.0	6.36	84.4	94.5	6.32	515.6	84.5	6.44
246.9	53.2	6.27	99.2	109.3	6.25	500.8	99.3	6.38
239.7	60.4	6.33	114.1	124.2	6.31	485.9	114.2	6.34
232.6	67.5	6.27	129.0	139.1	6.26	471.0	129.1	6.26
225.4	74.7	6.28	143.8	153.9	6.27	456.2	143.9	6.30
218.2	81.9	6.24	158.7	168.8	6.37	441.3	158.8	6.29
211.0	89.1	6.29	173.6	183.7	6.37	426.4	173.7	6.27
203.8	96.3	6.29	188.5	198.6	6.37	411.5	188.6	6.20
196.7	103.4	6.27	203.3	213.4	6.35	396.7	203.4	6.17
189.5	110.6	6.26	218.2	228.3	6.33	381.8	218.3	6.16
182.3	117.8	6.19	233.1	243.2	6.35	366.9	233.2	6.10
175.1	125.0	6.24	247.9	258.0	6.39	352.1	248.0	6.12
167.9	132.2	6.16	262.8	272.9	6.41	337.2	262.9	6.04
160.8	139.3	6.23	277.7	287.8	6.40	322.3	277.8	6.14
153.6	146.5	6.11	292.6	302.7	6.39	307.4	292.7	6.08
146.4	153.7	6.18	307.4	317.5	6.36	292.6	307.5	6.05
139.2	160.9	6.14	322.3	332.4	6.43	277.7	322.4	6.06
132.1	168.0	6.23	337.2	347.3	6.37	262.8	337.3	6.05
124.9	175.2	6.17	352.1	362.2	6.39	247.9	352.2	6.11
117.7	182.4	6.16	366.9	377.0	6.46	233.1	367.0	6.06
110.5	189.6	6.14	381.8	391.9	6.42	218.2	381.9	6.11
103.3	196.8	6.14	396.7	406.8	6.48	203.3	396.8	6.12
96.2	203.9	6.20	411.5	421.6	6.36	188.5	411.6	6.16
89.0	211.1	6.10	426.4	436.5	6.46	173.6	426.5	6.20
81.8	218.3	6.12	441.3	451.4	6.49	158.7	441.4	6.22
74.6	225.5	6.05	456.2	466.3	6.52	143.8	456.3	6.26
67.4	232.7	6.15	471.0	481.1	6.52	129.0	471.1	6.30
60.3	239.8	6.08	485.9	496.0	6.46	114.1	486.0	6.33
53.1	247.0	6.12	500.8	510.9	6.50	99.2	500.9	6.30
45.9	254.2	6.03	515.6	525.7	6.44	84.4	515.7	6.32
38.7	261.4	6.10	530.5	540.6	6.48	69.5	530.6	6.33
31.5	268.6	6.13	545.4	555.5	6.46	54.6	545.5	6.33
24.4	275.7	6.17	560.3	570.4	6.53	39.7	560.4	6.38
17.2	282.9	6.13	575.1	585.2	6.53	24.9	575.2	6.38
10.0	290.1	6.18	590.0	600.1	6.50	10.0	590.1	6.48

REV. X2
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Page 2 of 5



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Frequency Mixer

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
2.0	59.73	62.98	64.42	49.91	52.28	53.48
5.0	58.95	62.06	63.57	50.65	52.79	53.94
10.0	58.36	60.47	61.17	50.51	52.35	53.27
50.9	65.34	67.61	69.89	69.42	70.04	61.48
91.7	60.76	62.94	65.51	63.23	66.32	57.55
132.6	57.85	60.75	63.76	58.23	61.09	53.89
173.4	56.03	58.83	61.61	55.53	59.18	52.40
214.2	54.64	57.75	60.81	51.91	56.05	51.15
255.0	53.73	56.82	60.19	50.29	53.53	49.70
295.9	53.05	55.87	60.03	48.14	50.83	48.52
336.7	52.10	55.47	59.46	45.29	46.60	45.69
377.5	51.43	56.27	61.47	43.13	44.32	44.40
418.3	50.21	56.45	65.91	41.57	42.66	43.27
459.1	49.06	54.19	60.60	38.95	40.32	41.08
500.0	48.19	51.79	55.16	37.45	38.88	39.78
540.8	47.64	50.03	52.94	35.93	37.09	38.30
581.6	47.07	49.30	52.07	34.57	35.74	36.97
622.4	47.38	51.05	56.59	33.63	35.34	36.65
663.3	49.01	53.41	61.67	32.67	34.69	36.22
704.1	50.46	55.90	60.48	31.66	34.08	35.84
785.7	60.58	61.12	55.99	30.05	32.34	34.58
826.5	56.86	57.47	53.89	29.22	31.19	33.18
867.4	50.66	52.58	51.10	28.51	30.08	31.92
908.2	46.49	48.86	48.70	28.14	29.16	30.81
949.0	44.27	45.55	45.96	27.89	28.38	29.69
989.8	42.62	42.80	43.13	27.69	27.88	28.74
1030.6	41.77	41.82	41.98	27.18	27.64	28.14
1071.5	40.72	40.72	40.93	26.88	27.52	28.18
1112.3	39.55	39.80	39.80	26.54	27.48	28.09
1153.1	38.58	39.30	39.30	26.11	27.47	28.44
1193.9	37.59	38.67	39.10	25.67	27.25	28.57
1234.8	36.40	37.61	38.40	25.13	26.78	28.27
1255.2	36.30	37.50	38.55	25.22	26.75	28.26
1296.0	35.14	36.54	38.16	24.53	25.92	27.47
1316.4	34.75	36.02	37.44	24.48	25.64	27.09
1357.2	33.84	35.51	37.21	23.77	24.94	26.60
1377.6	33.15	35.04	36.91	23.55	24.69	26.46
1438.9	32.00	34.26	36.03	22.69	24.17	25.99
1479.7	31.62	33.98	35.60	22.47	24.16	26.00
1500.1	31.67	33.80	35.25	22.57	24.22	25.98

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
10.1	40.1	48.39	49.59	50.09
50.9	80.9	34.61	34.95	35.22
91.7	121.7	29.88	30.27	30.62
132.6	162.6	27.21	27.58	27.93
173.4	203.4	25.30	25.71	26.09
214.2	244.2	24.03	24.63	24.97
255.0	285.0	23.36	23.83	24.26
295.9	325.9	22.91	23.59	23.91
336.7	366.7	22.59	23.64	24.03
377.5	407.5	22.46	23.39	24.12
418.3	448.3	22.65	23.28	24.03
459.1	489.1	23.39	24.13	24.47
500.0	530.0	24.50	25.15	25.32
540.8	570.8	25.17	25.37	25.64
581.6	611.6	24.53	24.78	25.55
622.4	652.4	22.80	23.11	23.93
663.3	693.3	21.03	21.14	21.62
704.1	734.1	19.62	19.53	19.58
744.9	774.9	18.49	18.09	17.79
785.7	815.7	17.56	16.83	16.33
826.5	856.5	16.80	15.88	15.32
867.4	897.4	16.26	15.24	14.59
908.2	938.2	15.98	14.90	14.18
949.0	979.0	15.67	14.71	13.84
989.8	1019.8	15.22	14.46	13.54
1030.6	1060.6	14.91	14.34	13.67
1071.5	1101.5	14.65	14.25	13.81
1112.3	1142.3	14.41	14.08	13.76
1153.1	1183.1	14.18	13.93	13.66
1193.9	1223.9	13.85	13.69	13.50
1234.8	1264.8	13.46	13.41	13.30
1255.2	1285.2	13.29	13.25	13.14
1296.0	1326.0	12.88	12.89	12.80
1316.4	1346.4	12.64	12.70	12.62
1357.2	1387.2	12.19	12.18	12.06
1377.6	1407.6	11.98	11.89	11.76
1418.5	1448.5	11.47	11.21	11.06
1438.9	1468.9	11.22	10.88	10.71
1479.7	1509.7	10.68	10.28	10.07
1500.1	1530.1	10.37	9.93	9.70

REV. X2
TUF-1H+
100818
Page 3 of 5

Frequency Mixer

TUF-1H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)				IF (OUT) (MHz)	IF VSWR @LO=600.1MHz (:1)			
		@LO (dBm)				@LO (dBm)					@LO (dBm)			
		+14	+17	+20		+14	+17	+20	+14		+17	+20		
2.0	32.0	1.28	1.22	1.25	2.0	1.27	1.67	2.71	5.0	1.51	1.33	1.25		
5.0	35.0	1.20	1.10	1.14	5.0	1.20	1.60	2.58	10.0	1.51	1.34	1.25		
10.0	40.0	1.16	1.03	1.09	10.0	1.07	1.63	2.60	25.1	2.01	1.70	1.46		
50.9	80.9	1.19	1.06	1.03	50.9	1.04	1.58	2.38	40.3	1.88	1.59	1.37		
91.7	121.7	1.23	1.08	1.05	91.7	1.06	1.50	2.24	55.4	1.85	1.57	1.35		
132.6	162.6	1.20	1.08	1.09	132.6	1.10	1.54	2.30	70.5	1.87	1.59	1.37		
173.4	203.4	1.24	1.12	1.11	173.4	1.11	1.50	2.19	85.6	1.90	1.62	1.40		
214.2	244.2	1.25	1.15	1.14	214.2	1.17	1.52	2.21	100.8	1.95	1.66	1.43		
255.0	285.0	1.27	1.17	1.17	255.0	1.18	1.52	2.22	115.9	1.99	1.68	1.45		
295.9	325.9	1.31	1.20	1.19	295.9	1.21	1.50	2.15	131.0	2.01	1.70	1.46		
336.7	366.7	1.31	1.21	1.20	336.7	1.27	1.56	2.23	146.2	1.98	1.68	1.45		
377.5	407.5	1.32	1.22	1.22	377.5	1.28	1.53	2.21	161.3	1.93	1.64	1.42		
418.3	448.3	1.33	1.22	1.22	418.3	1.31	1.55	2.19	176.4	1.94	1.64	1.42		
459.1	489.1	1.34	1.23	1.22	459.1	1.38	1.58	2.21	191.5	2.00	1.70	1.46		
500.0	530.0	1.35	1.24	1.24	500.0	1.40	1.56	2.15	206.7	2.06	1.75	1.51		
540.8	570.8	1.38	1.27	1.26	540.8	1.44	1.61	2.18	221.8	2.04	1.74	1.50		
581.6	611.6	1.38	1.29	1.28	581.6	1.50	1.62	2.14	236.9	2.00	1.70	1.47		
622.4	652.4	1.38	1.31	1.29	622.4	1.52	1.62	2.17	252.1	1.99	1.70	1.46		
663.3	693.3	1.37	1.30	1.29	663.3	1.55	1.63	2.14	267.2	2.05	1.74	1.50		
704.1	734.1	1.35	1.27	1.27	704.1	1.63	1.65	2.13	282.3	2.08	1.78	1.54		
744.9	774.9	1.33	1.24	1.23	744.9	1.66	1.66	2.12	297.4	2.09	1.78	1.55		
785.7	815.7	1.33	1.21	1.21	785.7	1.72	1.65	2.06	312.6	2.09	1.78	1.54		
826.5	856.5	1.36	1.24	1.23	826.5	1.77	1.70	2.09	327.7	2.12	1.81	1.56		
867.4	897.4	1.43	1.31	1.29	867.4	1.81	1.74	2.09	342.8	2.15	1.83	1.58		
908.2	938.2	1.55	1.42	1.40	908.2	1.80	1.77	2.12	357.9	2.15	1.84	1.59		
949.0	979.0	1.71	1.58	1.53	949.0	1.78	1.80	2.14	373.1	2.14	1.84	1.59		
989.8	1019.8	1.88	1.74	1.67	989.8	1.78	1.79	2.14	388.2	2.17	1.86	1.60		
1030.6	1060.6	2.08	1.93	1.83	1030.6	1.77	1.79	2.16	403.3	2.21	1.89	1.63		
1071.5	1101.5	2.28	2.11	1.99	1071.5	1.78	1.76	2.12	418.5	2.23	1.91	1.66		
1112.3	1142.3	2.45	2.26	2.11	1112.3	1.78	1.71	2.06	433.6	2.23	1.92	1.66		
1153.1	1183.1	2.62	2.42	2.24	1153.1	1.77	1.68	2.02	448.7	2.22	1.91	1.65		
1193.9	1223.9	2.75	2.55	2.34	1193.9	1.76	1.63	1.96	463.8	2.26	1.94	1.67		
1234.8	1264.8	2.83	2.62	2.40	1234.8	1.77	1.59	1.90	479.0	2.32	1.99	1.71		
1255.2	1285.2	2.86	2.65	2.42	1255.2	1.71	1.59	1.94	494.1	2.34	2.00	1.73		
1296.0	1326.0	2.92	2.69	2.48	1296.0	1.76	1.52	1.83	509.2	2.31	1.98	1.72		
1316.4	1346.4	2.94	2.71	2.51	1316.4	1.69	1.51	1.82	524.4	2.30	1.97	1.71		
1357.2	1387.2	2.93	2.72	2.55	1357.2	1.69	1.52	1.84	539.5	2.33	2.00	1.73		
1377.6	1407.6	2.92	2.73	2.57	1377.6	1.78	1.51	1.82	554.6	2.38	2.05	1.78		
1438.9	1468.9	2.88	2.75	2.62	1438.9	1.84	1.55	1.83	569.7	2.41	2.08	1.81		
1479.7	1509.7	2.85	2.75	2.65	1479.7	1.87	1.60	1.85	584.9	2.40	2.08	1.81		
1500.1	1530.1	2.82	2.74	2.65	1500.1	1.85	1.62	1.85	600.0	2.07	1.86	1.71		

REV. X2
TUF-1H+
100818
Page 4 of 5

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	24	37	18	40	27	48	36	61	39	49
1	-	17	+0	28	16	40	46	40	23	42	30	45
2	95	75	49	68	49	70	51	70	62	72	59	74
3	>100	59	54	63	48	59	44	62	43	56	44	63
4	>100	83	79	86	81	84	85	82	75	83	70	80
5	>100	72	70	76	68	75	65	75	67	82	67	83
6	>100	>93	92	>93	91	>93	90	89	90	>93	89	>93
7	>100	90	86	88	88	91	85	90	88	90	88	>93
8	>100	>93	>93	>93	>93	>93	>93	>93	90	>93	>93	>93
9	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
10	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	82	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; -1.00 dBm.
LO IN: 330.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.38 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	34	51	32	57	47	60	49	64	50	57
1	-	17	+0	29	15	40	28	41	35	49	43	54
2	80	69	47	60	46	59	45	69	49	64	63	79
3	>100	45	45	49	57	59	41	54	40	50	38	57
4	>100	68	60	73	60	73	61	71	62	75	68	77
5	>100	64	66	65	56	61	49	55	46	57	45	60
6	>100	72	70	75	69	80	72	81	76	77	70	90
7	>100	68	79	71	73	68	64	65	59	64	59	68
8	>100	100	81	81	78	88	79	100	81	84	80	80
9	>100	83	76	74	73	70	69	72	66	71	67	74
10	>100	101	>103	>103	95	99	97	101	93	90	88	84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 300.1 MHz; 9.00 dBm.
LO IN: 330.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.68 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

TUF-1H+

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Page 5 of 5



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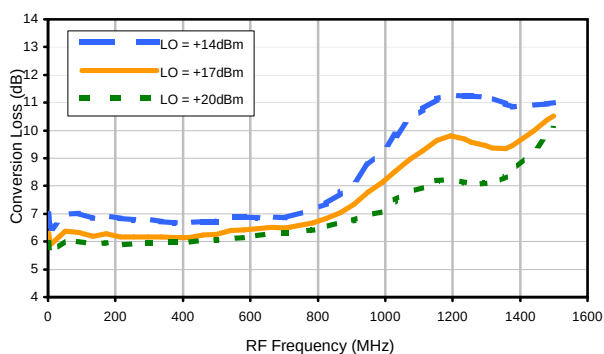


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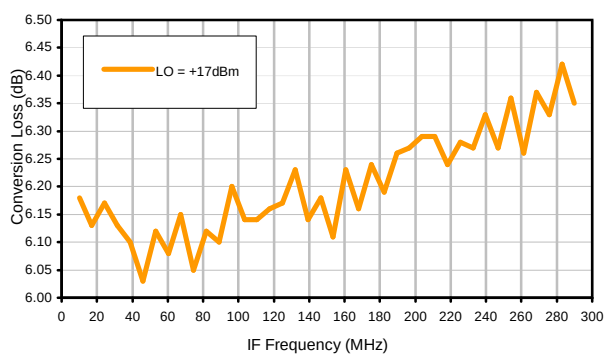


Typical Performance Curves

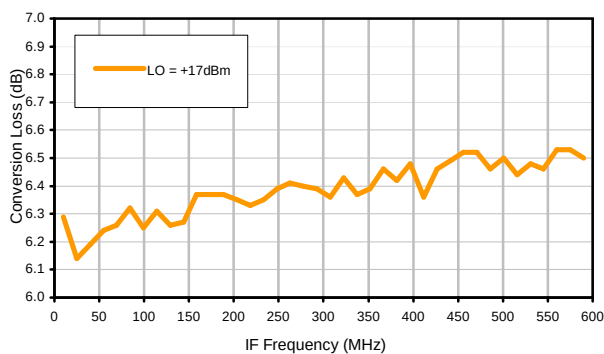
Conversion Loss @ IF=30MHz



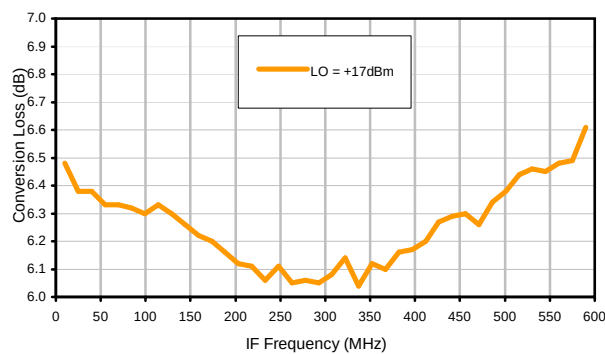
Conversion Loss vs. IF @ RF=300.1MHz



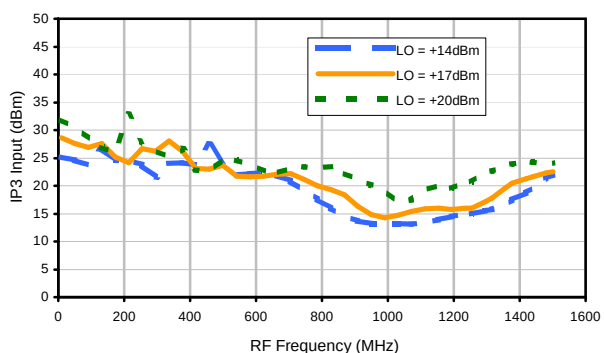
Conversion Loss vs. IF @ RF=10.1MHz



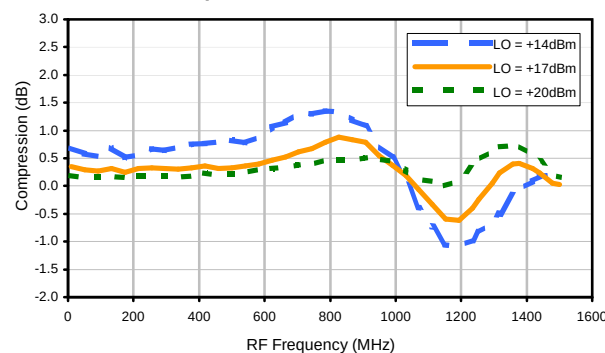
Conversion Loss vs. IF @ RF=600.1MHz



IP3 Input

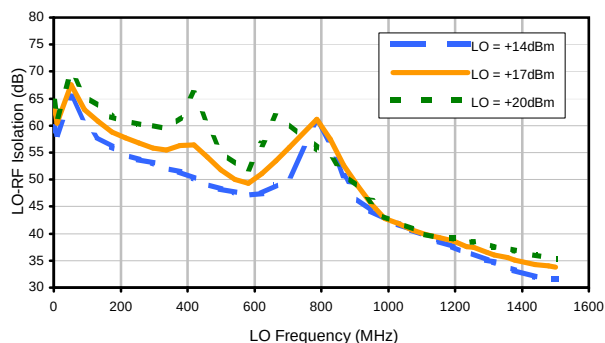


Compression @ RF IN=+14dBm

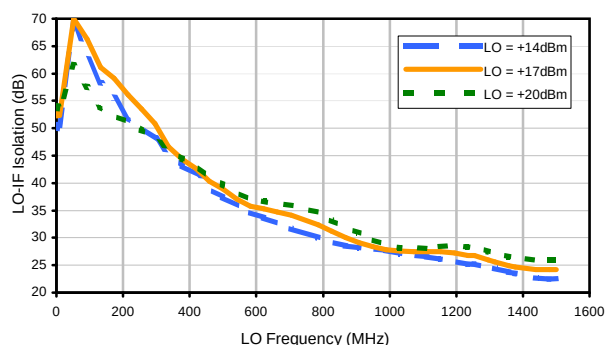


Typical Performance Curves

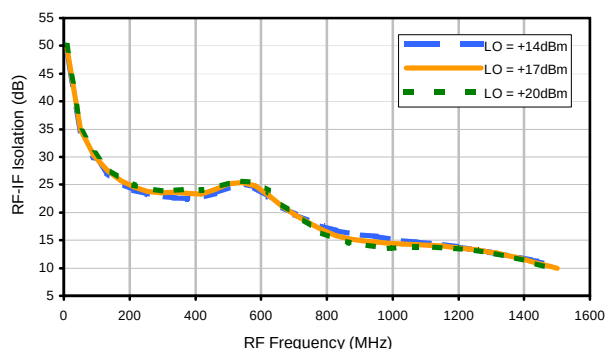
LO-RF Isolation



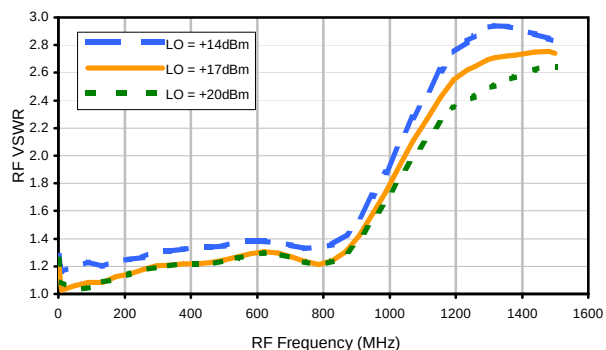
LO-IF Isolation



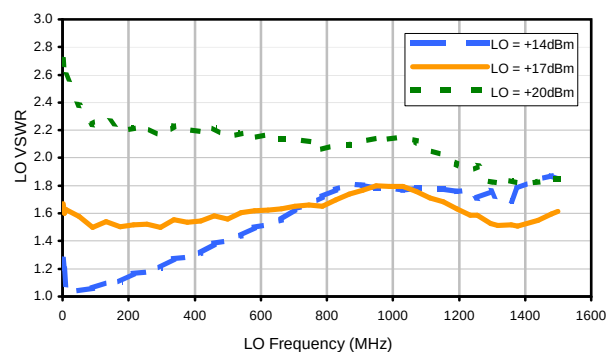
RF-IF Isolation



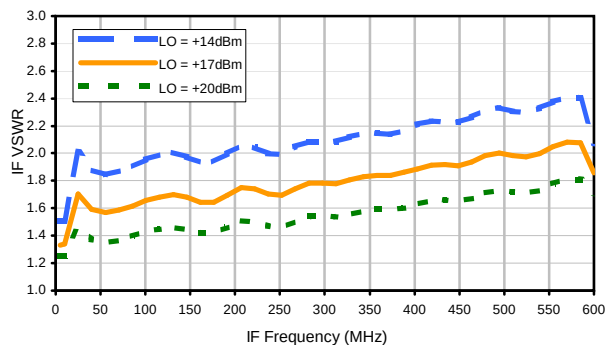
RF VSWR



LO VSWR



IF VSWR



REV. X2

TUF-1H+

100818

Page 2 of 3



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	24	37	18	40	27	48	36	61	39	49
1	-	17	+0	28	16	40	46	40	23	42	30	45
2	95	75	49	68	49	70	51	70	62	72	59	74
3	>100	59	54	63	48	59	44	62	43	56	44	63
4	>100	83	79	86	81	84	85	82	75	83	70	80
5	>100	72	70	76	68	75	65	75	67	82	67	83
6	>100	>93	92	>93	91	>93	90	89	90	>93	89	>93
7	>100	90	86	88	88	91	85	90	88	90	88	>93
8	>100	>93	>93	>93	>93	>93	>93	>93	90	>93	>93	>93
9	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
10	>100	>93	>93	>93	>93	>93	>93	>93	>93	>93	82	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -1.00 dBm.
LO IN: 330.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; -7.38 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	34	51	32	57	47	60	49	64	50	57
1	-	17	+0	29	15	40	28	41	35	49	43	54
2	80	69	47	60	46	59	45	69	49	64	63	79
3	>100	45	45	49	57	59	41	54	40	50	38	57
4	>100	68	60	73	60	73	61	71	62	75	68	77
5	>100	64	66	65	56	61	49	55	46	57	45	60
6	>100	72	70	75	69	80	72	81	76	77	70	90
7	>100	68	79	71	73	68	64	65	59	64	59	68
8	>100	100	81	81	78	88	79	100	81	84	80	80
9	>100	83	76	74	73	70	69	72	66	71	67	74
10	>100	101	>103	>103	95	99	97	101	93	90	88	84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; 9.00 dBm.
LO IN: 330.01 MHz; +17.00 dBm
IF OUT: 29.91 MHz; 2.68 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.

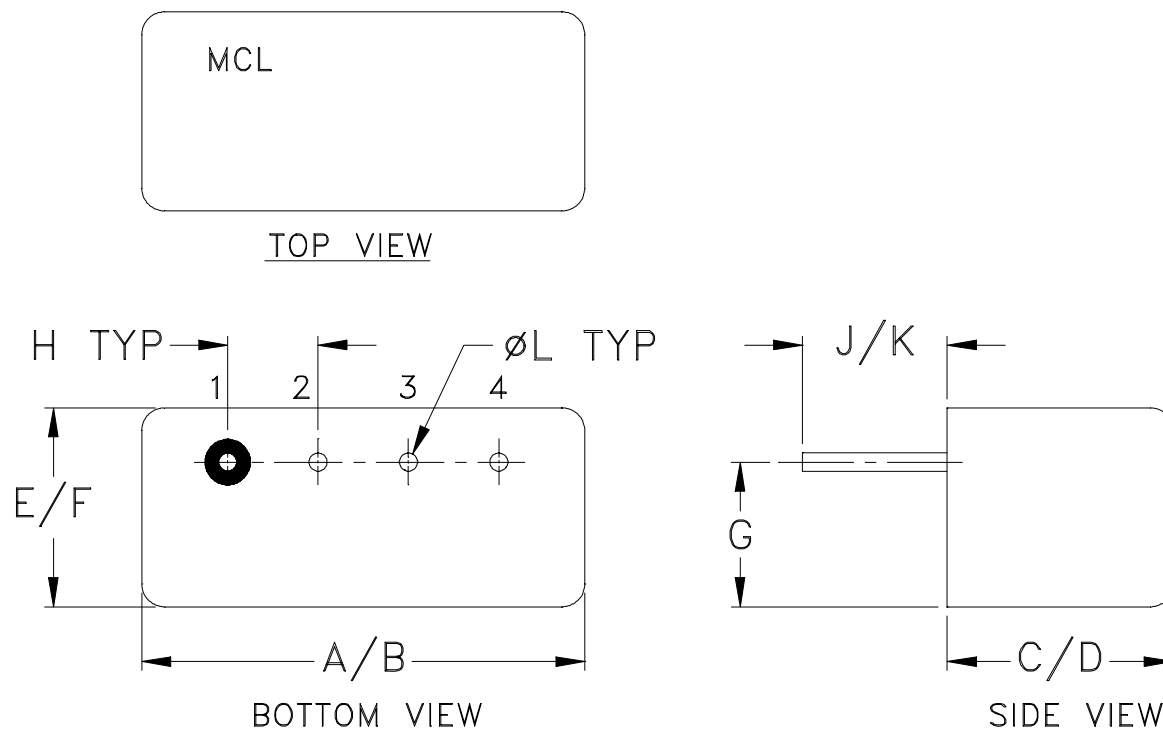
REV. X2
TUF-1H+
100818
Page 3 of 3



B02

B13

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
B02	.480 (12.19)	.500 (12.70)	.240 (6.10)	.255 (6.48)	.210 (5.33)	.230 (5.84)	.16 (4.06)	.100 (2.54)	.14 (3.56)	.20 (5.08)	.020 (.51)	1.9
B13			.390 (9.91)	.405 (10.29)								2.3

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.
- 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
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D