Plug-In

Frequency Mixer

SIMA-5H

Level 17 (LO Power +17 dBm) 2 to 1500 MHz

Generic photo used for illustration purposes only

CASE STYLE: A06

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	8
RF	1
IF	3
GROUND	2,5,6,7
CASE GROUND	2,5,6,7
DO NOT USE	4

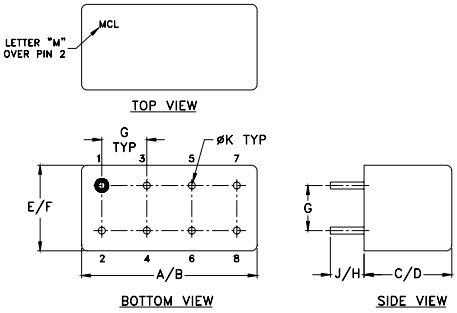
Features

- low conversion loss, 6.94 dB typ.
- wideband, 2 to 1500 MHz
- high L-R isolation, 44 dB typ., L-I isolation, 30 dB typ.
- hermetically metal case

Applications

- cellular/GPS
- satellite communications
- military, hi-rel applications

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

Electrical Specifications

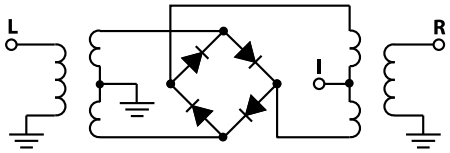
FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)					
LO/RF	IF	Mid-Band m			Total Range	L		M		U		L		M		U	
f_L-f_U		$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
2-1500	DC-1000	6.94	0.07	8.5	8.5	65	35	44	23	40	22	54	25	30	23	25	13

1 dB COMP.: +10 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 +17dBm	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm
2.00	32.00	7.20	78.18	71.38	1.30	2.25
4.00	34.00	6.92	76.93	70.73	1.22	2.21
5.00	35.00	6.86	75.95	70.75	1.19	2.27
10.00	40.00	6.73	72.17	69.37	1.18	2.21
20.00	50.00	6.72	67.37	67.87	1.17	2.22
50.00	80.00	6.71	59.93	62.42	1.15	2.18
100.00	70.00	6.75	54.27	56.40	1.13	2.17
162.50	132.50	6.81	50.46	52.07	1.08	2.12
200.00	170.00	6.94	48.77	50.41	1.10	2.03
376.50	346.50	7.07	43.97	43.09	1.17	2.09
500.00	470.00	7.32	42.46	39.34	1.28	1.92
590.50	560.50	7.84	41.96	38.16	1.46	1.97
750.00	720.00	7.10	38.19	34.48	1.47	2.05
804.50	774.50	6.83	37.85	33.39	1.59	2.01
1000.00	970.00	6.80	36.59	29.05	1.73	1.91
1018.50	988.50	6.78	36.20	28.58	1.75	1.91
1232.50	1202.50	6.95	33.05	26.99	1.95	1.80
1393.00	1363.00	7.26	31.84	27.40	2.05	1.70
1446.50	1416.50	7.26	31.02	27.35	2.09	1.58
1500.00	1470.00	7.31	30.42	27.05	2.12	1.52

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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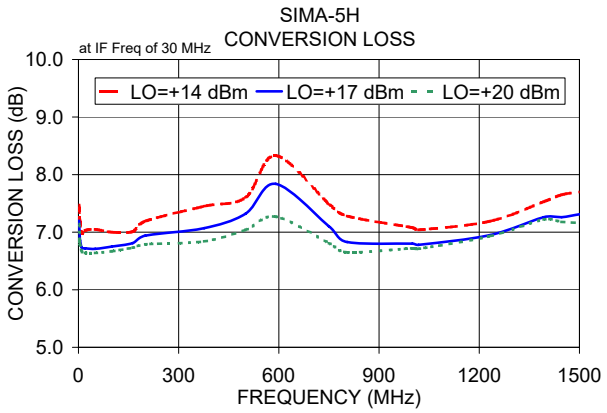

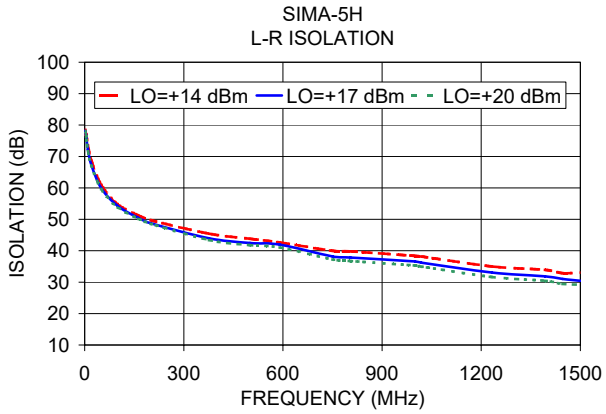

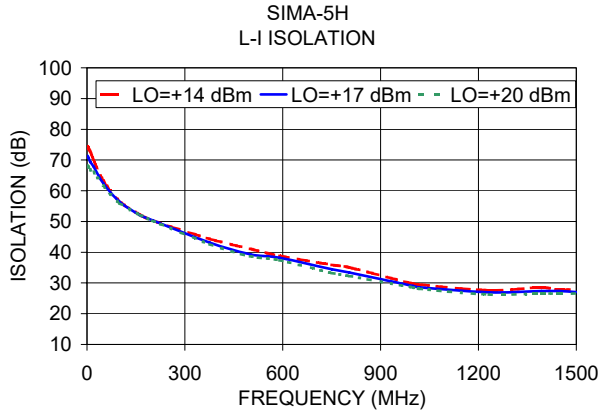

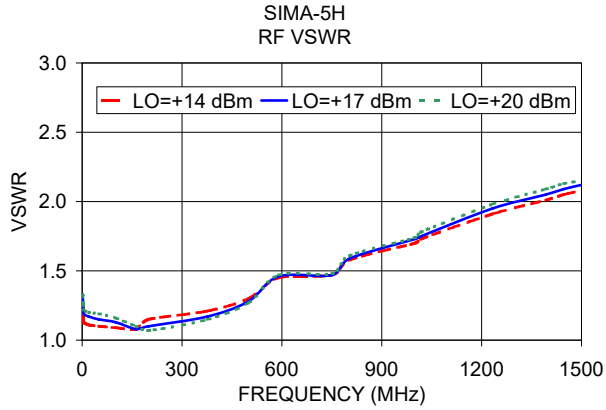

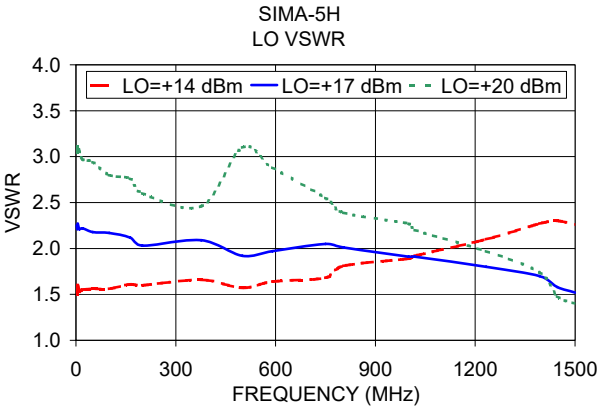

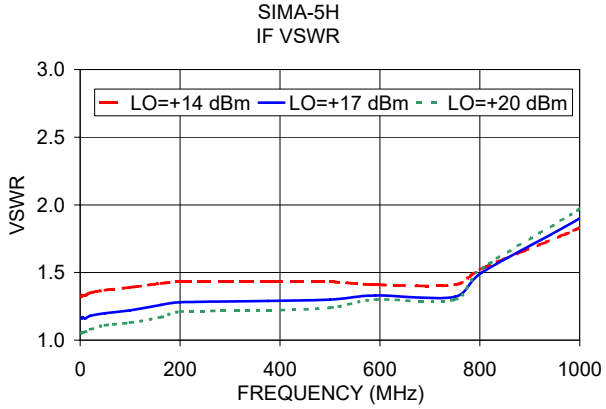

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Frequency Mixer SIMA-5H

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB) @LO (dBm)		
		+14	+17	+20
2.0	32.0	7.47	7.20	7.14
4.0	34.0	7.23	6.92	6.86
5.0	35.0	7.18	6.86	6.78
10.0	40.0	6.98	6.73	6.66
20.0	50.0	7.03	6.72	6.64
50.0	80.0	7.05	6.71	6.64
100.0	70.0	7.00	6.75	6.67
162.0	132.5	7.01	6.81	6.73
200.0	170.0	7.19	6.94	6.79
376.5	346.5	7.45	7.07	6.84
500.0	470.0	7.60	7.32	7.04
590.0	560.5	8.33	7.84	7.27
750.0	720.0	7.49	7.10	6.81
804.5	774.5	7.28	6.83	6.65
1000.0	970.0	7.08	6.80	6.72
1018.5	988.5	7.04	6.78	6.71
1232.5	1202.5	7.19	6.95	6.93
1393.0	1363.0	7.53	7.26	7.22
1446.5	1416.5	7.65	7.26	7.18
1500.0	1470.0	7.70	7.31	7.16

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+14	+17	+20	+14	+17	+20
2.0	78.50	78.20	78.10	74.50	71.40	68.10
4.0	77.10	76.90	76.50	73.80	70.70	67.80
5.0	76.90	76.00	75.40	73.70	70.80	67.70
10.0	73.50	72.20	71.60	72.70	69.40	66.90
20.0	68.80	67.40	67.10	70.00	67.90	66.10
50.0	61.00	59.90	59.60	63.30	62.40	61.70
100.0	54.80	54.30	53.80	56.60	56.40	55.90
162.0	51.20	50.50	50.20	52.20	52.10	52.20
200.0	49.70	48.80	48.60	50.30	50.40	50.30
376.5	45.40	44.00	43.40	44.40	43.10	42.60
500.0	43.80	42.50	41.80	41.10	39.30	38.70
590.0	42.60	42.00	41.10	38.90	38.20	37.40
750.0	40.00	38.20	37.20	35.90	34.50	33.30
804.5	39.80	37.90	36.70	35.00	33.40	32.30
1000.0	38.40	36.60	35.30	29.80	29.10	28.50
1018.5	38.20	36.20	35.00	29.40	28.60	28.10
1232.5	35.00	33.10	31.70	27.60	27.00	26.20
1393.0	33.90	31.80	30.40	28.50	27.40	26.60
1446.5	32.90	31.80	29.40	27.80	27.40	26.50
1500.0	33.10	30.40	29.10	28.10	27.10	26.60

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Typical Performance Data

RF/LO (MHz)	RF VSWR (:1) @LO (dBm)			LO VSWR (:1) @LO (dBm)		
	+14	+17	+20	+14	+17	+20
5.0	1.26	1.30	1.33	1.54	2.25	3.07
10.0	1.18	1.22	1.26	1.50	2.21	3.05
20.0	1.13	1.19	1.22	1.60	2.27	3.11
50.0	1.12	1.18	1.21	1.53	2.21	3.06
100.0	1.11	1.17	1.20	1.55	2.22	2.97
149.7	1.10	1.15	1.19	1.56	2.18	2.94
200.0	1.09	1.13	1.16	1.56	2.17	2.80
294.4	1.08	1.08	1.10	1.61	2.12	2.76
439.0	1.15	1.10	1.07	1.60	2.03	2.60
500.0	1.21	1.17	1.15	1.66	2.09	2.46
583.7	1.30	1.28	1.27	1.57	1.92	3.10
728.4	1.45	1.46	1.47	1.64	1.97	2.88
750.0	1.47	1.47	1.48	1.68	2.05	2.55
873.1	1.58	1.59	1.61	1.81	2.01	2.39
1000.0	1.70	1.73	1.74	1.89	1.91	2.27
1017.7	1.73	1.75	1.78	1.92	1.91	2.20
1162.4	1.91	1.95	1.98	2.10	1.80	1.97
1307.1	2.01	2.05	2.09	2.27	1.70	1.74
1451.8	2.05	2.09	2.13	2.30	1.58	1.48
1500.0	2.08	2.12	2.15	2.26	1.52	1.40

IF (MHz)	IF VSWR (:1) @LO (dBm)		
	+14	+17	+20
5.0	1.32	1.16	1.05
10.0	1.33	1.16	1.06
20.0	1.33	1.17	1.06
50.0	1.33	1.16	1.06
100.0	1.35	1.18	1.08
149.7	1.37	1.20	1.11
200.0	1.39	1.22	1.13
294.4	1.42	1.26	1.17
439.0	1.43	1.28	1.21
500.0	1.43	1.29	1.22
583.7	1.43	1.30	1.24
728.4	1.41	1.33	1.30
750.0	1.41	1.32	1.30
873.1	1.53	1.50	1.53
1000.0	1.83	1.90	1.97
1017.7	1.91	1.99	2.07
1162.4	3.06	3.26	3.34
1307.1	5.38	5.52	5.59
1451.8	7.17	7.08	7.00
1500.0	7.25	7.14	7.05

LO/RF (MHz) @LO (dBm) +17	max. DC output (mV)	DC Offset (mV)
2.00	-722.9	-0.43
4.00	-729.1	-0.42
5.00	-728.2	-0.42
10.00	-724.0	-0.41
20.00	-721.1	-0.39
50.00	-774.3	-0.34
100.00	-735.7	-0.27
200.00	-769.0	-0.11
208.62	-760.2	-0.09
415.24	-676.7	0.82
500.00	-629.2	1.04
621.86	-623.4	1.44
750.00	-636.1	4.36
828.48	-632.5	7.03
1000.00	-701.8	10.15
1035.10	-698.3	11.15
1241.72	-690.3	12.70
1396.69	-624.3	8.79
1448.35	-611.0	7.87
1500.00	-603.7	7.02

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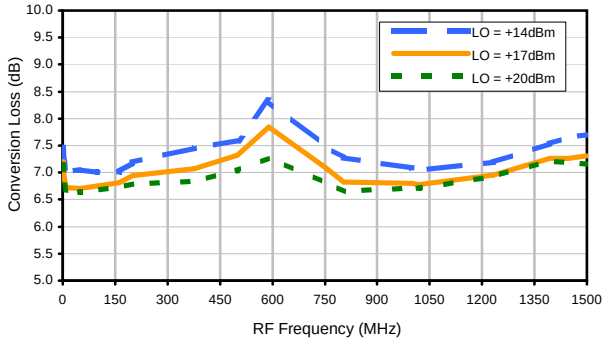
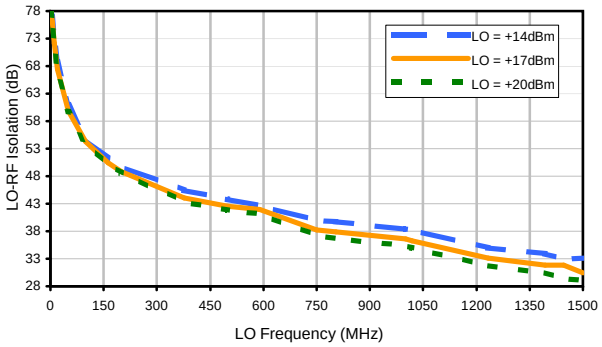
Frequency Mixer SIMA-5H

Typical Performance Curves

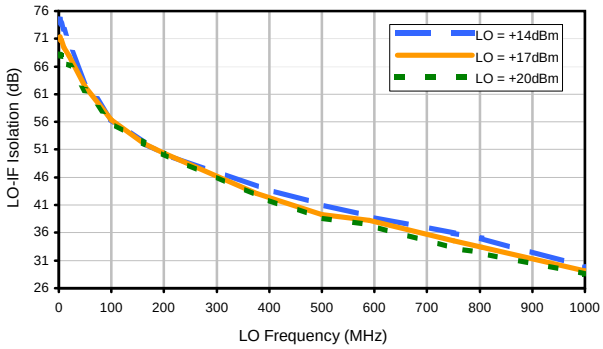
Conversion Loss



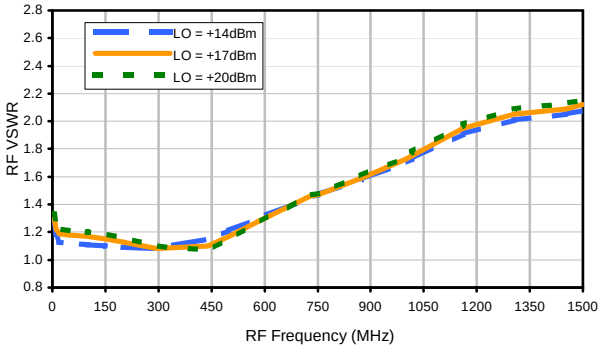
LO-RF Isolation



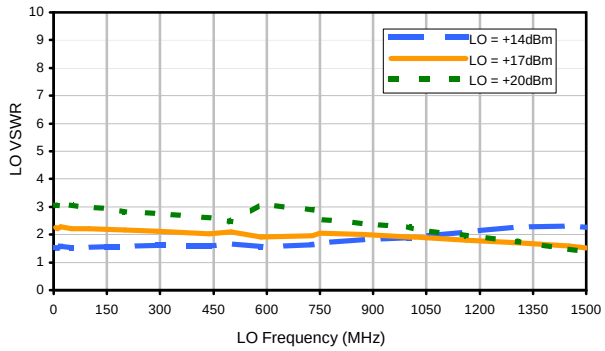
LO-IF Isolation



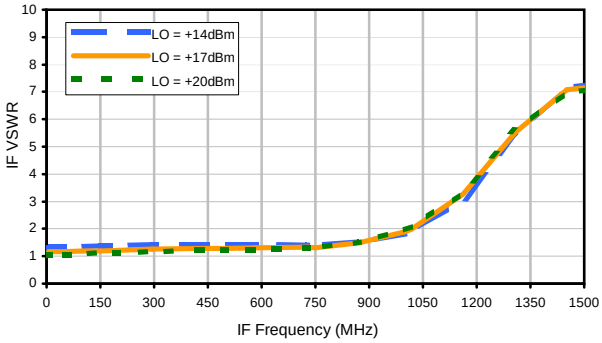
RF VSWR



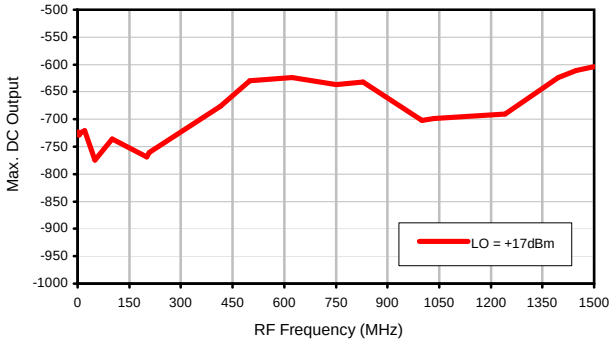
LO VSWR



IF VSWR



Max. DC Output



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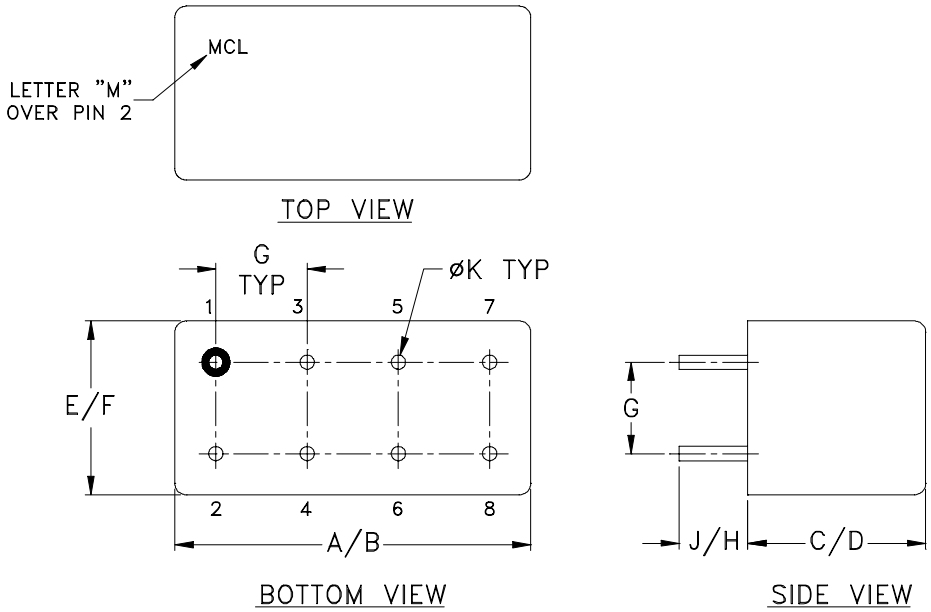
Case Style A

A01
A04
A05
A06

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A01	.770 (19.56)	.800 (20.32)	.385 (9.78)	.400 (10.16)	.370 (9.40)	.400 (10.16)	.200 (5.08)	.20 (5.08)	.14 (3.56)	.031 (.79)	5.2
A04			.200 (5.08)	.210 (5.33)							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. ± .03; 3 Pl. ± .015

Notes:

1. Header material: C.R.S.
   Pin material: #52 alloy.
   Cover material: Cupro-Nickel.
2. Pin finish: Electro Tin-Silver.
3. Insulated spacer available. Request P/N B14-045-01.
4. Tolerance on pin diameter +/-.005 inch.
5. Glass meniscus 0.015 inch max.
6. 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
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

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