

Voltage Controlled Oscillator

ROS-355-219+

5V Tuning for PLL IC's 318 to 355 MHz

Features

- linear tuning characteristics
- low phase noise
- low pushing
- low pulling
- aqueous washable

Applications

- wireless communications
- PLL circuitry
- radio link



CASE STYLE: CK605

+RoHS Compliant

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

Electrical Specifications

MODEL NO.	FREQ. (MHz)		POWER OUTPUT (dBm)	PHASE NOISE dBc/Hz SSB at offset frequencies,kHz				TUNING					NON HARMONIC SPURIOUS (dBc)	HARMONICS (dBc)		PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	DC OPERATING POWER				
	Min.	Max.		Typ.	1	10	100	1000	VOLTAGE RANGE (V)	SENSI- TIVITY (MHz/V)	PORT CAP (pF)	3 dB MODULATION BANDWIDTH (MHz)		Typ.	Typ.			Max.	Typ.	Typ.	Vcc (volts)	Current (mA)
ROS-355-219+	318	355	+5	-87	-113	-133	-153	0.5	5	20	330	3	-90	-23	-12	0.2	0.5	5	22			

Pin Connections

RF OUT	10
VCC	14
V-TUNE	2
GROUND	1,3,4,5,6,7,8,9,11,12,13,15,16

Maximum Ratings

Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
Absolute Max. Supply Voltage (Vcc)	7V
Absolute Max. Tuning Voltage (Vtune)	7V
All specifications	50 ohm system

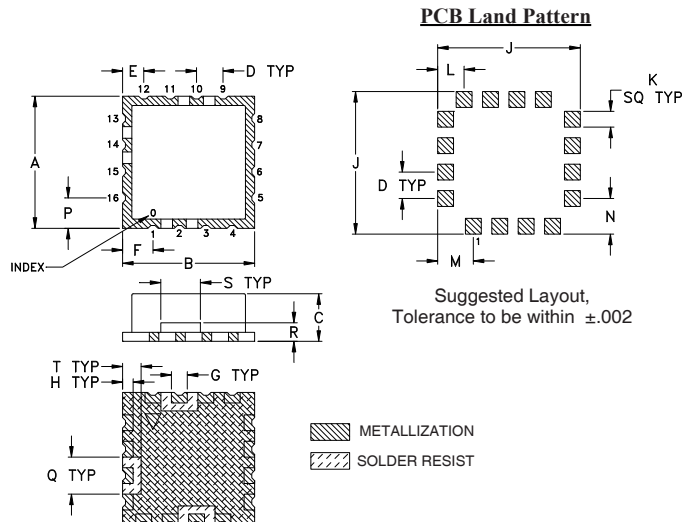
Permanent damage may occur if any of these limits are exceeded.

Tape & Reel: F37

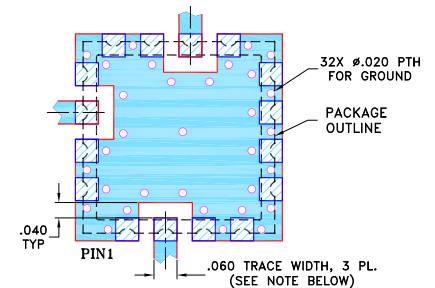
7" Reels with 10, 20, 50, 100 devices
13" Reels with 200, 500 devices

Environmental Ratings: ENV65

Outline Drawing



Demo Board MCL P/N: TB-10
Suggested PCB Layout (PL-012)



NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - BOTTOM SIDE OF THE BOTTOM IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt.
.500	.500	.180	.100	.080	.115	.060	.040	.540	.060	.100	.135	.135	.115	.140	.070	.150	.070	grams
12.70	12.70	4.57	2.54	2.03	2.92	1.52	1.02	13.72	1.52	2.54	3.43	3.43	2.92	3.56	1.78	3.81	1.78	1.0

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-Circuits' applicable established test performance criteria and measurement instructions.
- C. 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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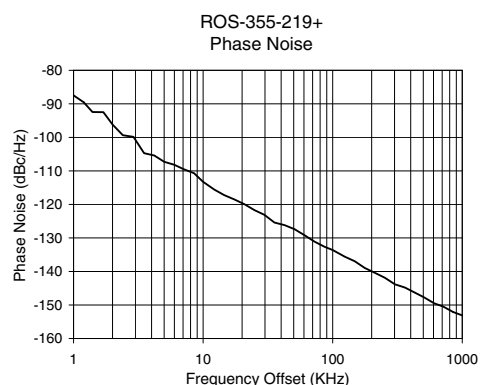
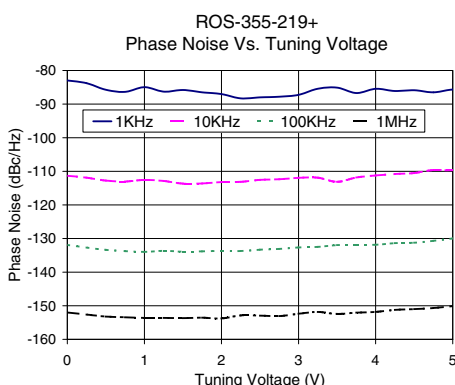
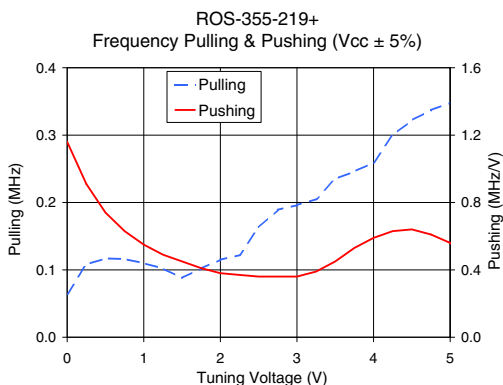
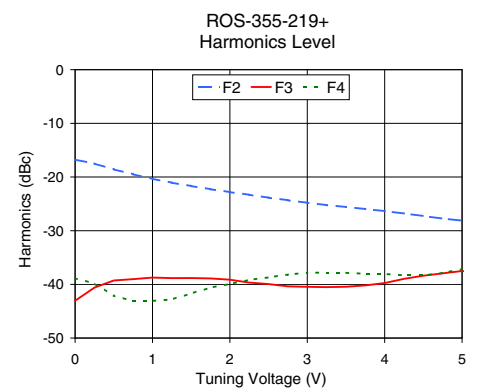
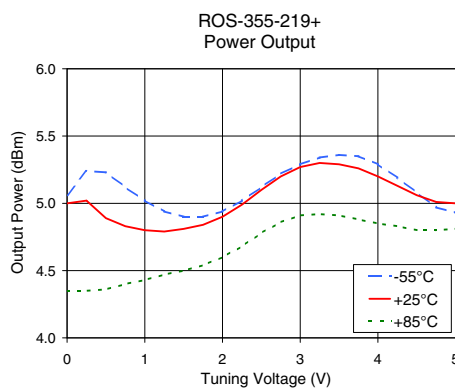
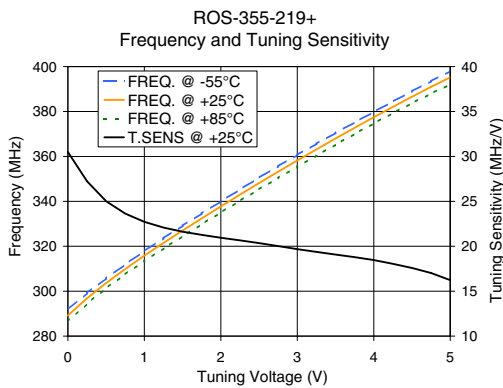
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Performance Data & Curves*

ROS-355-219+

V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			Icc (mA)	HARMONICS (dBc)			FREQ. PUSH (MHz/V)	FREQ. PULL (MHz)	PHASE NOISE (dBc/Hz) at offsets				FREQ OFFSET (KHz)	PHASE NOISE at 337 MHz (dBc/Hz)
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C		F2	F3	F4			1kHz	10kHz	100kHz	1MHz		
0.00	30.50	291.8	289.2	286.5	5.06	5.00	4.35	17.14	-16.8	-43.1	-38.9	1.16	0.06	-83.0	-111.3	-131.9	-152.0	1.0	-87.48
0.50	25.02	305.7	303.6	301.3	5.23	4.89	4.36	17.18	-18.6	-39.3	-42.1	0.74	0.12	-85.7	-112.8	-133.4	-153.2	2.0	-96.17
0.75	23.64	311.9	309.9	307.5	5.12	4.83	4.40	17.19	-19.5	-39.0	-43.1	0.63	0.12	-86.4	-113.0	-133.8	-153.4	3.5	-104.72
1.00	22.72	317.9	315.8	313.4	5.02	4.80	4.43	17.20	-20.3	-38.7	-43.1	0.55	0.11	-85.0	-112.6	-134.0	-153.6	6.0	-108.18
1.25	22.08	323.6	321.5	319.0	4.94	4.79	4.47	17.22	-21.1	-38.8	-42.8	0.49	0.10	-86.3	-112.9	-133.7	-153.6	8.5	-110.67
1.50	21.62	329.1	327.0	324.5	4.90	4.81	4.50	17.23	-21.7	-38.8	-41.7	0.45	0.09	-85.8	-113.7	-133.9	-153.7	10.0	-113.27
1.75	21.27	334.6	332.4	329.8	4.90	4.84	4.54	17.23	-22.3	-38.9	-40.6	0.41	0.10	-86.5	-113.6	-133.8	-153.5	20.8	-119.94
2.00	20.94	340.0	337.7	335.1	4.94	4.90	4.60	17.24	-22.8	-39.1	-39.9	0.38	0.12	-87.0	-113.2	-133.7	-153.8	35.5	-125.40
2.25	20.66	345.3	343.0	340.2	5.02	4.99	4.68	17.24	-23.3	-39.7	-39.2	0.37	0.12	-88.3	-113.1	-133.7	-152.9	60.7	-129.21
2.50	20.36	350.5	348.1	345.4	5.12	5.10	4.78	17.24	-23.9	-39.9	-38.7	0.36	0.16	-88.0	-112.6	-133.3	-153.0	86.7	-132.65
2.75	20.02	355.7	353.2	350.4	5.22	5.20	4.86	17.23	-24.3	-40.4	-38.2	0.36	0.19	-87.8	-112.4	-133.1	-153.1	100.0	-133.61
3.00	19.68	360.7	358.2	355.4	5.29	5.27	4.91	17.22	-24.8	-40.5	-37.8	0.36	0.20	-87.3	-112.0	-132.7	-152.4	148.1	-136.96
3.25	19.37	365.6	363.1	360.4	5.34	5.30	4.92	17.21	-25.2	-40.5	-37.8	0.39	0.21	-85.4	-111.9	-132.5	-151.8	177.0	-138.96
3.50	19.08	370.5	368.0	365.3	5.36	5.29	4.91	17.20	-25.6	-40.4	-37.8	0.45	0.24	-85.1	-113.1	-132.0	-152.4	211.6	-140.41
3.75	18.79	375.2	372.8	370.0	5.35	5.26	4.88	17.18	-26.0	-40.2	-38.0	0.53	0.25	-86.7	-111.8	-131.9	-152.1	302.4	-143.84
4.00	18.47	379.8	377.4	374.7	5.29	5.20	4.85	17.17	-26.3	-39.8	-38.0	0.59	0.26	-85.4	-111.2	-131.9	-151.8	361.5	-144.81
4.25	18.04	384.4	382.1	379.3	5.19	5.13	4.83	17.17	-26.8	-39.0	-38.3	0.63	0.30	-86.1	-110.8	-131.4	-151.2	507.5	-147.73
4.50	17.58	389.0	386.6	383.7	5.08	5.06	4.80	17.17	-27.3	-38.4	-38.3	0.64	0.32	-85.9	-110.5	-131.3	-151.0	606.7	-149.50
4.75	17.02	393.5	391.0	388.0	4.97	5.01	4.80	17.18	-27.8	-38.0	-37.9	0.61	0.34	-86.5	-109.6	-130.7	-150.7	851.6	-152.11
5.00	16.23	398.0	395.2	392.1	4.93	5.00	4.81	17.21	-28.1	-37.5	-37.2	0.56	0.35	-85.7	-109.7	-130.0	-150.1	1000.0	-153.10

*at 25°C unless mentioned otherwise



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Voltage Controlled Oscillator

ROS-355-219+

Typical Performance Data

V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			HARMONICS (dBc)			FREQ. PUSH (MHz/V)	FREQ OFFSET (KHz)	PHASE NOISE (dBc/Hz)
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C	F2	F3	F4			
0.0	30.50	291.8	289.2	286.5	5.06	5.00	4.35	-16.8	-43.1	-38.9	1.16	1	-87
0.3	27.24	299.1	296.8	294.4	5.24	5.02	4.35	-17.5	-40.6	-39.8	0.91	10	-113
0.5	25.02	305.7	303.6	301.3	5.23	4.89	4.36	-18.6	-39.3	-42.1	0.74	100	-134
0.8	23.64	311.9	309.9	307.5	5.12	4.83	4.40	-19.5	-39.0	-43.1	0.63	1000	-153
1.0	22.72	317.9	315.8	313.4	5.02	4.80	4.43	-20.3	-38.7	-43.1	0.55		
1.3	22.08	323.6	321.5	319.0	4.94	4.79	4.47	-21.1	-38.8	-42.8	0.49		
1.5	21.62	329.1	327.0	324.5	4.90	4.81	4.50	-21.7	-38.8	-41.7	0.45		
1.8	21.27	334.6	332.4	329.8	4.90	4.84	4.54	-22.3	-38.9	-40.6	0.41		
2.0	20.94	340.0	337.7	335.1	4.94	4.90	4.60	-22.8	-39.1	-39.9	0.38		
2.3	20.66	345.3	343.0	340.2	5.02	4.99	4.68	-23.3	-39.7	-39.2	0.37		
2.5	20.36	350.5	348.1	345.4	5.12	5.10	4.78	-23.9	-39.9	-38.7	0.36		
2.8	20.02	355.7	353.2	350.4	5.22	5.20	4.86	-24.3	-40.4	-38.2	0.36		
3.0	19.68	360.7	358.2	355.4	5.29	5.27	4.91	-24.8	-40.5	-37.8	0.36		
3.3	19.37	365.6	363.1	360.4	5.34	5.30	4.92	-25.2	-40.5	-37.8	0.39		
3.5	19.08	370.5	368.0	365.3	5.36	5.29	4.91	-25.6	-40.4	-37.8	0.45		
3.8	18.79	375.2	372.8	370.0	5.35	5.26	4.88	-26.0	-40.2	-38.0	0.53		
4.0	18.47	379.8	377.4	374.7	5.29	5.20	4.85	-26.3	-39.8	-38.0	0.59		
4.3	18.04	384.4	382.1	379.3	5.19	5.13	4.83	-26.8	-39.0	-38.3	0.63		
4.5	17.58	389.0	386.6	383.7	5.08	5.06	4.80	-27.3	-38.4	-38.3	0.64		
4.8	17.02	393.5	391.0	388.0	4.97	5.01	4.80	-27.8	-38.0	-37.9	0.61		
5.0	16.23	398.0	395.2	392.1	4.93	5.00	4.81	-28.1	-37.5	-37.2	0.56		
5.3	14.89	402.1	399.3	395.9	4.98	5.03	4.84	-28.4	-37.9	-36.3	0.47		
5.5	13.36	405.9	403.0	399.6	5.03	5.07	4.82	-28.2	-39.3	-36.1	0.36		
5.8	12.27	409.2	406.3	403.0	5.06	5.07	4.77	-28.0	-41.1	-36.3	0.28		
6.0	12.56	412.1	409.4	406.4	5.01	4.98	4.66	-27.8	-42.8	-36.8	0.38		

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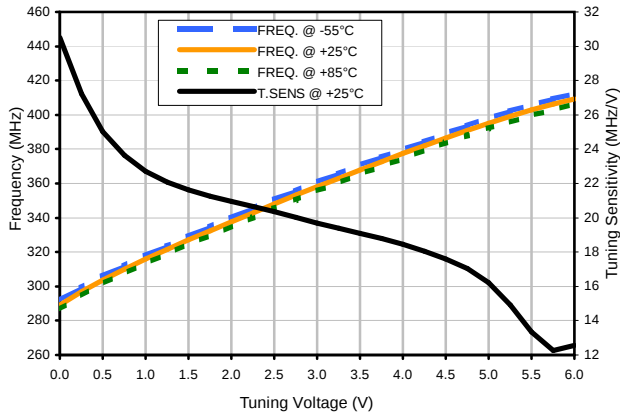


Voltage Controlled Oscillator

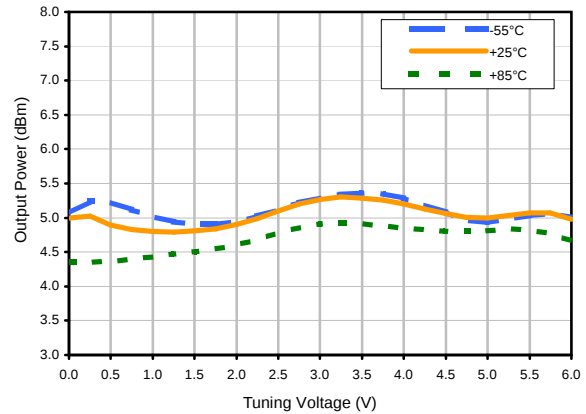
ROS-355-219+

Typical Performance Data

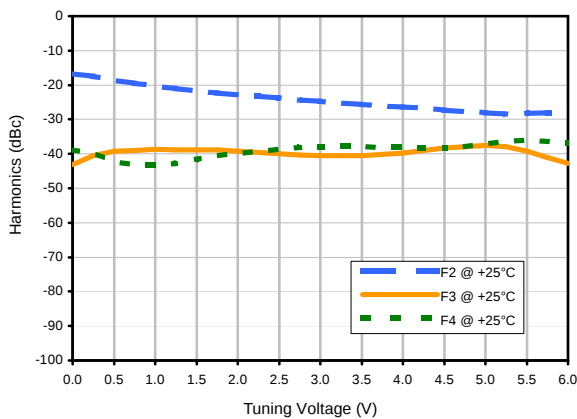
Frequency and Tuning Sensitivity



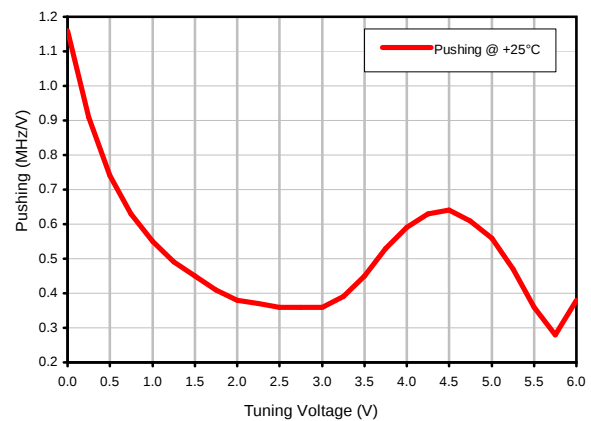
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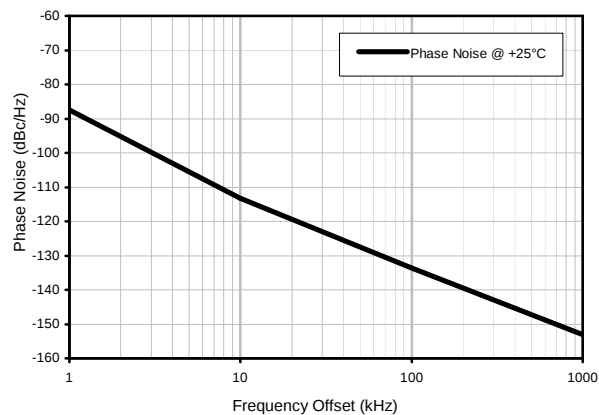
Harmonics Level



Frequency Pushing



Phase Noise



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Outline Dimensions

CK605

PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K
CK605	.500 (12.70)	.500 (12.70)	.180 (4.57)	.100 (2.54)	.080 (2.03)	.115 (2.92)	.060 (1.52)	.040 (1.02)	.540 (13.72)	.060 (1.52)

CASE #	L	M	N	P	Q	R	S	T	WT. GRAM
CK605	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	.070 (1.78)	.150 (3.81)	.070 (1.78)	1.2 +0.5 -0.0

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

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
For RoHS Case Styles: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
				500

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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Evaluation Board and Circuit



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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