REGULATORY COMPLIANCE

Lead Free COMPLIANT | EU RoHS 2011/65 + 2015/863 COMPLIANT | China RoHS COMPLIANT | REACH SVHC COMPLIANT | DRC CONFLICT FREE

ITEM DESCRIPTION

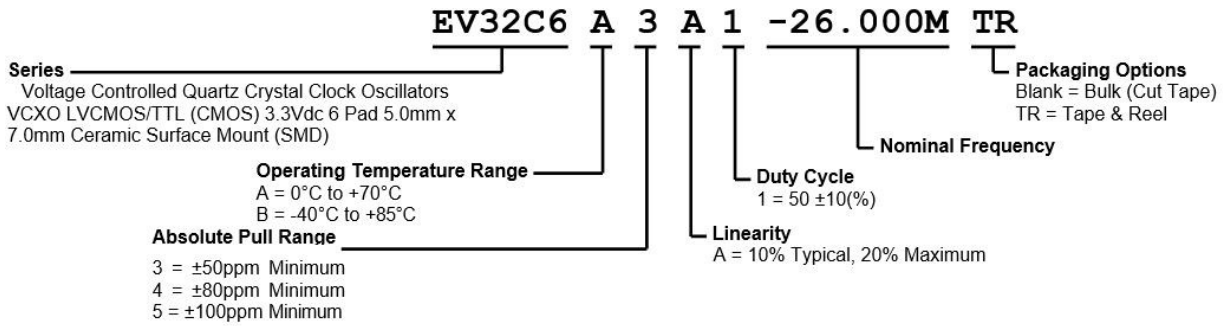
Voltage Controlled Quartz Crystal Clock Oscillators VCXO LVCMOS/TTL (CMOS) 3.3Vdc 6 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

ELECTRICAL SPECIFICATIONS

Nominal Frequency	1.544MHz to 77.76MHz
Frequency Tolerance/Stability	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, and Vibration. ±50ppm Maximum
Aging at 25°C	±2ppm/First Year Typical, ±10ppm/10 Years Maximum
Operating Temperature Range	0°C to +70°C -40°C to +85°C
Supply Voltage	3.3Vdc ±10%
Input Current	15mA Maximum
Output Voltage Logic High (V_{OH})	IOH = -4mA 90% of Vdd Minimum
Output Voltage Logic Low (V_{OL})	IOL = +4mA 10% of Vdd Maximum
Rise/Fall Time	Measured at 20% to 80% of Waveform 5nSec Maximum
Duty Cycle	Measured at 50% of Waveform 50 ±10(%)
Load Drive Capability	10TTL Load or 30pF LVCMOS Load Maximum over Nominal Frequency of 1.544MHz to 12.288MHz 15pF LVCMOS Load Maximum over Nominal Frequency of 12.288001MHz to 77.76MHz
Output Logic Type	CMOS
Absolute Pull Range	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, Vibration, and Aging over the Control Voltage (Vc). ±50ppm Minimum ±80ppm Minimum (Only available over Nominal Frequency range of 1.544MHz to 51.84MHz) ±100ppm Minimum (Only available over Nominal Frequency range of 1.544MHz to 36MHz)
Control Voltage	Test Condition for APR 0.3Vdc to 3.0Vdc
Control Voltage Range	0.0Vdc to Vdd
Linearity	10% Typical, 20% Maximum
Transfer Function	Positive Transfer Characteristic
Modulation Bandwidth	Measured at -3dB, Vc = 1.65Vdc 10kHz Minimum
Input Impedance	50kOhms Minimum
Input Leakage Current	10µA Maximum
Phase Noise	All Values are Typical -70dBc/Hz at offset of 10Hz -100dBc/Hz at offset of 100Hz -130dBc/Hz at offset of 1kHz -147dBc/Hz at offset of 10kHz -152dBc/Hz at offset of 100kHz -155dBc/Hz at offset of 1MHz
Tri-State Input Voltage (Vih and Vil)	90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance)
RMS Phase Jitter	Fj = 12kHz to 20MHz; Random 1pSec Maximum

Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

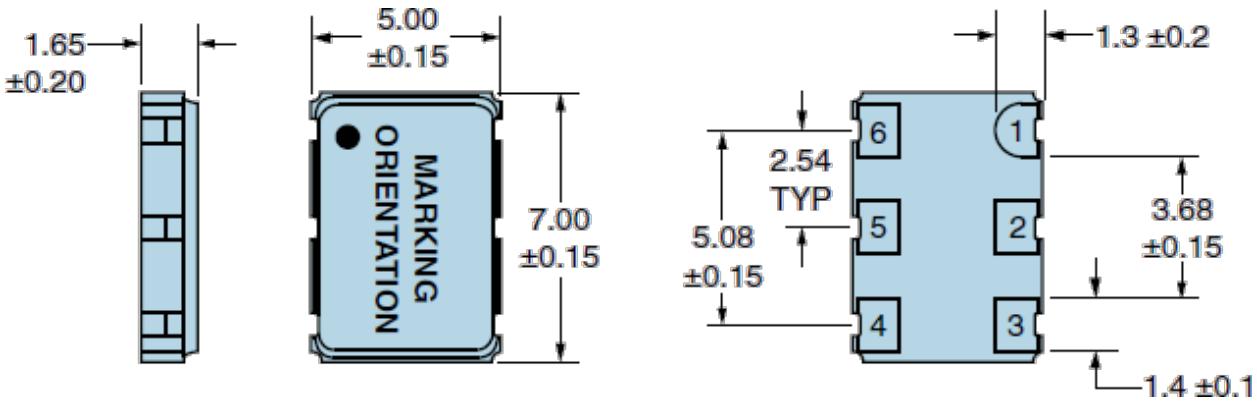
PART NUMBERING GUIDE



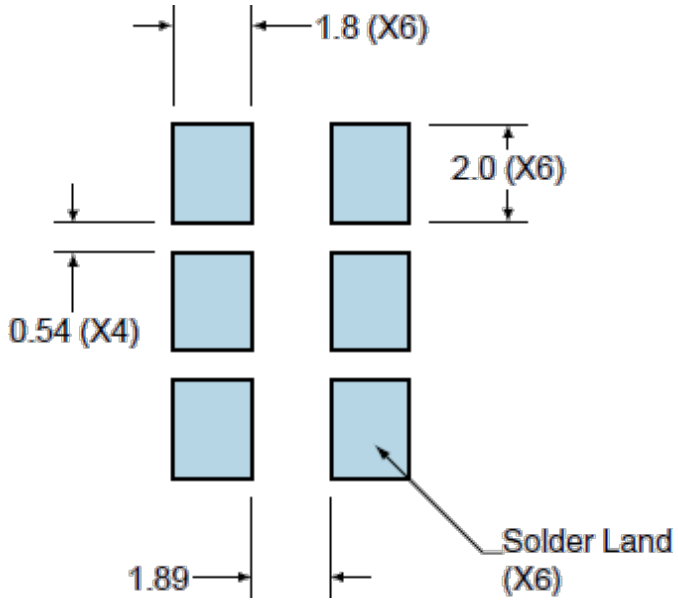
ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity	J-STD-020, MSL 1
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A

MECHANICAL DIMENSIONS



SUGGESTED SOLDER PAD LAYOUT

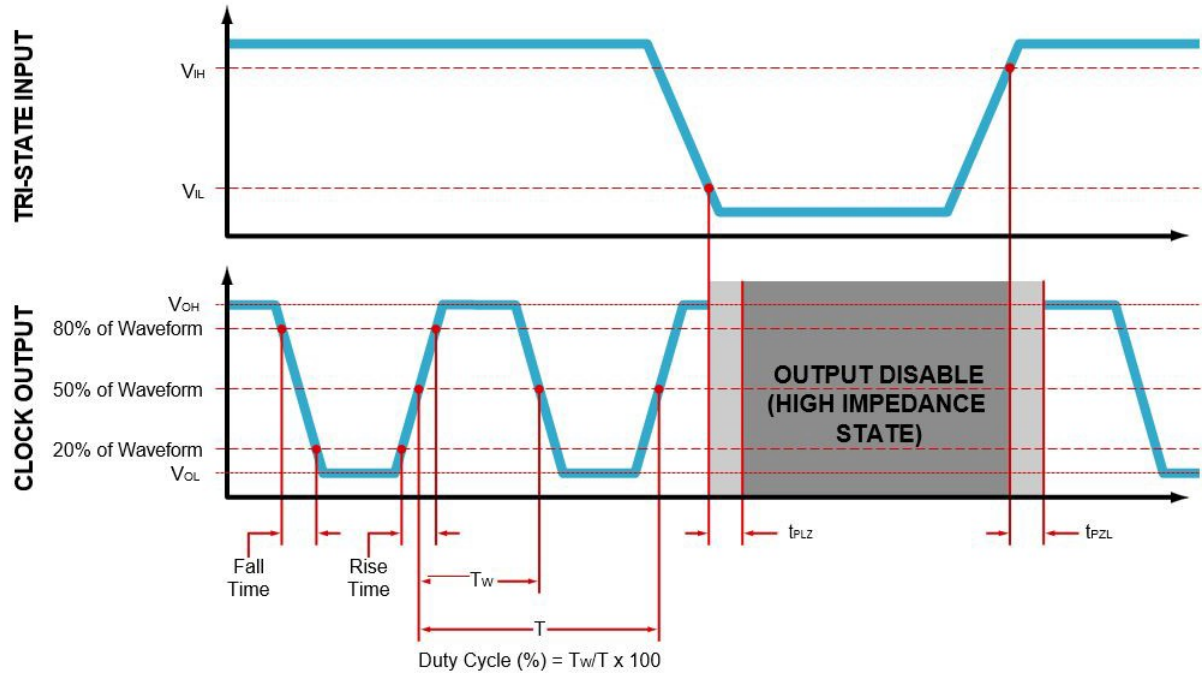


PIN	CONNECTION
1	Control Voltage
2	Tri-State
3	Case Ground
4	Output
5	No Connect
6	Supply Voltage

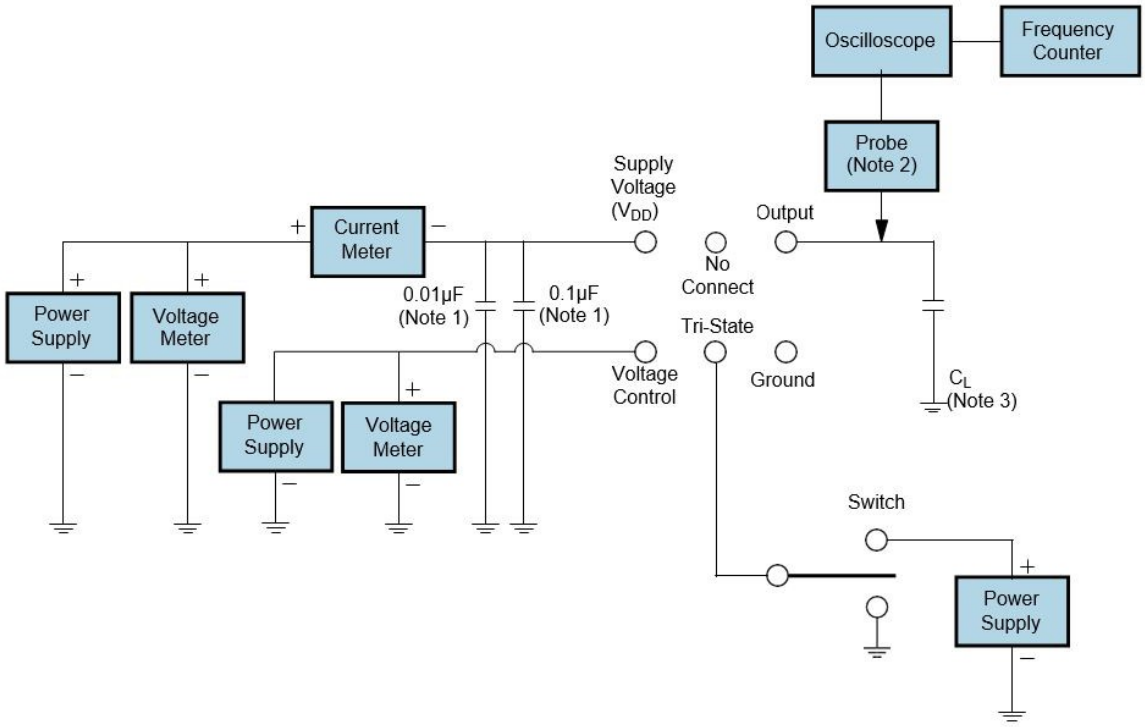
All Tolerances are ±0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT

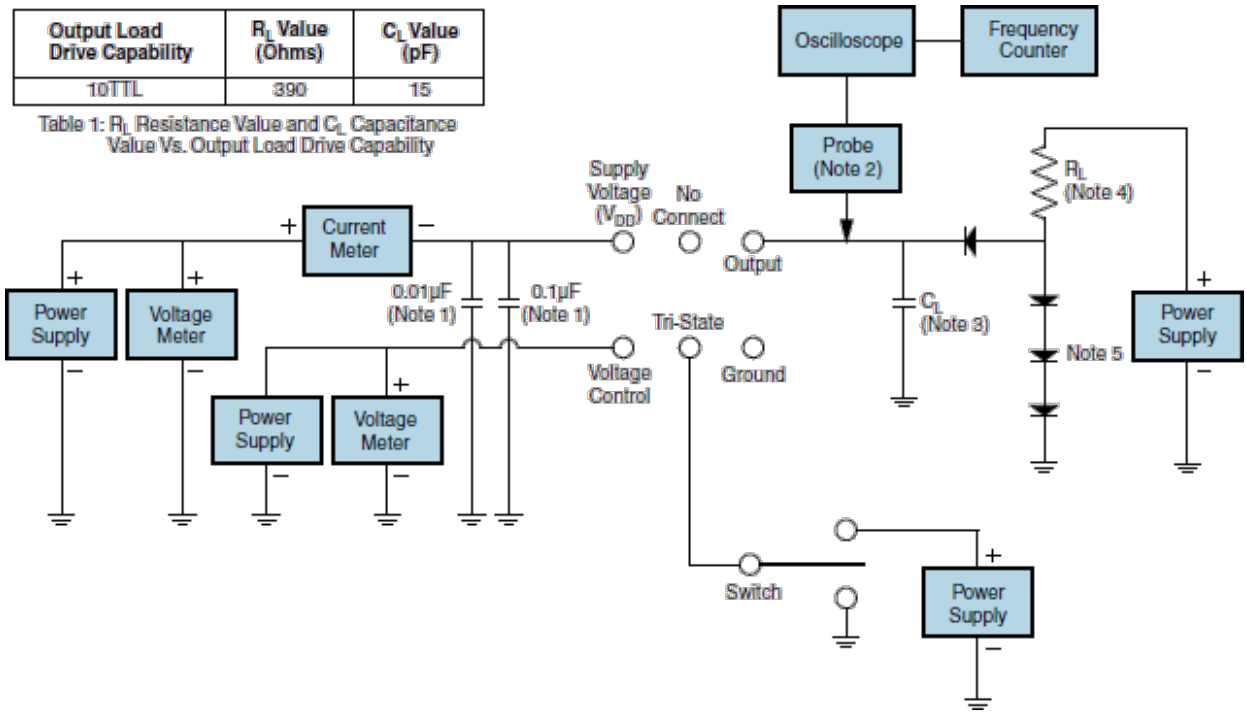


Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less Than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive Probe is recommended.
Note 3: Capacitance value CL includes sum of all probe and fixture capacitance.

TEST CIRCUIT FOR TTL OUTPUT

Output Load Drive Capability	R_L Value (Ohms)	C_L Value (pF)
10TTL	390	15

Table 1: R_L Resistance Value and C_L Capacitance Value Vs. Output Load Drive Capability



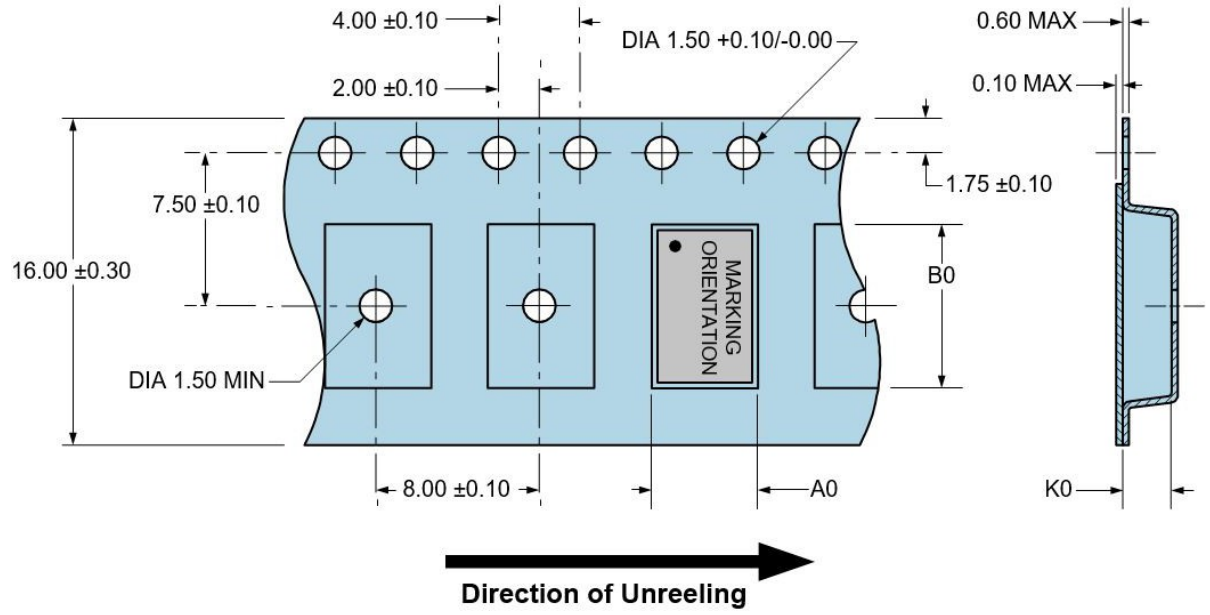
Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less Than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive Probe is recommended.
Note 3: Capacitance value CL includes sum of all probe and fixture capacitance.
Note 4: Resistance value RL is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.
Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

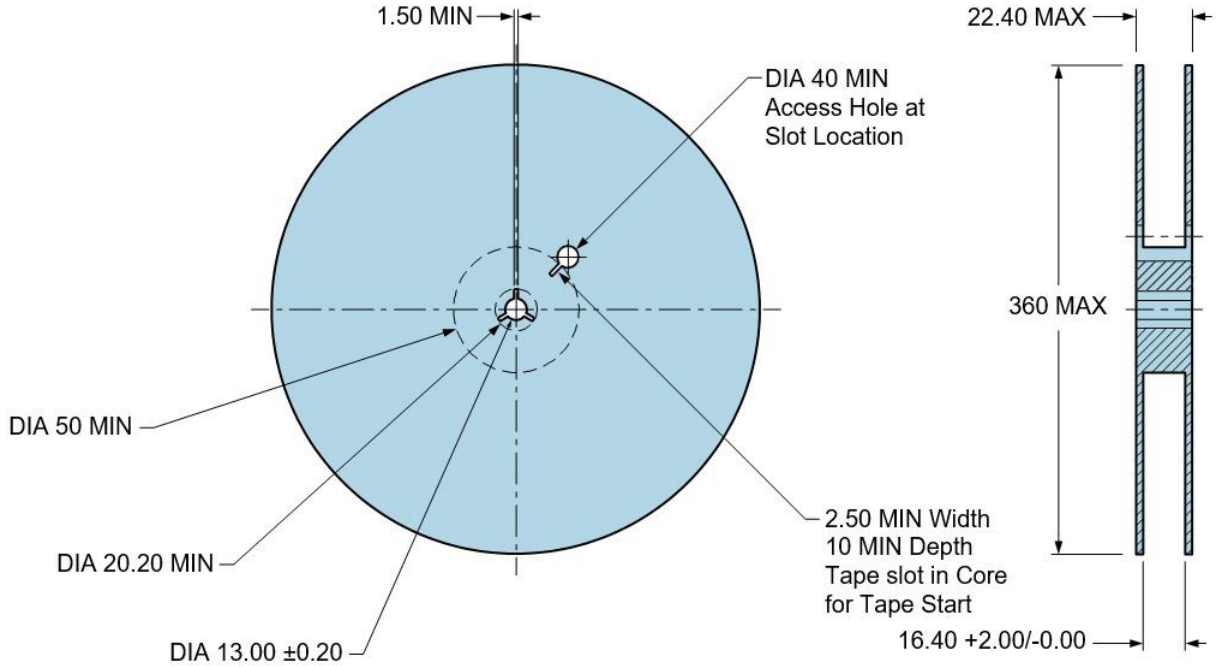
TAPE & REEL DIMENSIONS

Quantity per Reel: 1,000 Units

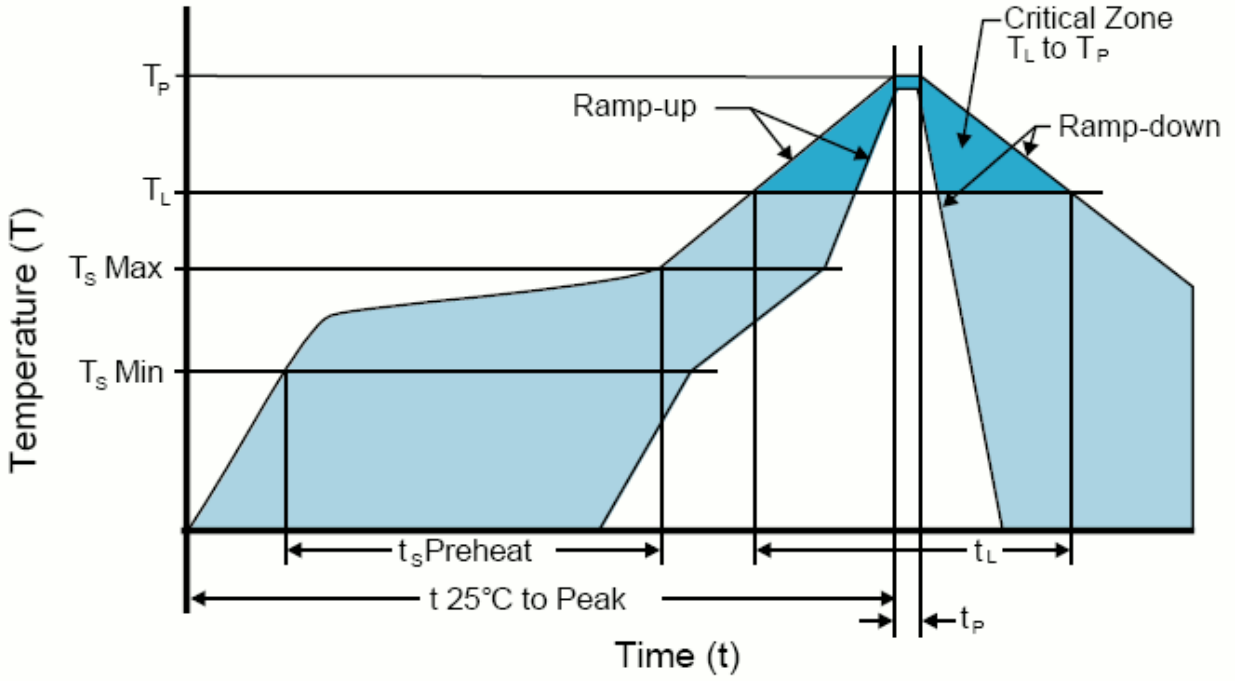
All Dimensions in Millimeters

Compliant to EIA-481





RECOMMENDED SOLDER REFLOW METHOD

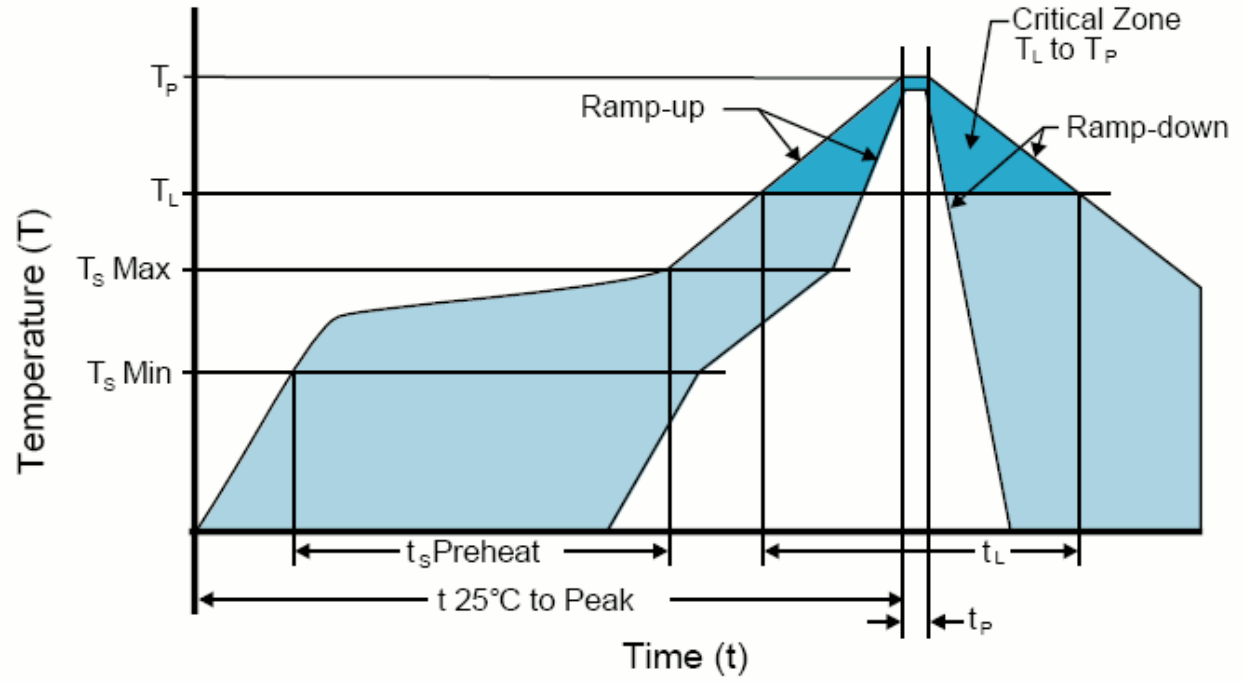


HIGH TEMPERATURE INFRARED/CONVECTION	
T_S MAX to T_L (Ramp-up Rate)	3°C/Second Maximum
Preheat **- Temperature Minimum (T_S MIN)** **- Temperature Typical (T_S TYP)** **- Temperature Maximum(T_S MAX)** **- Time (t_s MIN)**	 150°C 175°C 200°C 60 - 180 Seconds
Ramp-up Rate (T_L to T_P)	3°C/Second Maximum
Time Maintained Above: **- Temperature (T_L)** **- Time (t_L)**	 217°C 60 - 150 Seconds
Peak Temperature (T_P)	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature(T_P Target)	250°C +0/-5°C
Time within 5°C of actual peak (t_p)	20 - 40 Seconds
Ramp-down Rate	6°C/Second Maximum
Time 25°C to Peak Temperature (t)	8 Minutes Maximum
Moisture Sensitivity Level	Level 1
Additional Notes	Temperatures shown are applied to body of device.

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)

RECOMMENDED SOLDER REFLOW METHOD



LOW TEMPERATURE INFRARED/CONVECTION	
T_S MAX to T_L (Ramp-up Rate)	5°C/Second Maximum
Preheat **- Temperature Minimum (T_S MIN)** **- Temperature Typical (T_S TYP)** **- Temperature Maximum(T_S MAX)** **- Time (t_S MIN)**	 N/A 150°C N/A 60 - 120 Seconds
Ramp-up Rate (T_L to T_P)	5°C/Second Maximum
Time Maintained Above: **- Temperature (T_L)** **- Time (t_L)**	 150°C 200 Seconds Maximum
Peak Temperature (T_P)	240°C Maximum
Target Peak Temperature(T_P Target)	240°C Maximum 2 Times/230˚C Maximum 1Time
Time within 5°C of actual peak (t_P)	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
Ramp-down Rate	5°C/Second Maximum
Time 25°C to Peak Temperature (t)	N/A
Moisture Sensitivity Level	Level 1
Additional Notes	Temperatures shown are applied to body of device.

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)