REGULATORY COMPLIANCE

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

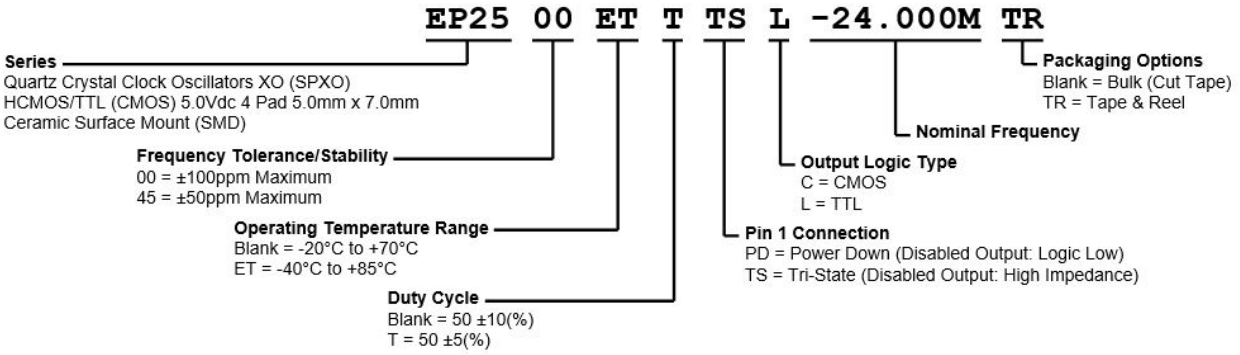
ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) HCMOS/TTL (CMOS) 5.0Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

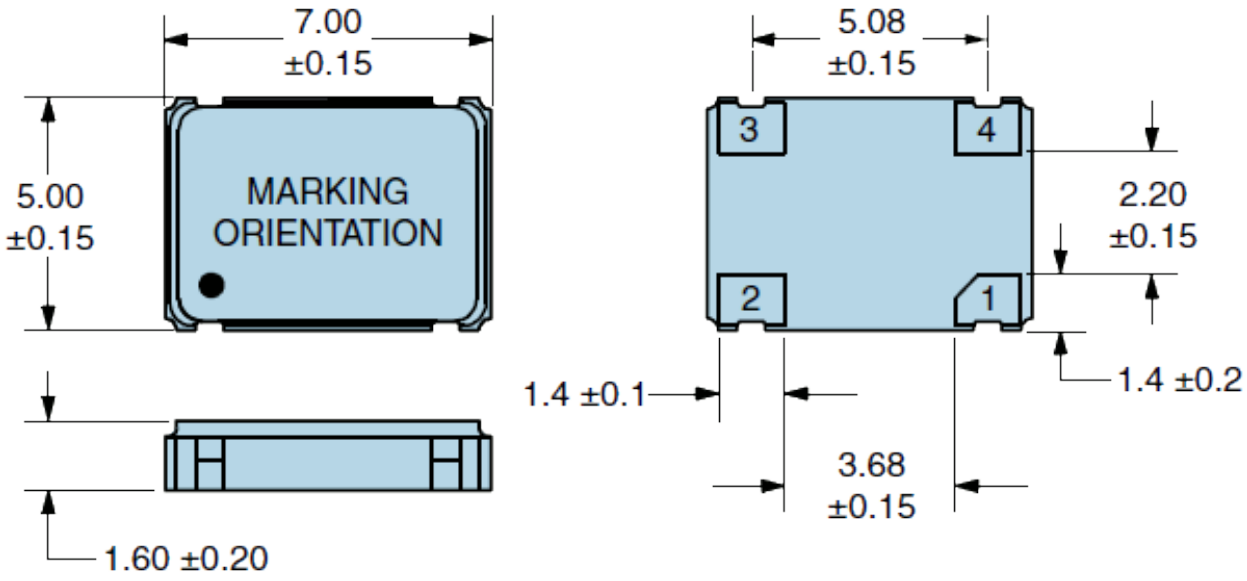
ELECTRICAL SPECIFICATIONS

Nominal Frequency	1MHz to 125MHz
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, First Year Aging at 25°C, Shock, and Vibration ±100ppm Maximum ±50ppm Maximum
Aging at 25°C	±5ppm/year Maximum
Operating Temperature Range	-20°C to +70°C -40°C to +85°C
Supply Voltage	5.0Vdc ±10%
Input Current	Unloaded 45mA Maximum
Output Voltage Logic High (V_{OH})	IOH = -16mA Vdd-0.4Vdc Minimum at Output Logic Type of CMOS 2.4Vdc Minimum at Output Logic Type of TTL
Output Voltage Logic Low (V_{OL})	IOL = +16mA 0.4Vdc Maximum
Rise/Fall Time	4nSec Maximum (Measured at 20% to 80% of waveform) at Output Logic Type of CMOS 4nSec Maximum (Measured at 0.8Vdc to 2.0Vdc) at Output Logic Type of TTL
Duty Cycle	Measured at 1.4Vdc with TTL Load or 50% of waveform with HCMOS Load 50 ±10(%) 50 ±5(%) (Not available with TTL Output Logic Type over Nominal Frequency range of 27.000001MHz to 125MHz; Not available with CMOS Output Logic Type over Nominal Frequency range of 50.000001MHz to 125MHz)
Load Drive Capability	50pF HCMOS Load Maximum (over 1MHz to 50MHz at CMOS Output Logic Type) 15pF HCMOS Load Maximum (over 50.000001MHz to 125MHz at CMOS Output Logic Type) 10TTL Load Maximum over 1MHz to 40MHz at TTL Output Logic Type 5TTL Load Maximum over 40.000001MHz to 125MHz at TTL Output Logic Type
Output Logic Type	CMOS TTL
Pin 1 Connection	Power Down (Disabled Output: Logic Low) Tri-State (Disabled Output: High Impedance)
Pin 1 Input Voltage (Vih and Vil)	+2.0Vdc Minimum to enable output, +0.8Vdc Maximum to disable output, No Connect to enable output.
Standby Current	50µA Maximum (Pin 1 = Ground, Disabled Output: Logic Low)
Disable Current	30mA Maximum (Pin 1 = Ground, Disabled Output: High Impedance)
Absolute Clock Jitter	±250pSec Maximum, ±100pSec Typical over Nominal Frequency of 1MHz to 33MHz ±100pSec Maximum, ±50pSec Typical over Nominal Frequency of 33.000001MHz to 125MHz
One Sigma Clock Period Jitter	±50pSec Maximum over Nominal Frequency of 1MHz to 33MHz ±30pSec Maximum over Nominal Frequency of 33.000001MHz to 125MHz
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

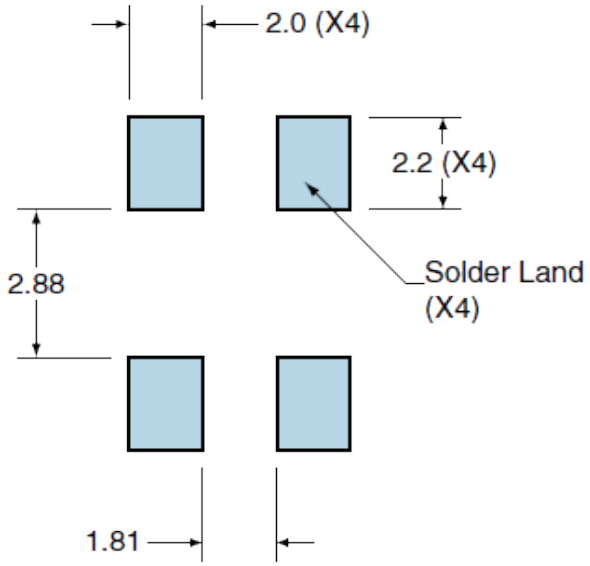
PART NUMBERING GUIDE



MECHANICAL DIMENSIONS



SUGGESTED SOLDER PAD LAYOUT

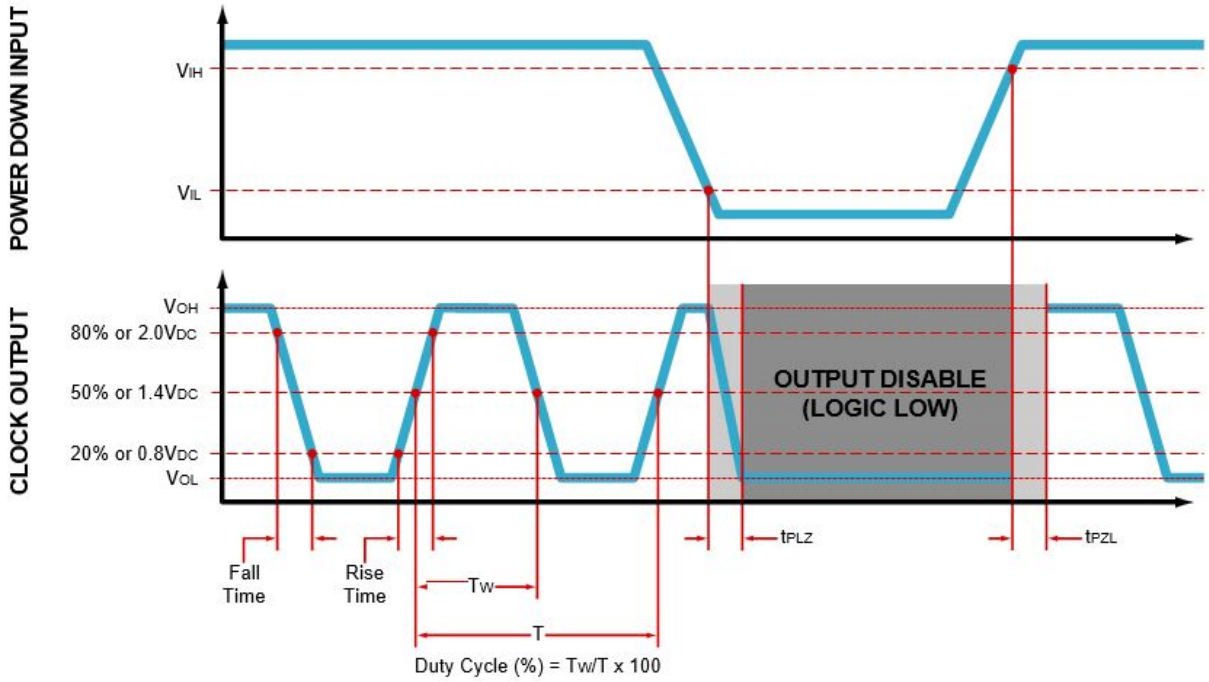


PIN	CONNECTION
1	Power Down Or Tri-State
2	Ground/Case Ground
3	Output
4	Supply Voltage

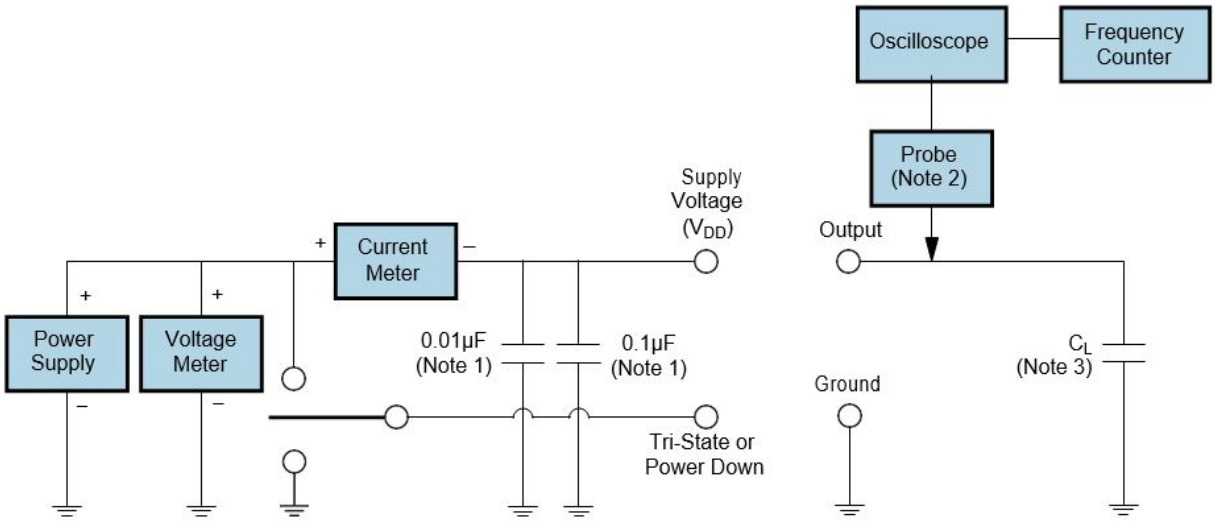
All Tolerances are ±0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT

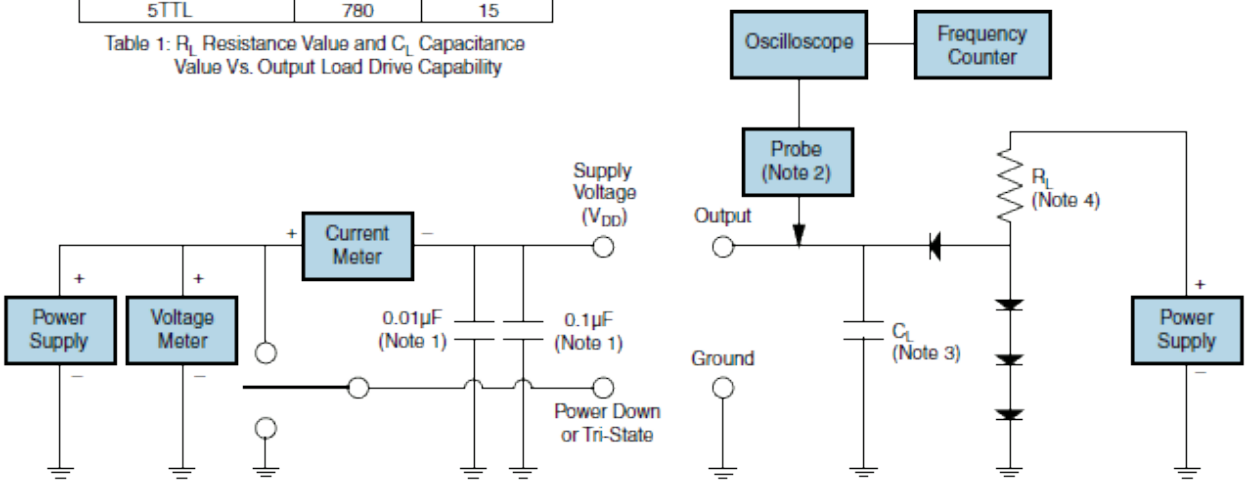


Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less Than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low input capacitance (<12pF), 10X Attentuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) Passive probe is recommended.
Note 3: Capacitance value CL includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

TEST CIRCUIT FOR TTL OUTPUT

Output Load Drive Capability	R_L Value (Ohms)	C_L Value (pF)
10TTL	390	15
5TTL	780	15

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



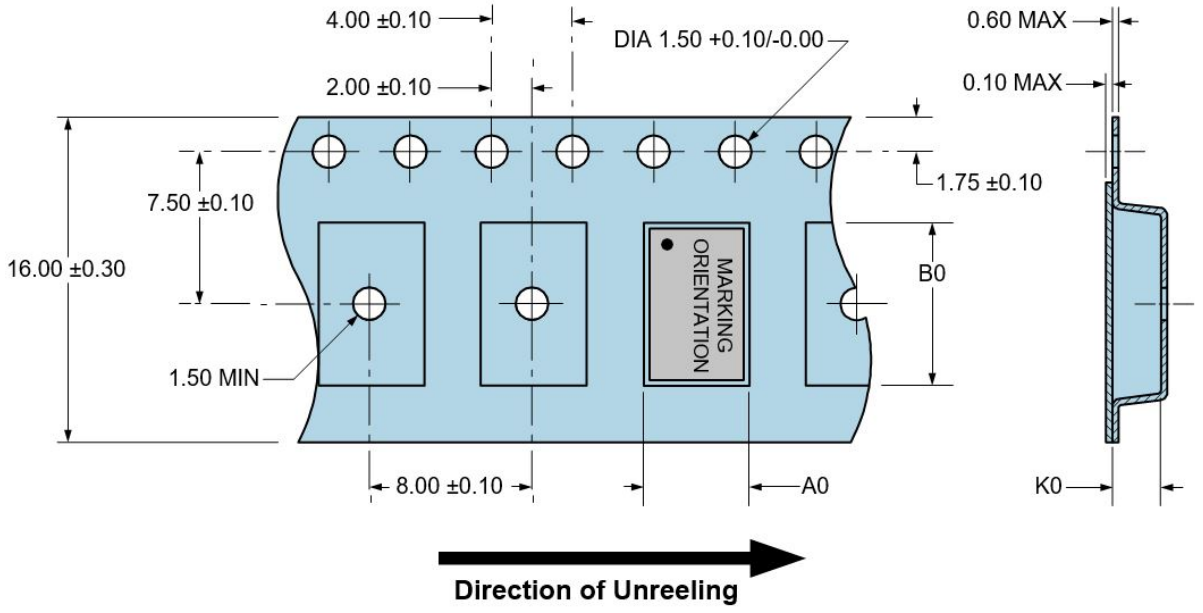
Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less Than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>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.

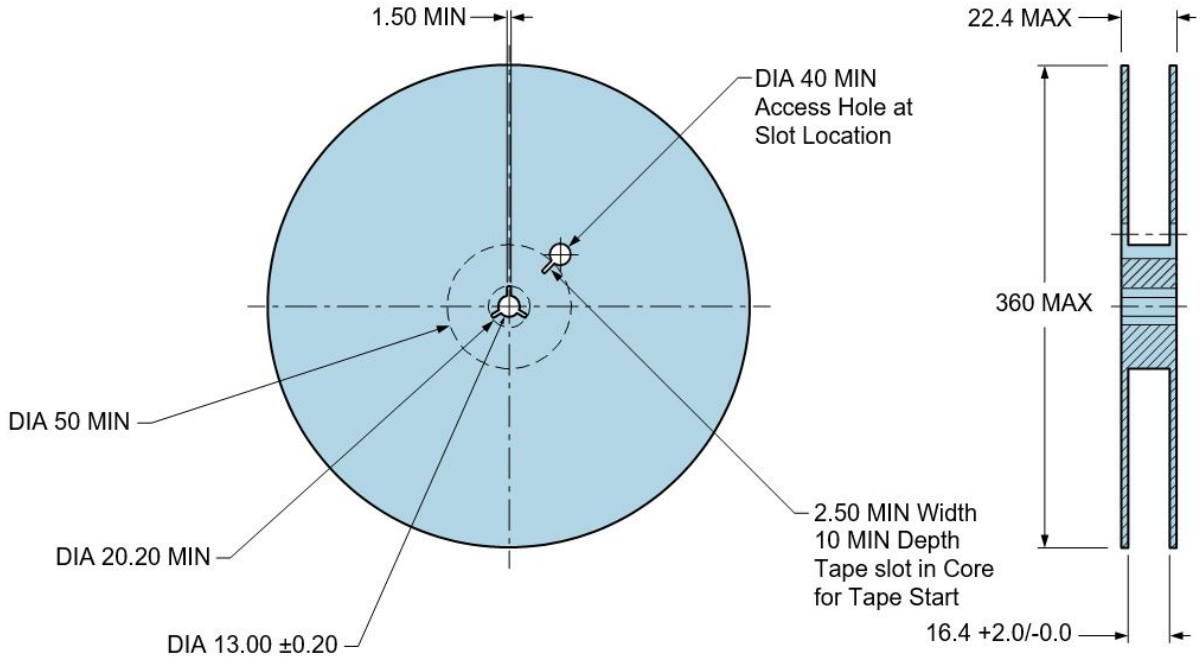
TAPE & REEL DIMENSIONS

Quantity per Reel: 1,000 Units

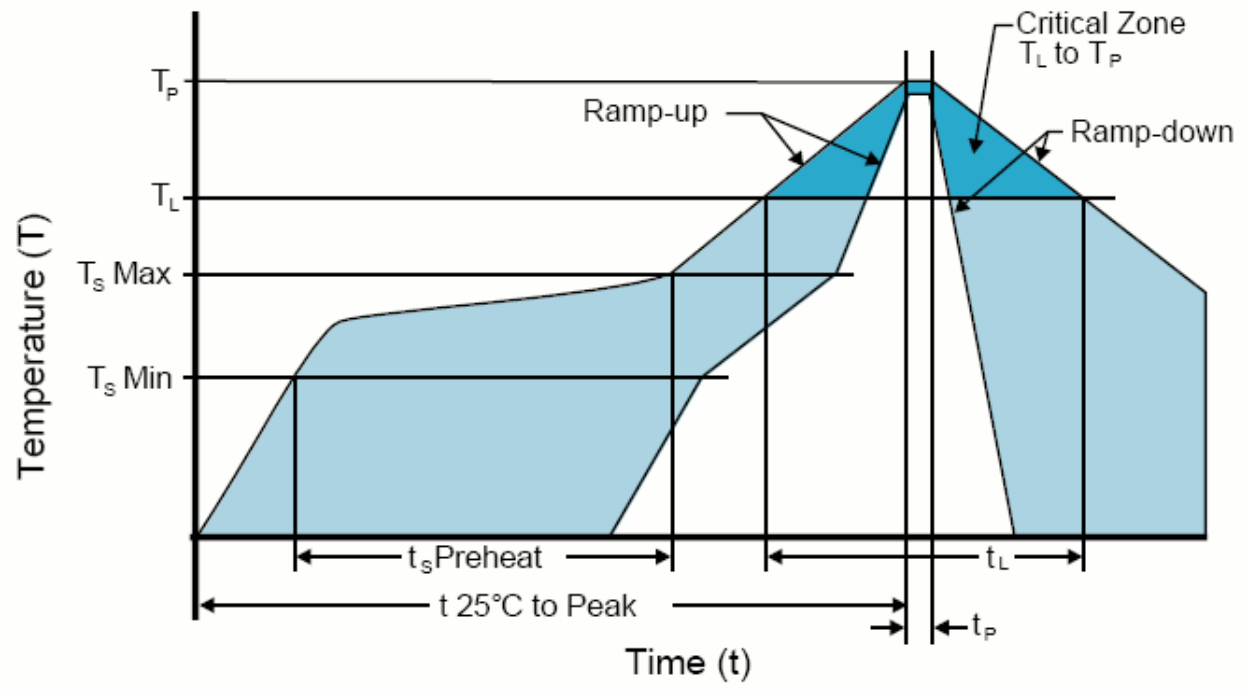
All Dimensions in Millimeters

Compliant to EIA-481





RECOMMENDED SOLDER REFLOW METHOD

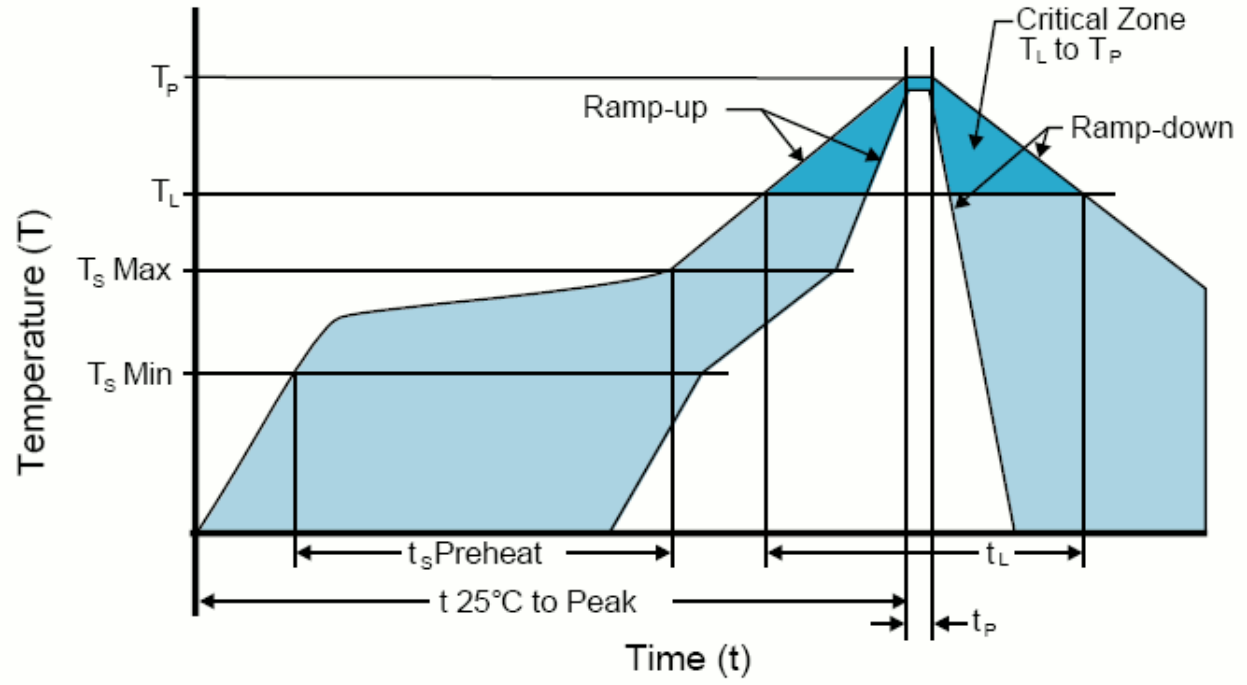


HIGH TEMPERATURE INFRARED/CONVECTION	
T_S MAX to T_L (Ramp-up Rate)	3°C/Second Maximum
Preheat **- Temperature Minimum (T_S MIN)** **- Temperature Typical (T_S TYP)** **- Temperature Maximum(T_S MAX)** **- Time (t_s MIN)**	 150°C 175°C 200°C 60 - 180 Seconds
Ramp-up Rate (T_L to T_P)	3°C/Second Maximum
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.)

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