REGULATORY COMPLIANCE

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

ITEM DESCRIPTION

Temperature Compensated Quartz Crystal Clock Oscillators TCXO LVCMOS (CMOS) 3.3Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD)

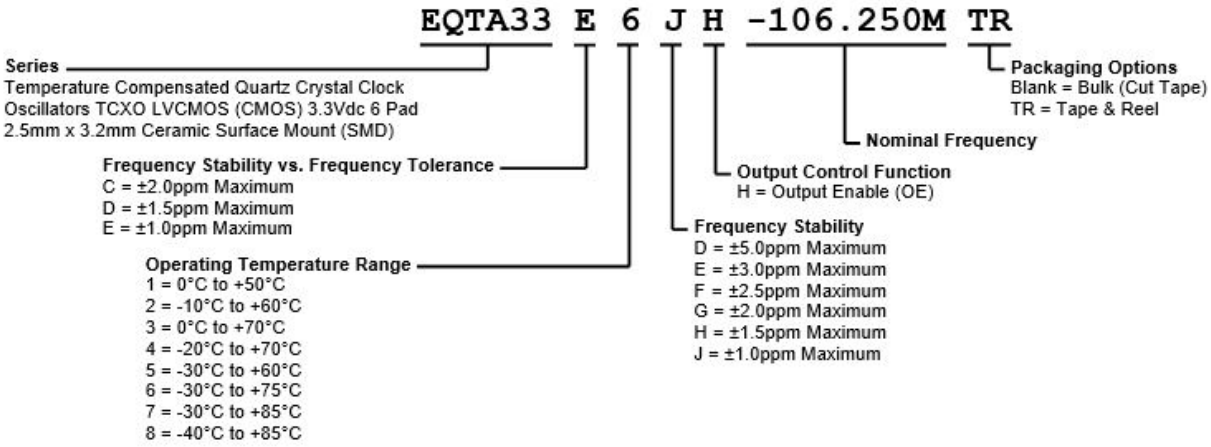
ELECTRICAL SPECIFICATIONS

Nominal Frequency	10MHz to 200MHz
Frequency Stability	Inclusive of Operating Temperature Range, at Vdd=3.3Vdc ±5.0ppm Maximum ±3.0ppm Maximum ±2.5ppm Maximum ±2.0ppm Maximum ±1.5ppm Maximum ±1.0ppm Maximum
Frequency Stability vs. Frequency Tolerance	at 25°C ±2°C, at Vdd=3.3Vdc, Pre-Reflow ±2.0ppm Maximum ±1.5ppm Maximum ±1.0ppm Maximum
Frequency Stability vs. Input Voltage	±0.2ppm Maximum (±5%)
Frequency Stability vs. Load	±0.2ppm Maximum (±2pF)
Frequency Stability vs. Reflow	±1.0ppm Maximum (at 25°C, 24 hours after reflow, 1 time)
Frequency Stability vs. Aging	±1ppm/Year Maximum (at 25°C)
Operating Temperature Range	0°C to +50°C -10°C to +60°C 0°C to +70°C -20°C to +70°C -30°C to +60°C -30°C to +75°C -30°C to +85°C -40°C to +85°C
Supply Voltage	3.3Vdc ±5%
Input Current	Unloaded 20mA Maximum over Nominal Frequency of 10MHz to 50MHz 25mA Maximum over Nominal Frequency of 50.000001MHz to 100MHz 30mA Maximum over Nominal Frequency of 100.000001MHz to 200MHz
Output Voltage Logic High (Voh)	IOH = -4mA 90% of Vdd Minimum
Output Voltage Logic Low (Vol)	IOL = +4mA 10% of Vdd Maximum
Rise/Fall Time	Measured at 10% to 90% of Waveform 3nSec Maximum
Duty Cycle	Measured at 50% of Waveform 50 ±5 (%)
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS

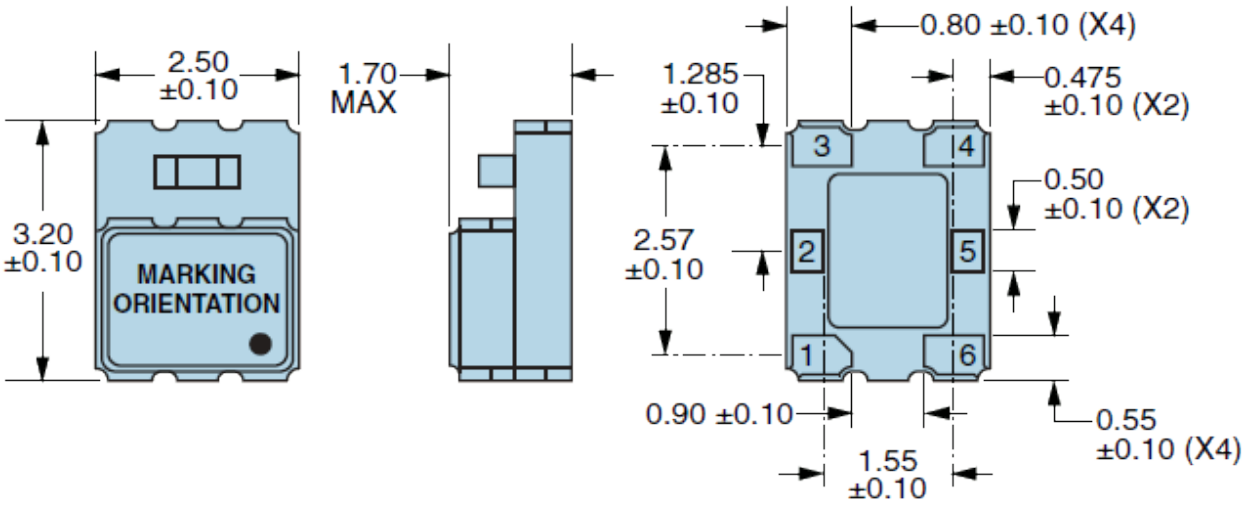
ELECTRICAL SPECIFICATIONS

Phase Noise	All Values are Typical -64dBc/Hz at 10Hz offset; -96dBc/Hz at 100Hz offset; -124dBc/Hz at 1kHz offset; -131dBc/Hz at 10kHz offset; - 132dBc/Hz at 100kHz offset; -149dBc/Hz at 1MHz offset; -157dBc/Hz at 10MHz offset; -159dBc/Hz at 20MHz offset over Nominal Frequency of 10MHz to 50MHz -58dBc/Hz at 10Hz offset; -90dBc/Hz at 100Hz offset; -118dBc/Hz at 1kHz offset; -125dBc/Hz at 10kHz offset; - 126dBc/Hz at 100kHz offset; -145dBc/Hz at 1MHz offset; -155dBc/Hz at 10MHz offset; -157dBc/Hz at 20MHz offset over Nominal Frequency of 50.000001MHz to 100MHz -57dBc/Hz at 10Hz offset; -86dBc/Hz at 100Hz offset; -114dBc/Hz at 1kHz offset; -121dBc/Hz at 10kHz offset; - 122dBc/Hz at 100kHz offset; -141dBc/Hz at 1MHz offset; -151dBc/Hz at 10MHz offset; -153dBc/Hz at 20MHz offset over Nominal Frequency of 100.000001MHz to 156.249999MHz -58dBc/Hz at 10Hz offset; -86dBc/Hz at 100Hz offset; -110dBc/Hz at 1kHz offset; -116dBc/Hz at 10kHz offset; - 117dBc/Hz at 100kHz offset; -136dBc/Hz at 1MHz offset; -146dBc/Hz at 10MHz offset; -148dBc/Hz at 20MHz offset over Nominal Frequency of 156.25MHz to 200MHz
Output Control Function	Output Enable (OE)
Output Control Input Voltage Logic High (Vih)	90% of Vdd Minimum or No Connect to Enable Output
Output Control Input Voltage Logic Low (Vil)	10% of Vdd Maximum to Disable Output (High Impedance)
Output Enable Time	100nSec Maximum
Output Disable Time	50nSec Maximum
Output Enable Current	Without Load (Pin 2 = Ground) 15mA Maximum
RMS Phase Jitter	Fj=12kHz to 20MHz (Random) 1.5pSec Maximum over Nominal Frequency of 10MHz to 50MHz 1.4pSec Maximum over Nominal Frequency of 50.000001MHz to 100MHz 1.3pSec Maximum over Nominal Frequency of 100.000001MHz to 200MHz
Period Jitter (Deterministic)	0.2pSec Typical
Period Jitter (Random)	2pSec Typical
Period Jitter (RMS)	3pSec Maximum
Period Jitter (pk-pk)	30pSec Maximum
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

PART NUMBERING GUIDE

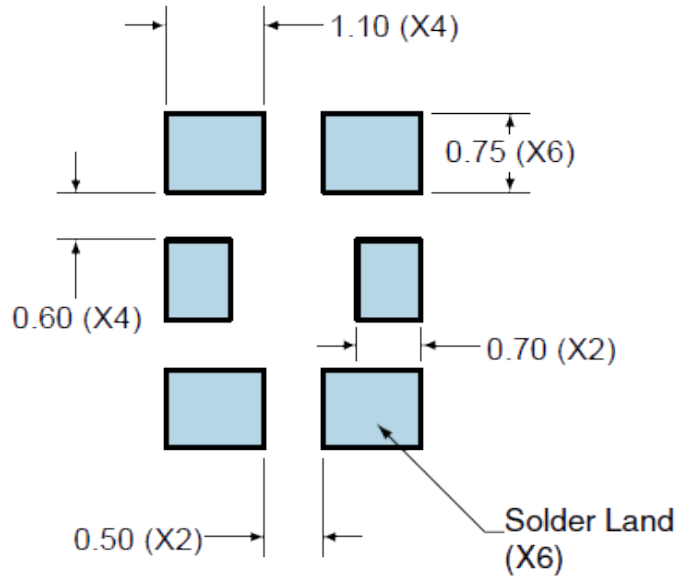


MECHANICAL DIMENSIONS



Terminal Plating Thickness: Gold (0.3 to 1.0µm) over Nickel (1.27 to 8.89µm).

SUGGESTED SOLDER PAD LAYOUT

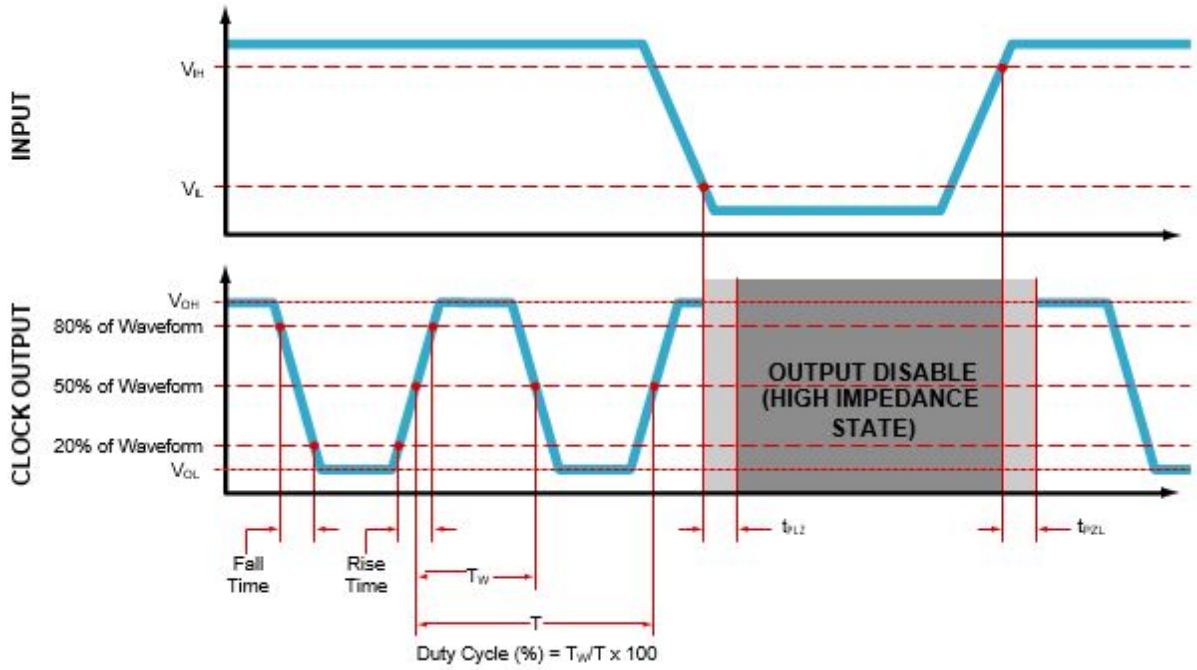


PIN	CONNECTION
1	Do Not Connect
2	Output Enable (OE)
3	Case/Ground
4	Output
5	Do Not Connect
6	Supply Voltage

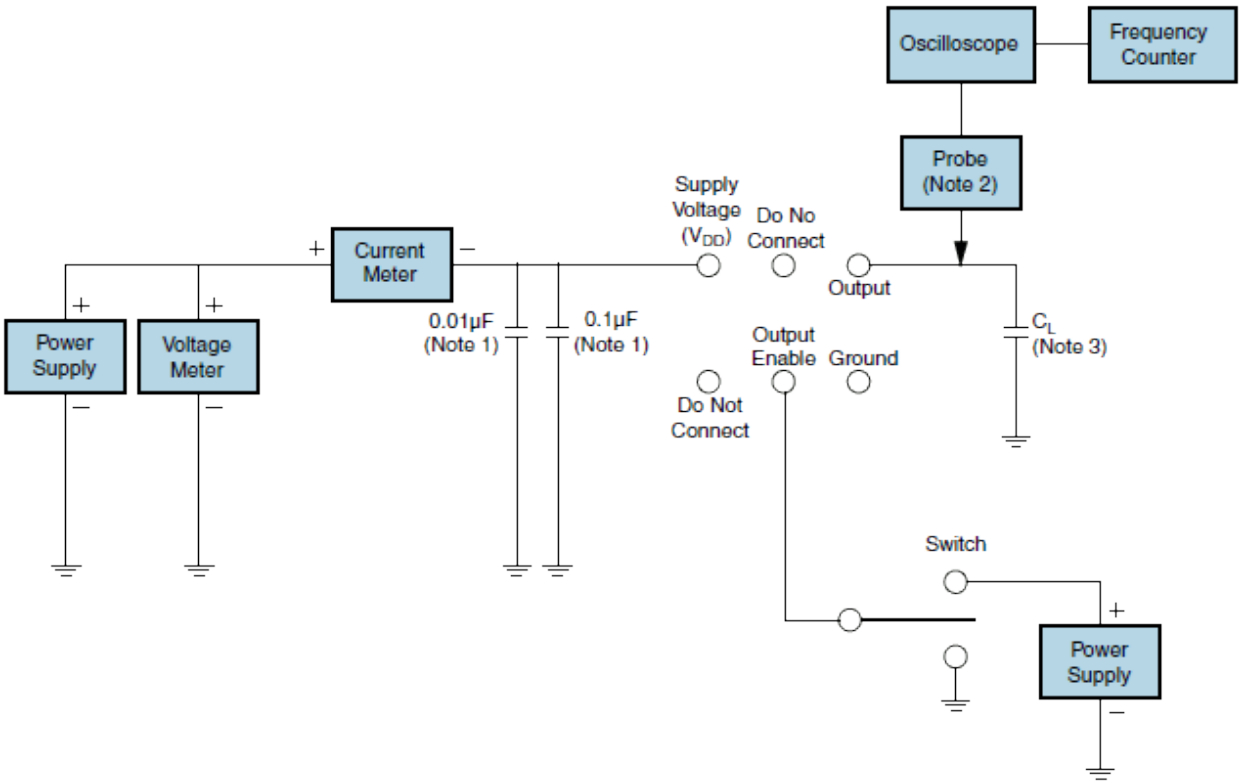
All Tolerances are ±0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



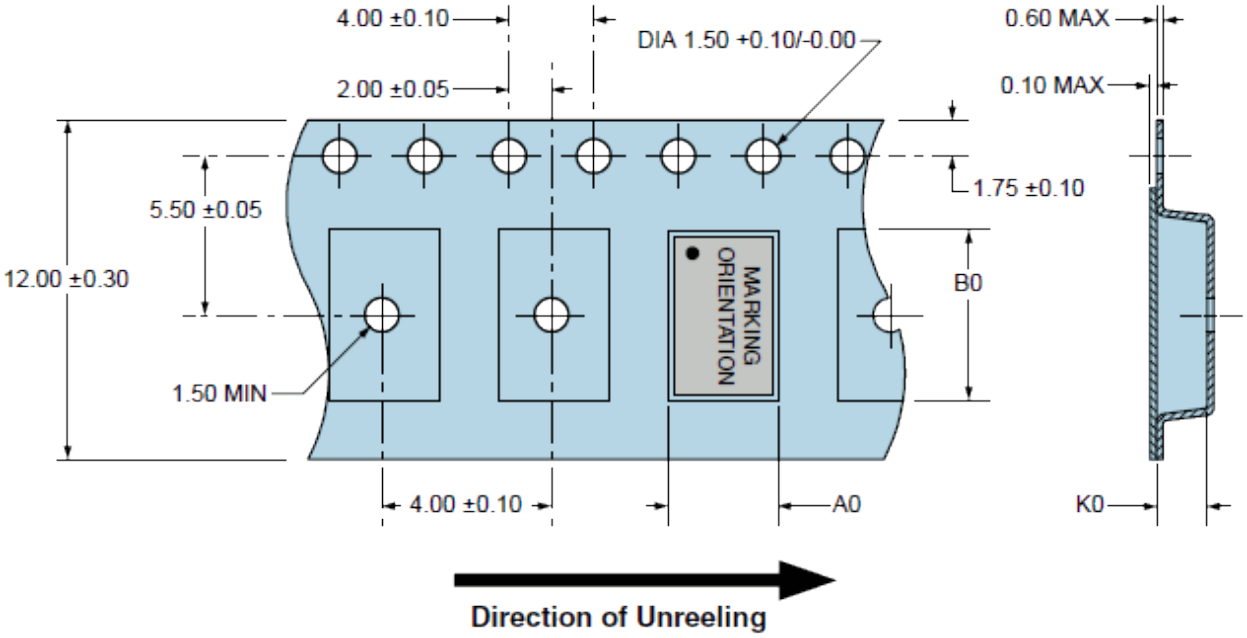
Note 1: An external 0.01µF bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass Capacitor close (less than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low input capacitance (<12pF), 10X Attentuation Factor, High Impedance (>10Mohms), and High bandwidth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

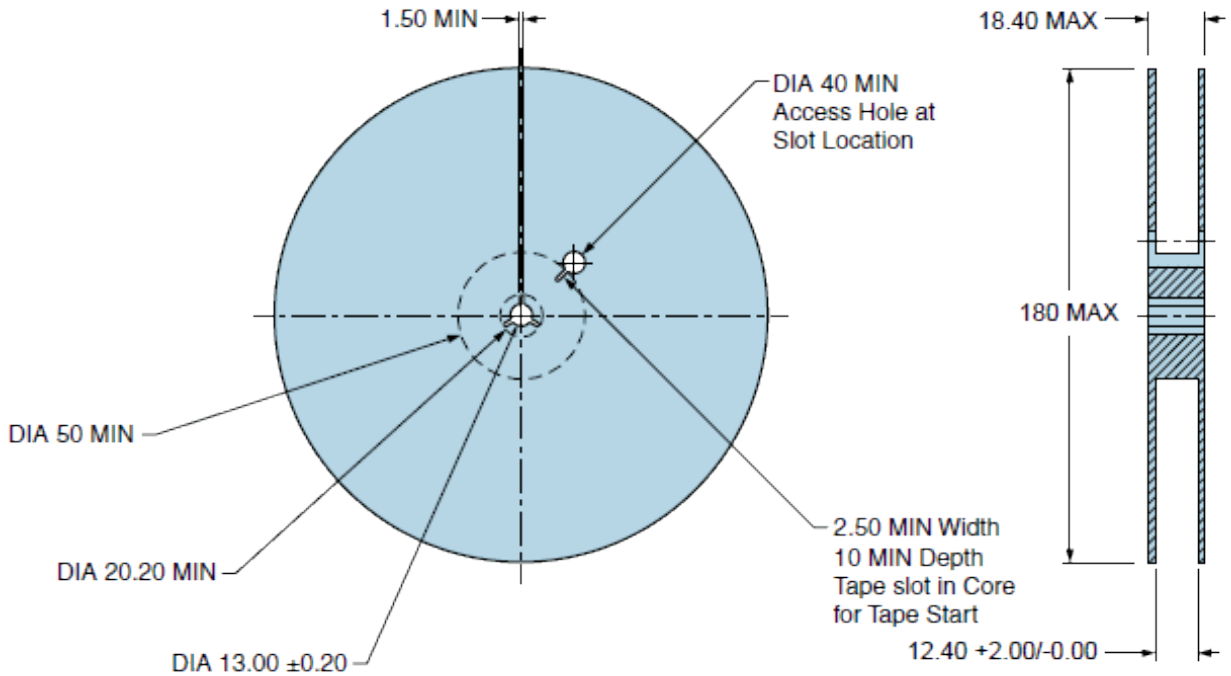
TAPE & REEL DIMENSIONS

Quantity per Reel: 1,000 Units

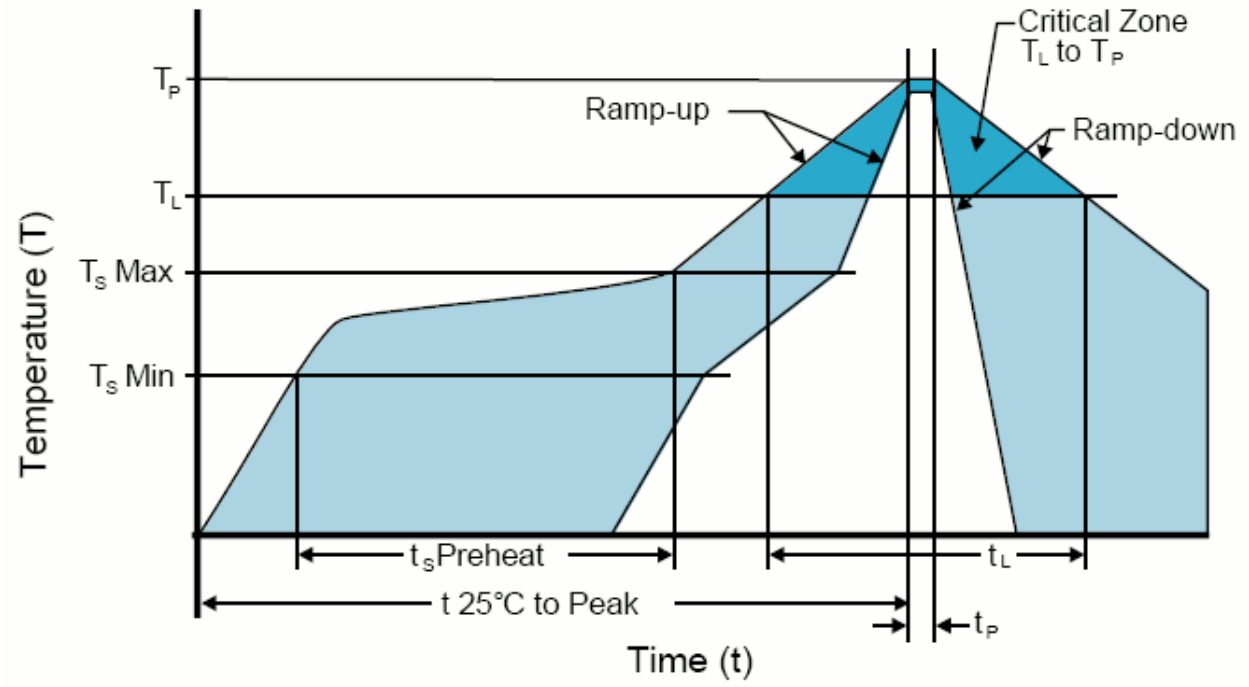
All Dimensions in Millimeters

Compliant to EIA-481





RECOMMENDED SOLDER REFLOW METHOD

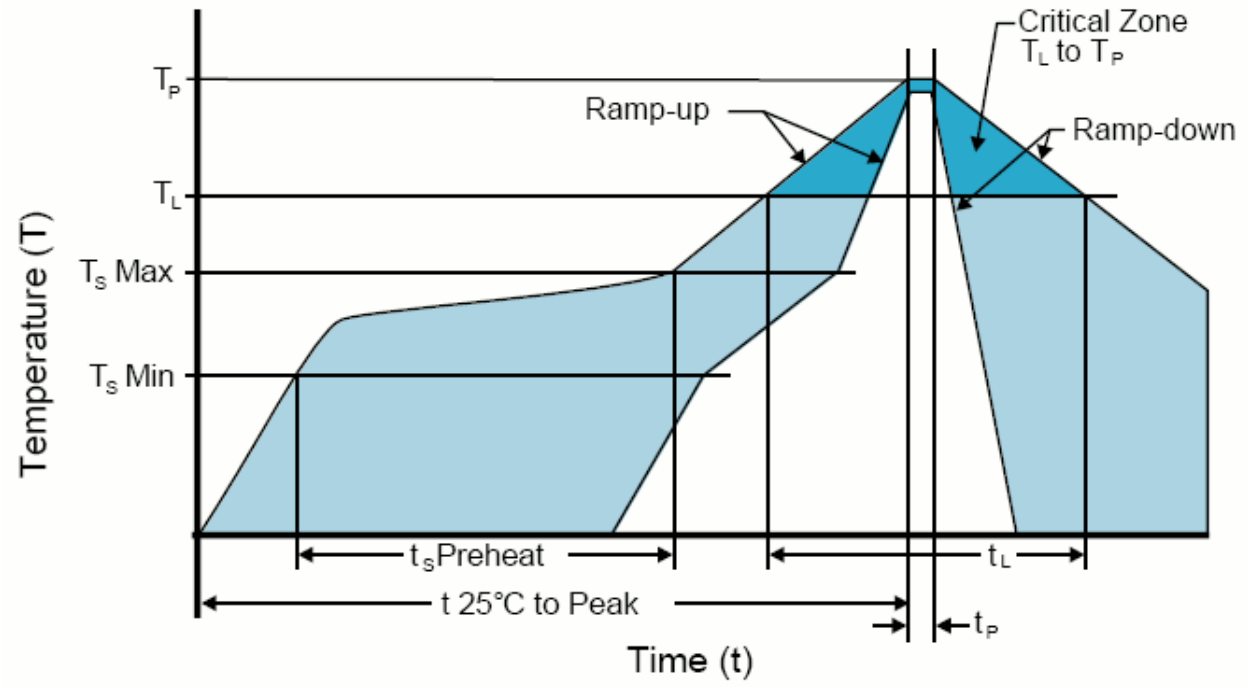


HIGH TEMPERATURE INFRARED/CONVECTION	
T_S MAX to T_L (Ramp-up Rate)	3°C/Second Maximum
Preheat **- Temperature Minimum (T_S MIN)** **- Temperature Typical (T_S TYP)** **- Temperature Maximum(T_S MAX)** **- Time (t_S MIN)**	 150°C 175°C 200°C 60 - 180 Seconds
Ramp-up Rate (T_L to T_P)	3°C/Second Maximum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