

REGULATORY COMPLIANCE

				
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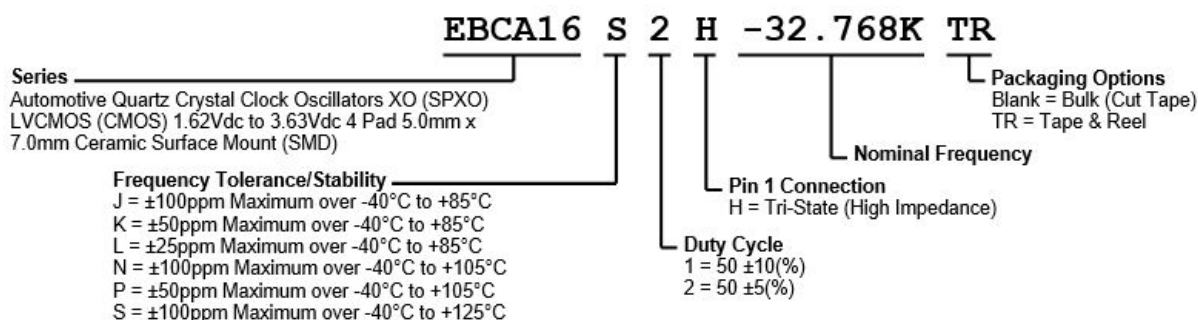
ITEM DESCRIPTION

Automotive Grade Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 1.62Vdc to 3.63Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

ELECTRICAL SPECIFICATIONS

Nominal Frequency	32.768kHz
Frequency Tolerance/Stability	Inclusive of all conditions: Calibration Tolerance (at 25°C), Frequency Stability over the Operating Temperature Range, Supply Voltage Change ($\pm 5\%$), Output Load Change ($\pm 5\%$), and First Year Aging at 25°C $\pm 100\text{ppm}$ Maximum over -40°C to $+85^\circ\text{C}$ $\pm 50\text{ppm}$ Maximum over -40°C to $+85^\circ\text{C}$ $\pm 25\text{ppm}$ Maximum over -40°C to $+85^\circ\text{C}$ $\pm 100\text{ppm}$ Maximum over -40°C to $+105^\circ\text{C}$ $\pm 50\text{ppm}$ Maximum over -40°C to $+105^\circ\text{C}$ $\pm 100\text{ppm}$ Maximum over -40°C to $+125^\circ\text{C}$
Aging at 25°C	$\pm 3\text{ppm/year}$ Maximum
Supply Voltage	1.62Vdc to 3.63Vdc
Input Current	Unloaded, Vdd = 3.3Vdc $50\mu\text{A}$ Typical, $100\mu\text{A}$ Maximum
Output Voltage Logic High (V_{OH})	$I_{OH} = -1\text{mA}$ 90% of Vdd Minimum
Output Voltage Logic Low (V_{OL})	$I_{OL} = +1\text{mA}$ 10% of Vdd Maximum
Rise/Fall Time	Measured at 10% to 90% of Waveform 15nSec Maximum
Duty Cycle	Measured at 50% of Waveform $50 \pm 10(\%)$ $50 \pm 5(\%)$
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Pin 1 Connection	Tri-State (High Impedance)
Output Control Input Voltage Logic High (V_{IH})	70% of Vdd Minimum or No Connect to Enable Output
Output Control Input Voltage Logic Low (V_{IL})	30% of Vdd Maximum to Disable Output (High Impedance)
Standby Current	Disable Output: High Impedance $1\mu\text{A}$ Typical, $3\mu\text{A}$ Maximum
Start Up Time	2mSec Maximum
Storage Temperature Range	-55°C to $+125^\circ\text{C}$

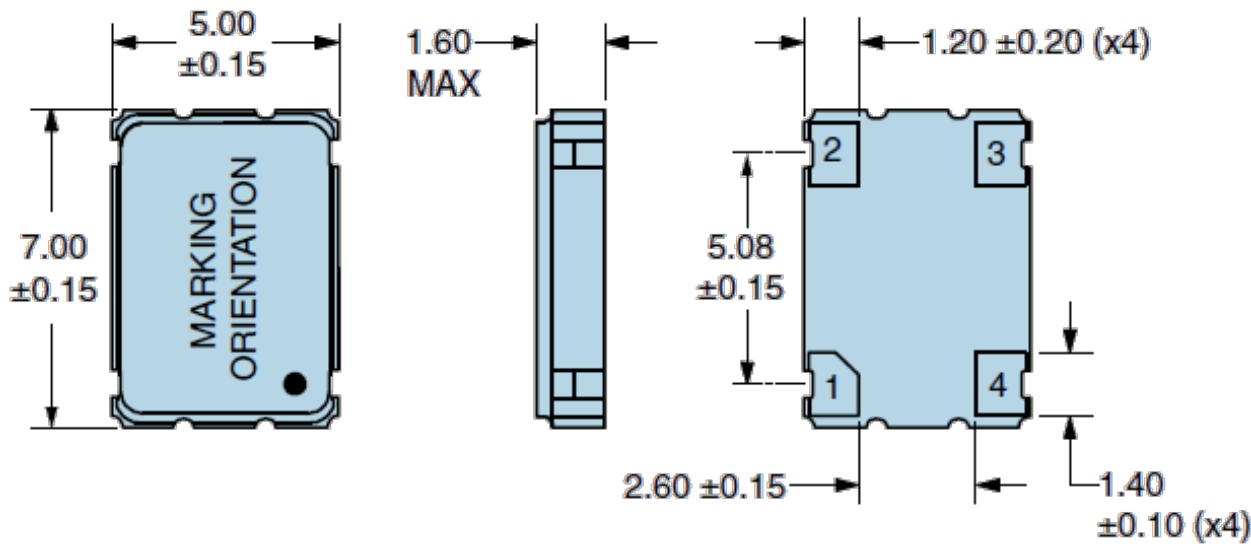
PART NUMBERING GUIDE



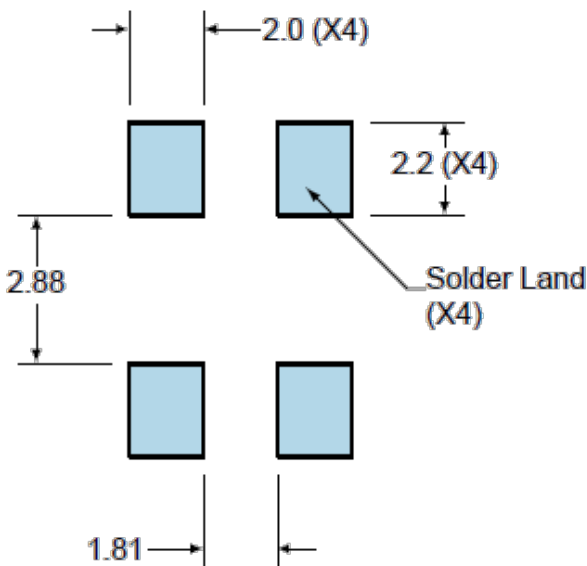
ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

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

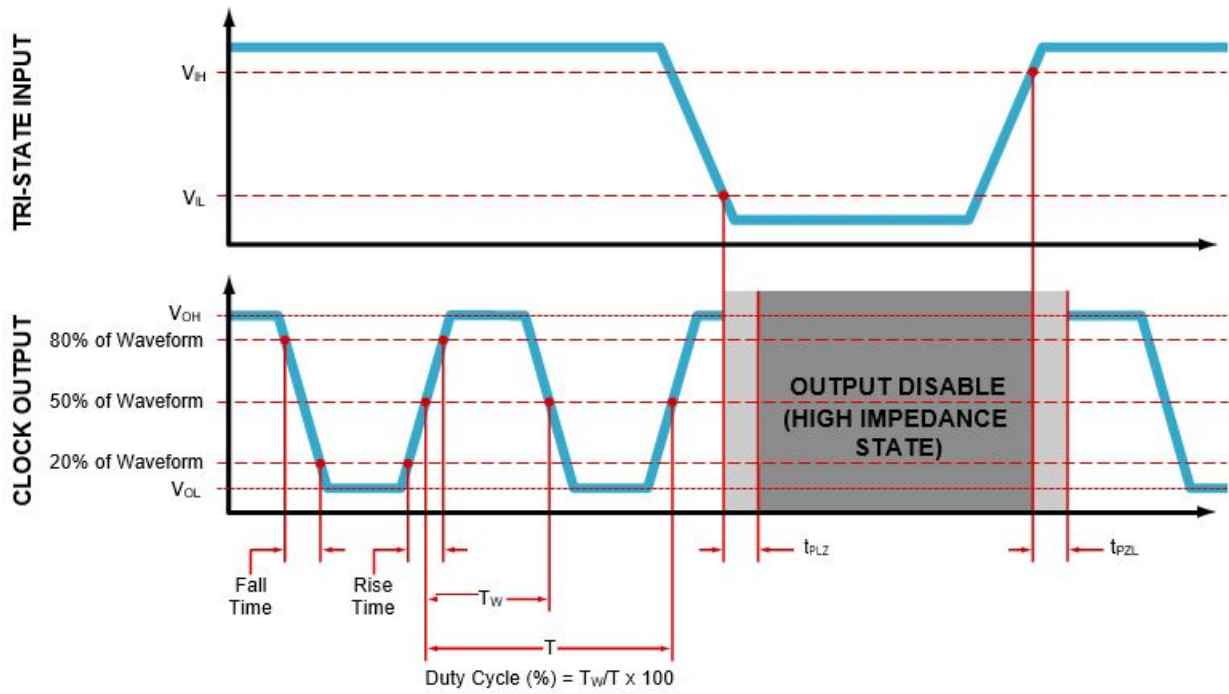


PIN	CONNECTION
1	Tri-State
2	Case/Ground
3	Output
4	Supply Voltage

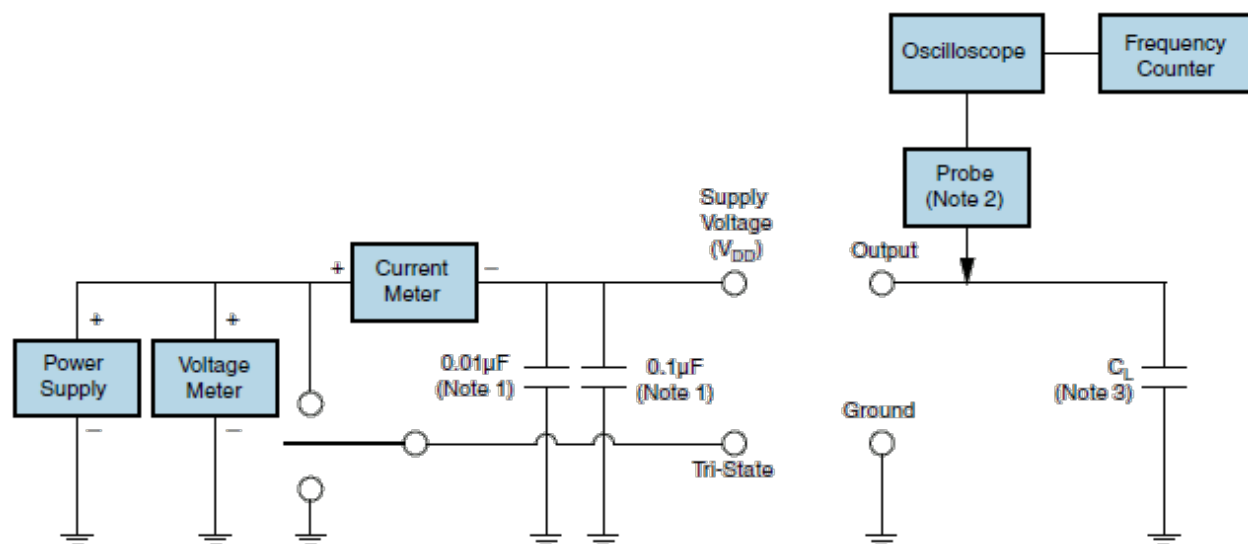
All Tolerances are ± 0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



Note 1: An external $0.01\mu\text{F}$ ceramic bypass capacitor in parallel with a $0.1\mu\text{F}$ 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 ($<12\text{pF}$), 10X Attenuation Factor, High Impedance ($>10\text{Mohms}$), and High bandwidth ($>300\text{MHz}$) Passive probe is recommended.

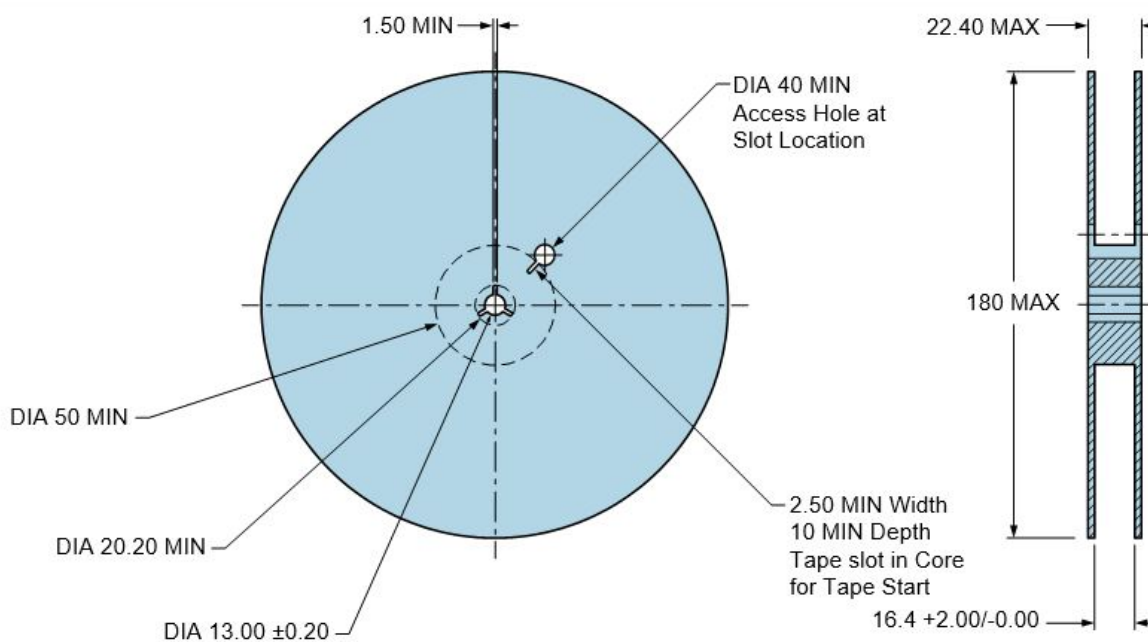
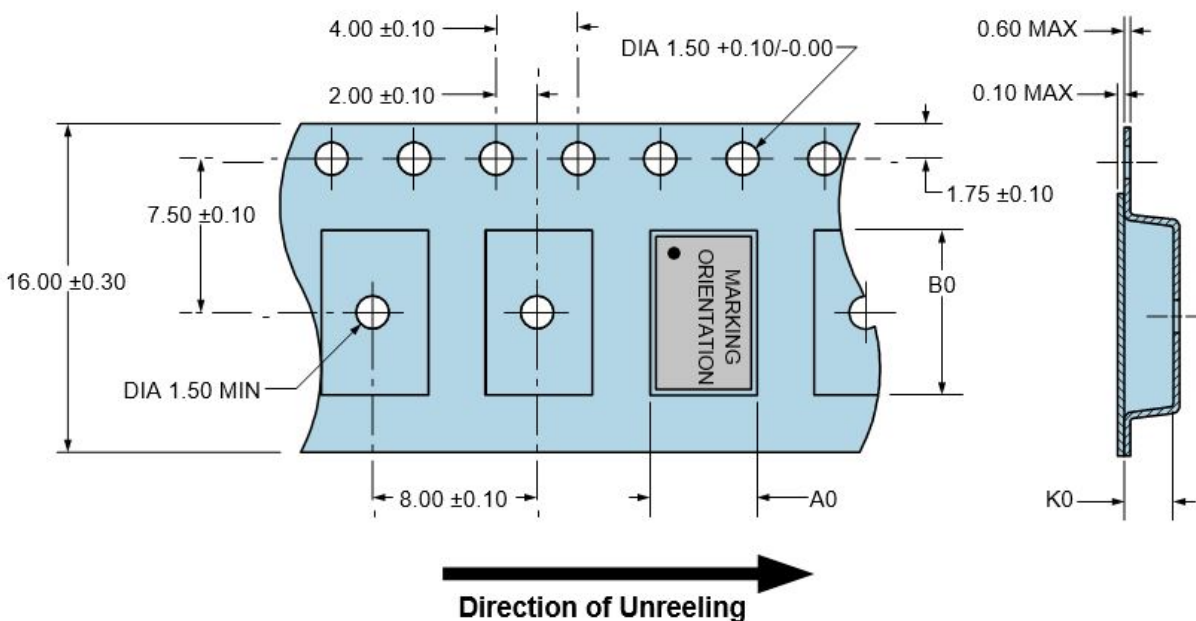
Note 3: Capacitance value (C_L) includes sum of all probe and fixture capacitance.

TAPE & REEL DIMENSIONS

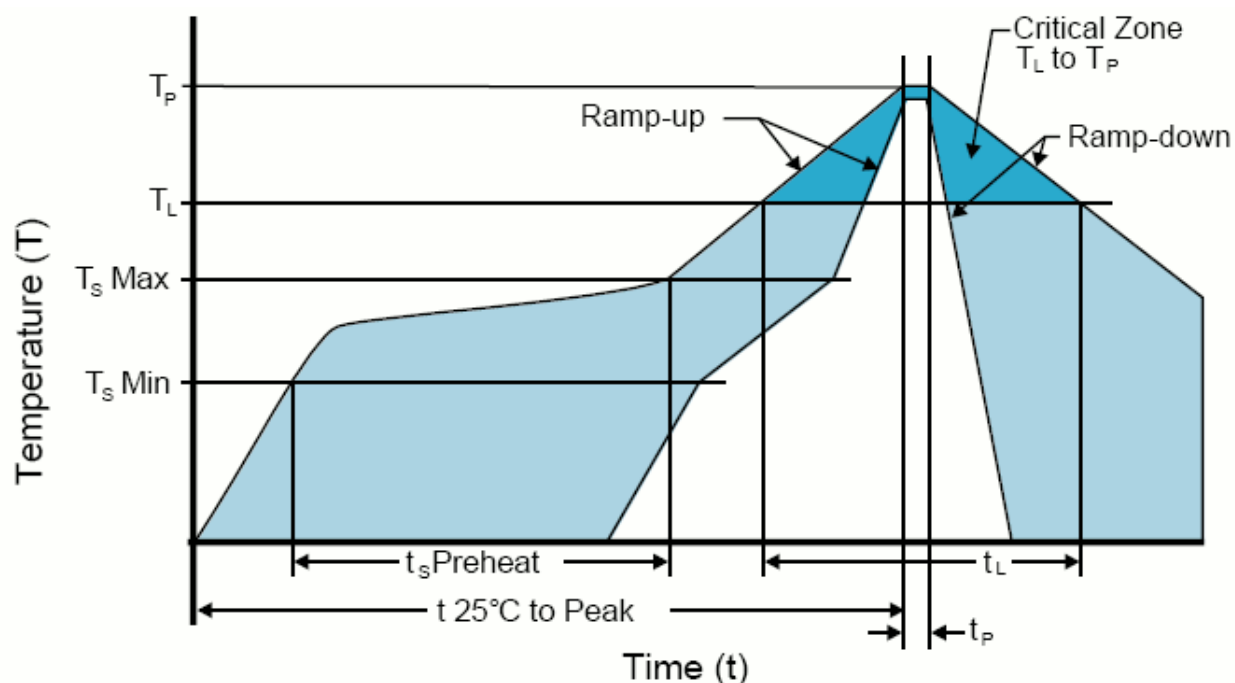
Quantity per Reel: TR = 1000 pieces

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



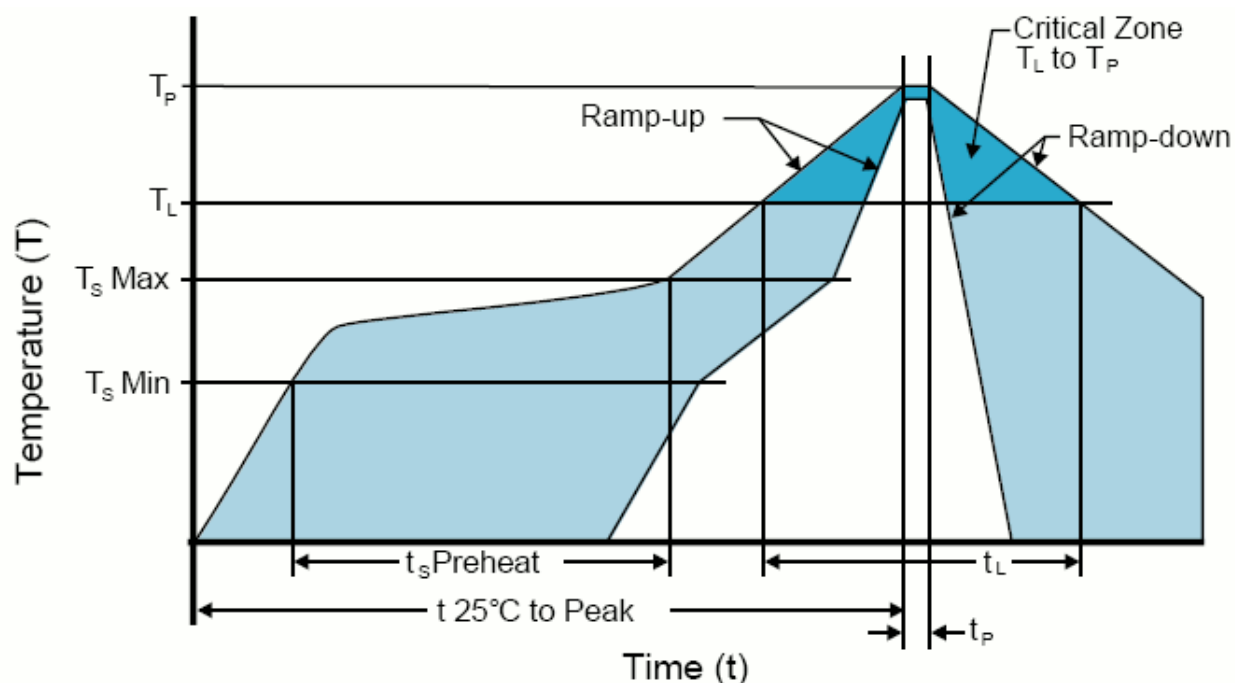
HIGH TEMPERATURE INFRARED/CONVECTION

T _s MAX to T _L (Ramp-up Rate)	3°C/Second Maximum
Preheat	
- Temperature Minimum (T _s MIN)	150°C
- Temperature Typical (T _s TYP)	175°C
- Temperature Maximum (T _s MAX)	200°C
- Time (t _s)	60 - 180 Seconds
Ramp-up Rate (T _L to T _P)	3°C/Second Maximum
Time Maintained Above:	
- Temperature (T _L)	217°C
- Time (t _L)	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)	N/A
- Temperature Typical (T_s TYP)	150°C
- Temperature Maximum (T_s MAX)	N/A
- Time (t_s)	60 - 120 Seconds
Ramp-up Rate (T_L to T_P)	5°C/Second Maximum
Time Maintained Above:	
- Temperature (T_L)	150°C
- Time (t_L)	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.)