

**EP1300TS-1.558M**
[Click part number to visit Part Number Details page](#)
**REGULATORY COMPLIANCE** (Data Sheet downloaded on Dec 27, 2016)
[Click badges to download compliance docs](#)

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**ITEM DESCRIPTION**

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 14 Pin DIP Metal Thru-Hole 1.558MHz  $\pm$ 100ppm -20°C to +70°C

**ELECTRICAL SPECIFICATIONS**

<b>Nominal Frequency</b>	1.558MHz
<b>Frequency Tolerance/Stability</b>	$\pm$ 100ppm Maximum (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)
<b>Aging at 25°C</b>	$\pm$ 5ppm/year Maximum
<b>Operating Temperature Range</b>	-20°C to +70°C
<b>Supply Voltage</b>	3.3Vdc $\pm$ 10%
<b>Input Current</b>	28mA Maximum (Unloaded)
<b>Output Voltage Logic High (Voh)</b>	Vdd-0.4Vdc Minimum (IOH = -8mA)
<b>Output Voltage Logic Low (Vol)</b>	0.4Vdc Maximum (IOL = +8mA)
<b>Rise/Fall Time</b>	4nSec Maximum (Measured at 20% to 80% of waveform)
<b>Duty Cycle</b>	50 $\pm$ 10(%) (Measured at 50% of waveform)
<b>Load Drive Capability</b>	30pF Maximum
<b>Output Logic Type</b>	CMOS
<b>Pin 1 Connection</b>	Tri-State (Disabled Output: High Impedance)
<b>Pin 1 Input Voltage (Vih and Vil)</b>	70% of Vdd Minimum to enable output, 20% of Vdd Maximum to disable output, No Connect to enable output.
<b>Disable Current</b>	16mA Maximum (Pin 1 = Ground)
<b>Standby Current</b>	20 $\mu$ A Maximum (Pin 1 = Ground)
<b>Peak to Peak Jitter (tPK)</b>	500pSec Maximum, 100pSec Typical
<b>RMS Period Jitter (tRMS)</b>	50pSec Maximum, 15pSec Typical
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

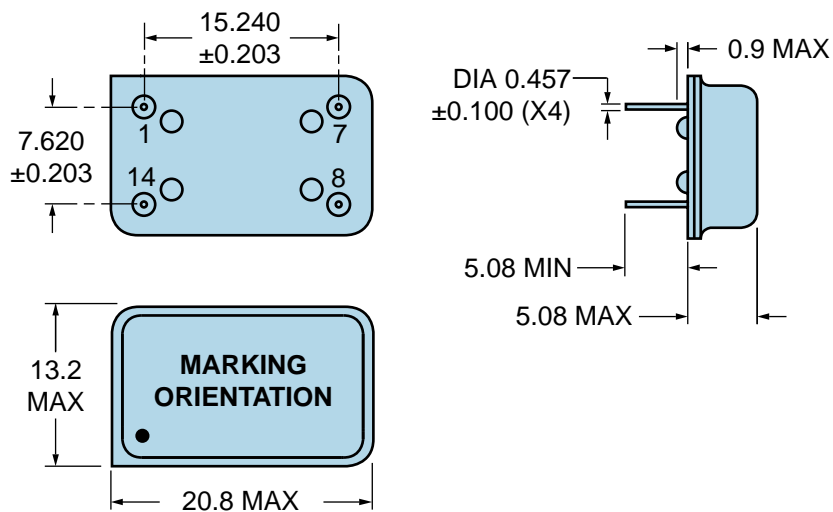
**ENVIRONMENTAL & MECHANICAL SPECIFICATIONS**

<b>Fine Leak Test</b>	MIL-STD-883, Method 1014, Condition A
<b>Gross Leak Test</b>	MIL-STD-883, Method 1014, Condition C
<b>Lead Integrity</b>	MIL-STD-883, Method 2004
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition C
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Solderability</b>	MIL-STD-883, Method 2003
<b>Temperature Cycling</b>	MIL-STD-883, Method 1010
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A

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## MECHANICAL DIMENSIONS (all dimensions in millimeters)



PIN	CONNECTION
1	Tri-State (High Impedance)
7	Ground/Case Ground
8	Output
14	Supply Voltage

LINE	MARKING
1	<b>ECLIPTEK</b>
2	<b>EP13TS</b> <i>EP13=Product Series</i>
3	<b>1.5580M</b>
4	<b>XXYZZ</b> <i>XX=Ecliptek Manufacturing Code</i> <i>Y=Last Digit of the Year</i> <i>ZZ=Week of the Year</i>

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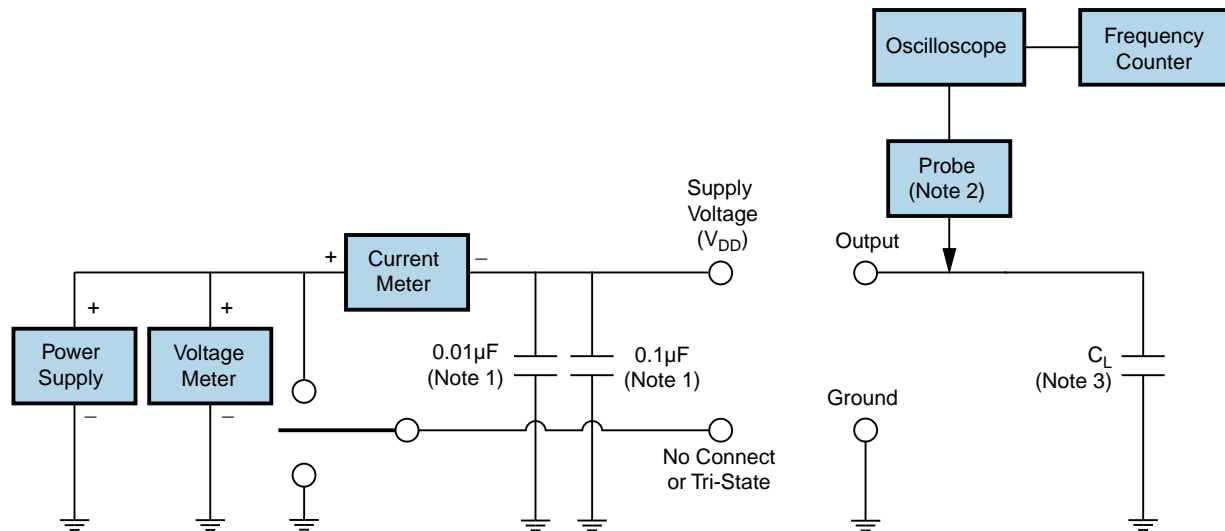
## OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for CMOS Output



Note 1: An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

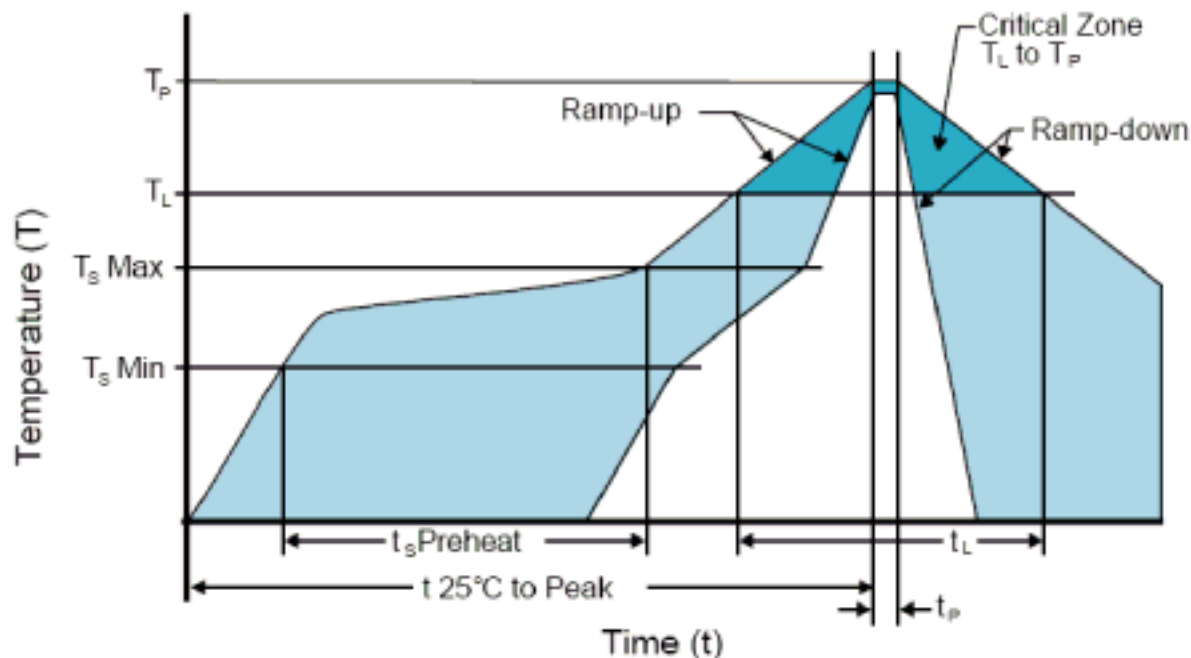
Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

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

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## Recommended Solder Reflow Methods



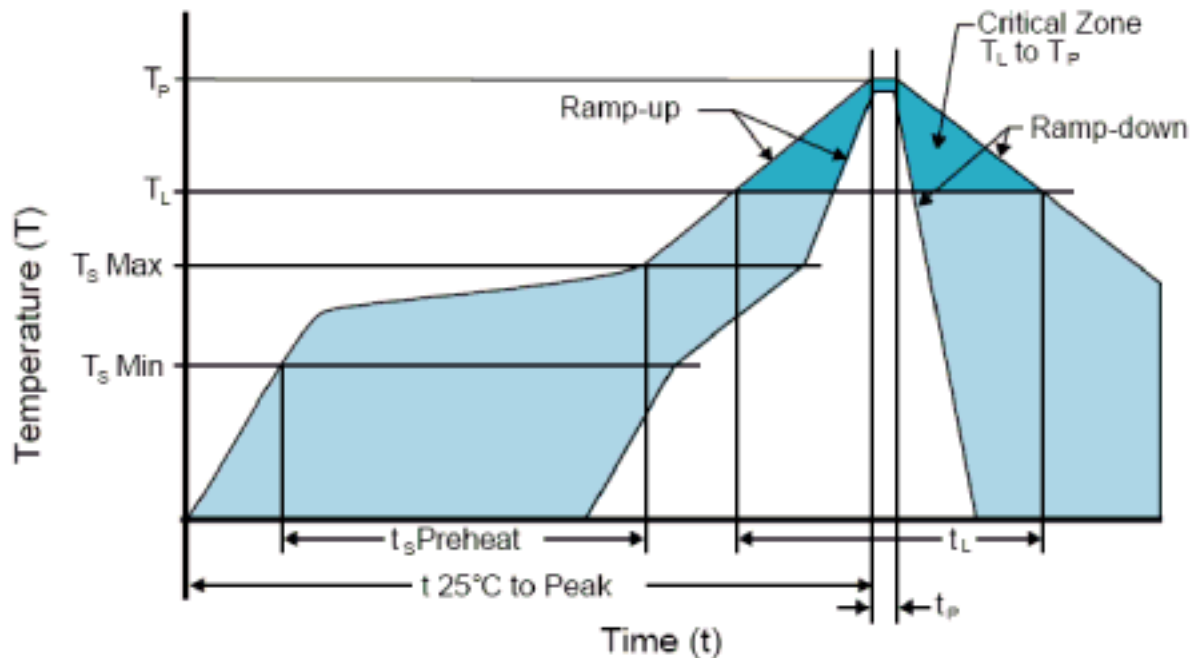
### High Temperature Solder Bath (Wave Solder)

$T_S$ MAX to $T_L$ (Ramp-up Rate)	3°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S$ MIN)	150°C
- Temperature Typical ( $T_S$ TYP)	175°C
- Temperature Maximum ( $T_S$ MAX)	200°C
- Time ( $t_s$ MIN)	60 - 180 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	3°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	20 - 40 Seconds
<b>Ramp-down Rate</b>	6°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	8 Minutes Maximum
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to back of PCB board and device leads only. Do not use this method for product with the Gull Wing option.

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## Recommended Solder Reflow Methods



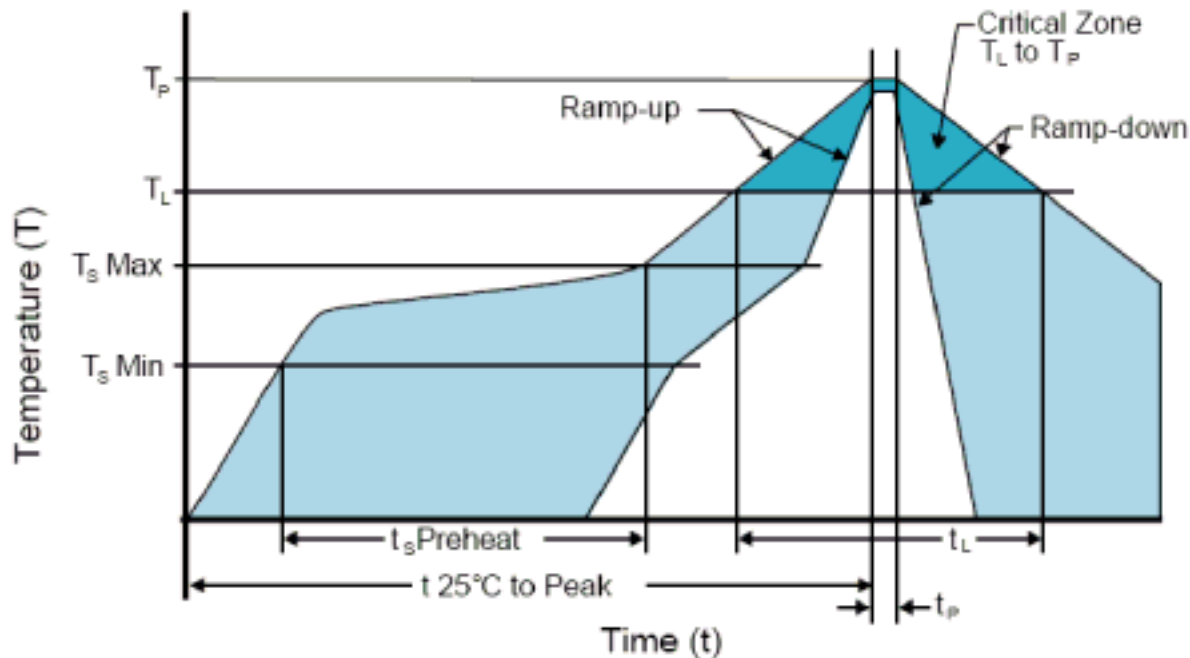
### Low Temperature Infrared/Convection 185°C

<b><math>T_S \text{ MAX}</math> to <math>T_L</math> (Ramp-up Rate)</b>	5°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S \text{ MIN}$ )	N/A
- Temperature Typical ( $T_S \text{ TYP}$ )	150°C
- Temperature Maximum ( $T_S \text{ MAX}$ )	N/A
- Time ( $t_s \text{ MIN}$ )	60 - 120 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	5°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_P</math>)</b>	185°C Maximum
<b>Target Peak Temperature (<math>T_P \text{ Target}</math>)</b>	185°C Maximum 2 Times
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	10 Seconds Maximum 2 Times
<b>Ramp-down Rate</b>	5°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to body of device. Use this method only for product with the Gull Wing option.

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## Recommended Solder Reflow Methods



### Low Temperature Solder Bath (Wave Solder)

Ts MAX to TL (Ramp-up Rate)	5°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum (Ts MIN)	N/A
- Temperature Typical (Ts TYP)	150°C
- Temperature Maximum (Ts MAX)	N/A
- Time (ts MIN)	30 - 60 Seconds
<b>Ramp-up Rate (TL to TP)</b>	5°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature (TL)	150°C
- Time (tL)	200 Seconds Maximum
<b>Peak Temperature (TP)</b>	245°C Maximum
<b>Target Peak Temperature (TP Target)</b>	245°C Maximum 1 Time / 235°C Maximum 2 Times
<b>Time within 5°C of actual peak (tp)</b>	5 Seconds Maximum 1 Time / 15 Seconds Maximum 2 Times
<b>Ramp-down Rate</b>	5°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to back of PCB board and device leads only. Do not use this method for product with the Gull Wing option.

### Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)

### High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)