

EH4600TS-32.768M
[Click part number to visit Part Number Details page](#)
REGULATORY COMPLIANCE (Data Sheet downloaded on Aug 24, 2016)
[Click badges to download compliance docs](#)

Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.

**ITEM DESCRIPTION**

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 32.768MHz ± 100 ppm 0°C to +70°C

ELECTRICAL SPECIFICATIONS

Nominal Frequency	32.768MHz
Frequency Tolerance/Stability	± 100 ppm 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°, 260°C Reflow, Shock, and Vibration)
Aging at 25°C	± 5 ppm/Year Maximum
Operating Temperature Range	0°C to +70°C
Supply Voltage	3.3Vdc $\pm 5\%$
Input Current	12mA Maximum (No Load)
Output Voltage Logic High (Voh)	90% of Vdd Minimum (IOH = -8mA)
Output Voltage Logic Low (Vol)	10% of Vdd Maximum (IOL = +8mA)
Rise/Fall Time	6nSec Maximum (Measured at 20% to 80% of waveform)
Duty Cycle	50 ± 10 (%) (Measured at 50% of waveform)
Load Drive Capability	30pF Maximum
Output Logic Type	CMOS
Pin 1 Connection	Tri-State (High Impedance)
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)
Standby Current	10 μ A Maximum (Pin 1 = Ground)
RMS Phase Jitter	20pSec Typical, 30pSec Maximum (Fj = 12kHz to 20MHz)
Period Jitter (RMS)	10pSec Typical
Period Jitter (pk-pk)	60pSec Typical, 100pSec Maximum
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

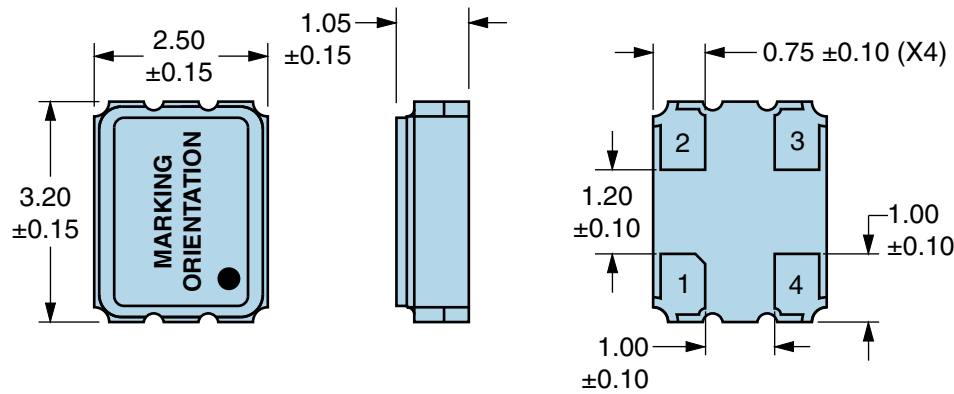
ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500Vdc
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

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MECHANICAL DIMENSIONS (all dimensions in millimeters)

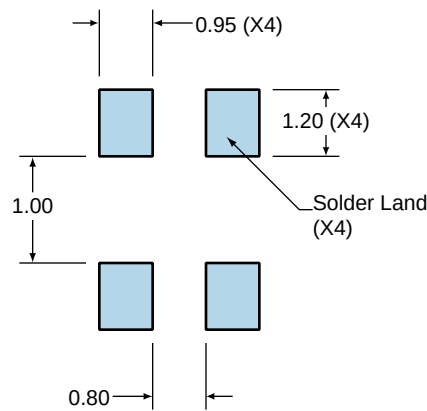


PIN	CONNECTION
1	Tri-State
2	Case Ground
3	Output
4	Supply Voltage

LINE	MARKING
1	E32.768 <i>E=Ecliptek Designator</i>
2	XXXXXX <i>XXXXXX=Ecliptek Manufacturing Identifier</i>

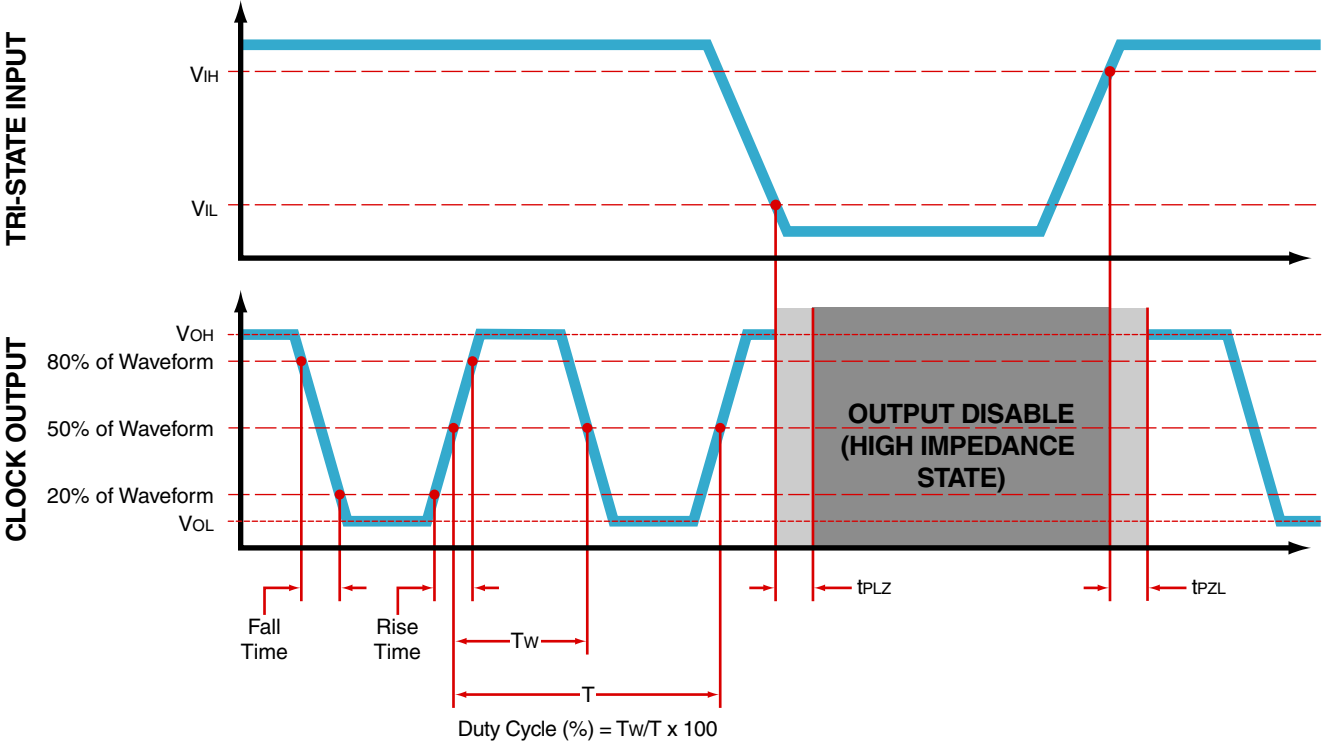
Suggested Solder Pad Layout

All Dimensions in Millimeters

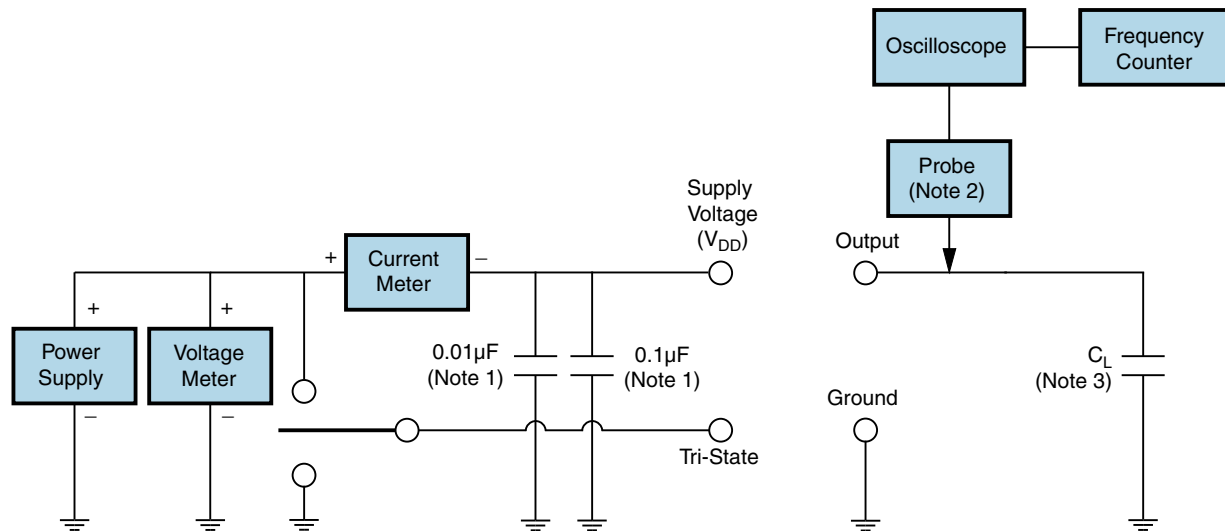


All Tolerances are ±0.1

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.

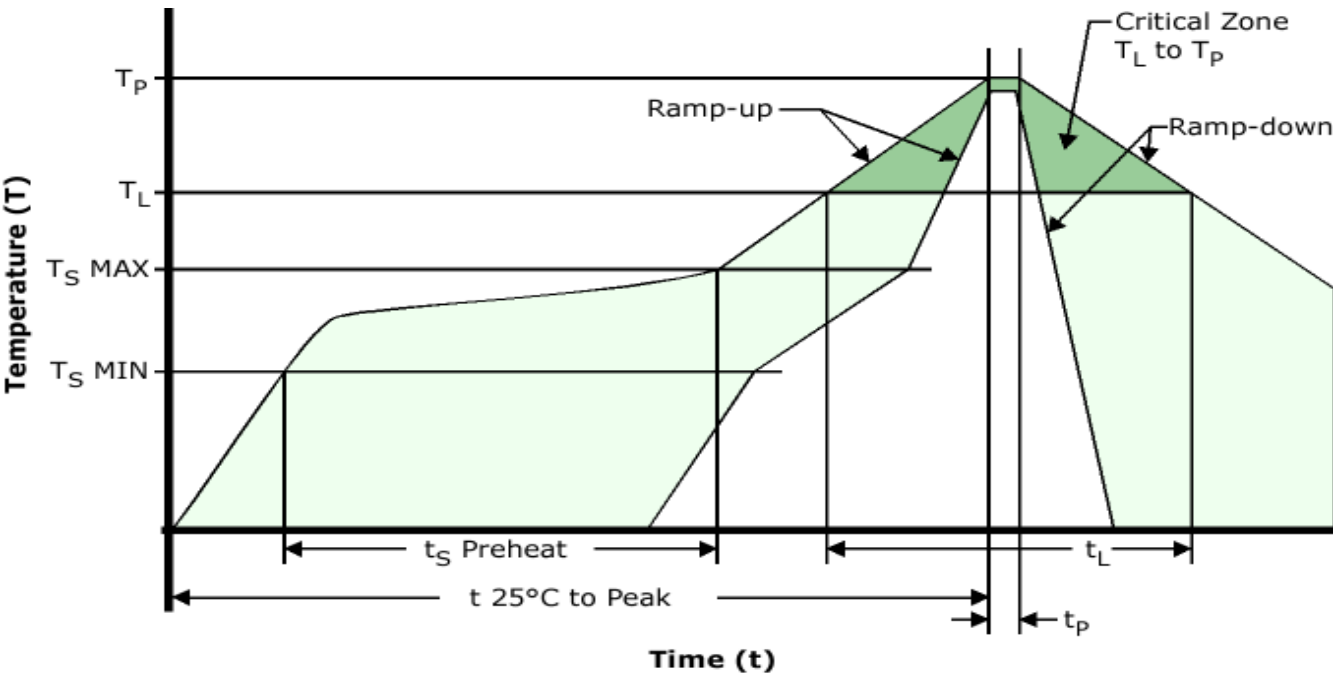
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

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

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Recommended Solder Reflow Methods



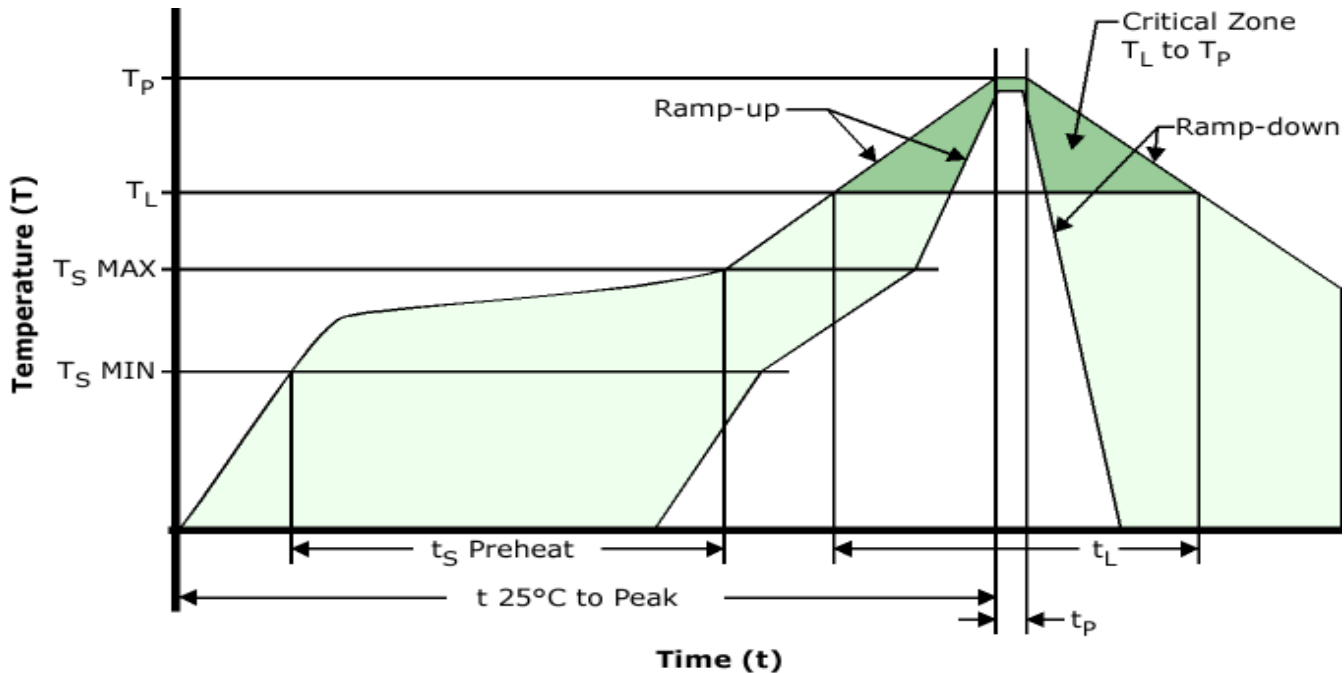
High Temperature Infrared/Convection

TS MAX to TL (Ramp-up Rate)		3°C/Second Maximum
Preheat		
- Temperature Minimum (TS MIN)		150°C
- Temperature Typical (TS TYP)		175°C
- Temperature Maximum (TS MAX)		200°C
- Time (ts MIN)		60 - 180 Seconds
Ramp-up Rate (TL to TP)		3°C/Second Maximum
Time Maintained Above:		
- Temperature (TL)		217°C
- Time (tL)		60 - 150 Seconds
Peak Temperature (TP)		260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (TP Target)		250°C +0/-5°C
Time within 5°C of actual peak (tp)		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.

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Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

$T_S \text{ MAX}$ to T_L (Ramp-up Rate)	5°C/Second Maximum
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Preheat

- 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

Ramp-up Rate (T_L to T_P)	5°C/Second Maximum
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Time Maintained Above:

- Temperature (T_L)	150°C
- Time (t_L)	200 Seconds Maximum

Peak Temperature (T_P)	240°C Maximum
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Target Peak Temperature ($T_P \text{ Target}$)	240°C Maximum 2 Times / 230°C Maximum 1 Time
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Time within 5°C of actual peak (t_p)	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
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Ramp-down Rate	5°C/Second Maximum
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Time 25°C to Peak Temperature (t)	N/A
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Moisture Sensitivity Level	Level 1
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Additional Notes	Temperatures shown are applied to body of device.
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Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (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.)