

EC2600ETTS-4.000M TR

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REGULATORY COMPLIANCE (Data Sheet downloaded on Jun 25, 2016)


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ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 4.000MHz ± 100 ppm -40°C to +85°C

ELECTRICAL SPECIFICATIONS

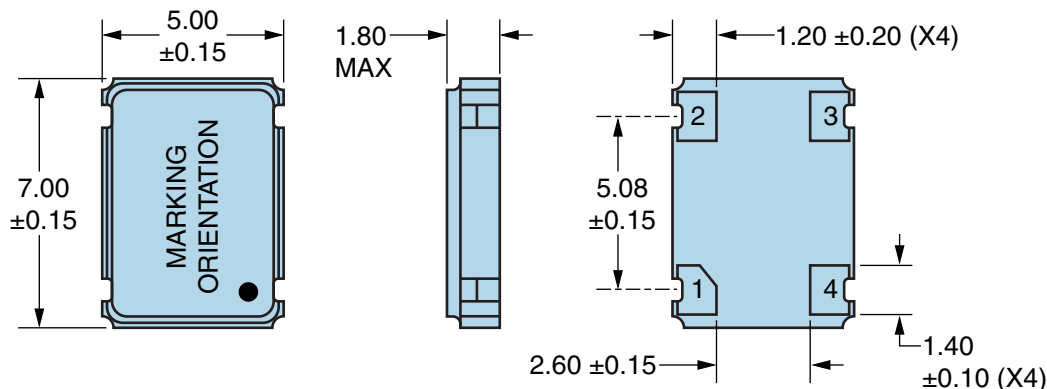
| | |
|---|---|
| Nominal Frequency | 4.000MHz |
| Frequency Tolerance/Stability | ± 100 ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration) |
| Aging at 25°C | ± 5 ppm/year Maximum |
| Operating Temperature Range | -40°C to +85°C |
| Supply Voltage | 3.3Vdc $\pm 10\%$ |
| Input Current | 10mA Maximum |
| 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 | 5nSec Maximum (w/15pF Load), 7nSec Maximum (w/30pF Load) (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) |
| Output Control Input Voltage Logic High (Vih) | 70% of Vdd Minimum or No Connect to Enable Output |
| Output Control Input Voltage Logic Low (Vil) | 30% of Vdd Maximum to Disable Output (High Impedance) |
| Standby Current | 10 μ A Maximum (Disabled Output: High Impedance) |
| RMS Phase Jitter | 1pSec Maximum (12kHz to 20MHz offset frequency) |
| 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: 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 |

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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 | ECLIPTEK |
| 2 | 4.0000M |
| 3 | XXXXXX XXXXXX=Ecliptek Manufacturing Identifier |

Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

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OUTPUT WAVEFORM & TIMING DIAGRAM



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.

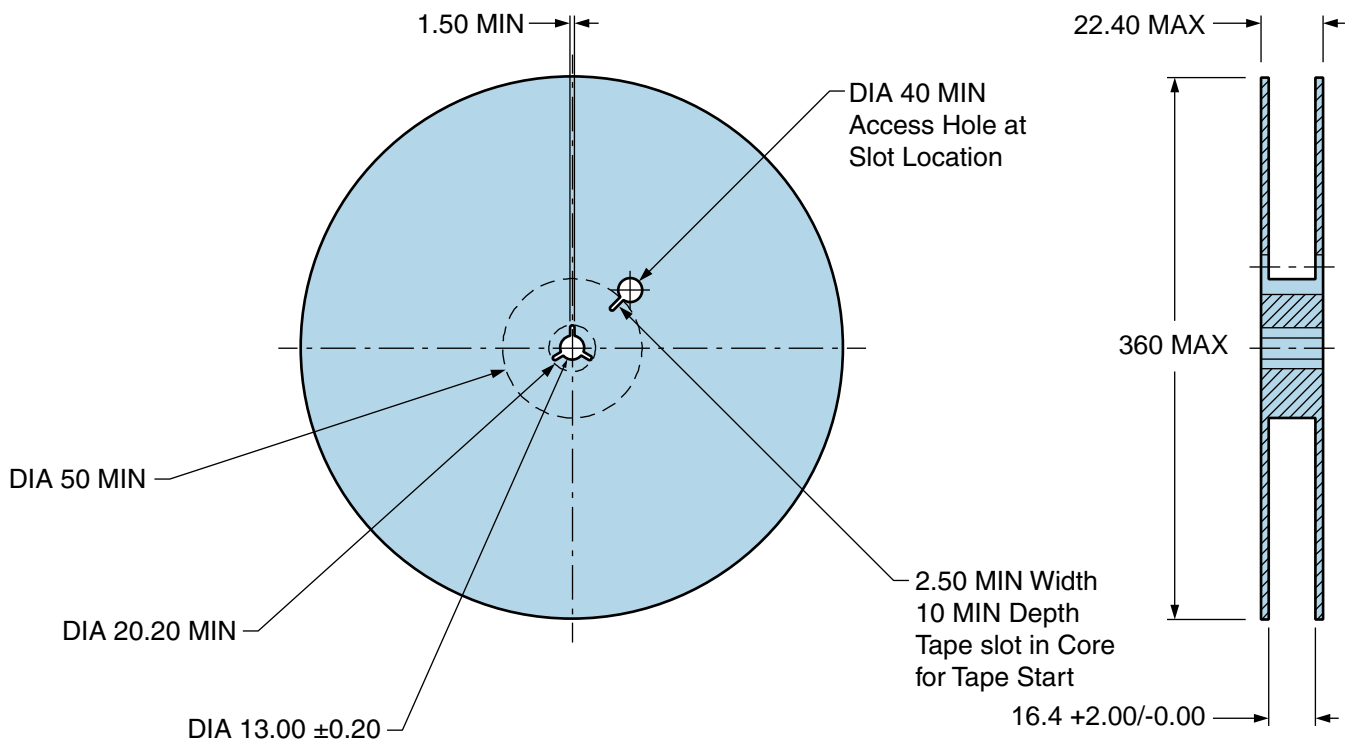
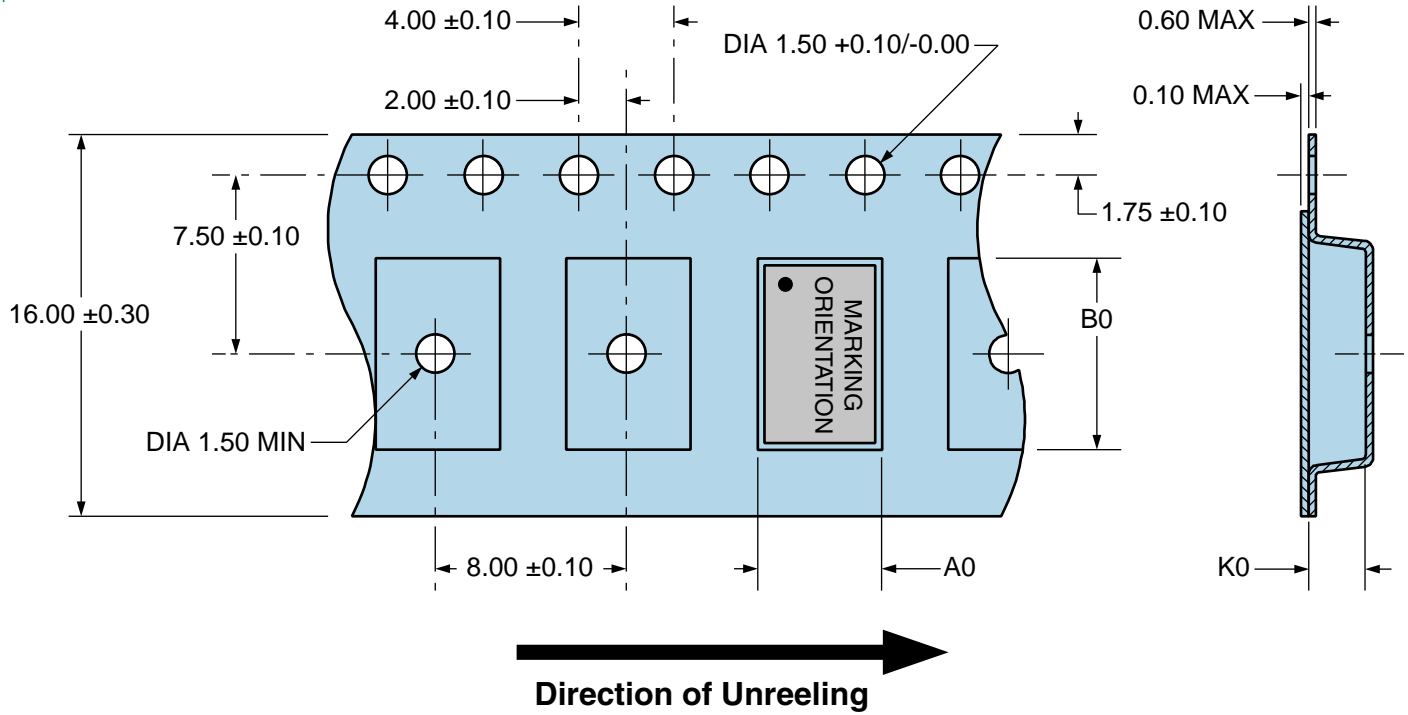
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Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

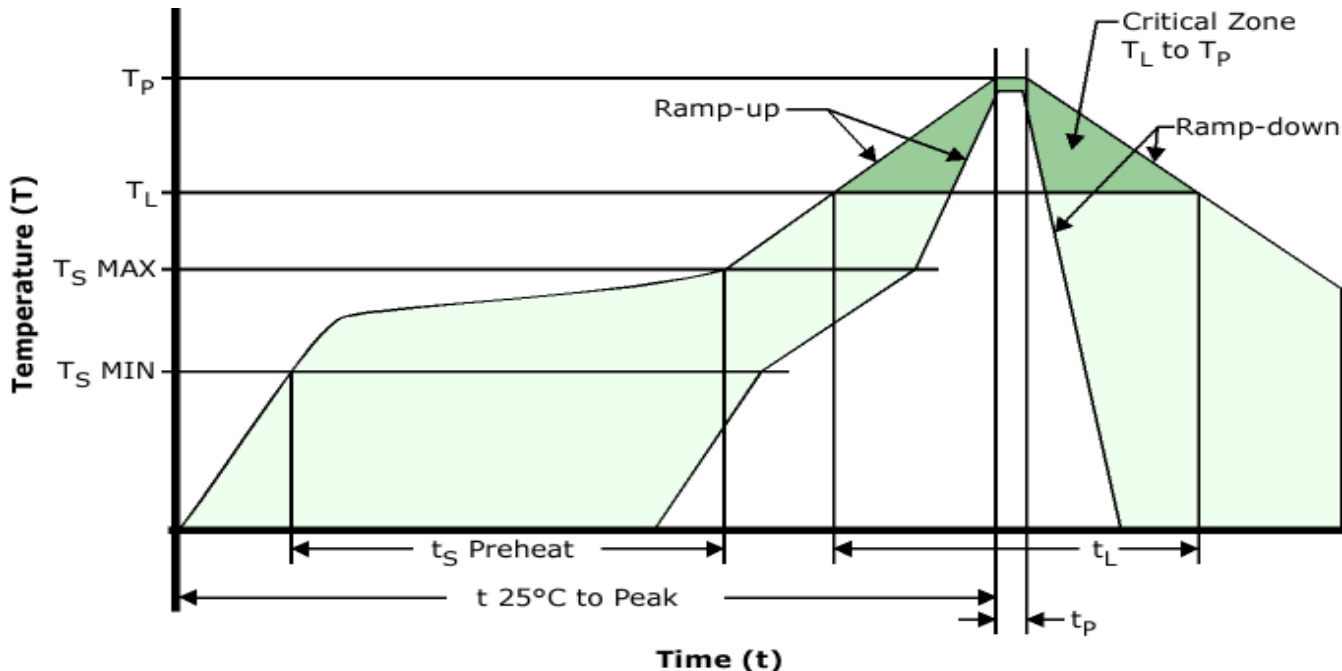
Compliant to EIA-481



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Recommended Solder Reflow Methods



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 MIN) | 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 |
|-----------------------------------|-------------------|

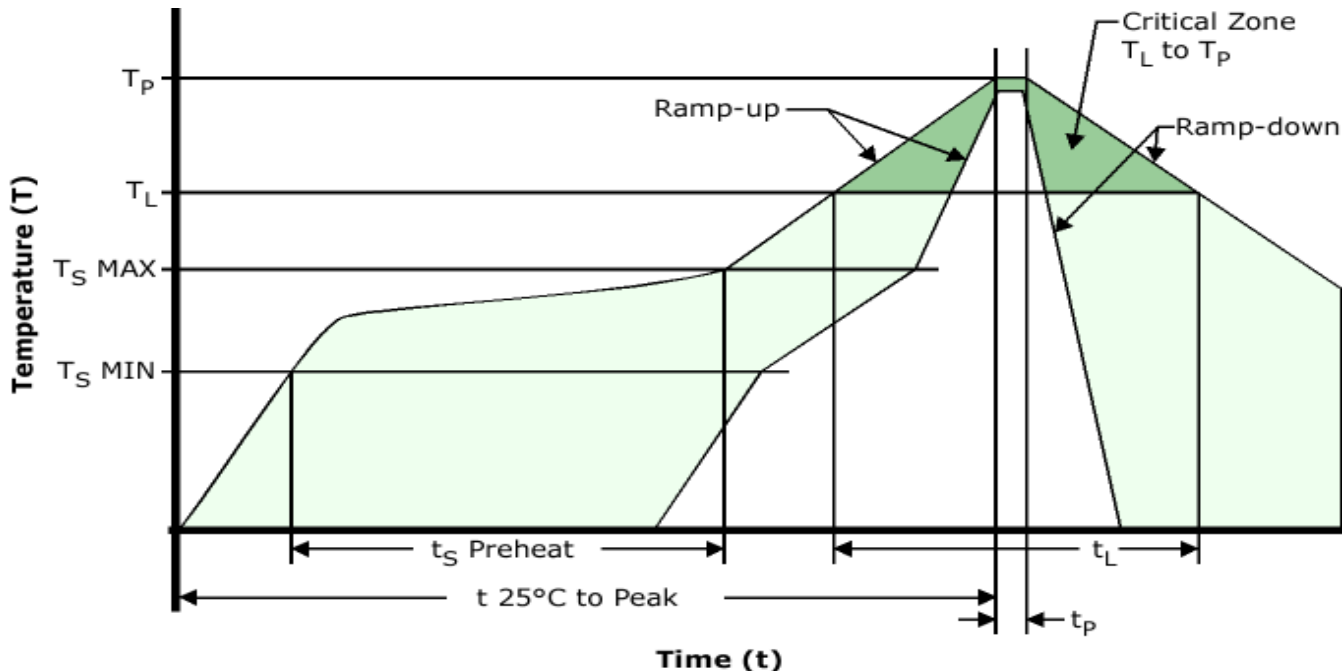
| | |
|----------------------------|---------|
| Moisture Sensitivity Level | Level 1 |
|----------------------------|---------|

| | |
|------------------|---|
| Additional Notes | Temperatures shown are applied to body of device. |
|------------------|---|

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Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

| | |
|-----------------------------|--------------------|
| Ts MAX to TL (Ramp-up Rate) | 5°C/Second Maximum |
|-----------------------------|--------------------|

Preheat

| | |
|--------------------------------|------------------|
| - Temperature Minimum (Ts MIN) | N/A |
| - Temperature Typical (Ts TYP) | 150°C |
| - Temperature Maximum (Ts MAX) | N/A |
| - Time (ts MIN) | 60 - 120 Seconds |

| | |
|-------------------------|--------------------|
| Ramp-up Rate (TL to TP) | 5°C/Second Maximum |
|-------------------------|--------------------|

Time Maintained Above:

| | |
|--------------------|---------------------|
| - Temperature (TL) | 150°C |
| - Time (tL) | 200 Seconds Maximum |

| | |
|-----------------------|---------------|
| Peak Temperature (TP) | 240°C Maximum |
|-----------------------|---------------|

| | |
|-------------------------------------|--|
| Target Peak Temperature (TP Target) | 240°C Maximum 2 Times / 230°C Maximum 1 Time |
|-------------------------------------|--|

| | |
|-------------------------------------|--|
| Time within 5°C of actual peak (tp) | 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.)

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)