

EH2700ETTTS-19.608M TR

[Click part number to visit Part Number Details page](#)

REGULATORY COMPLIANCE (Data Sheet downloaded on May 9, 2018)


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ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 2.5Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 19.608MHz ± 100 ppm -40°C to +85°C

ELECTRICAL SPECIFICATIONS

| | |
|---------------------------------------|--|
| Nominal Frequency | 19.608MHz |
| 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 | -40°C to +85°C |
| Supply Voltage | 2.5Vdc $\pm 5\%$ |
| Input Current | 6mA 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 ± 5 (%) (Measured at 50% of waveform) |
| Load Drive Capability | 15pF 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) | 13pSec Typical |
| Period Jitter (pk-pk) | 85pSec 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: 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 |

EH2700ETTTS-19.608M TR [Click part number to visit Part Number Details page](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)



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

| LINE | MARKING |
|------|---|
| 1 | ECLIPTEK |
| 2 | 19.608M |
| 3 | XXXXX XXXXX=Ecliptek Manufacturing Identifier |

Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

EH2700ETTTS-19.608M TR [Click part number to visit Part Number Details page](#)

OUTPUT WAVEFORM & TIMING DIAGRAM



EH2700ETTTS-19.608M TR [Click part number to visit Part Number Details page](#)

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 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



EH2700ETTTS-19.608M TR

[Click part number to visit Part Number Details page](#)

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. |

EH2700ETTTS-19.608M TR

[Click part number to visit Part Number Details page](#)

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.)