

EQRD22E2J-156.250M

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REGULATORY COMPLIANCE (Data Sheet downloaded on May 26, 2020)


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ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVPECL (PECL) 2.5Vdc 6 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD) 156.250MHz ± 100 ppm over -20°C to $+70^{\circ}\text{C}$

ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Nominal Frequency | 156.250MHz |
| Frequency Tolerance/Stability | ± 100 ppm Maximum over -20°C to $+70^{\circ}\text{C}$ (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 | ± 3 ppm Maximum First Year |
| Supply Voltage | 2.5Vdc $\pm 5\%$ |
| Input Current | 50mA Maximum |
| Output Voltage Logic High (Voh) | Vdd-1.025Vdc Minimum, 1.55Vdc Typical, Vdd-0.88Vdc Maximum |
| Output Voltage Logic Low (Vol) | Vdd-1.81Vdc Minimum, 0.80Vdc Typical, Vdd-1.62Vdc Maximum |
| Rise/Fall Time | 400pSec Maximum (Measured at 20% to 80% of Waveform) |
| Duty Cycle | 50 ± 5 (%) (Measured at 50% of Waveform) |
| Load Drive Capability | 50 Ohms into Vdd-2.0Vdc |
| Output Logic Type | LVPECL |
| Phase Noise | All Values are Typical -50dBc/Hz at 10Hz Offset -82dBc/Hz at 100Hz Offset -116dBc/Hz at 1kHz Offset -138dBc/Hz at 10kHz Offset -144dBc/Hz at 100kHz Offset -149dBc/Hz at 1MHz Offset -155dBc/Hz at 10MHz Offset -155dBc/Hz at 20MHz Offset |
| Output Control Function | Standby (on Pad 1) |
| Output Control Input Voltage Logic High (Vih) | 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output |
| Output Control Input Voltage Logic Low (Vil) | 30% of Vdd Maximum to Disable Output and Complementary Output (High Impedance) |
| Standby Output Enable Time | 10mSec Maximum |
| Standby Output Disable Time | 200nSec Maximum |
| Standby Current | 10 μ A Maximum (Without Load) |
| RMS Phase Jitter | 200fSec Maximum (Fj=12kHz to 20MHz (Random)) |
| Period Jitter (Deterministic) | 0.2pSec Typical |
| Period Jitter (Random) | 1.0pSec Typical |
| Period Jitter (One Sigma) | 1.5pSec Typical |
| Period Jitter (tp-p) | 40pSec Maximum |
| Start Up Time | 10mSec Maximum |
| Storage Temperature Range | -55°C to $+125^{\circ}\text{C}$ |

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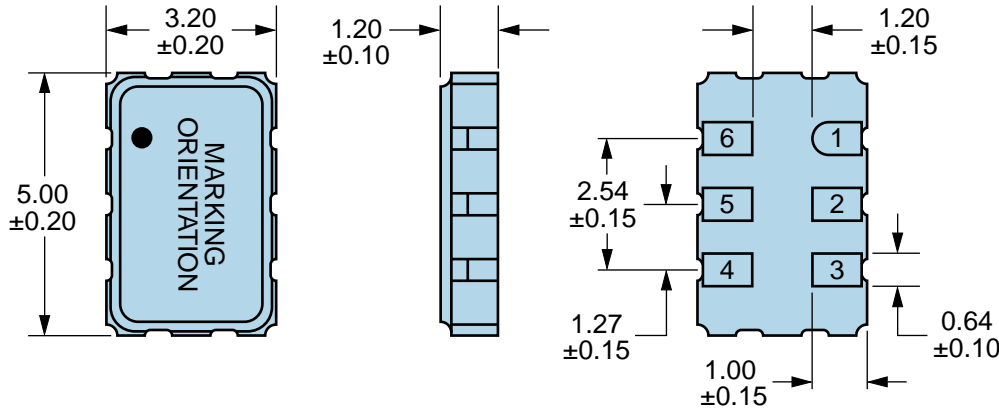
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ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|-------------------------------------|---|
| 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)

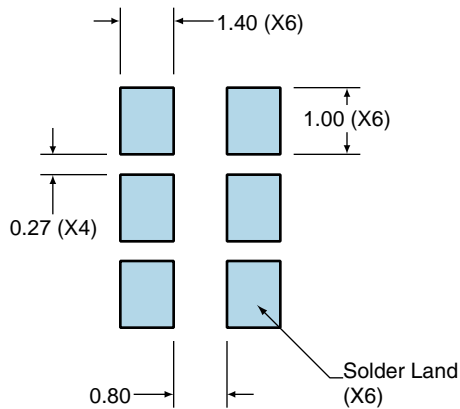


| PIN | CONNECTION |
|-----|----------------------|
| 1 | Standby |
| 2 | No Connect |
| 3 | Case Ground |
| 4 | Output |
| 5 | Complementary Output |
| 6 | Supply Voltage |

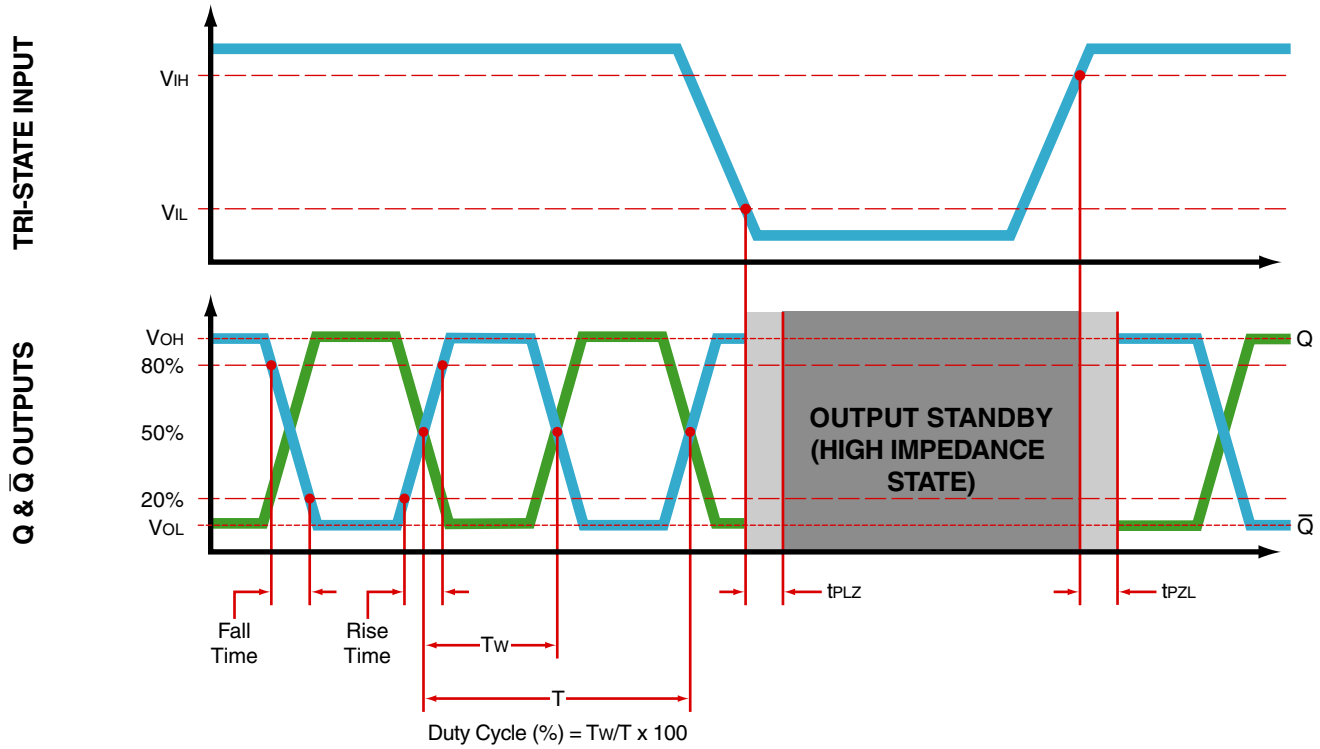
| LINE | MARKING |
|------|--|
| 1 | E156.25 <i>E=Ecliptek Designator</i> |
| 2 | XXXXX <i>XXXXX=Ecliptek Manufacturing Identifier</i> |

Suggested Solder Pad Layout

All Dimensions in Millimeters

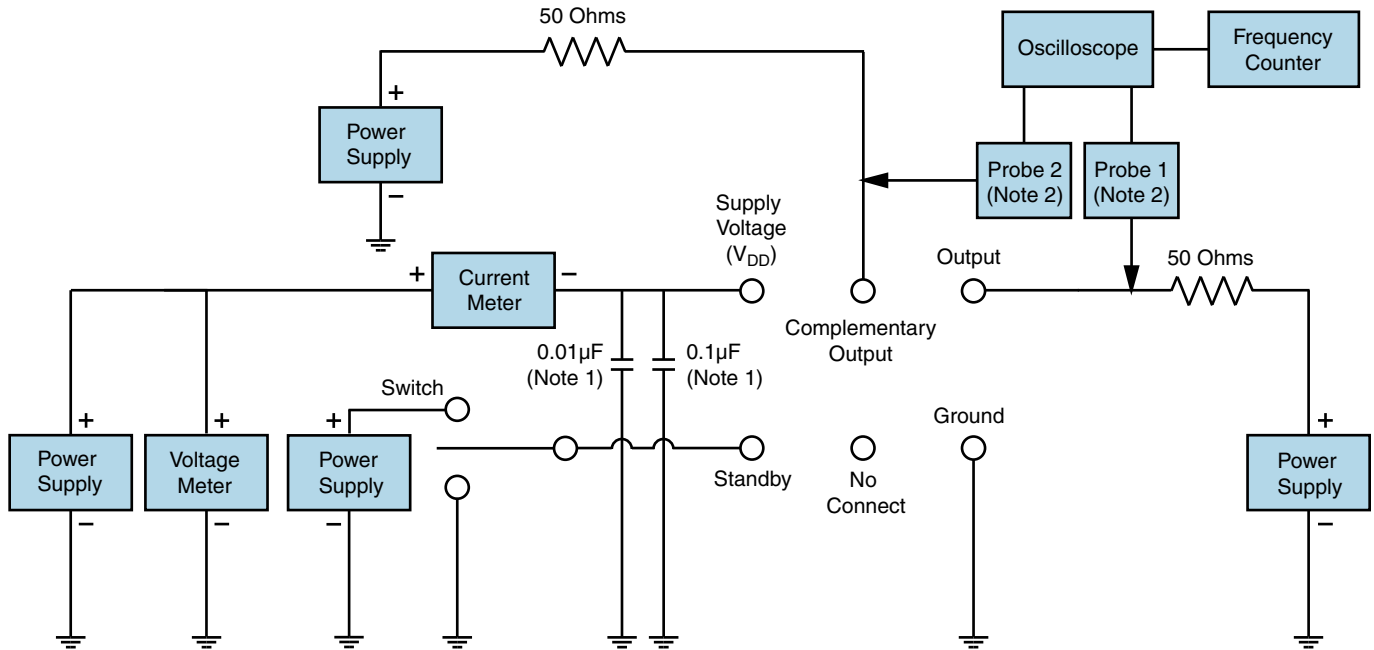


All Tolerances are ±0.1

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OUTPUT WAVEFORM & TIMING DIAGRAM


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Test Circuit for Standby (Pad 1) and Complementary 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 (>500MHz) passive probe is recommended.

Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

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Recommended Solder Reflow Methods



High Temperature Infrared/Convection

| | |
|--|---|
| $T_s \text{ MAX}$ to T_L (Ramp-up Rate) | 3°C/Second Maximum |
| Preheat | |
| - Temperature Minimum ($T_s \text{ MIN}$) | 150°C |
| - Temperature Typical ($T_s \text{ TYP}$) | 175°C |
| - Temperature Maximum ($T_s \text{ MAX}$) | 200°C |
| - Time ($t_s \text{ MIN}$) | 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 ($T_p \text{ Target}$) | 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

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

High Temperature Manual Soldering

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