

EQUG32D4J1H-16.03495M

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REGULATORY COMPLIANCE (Data Sheet downloaded on Jun 1, 2020)


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ITEM DESCRIPTION

Temperature Compensated Voltage Controlled Quartz Crystal Clock Oscillators TCVCXO LVPECL (PECL) 2.5Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 16.03495MHz -20°C to +70°C

ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Nominal Frequency | 16.03495MHz |
| Frequency Stability | ±1.0ppm Maximum (Inclusive of Operating Temperature Range, at Vdd=2.5Vdc, at Vc=1.5Vdc) |
| Frequency Stability vs. Frequency Tolerance | ±1.5ppm Maximum (at 25°C ±2°C, at Vdd=2.5Vdc, at Vc=1.5Vdc ±0.1Vdc, Pre-Reflow) |
| Frequency Stability vs. Input Voltage | ±0.2ppm Maximum (±5%) |
| Frequency Stability vs. Load | ±0.2ppm Maximum (±2pF) |
| Frequency Stability vs. Reflow | ±1.0ppm Maximum (at 25°C, 24 hours after reflow, 1 time) |
| Frequency Stability vs. Aging | ±1ppm/Year Maximum (at 25°C) |
| Operating Temperature Range | -20°C to +70°C |
| Supply Voltage | 2.5Vdc ±5% |
| Input Current | 75mA Maximum |
| Output Voltage Logic High (Voh) | Vdd-1.025Vdc Minimum, 1.6Vdc Typical, Vdd-0.6Vdc Maximum |
| Output Voltage Logic Low (Vol) | Vdd-1.85Vdc Minimum, 0.8Vdc Typical, Vdd-1.62Vdc Maximum |
| Rise/Fall Time | 300pSec Maximum (Measured at 10% to 90% of Waveform) |
| Duty Cycle | 50 ±5(%) (Measured at 50% of Waveform) |
| Load Drive Capability | 50 Ohms into Vdd-2Vdc |
| Output Logic Type | LVPECL |
| Control Voltage | 1.5Vdc ±1.0Vdc |
| Frequency Deviation | ±8ppm Minimum |
| Linearity | 10% Maximum |
| Transfer Function | Positive Transfer Characteristic |
| Modulation Bandwidth | 10kHz Minimum (Measured at -3dB) |
| Input Impedance | 1MOhms Minimum |
| Phase Noise | -64dBc/Hz at 10Hz offset; -96dBc/Hz at 100Hz offset; -124dBc/Hz at 1kHz offset; -131dBc/Hz at 10kHz offset; -132dBc/Hz at 100kHz offset; -149dBc/Hz at 1MHz offset; -157dBc/Hz at 10MHz offset; -159dBc/Hz at 20MHz offset (All Values are Typical) |
| Output Control Function | Output Enable (OE) |
| Output Control Input Voltage Logic High (Vih) | 90% of Vdd Minimum or No Connect to Enable Output and Complementary Output |
| Output Control Input Voltage Logic Low (Vil) | 10% of Vdd Maximum to Disable Output and Complementary Output (High Impedance) |
| Output Enable Time | 100nSec Maximum |
| Output Disable Time | 50nSec Maximum |
| Output Enable Current | 15mA Maximum (Without Load (Pin 2 = Ground)) |
| RMS Phase Jitter | 1.5pSec Maximum (Fj=12kHz to 20MHz (Random)) |
| Period Jitter (Deterministic) | 0.2pSec Typical |
| Period Jitter (Random) | 2pSec Typical |
| Period Jitter (RMS) | 3pSec Maximum |
| Period Jitter (pk-pk) | 30pSec Maximum |

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ELECTRICAL SPECIFICATIONS CONTINUED

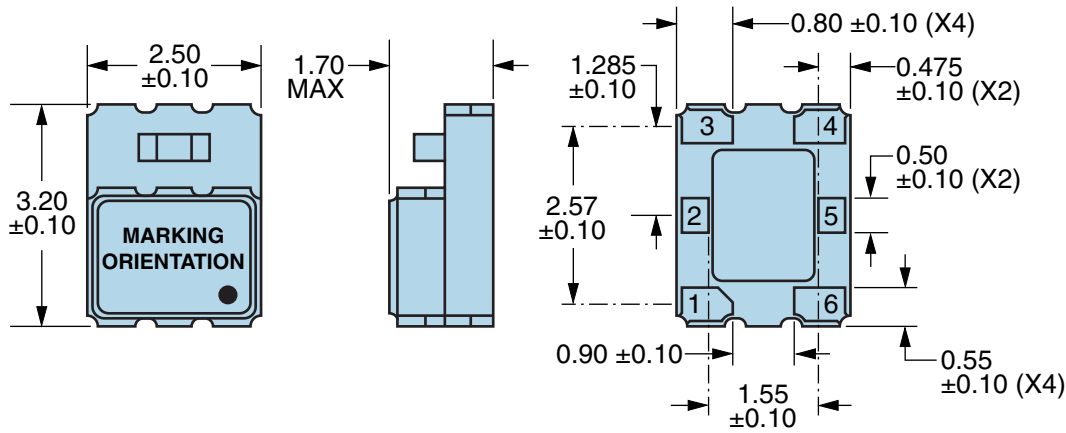
| | |
|----------------------------------|-----------------|
| Start Up Time | 10mSec Maximum |
| Storage Temperature Range | -55°C to +125°C |

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)



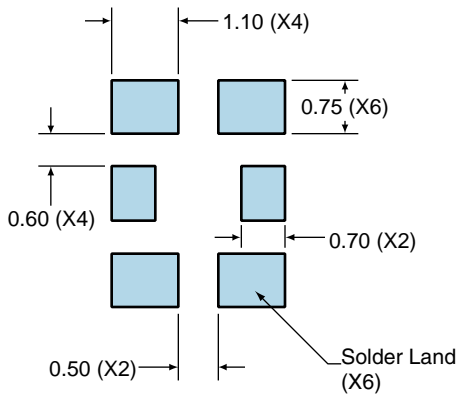
| PIN | CONNECTION |
|-----|----------------------|
| 1 | Control Voltage |
| 2 | Output Enable (OE) |
| 3 | Case/Ground |
| 4 | Output |
| 5 | Complementary Output |
| 6 | Supply Voltage |

| LINE | MARKING |
|------|---|
| 1 | E16.034 E=Ecliptek Designator |
| 2 | XXXXX XXXXX=Ecliptek Manufacturing Identifier |

Terminal Plating Thickness: Gold (0.3 to 1.0µm) over Nickel (1.27 to 8.89µm).

Suggested Solder Pad Layout

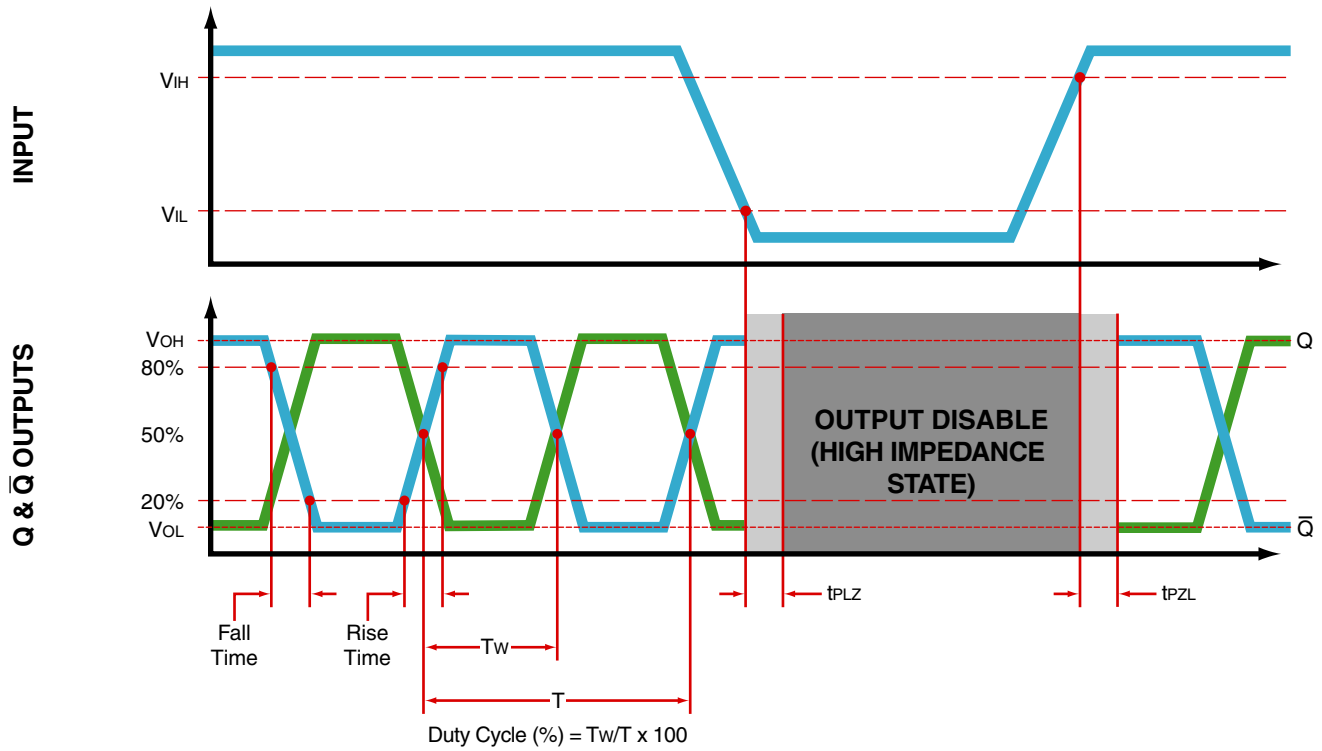
All Dimensions in Millimeters

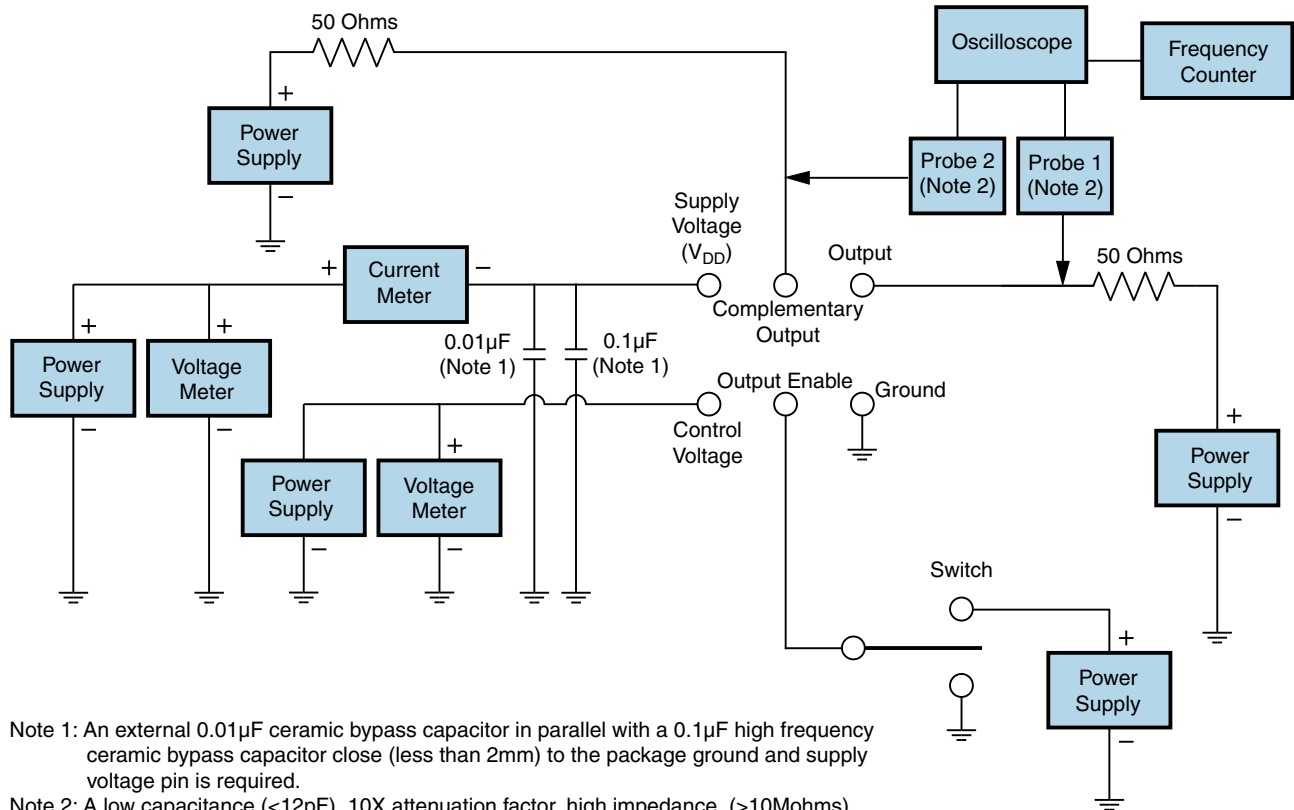


All Tolerances are ±0.1

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OUTPUT WAVEFORM & TIMING DIAGRAM



Test Circuit for PECL Output


Note 1: An external 0.01 μF ceramic bypass capacitor in parallel with a 0.1 μF 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 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.)