

**EQTG32D5GH-16.367767M**
[Click part number to visit Part Number Details page](#)
**REGULATORY COMPLIANCE** (Data Sheet downloaded on May 26, 2020)

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**ITEM DESCRIPTION**

Temperature Compensated Quartz Crystal Clock Oscillators TCXO LVPECL (PECL) 2.5Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 16.367767MHz -30°C to +60°C

**ELECTRICAL SPECIFICATIONS**

|   |   |
|---|---|
| Nominal Frequency                             | 16.367767MHz  |
| Frequency Stability                           | ±2.0ppm Maximum (Inclusive of Operating Temperature Range, at Vdd=2.5Vdc)   |
| Frequency Stability vs. Frequency Tolerance   | ±1.5ppm Maximum (at 25°C ±2°C, at Vdd=2.5Vdc, 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                   | -30°C to +60°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  |
| 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  |
| Start Up Time                                 | 10mSec Maximum  |
| Storage Temperature Range                     | -55°C to +125°C   |

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## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                                     |   |
|-------------------------------------|---|
| <b>ESD Susceptibility</b>           | MIL-STD-883, Method 3015, Class 1, HBM: 1500V |
| <b>Fine Leak Test</b>               | MIL-STD-883, Method 1014, Condition A         |
| <b>Flammability</b>                 | UL94-V0                                       |
| <b>Gross Leak Test</b>              | MIL-STD-883, Method 1014, Condition C         |
| <b>Mechanical Shock</b>             | MIL-STD-883, Method 2002, Condition B         |
| <b>Moisture Resistance</b>          | MIL-STD-883, Method 1004                      |
| <b>Moisture Sensitivity</b>         | J-STD-020, MSL 1                              |
| <b>Resistance to Soldering Heat</b> | MIL-STD-202, Method 210, Condition K          |
| <b>Resistance to Solvents</b>       | MIL-STD-202, Method 215                       |
| <b>Solderability</b>                | MIL-STD-883, Method 2003                      |
| <b>Temperature Cycling</b>          | MIL-STD-883, Method 1010, Condition B         |
| <b>Vibration</b>                    | MIL-STD-883, Method 2007, Condition A         |

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### MECHANICAL DIMENSIONS (all dimensions in millimeters)



| PIN | CONNECTION           |
|-----|----------------------|
| 1   | Do Not Connect       |
| 2   | Output Enable (OE)   |
| 3   | Case/Ground          |
| 4   | Output               |
| 5   | Complementary Output |
| 6   | Supply Voltage       |

| LINE | MARKING  |
|------|--|
| 1    | <b>E16.367</b><br>E=Ecliptek Designator                    |
| 2    | <b>XXXXX</b><br>XXXXX=Ecliptek<br>Manufacturing Identifier |

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

### Suggested Solder Pad Layout

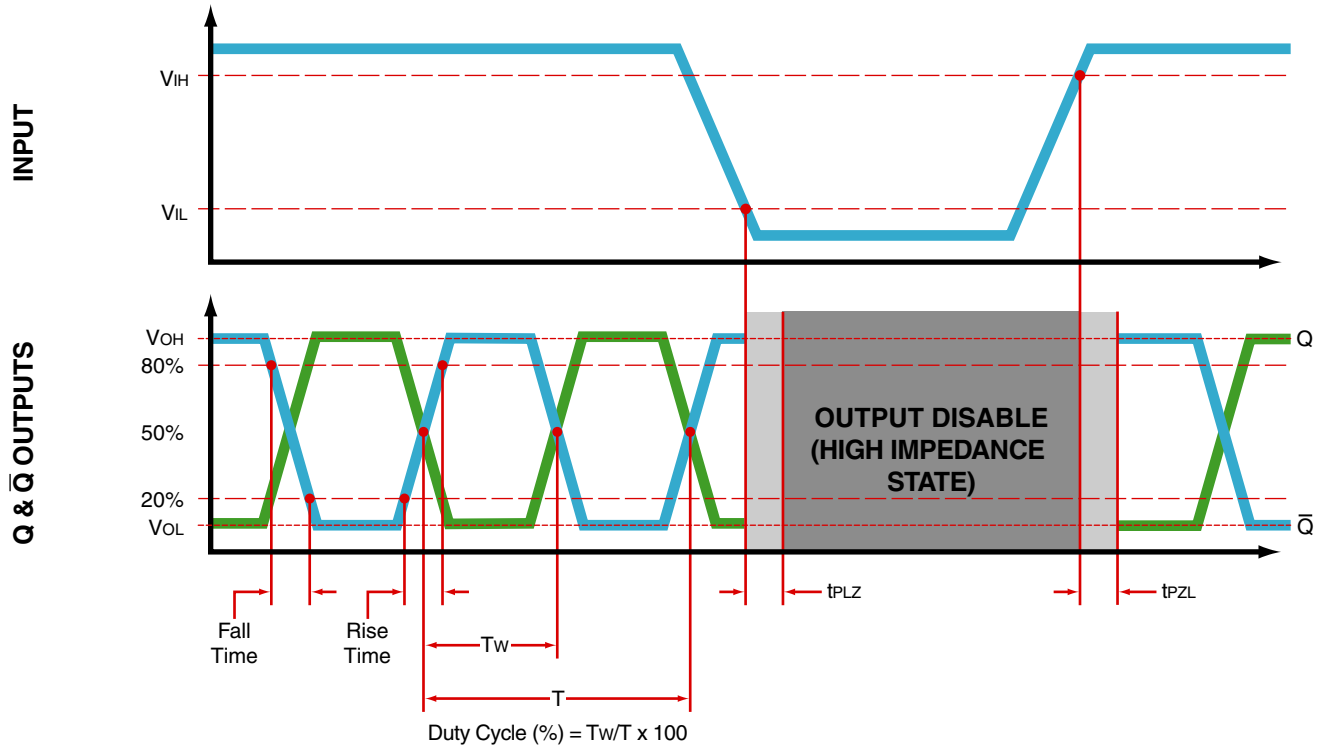
All Dimensions in Millimeters



All Tolerances are ±0.1

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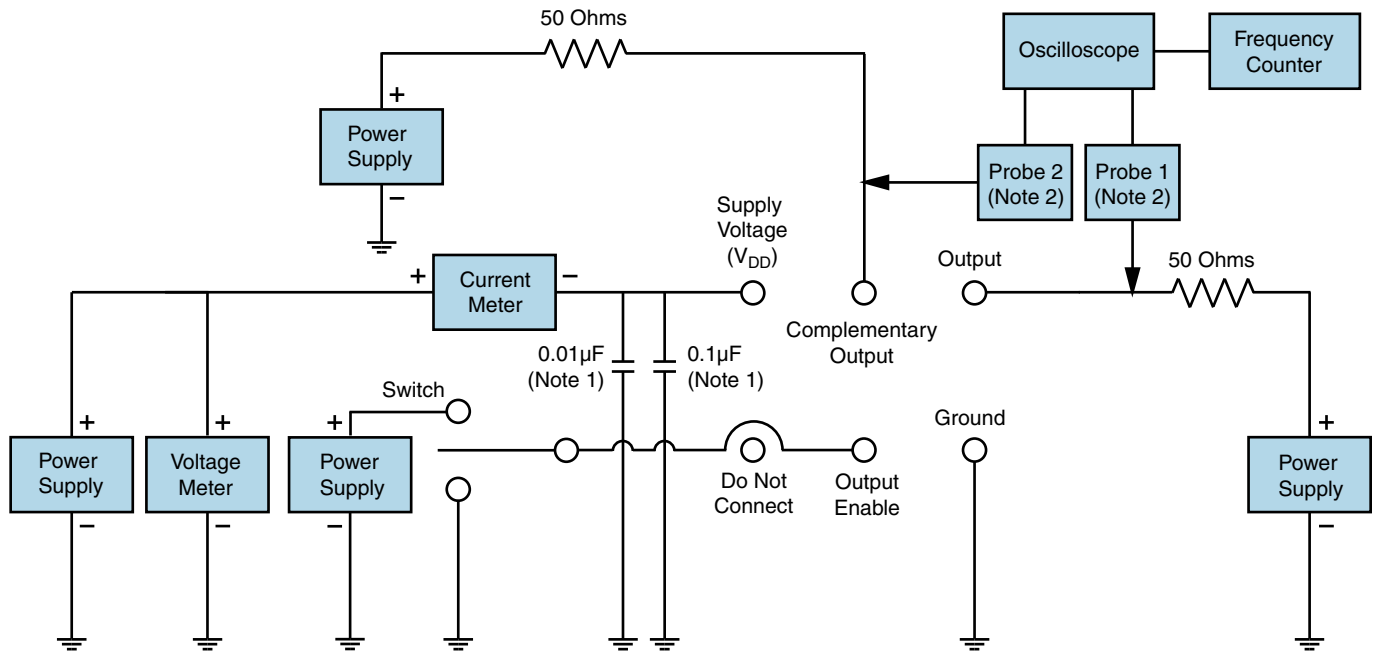
## OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for PECL 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)   | $3^\circ\text{C/Second Maximum}$                   |
| <b>Preheat</b>  |  |
| - Temperature Minimum ( $T_s \text{ MIN}$ )                                       | $150^\circ\text{C}$                                |
| - Temperature Typical ( $T_s \text{ TYP}$ )                                       | $175^\circ\text{C}$                                |
| - Temperature Maximum ( $T_s \text{ MAX}$ )                                       | $200^\circ\text{C}$                                |
| - Time ( $t_s \text{ MIN}$ )  | 60 - 180 Seconds                                   |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>                        | $3^\circ\text{C/Second Maximum}$                   |
| <b>Time Maintained Above:</b>   |  |
| - Temperature ( $T_L$ )   | $217^\circ\text{C}$                                |
| - Time ( $t_L$ )  | 60 - 150 Seconds                                   |
| <b>Peak Temperature (<math>T_P</math>)</b>  | $260^\circ\text{C Maximum for 10 Seconds Maximum}$ |
| <b>Target Peak Temperature (<math>T_P \text{ Target}</math>)</b>                  | $250^\circ\text{C} +0/-5^\circ\text{C}$            |
| <b>Time within <math>5^\circ\text{C}</math> of actual peak (<math>t_p</math>)</b> | 20 - 40 Seconds                                    |
| <b>Ramp-down Rate</b>   | $6^\circ\text{C/Second Maximum}$                   |
| <b>Time <math>25^\circ\text{C}</math> to Peak Temperature (t)</b>                 | 8 Minutes Maximum                                  |
| <b>Moisture Sensitivity Level</b>   | Level 1  |
| <b>Additional Notes</b>   | 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                                     |
| <b>Preheat</b>                             |  |
| - Temperature Minimum (Ts MIN)             | N/A  |
| - Temperature Typical (Ts TYP)             | 150°C  |
| - Temperature Maximum (Ts MAX)             | N/A  |
| - Time (ts MIN)                            | 60 - 120 Seconds                                       |
| <b>Ramp-up Rate (TL to TP)</b>             | 5°C/Second Maximum                                     |
| <b>Time Maintained Above:</b>              |  |
| - Temperature (TL)                         | 150°C  |
| - Time (tL)                                | 200 Seconds Maximum                                    |
| <b>Peak Temperature (TP)</b>               | 240°C Maximum  |
| <b>Target Peak Temperature (TP Target)</b> | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| <b>Time within 5°C of actual peak (tp)</b> | 10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time |
| <b>Ramp-down Rate</b>                      | 5°C/Second Maximum                                     |
| <b>Time 25°C to Peak Temperature (t)</b>   | N/A  |
| <b>Moisture Sensitivity Level</b>          | Level 1  |
| <b>Additional Notes</b>                    | 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.)