

EQTA35E1HH-16.367767M [Click part number to visit Part Number Details page](#)
REGULATORY COMPLIANCE (Data Sheet downloaded on May 30, 2020)

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ITEM DESCRIPTION

Temperature Compensated Quartz Crystal Clock Oscillators TCXO LVCMOS (CMOS) 3.0Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 16.367767MHz 0°C to +50°C

ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Nominal Frequency | 16.367767MHz |
| Frequency Stability | ±1.5ppm Maximum (Inclusive of Operating Temperature Range, at Vdd=3.0Vdc) |
| Frequency Stability vs. Frequency Tolerance | ±1.0ppm Maximum (at 25°C ±2°C, at Vdd=3.0Vdc, 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 | 0°C to +50°C |
| Supply Voltage | 3.0Vdc ±5% |
| Input Current | 20mA Maximum (Unloaded) |
| Output Voltage Logic High (Voh) | 90% of Vdd Minimum (IOH = -4mA) |
| Output Voltage Logic Low (Vol) | 10% of Vdd Maximum (IOL = +4mA) |
| Rise/Fall Time | 3nSec Maximum (Measured at 10% to 90% of Waveform) |
| Duty Cycle | 50 ±5% (Measured at 50% of Waveform) |
| Load Drive Capability | 15pF Maximum |
| Output Logic Type | CMOS |
| 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 |
| Output Control Input Voltage Logic Low (Vil) | 10% of Vdd Maximum to Disable 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 |

EQTA35E1HH-16.367767M

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

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 |

EQTA35E1HH-16.367767M [Click part number to visit Part Number Details page](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)



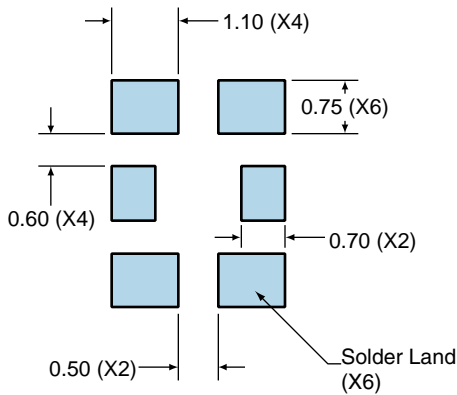
| PIN | CONNECTION |
|-----|--------------------|
| 1 | Do Not Connect |
| 2 | Output Enable (OE) |
| 3 | Case/Ground |
| 4 | Output |
| 5 | Do Not Connect |
| 6 | Supply Voltage |

| LINE | MARKING |
|------|--|
| 1 | E16.367 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

EQTA35E1HH-16.367767M [Click part number to visit Part Number Details page](#)

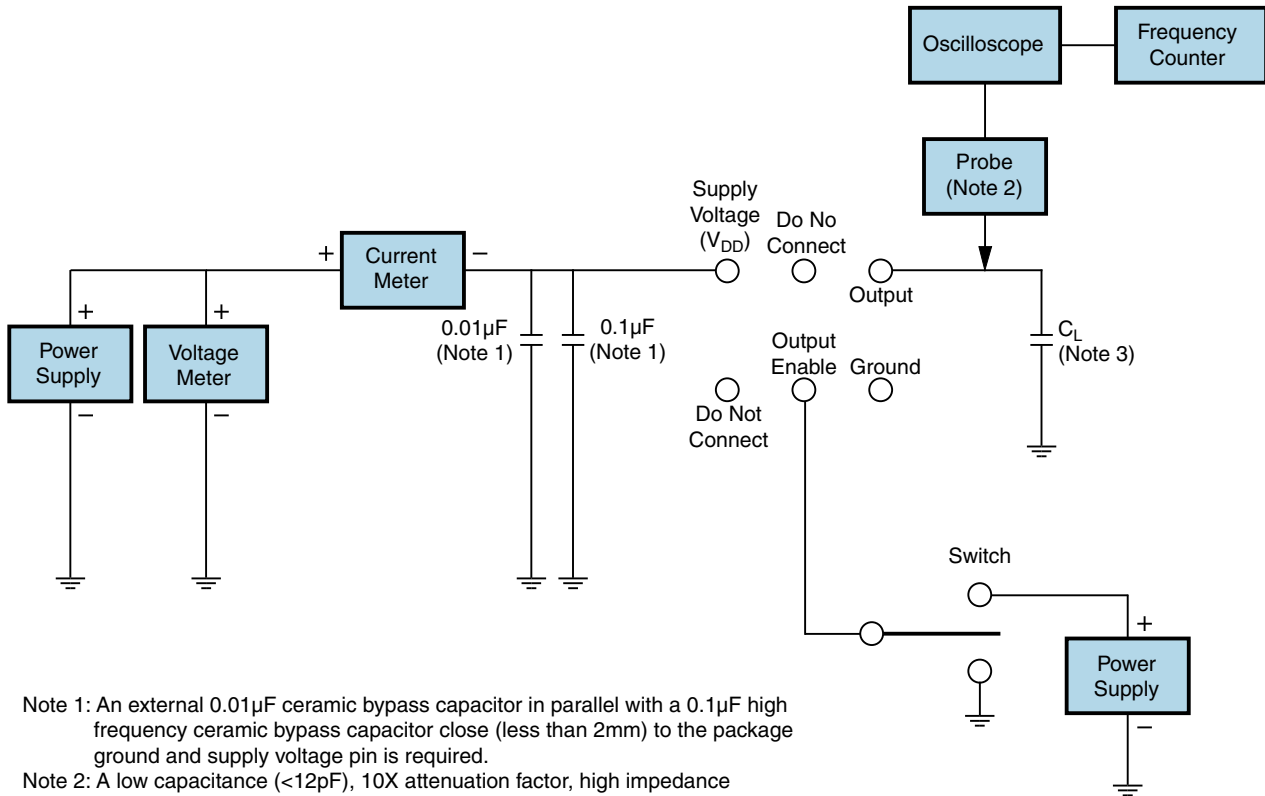
OUTPUT WAVEFORM & TIMING DIAGRAM



EQTA35E1HH-16.367767M

[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.

EQTA35E1HH-16.367767M [Click part number to visit Part Number Details page](#)
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. |

EQTA35E1HH-16.367767M [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.)