

EMTB84A8D-32.768K [Click part number to visit Part Number Details page](#)

REGULATORY COMPLIANCE (Data Sheet downloaded on Aug 3, 2020)



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ITEM DESCRIPTION

Temperature Compensated MEMS Clock Oscillators TCMO LVCMOS (CMOS) 2.8Vdc 4 Pad 0.8mm x 1.5mm Chip Scale Package (CSP) 32.768KHz -40°C to +85°C

ELECTRICAL SPECIFICATIONS

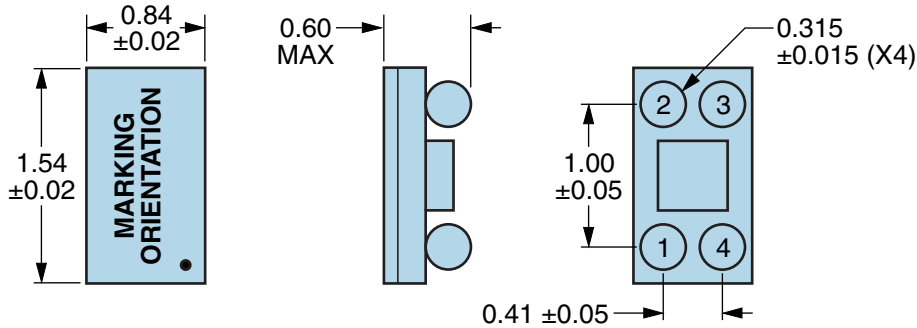
| | |
|---|--|
| Nominal Frequency | 32.768KHz |
| Frequency Stability | ±5.0ppm Maximum (Inclusive of Operating Temperature Range, Output Load Change (±20%), and Reflow, at Vdd=2.8Vdc) |
| Frequency Stability vs. Frequency Tolerance | ±5.0ppm Maximum (Measured at 25°C ±2°C, at Vdd=2.8Vdc, Post Reflow) |
| Frequency Stability vs. Input Voltage | ±0.75ppm Maximum (±10%) |
| Frequency Stability vs. Aging | ±1ppm/Year Maximum (at 25°C) |
| Operating Temperature Range | -40°C to +85°C |
| Supply Voltage | 2.8Vdc ±10% |
| Core Operating Current | 0.99µA Typical (at 25°C), 1.52µA Maximum |
| Output Stage Operating Current | 0.065µA/Vpp Typical, 0.125µA/Vpp Maximum |
| Input Current | 1.2µA Typical (at 25°C), 1.9µA Maximum (No Load, Nominal Vdd) |
| Output Voltage Logic High (Voh) | 90% of Vdd Minimum (IOH = -10µA) |
| Output Voltage Logic Low (Vol) | 10% of Vdd Maximum (IOL = +10µA) |
| Rise/Fall Time | 100nSec Typical, 200nSec Maximum (Measured at 10% to 90% of waveform) |
| Duty Cycle | 50 ±2(%) (Measured at 50% of waveform) |
| Load Drive Capability | 15pF Maximum |
| Output Logic Type | CMOS |
| Peak to Peak Jitter (tPK) | 2.5µSec Maximum |
| Period Jitter (RMS) | 33nSec Typical (Measured at 25°C) |
| Power Supply Ramp | 100mSec Maximum (Measured at 0Vdc to 90% of Vdd) |
| Start Up Time | 180mSec Typical, 380mSec Maximum (Measured at Nominal Vdd) |
| Storage Temperature Range | -55°C to +125°C |

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|----------------------|--|
| ESD Susceptibility | JESD22-A114, HBM, 3000V |
| Flammability | UL94-V0 |
| Mechanical Shock | MIL-STD-883, Method 2002, Condition E, 10,000G |
| Moisture Sensitivity | J-STD-020, MSL 1 |
| Solderability | MIL-STD-883, Method 2003 |
| Temperature Cycling | JESD22-A104, Condition G |
| Vibration | MIL-STD-883, Method 2007, Condition C, 70G |

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MECHANICAL DIMENSIONS (all dimensions in millimeters)



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

| LINE | MARKING |
|------|---|
| 1 | XX XX=Ecliptek Manufacturing Identifier |
| 2 | XXX XXX=Ecliptek Manufacturing Identifier (continued) |

Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ± 0.1

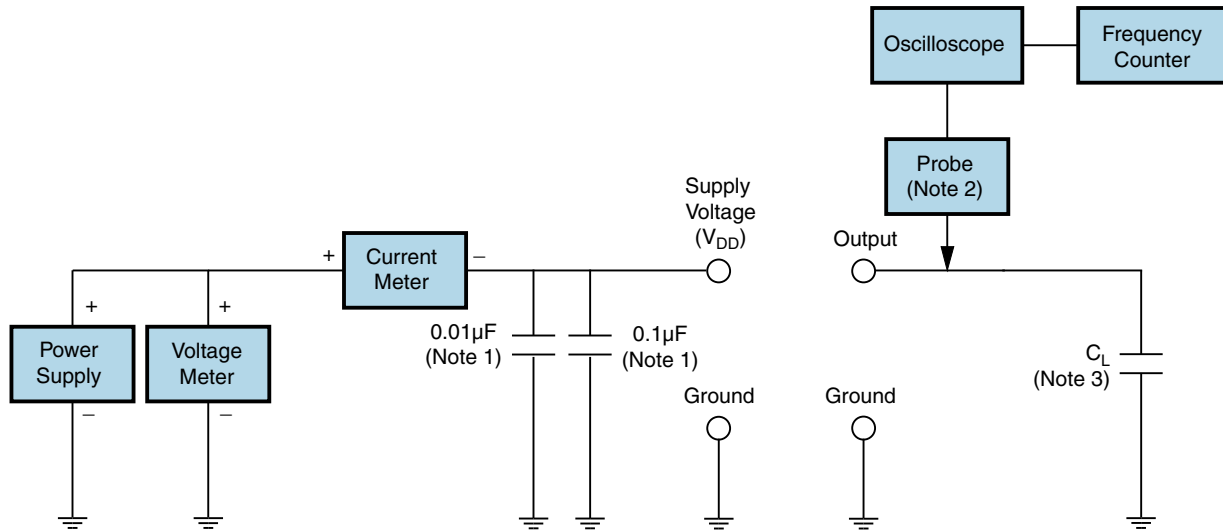
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OUTPUT WAVEFORM



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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 recommended.

Note 2: A low input 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. See applicable specification sheet for 'Load Drive Capability'.

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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 | Temperature 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 | Temperature shown are applied to body of device. |

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperature shown are applied to body of device.)

High Temperature Manual Soldering

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

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