

EMTB81A3D-32.768K TR [Click part number to visit Part Number Details page](#)
REGULATORY COMPLIANCE (Data Sheet downloaded on Aug 3, 2020)

ITEM DESCRIPTION

Temperature Compensated MEMS Clock Oscillators TCMO LVC MOS (CMOS) 1.8Vdc 4 Pad 0.8mm x 1.5mm Chip Scale Package (CSP) 32.768KHz 0°C to +70°C

ELECTRICAL SPECIFICATIONS

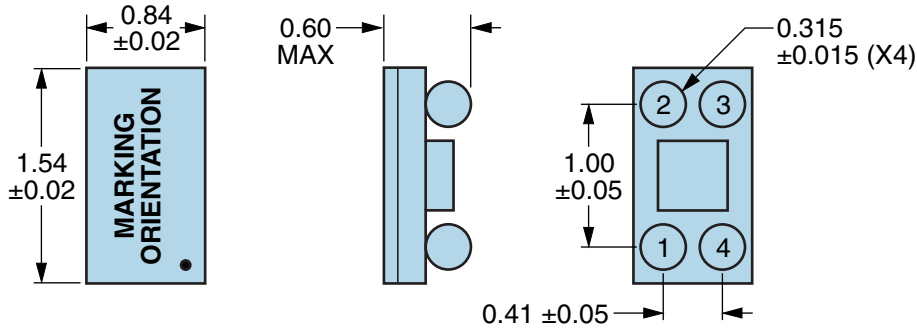
Nominal Frequency	32.768KHz
Frequency Stability	±5.0ppm Maximum (Inclusive of Operating Temperature Range, Output Load Change (±20%), and Reflow, at Vdd=1.8Vdc)
Frequency Stability vs. Frequency Tolerance	±5.0ppm Maximum (Measured at 25°C ±2°C, at Vdd=1.8Vdc, Post Reflow)
Frequency Stability vs. Input Voltage	±0.75ppm Maximum (±10%)
Frequency Stability vs. Aging	±1ppm/Year Maximum (at 25°C)
Operating Temperature Range	0°C to +70°C
Supply Voltage	1.8Vdc ±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	1.1µA Typical (at 25°C), 1.8µA 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, 350mSec 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)

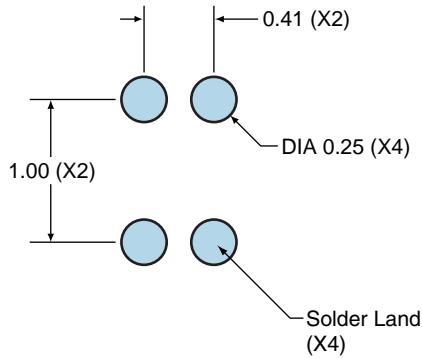


PIN	CONNECTION
1	Ground
2	Output
3	Supply Voltage
4	Ground

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

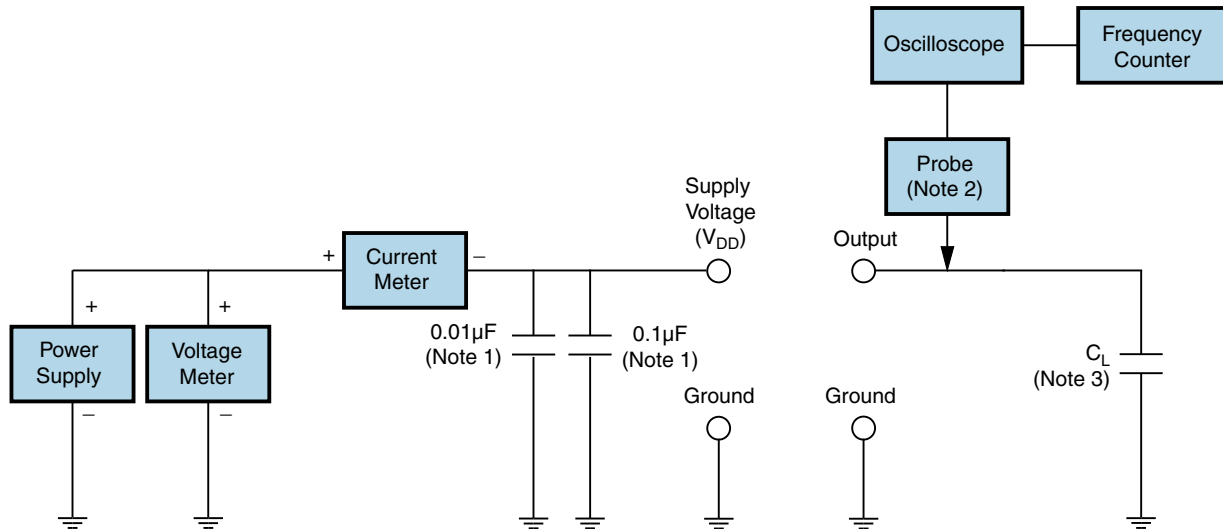
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OUTPUT WAVEFORM



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Test Circuit for CMOS Output



Note 1: An external 0.01 μ F ceramic bypass capacitor in parallel with a 0.1 μ 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 (<12pF), 10X Attenuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) 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'.

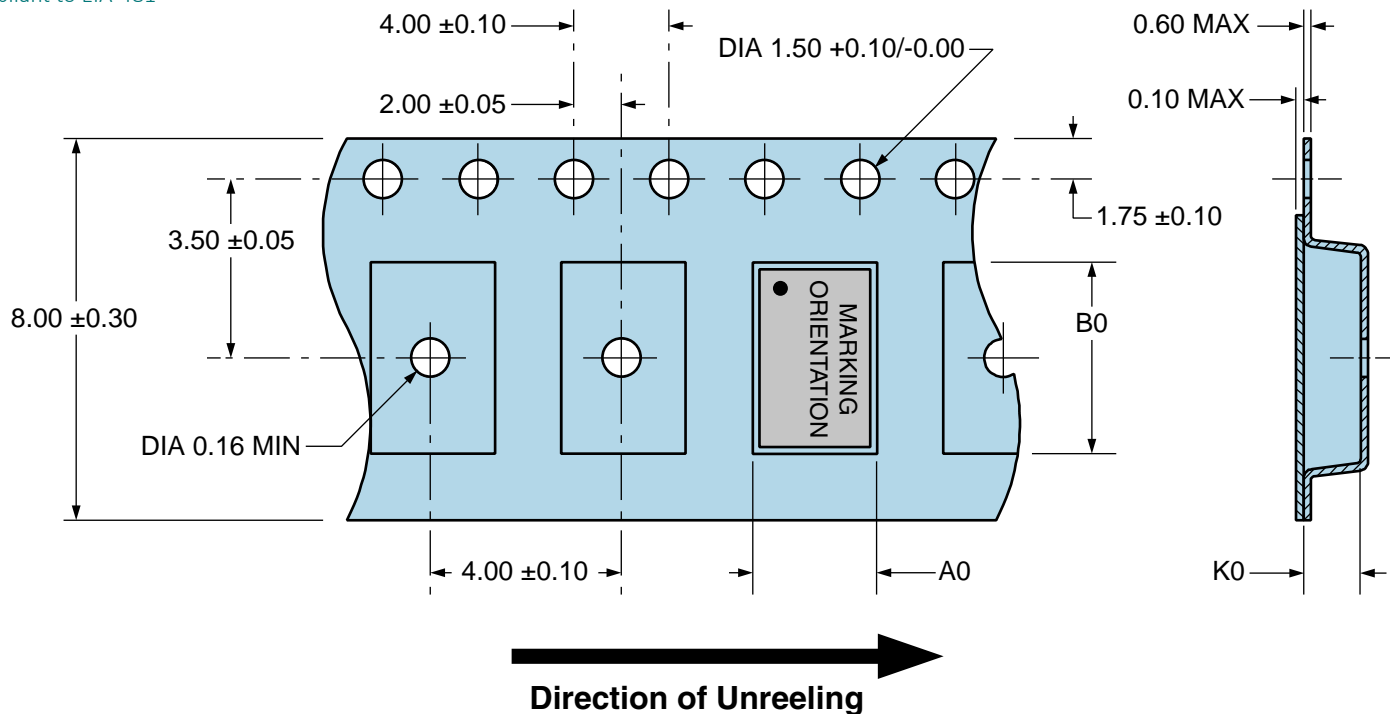
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Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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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	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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