

EMRB84B-32.768K

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REGULATORY COMPLIANCE (Data Sheet downloaded on May 20, 2017)


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ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 2.8Vdc 4 Pad 0.8mm x 1.5mm Chip Scale Package (CSP) 32.768KHz ± 75 ppm over -10°C to $+70^{\circ}\text{C}$

ELECTRICAL SPECIFICATIONS

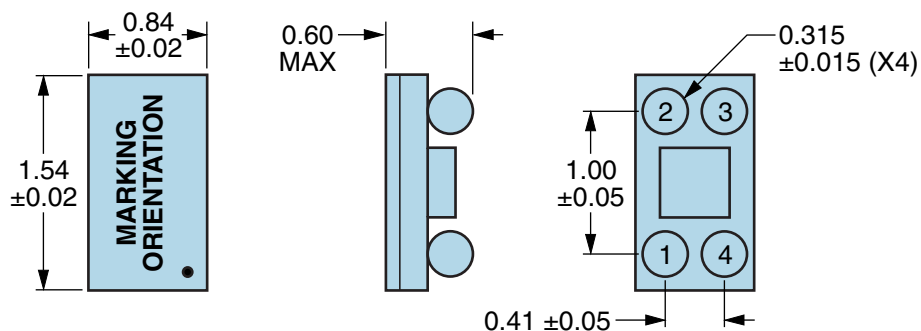
Nominal Frequency	32.768KHz
Frequency Tolerance/Stability	± 75 ppm Maximum over -10°C to $+70^{\circ}\text{C}$ (Inclusive of all conditions: Calibration Tolerance at 25°C , Frequency Stability over the Operating Temperature Range, Supply Voltage Change, and Output Load Change)
Frequency Tolerance	± 20 ppm Maximum (Measured at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, at $V_{\text{dd}}=2.8\text{Vdc}$, Post Reflow, with board level underfill)
Aging at 25°C	± 1 ppm Maximum First Year
Supply Voltage	2.8Vdc $\pm 10\%$
Core Operating Current	0.9 μA Typical (at 25°C), 1.3 μA Maximum
Output Stage Operating Current	0.065 $\mu\text{A}/\text{Vpp}$ Typical, 0.125 $\mu\text{A}/\text{Vpp}$ Maximum
Input Current	1.1 μA Typical (at 25°C), 1.7 μA Maximum (No Load, Nominal V_{dd})
Output Voltage Logic High (Voh)	90% of V_{dd} Minimum ($\text{IOH} = -10\mu\text{A}$)
Output Voltage Logic Low (Vol)	10% of V_{dd} Maximum ($\text{IOL} = +10\mu\text{A}$)
Rise/Fall Time	100nSec Typical, 200nSec Maximum (Measured from 10% to 90% of waveform)
Duty Cycle	50 ± 2 (%) (Measured at 50% of waveform)
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Period Jitter (RMS)	35nSec Typical (Measured at 25°C)
Power Supply Ramp	100mSec Maximum (Measured at 0Vdc to 90% of V_{dd})
Start Up Time	180mSec Typical, 300mSec Maximum (at 25°C) 450mSec Maximum (over Operating Temperature Range) (Measured at Nominal V_{dd})
Storage Temperature Range	-55°C to $+125^{\circ}\text{C}$

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)

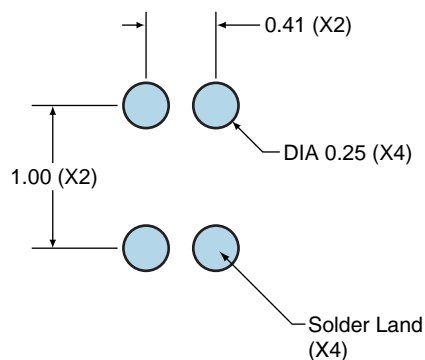


PIN	CONNECTION
1	Ground
2	Output
3	Supply Voltage
4	Ground

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

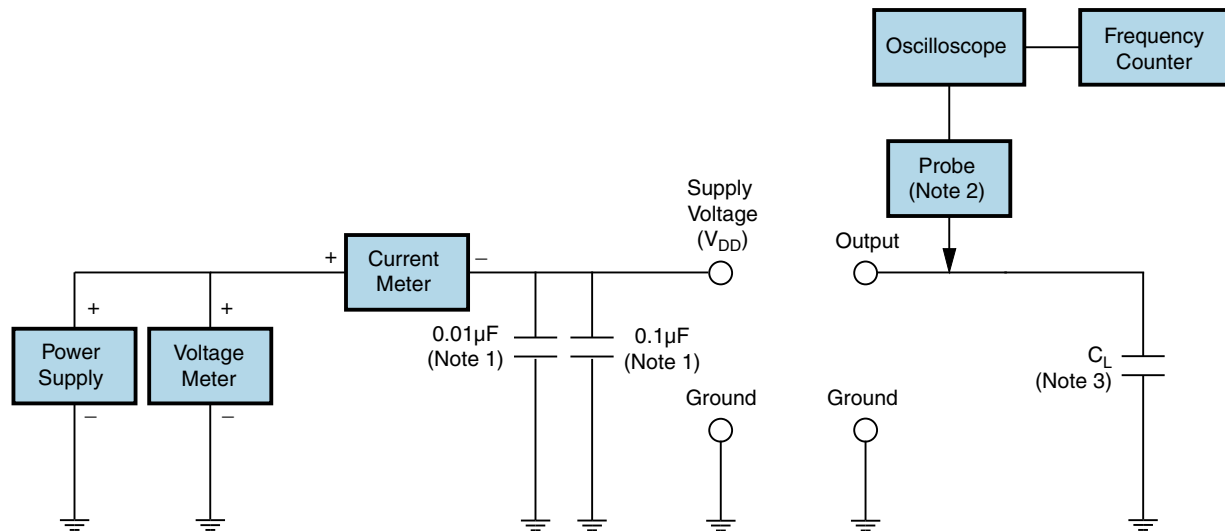
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OUTPUT WAVEFORM



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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.

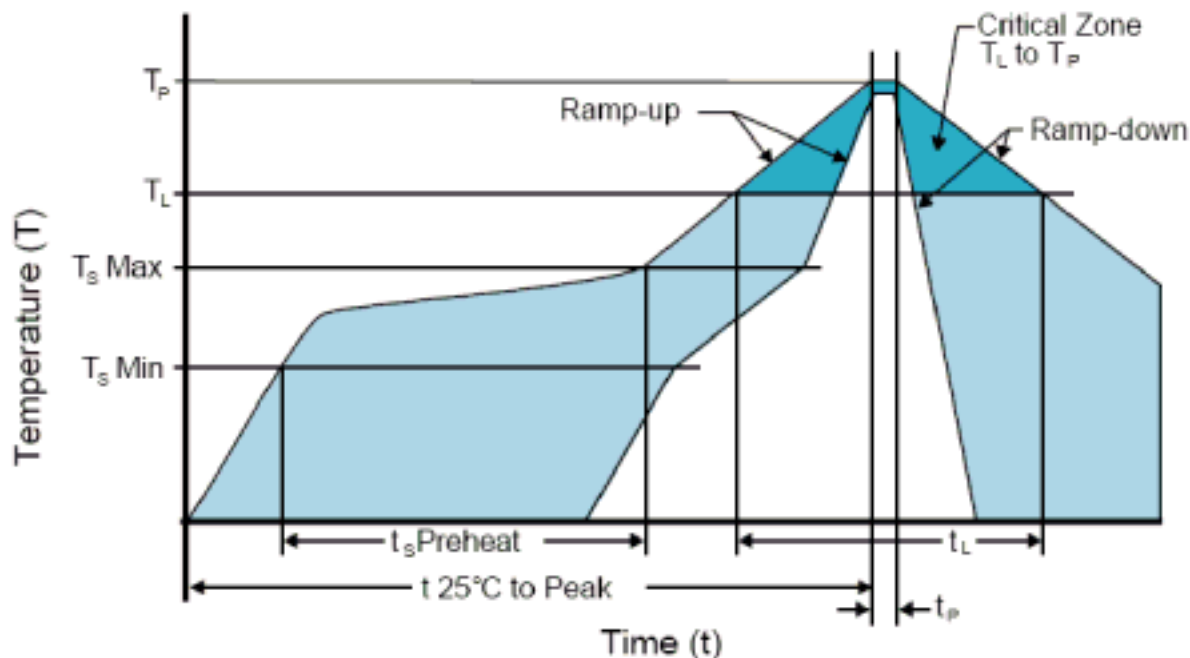
Note 2: A low input capacitance ($<12\text{pF}$), 10X Attenuation Factor, High Impedance ($>10\text{Mohms}$), and High bandwidth ($>300\text{MHz}$) passive probe is recommended.

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
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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
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Time Maintained Above:

- Temperature (TL)	217°C
- Time (tL)	60 - 150 Seconds

Peak Temperature (TP)	260°C Maximum for 10 Seconds Maximum
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Target Peak Temperature (TP Target)	250°C +0/-5°C
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Time within 5°C of actual peak (tp)	20 - 40 Seconds
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Ramp-down Rate	6°C/Second Maximum
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Time 25°C to Peak Temperature (t)	8 Minutes Maximum
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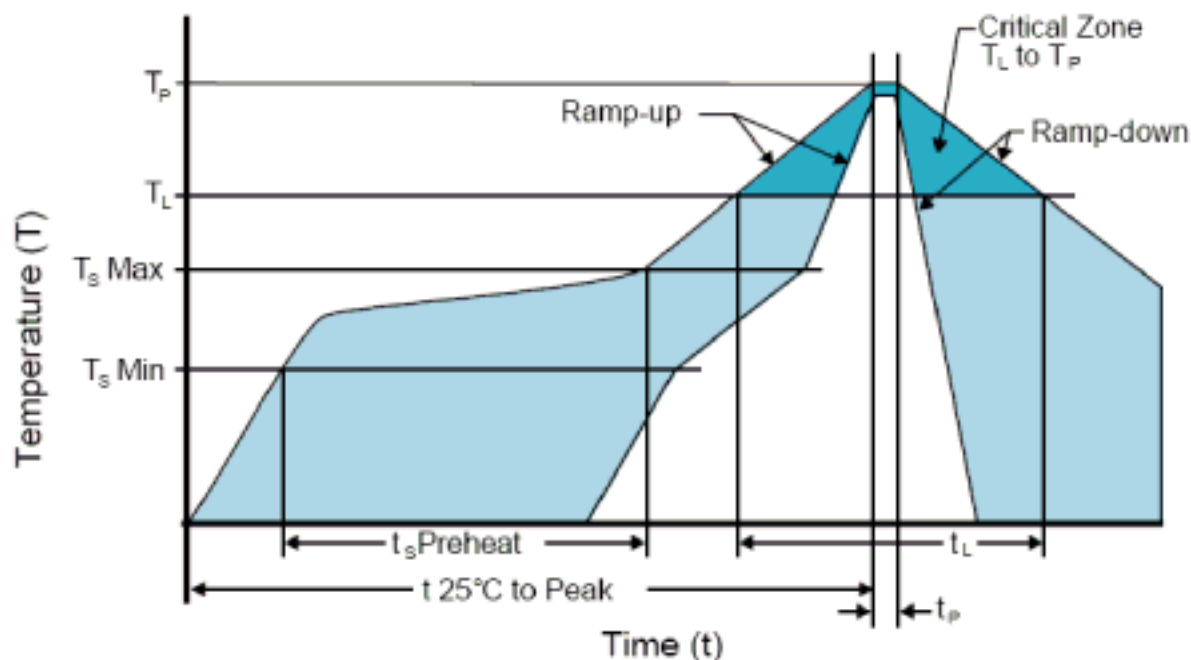
Moisture Sensitivity Level	Level 1
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Additional Notes	Temperature shown are applied to body of device.
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Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

Ts MAX to TL (Ramp-up Rate)	5°C/Second Maximum
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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
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Time Maintained Above:

- Temperature (TL)	150°C
- Time (tL)	200 Seconds Maximum

Peak Temperature (TP)	240°C Maximum
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Target Peak Temperature (TP Target)	240°C Maximum 2 Times / 230°C Maximum 1 Time
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Time within 5°C of actual peak (tp)	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
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Ramp-down Rate	5°C/Second Maximum
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Time 25°C to Peak Temperature (t)	N/A
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Moisture Sensitivity Level	Level 1
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Additional Notes	Temperature shown are applied to body of device.
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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.)