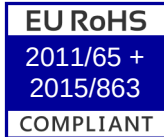


# EMK32H2H-33.833M



## ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 2.5Vdc 4 Pad 2.5mm x 3.2mm Plastic Surface Mount (SMD) 33.833MHz  $\pm 50$ ppm over -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

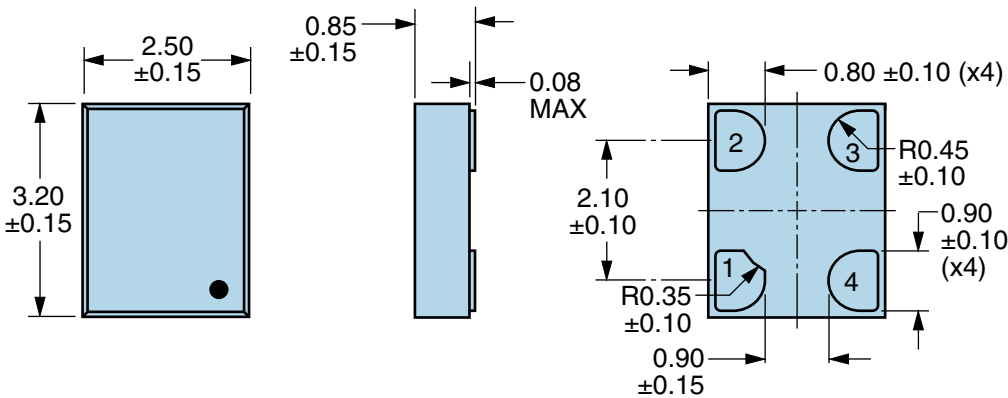
|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency               | 33.833MHz                                                                                                                                                                                                                                                                |
| Frequency Tolerance/Stability   | $\pm 50$ ppm Maximum over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, 260°C Reflow, Shock, and Vibration) |
| Aging at 25°C                   | $\pm 1$ ppm Maximum First Year                                                                                                                                                                                                                                           |
| Supply Voltage                  | 2.5Vdc $\pm 5\%$                                                                                                                                                                                                                                                         |
| Input Current                   | 20mA Maximum                                                                                                                                                                                                                                                             |
| Output Voltage Logic High (Voh) | 90% of Vdd Minimum (IOH=-8mA)                                                                                                                                                                                                                                            |
| Output Voltage Logic Low (Vol)  | 10% of Vdd Maximum (IOL=+8mA)                                                                                                                                                                                                                                            |
| Rise/Fall Time                  | 2nSec Maximum (Measured from 20% to 80% of waveform)                                                                                                                                                                                                                     |
| Duty Cycle                      | 50 $\pm 5$ (%) (Measured at 50% of waveform)                                                                                                                                                                                                                             |
| Load Drive Capability           | 15pF Maximum                                                                                                                                                                                                                                                             |
| Output Logic Type               | CMOS                                                                                                                                                                                                                                                                     |
| Output Control Function         | Tri-State (Disabled Output: High Impedance)                                                                                                                                                                                                                              |
| Output Control Input Voltage    | +0.7Vdd Minimum or No Connect to Enable Output, +0.3Vdd Maximum to Disable Output                                                                                                                                                                                        |
| Peak to Peak Jitter (tPK)       | 250pSec Maximum, 100pSec Typical                                                                                                                                                                                                                                         |
| Start Up Time                   | 50mSec Maximum                                                                                                                                                                                                                                                           |
| Storage Temperature Range       | -55°C to +125°C                                                                                                                                                                                                                                                          |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                              |                                                           |
|------------------------------|-----------------------------------------------------------|
| ESD Susceptibility           | MIL-STD-883, Method 3015, Class 2, HBM 2000V              |
| Flammability                 | UL94-V0                                                   |
| Mechanical Shock             | MIL-STD-883, Method 2002, Condition G, 30,000G            |
| Moisture Resistance          | MIL-STD-883, Method 1004                                  |
| Moisture Sensitivity Level   | 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 (Pads on Bottom of Package Only) |
| Temperature Cycling          | MIL-STD-883, Method 1010, Condition B                     |
| Thermal Shock                | MIL-STD-883, Method 1011, Condition B                     |
| Vibration                    | MIL-STD-883, Method 2007, Condition A, 20G                |

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MECHANICAL DIMENSIONS (all dimensions in millimeters)

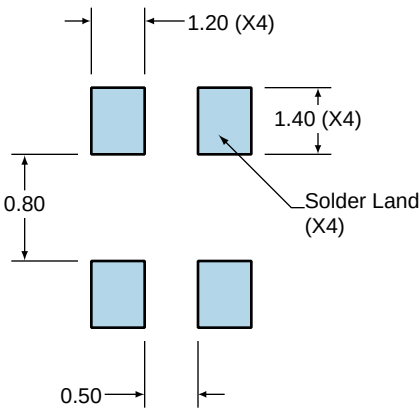


| PIN | CONNECTION     |
|-----|----------------|
| 1   | Tri-State      |
| 2   | Ground         |
| 3   | Output         |
| 4   | Supply Voltage |

| LINE | MARKING                                                           |
|------|-------------------------------------------------------------------|
| 1    | XXXX or XXXXX<br>XXXX or XXXXX=Ecliptek<br>Manufacturing Lot Code |

Suggested Solder Pad Layout

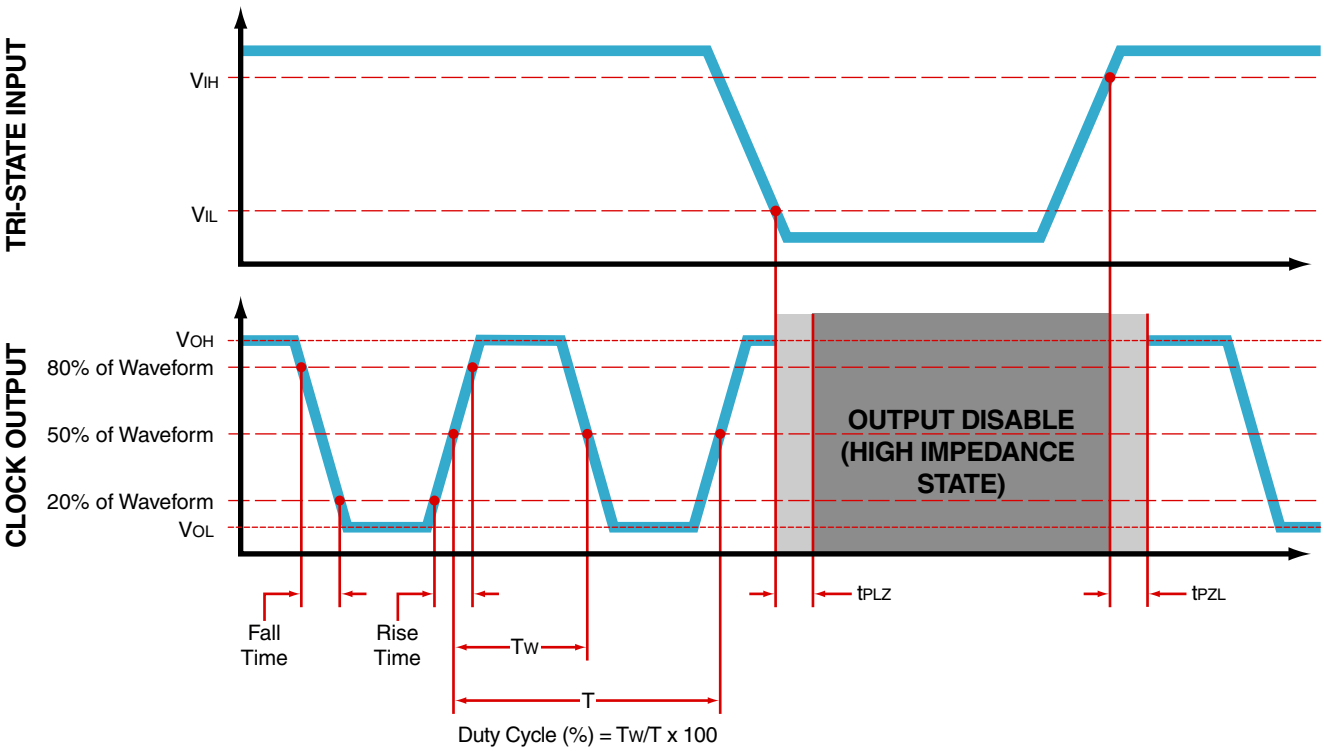
All Dimensions in Millimeters



All Tolerances are ±0.1

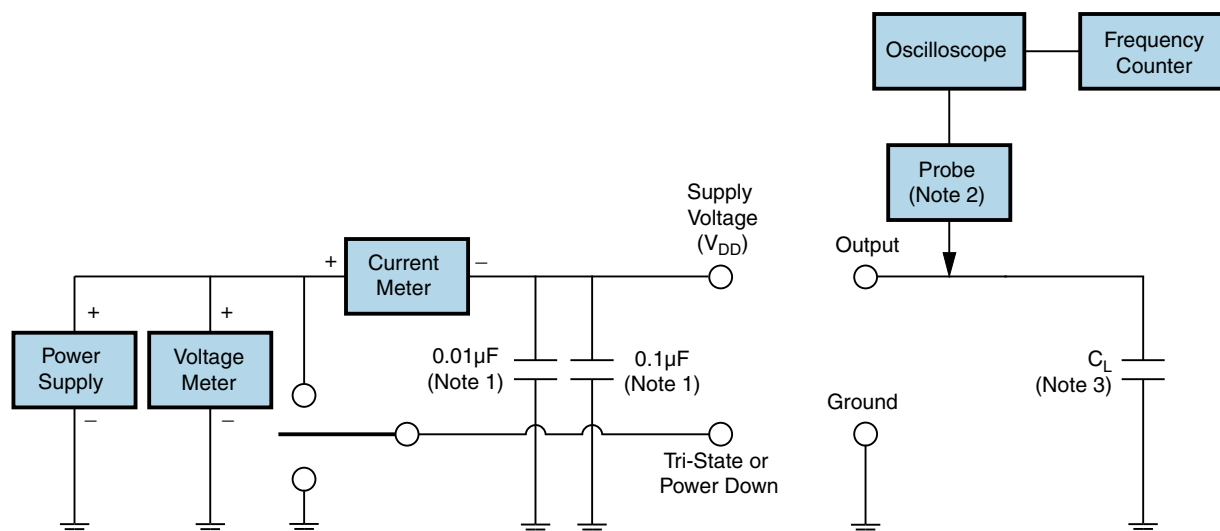
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OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for CMOS Output



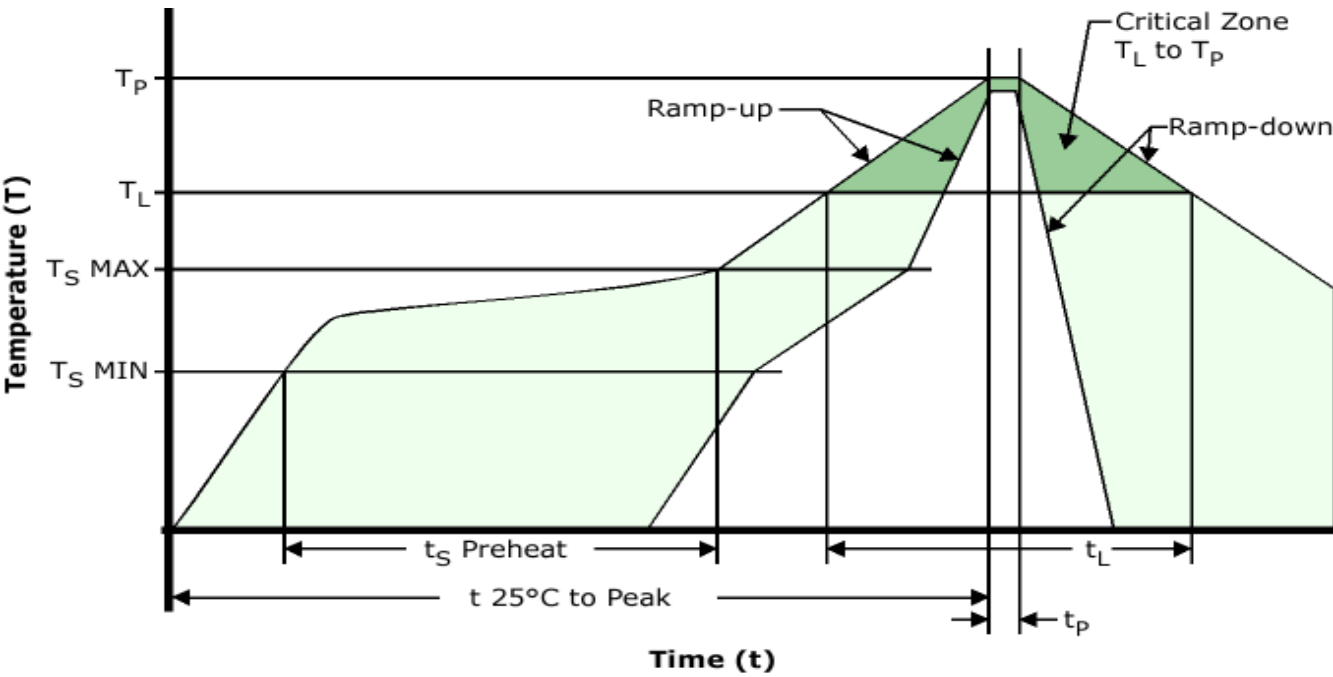
Note 1: An external 0.01  $\mu\text{F}$  ceramic bypass capacitor in parallel with a 0.1  $\mu\text{F}$  high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

Note 2: A low 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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Recommended Solder Reflow Methods

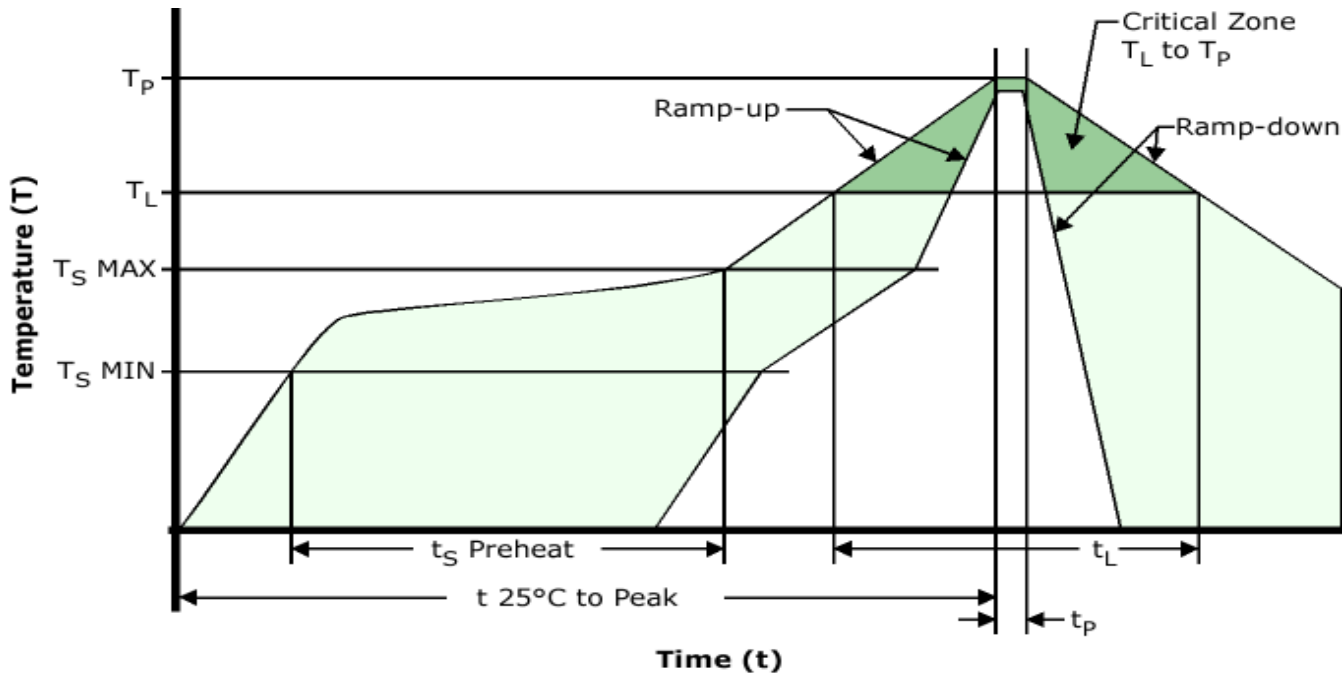


High Temperature Infrared/Convection

|                                                  |                                      |
|--------------------------------------------------|--------------------------------------|
| $T_S \text{ MAX}$ 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                              |

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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

## Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum.

## High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum.