

EMK23H2H-20.000M

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

REGULATORY COMPLIANCE (Data Sheet downloaded on May 22, 2017)


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ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 3.2mm x 5.0mm Plastic Surface Mount (SMD) 20.000MHz \pm 50ppm over -40°C to +85°C

ELECTRICAL SPECIFICATIONS

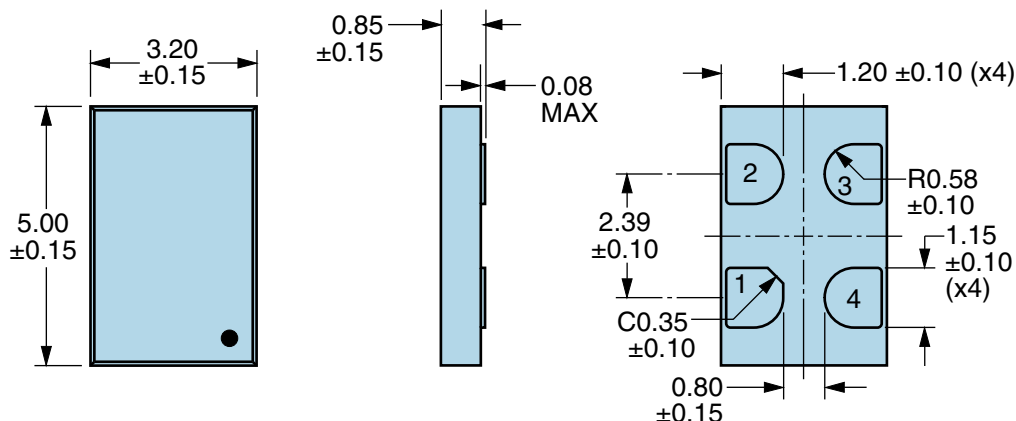
| | |
|---------------------------------|---|
| Nominal Frequency | 20.000MHz |
| Frequency Tolerance/Stability | \pm 50ppm Maximum over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, 260°C Reflow, Shock, and Vibration) |
| Aging at 25°C | \pm 1ppm Maximum First Year |
| Supply Voltage | 3.3Vdc \pm 10% |
| 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)

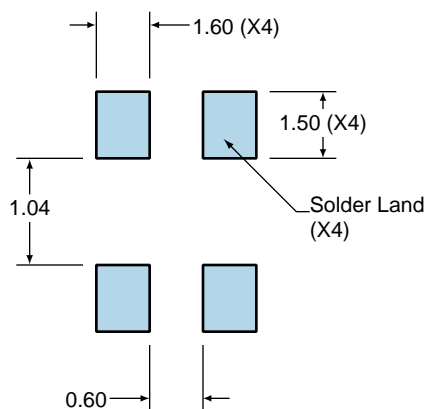


| PIN | CONNECTION |
|-----|----------------|
| 1 | Tri-State |
| 2 | Ground |
| 3 | Output |
| 4 | Supply Voltage |

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

Suggested Solder Pad Layout

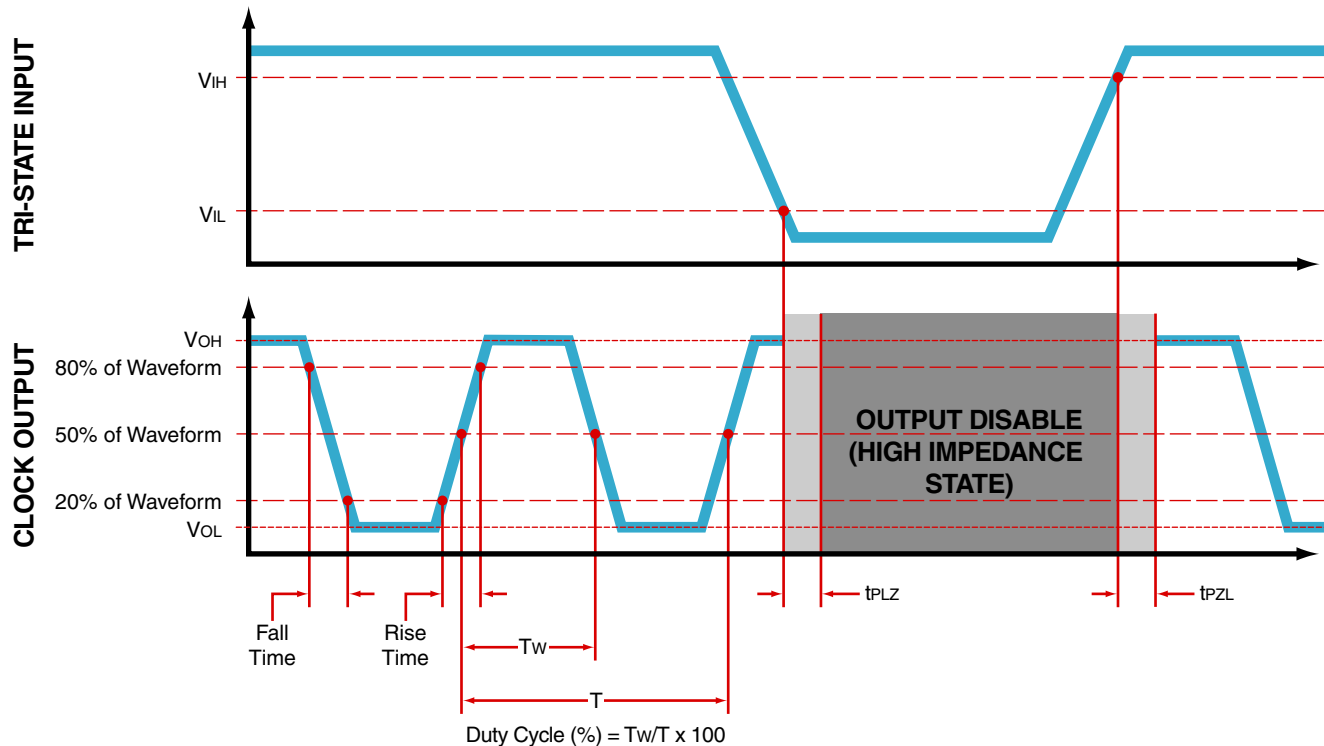
All Dimensions in Millimeters

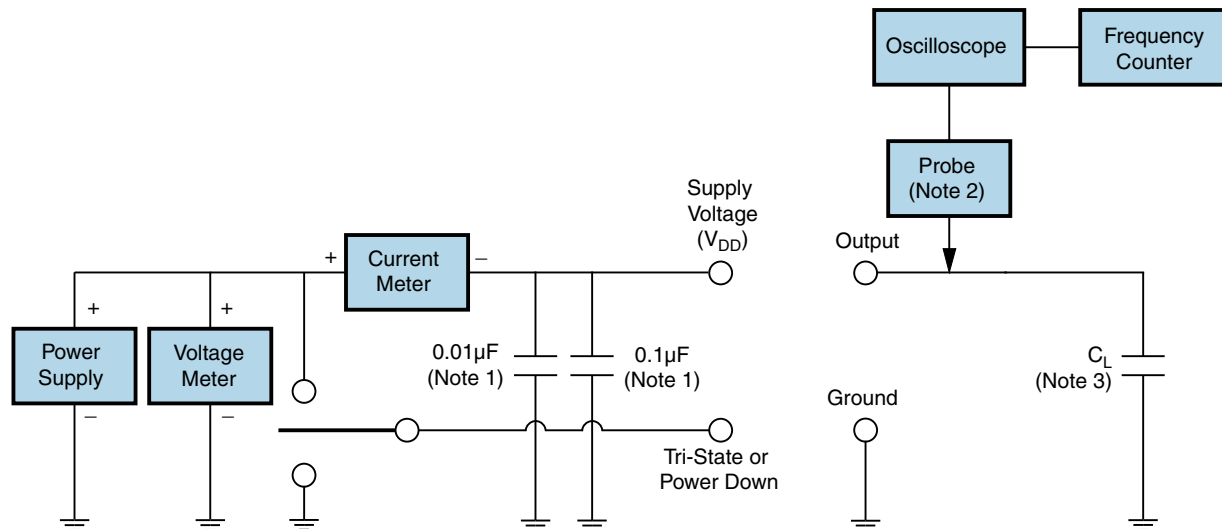


All Tolerances are ± 0.1

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OUTPUT WAVEFORM & TIMING DIAGRAM



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.

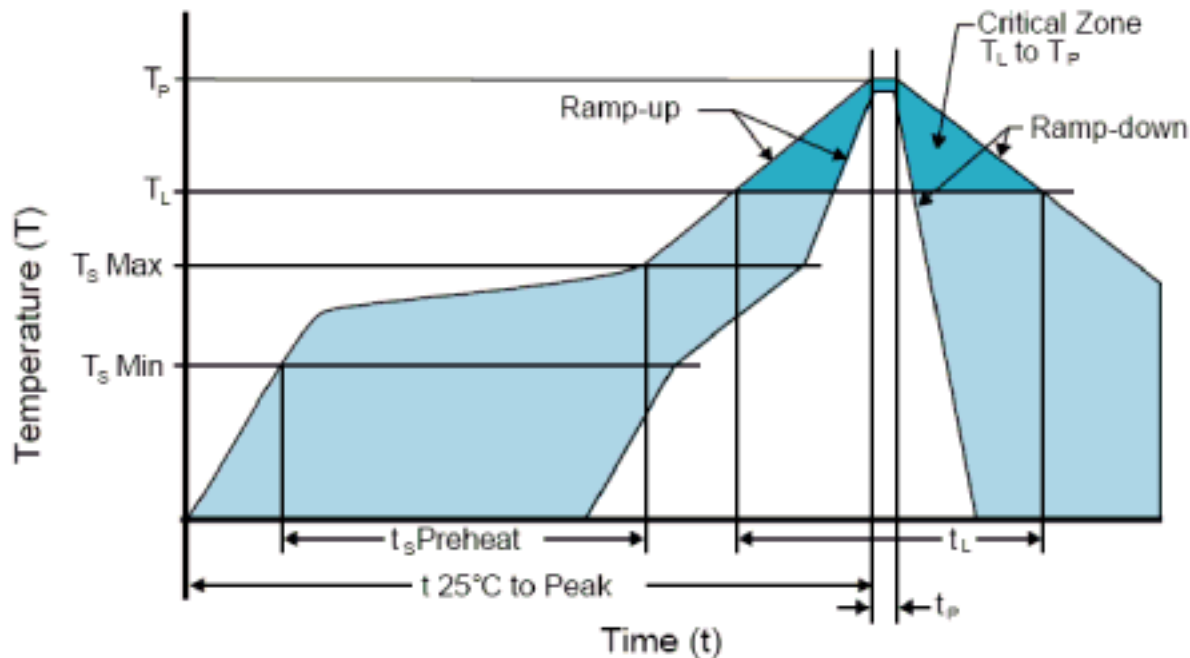
Note 2: A low input capacitance ($<12\text{pF}$), 10X Attenuation Factor, High Impedance ($>10\text{Mohms}$), and High bandwidth ($>300\text{MHz}$) passive probe is recommended.

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



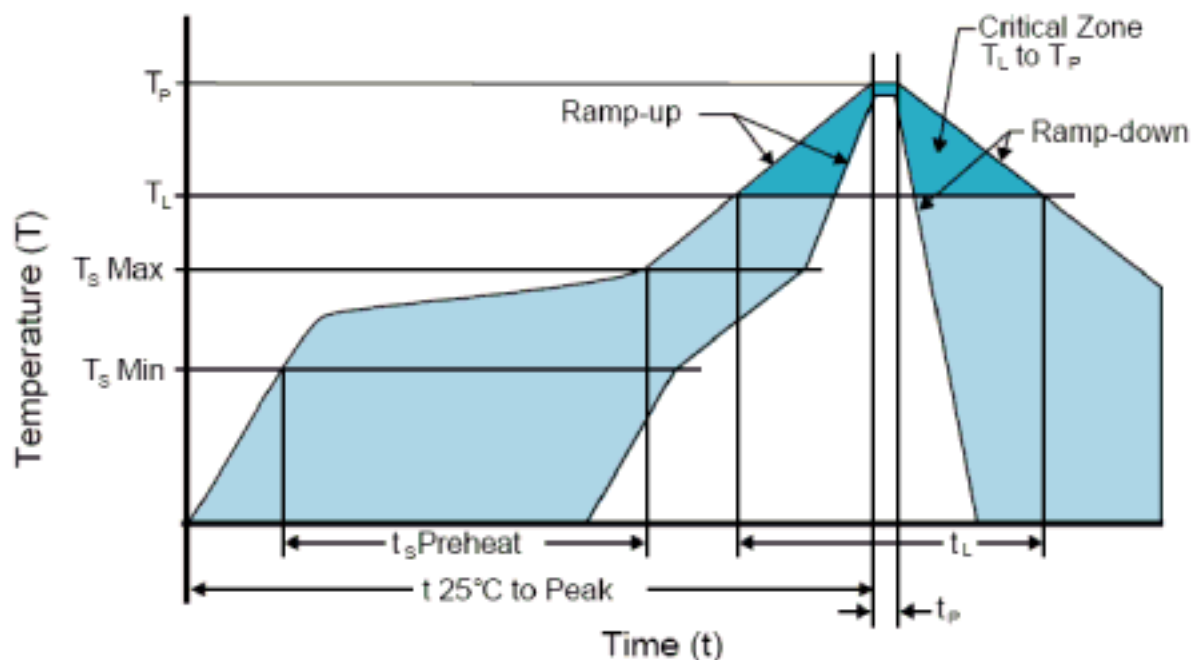
High Temperature Infrared/Convection

| | |
|--|---|
| 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 | Temperatures shown are applied to body of device. |

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Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

| | |
|--|--|
| $T_S \text{ MAX to } T_L$ (Ramp-up Rate) | 5°C/Second Maximum |
| Preheat | |
| - Temperature Minimum ($T_S \text{ MIN}$) | N/A |
| - Temperature Typical ($T_S \text{ TYP}$) | 150°C |
| - Temperature Maximum ($T_S \text{ MAX}$) | N/A |
| - Time ($t_s \text{ MIN}$) | 60 - 120 Seconds |
| Ramp-up Rate (T_L to T_P) | 5°C/Second Maximum |
| Time Maintained Above: | |
| - Temperature (T_L) | 150°C |
| - Time (t_L) | 200 Seconds Maximum |
| Peak Temperature (T_P) | 240°C Maximum |
| Target Peak Temperature ($T_P \text{ Target}$) | 240°C Maximum 2 Times / 230°C Maximum 1 Time |
| Time within 5°C of actual peak (t_p) | 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.)