

EMK33H2H-16.400M

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REGULATORY COMPLIANCE (Data Sheet downloaded on Apr 29, 2017)


[Click badges to download compliance docs](#)

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ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 2.5mm x 3.2mm Plastic Surface Mount (SMD) 16.400MHz ± 50 ppm over -40°C to +85°C

ELECTRICAL SPECIFICATIONS

Nominal Frequency	16.400MHz
Frequency Tolerance/Stability	± 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	± 1 ppm 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



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Note 1: An external 0.01μF ceramic bypass capacitor in parallel with a 0.1μF 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

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

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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.