

# EMK32G2H-88.300M

<b>Lead Free</b>  COMPLIANT	<b>EU RoHS</b> 2011/65 + 2015/863 COMPLIANT	<b>ChinaRoHS</b>  COMPLIANT	<b>REACH</b> 163 SVHC COMPLIANT
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## ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 2.5Vdc 4 Pad 2.5mm x 3.2mm Plastic Surface Mount (SMD) 88.300MHz  $\pm$ 100ppm over -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

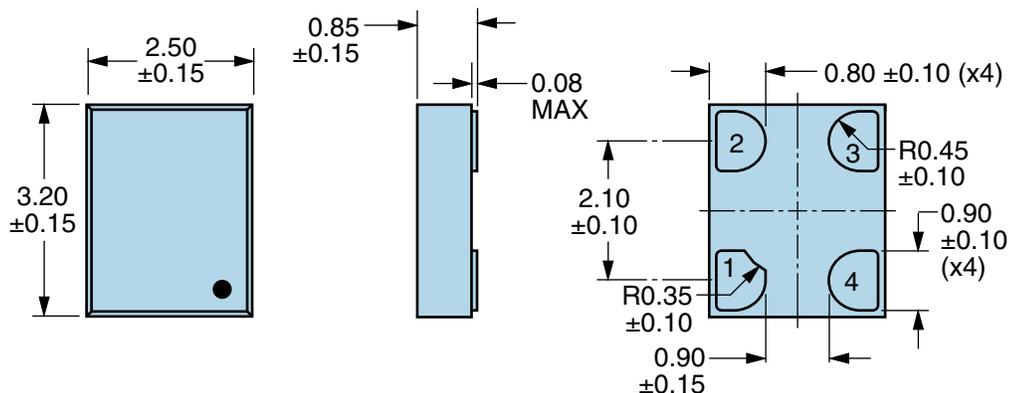
<b>Nominal Frequency</b>	88.300MHz
<b>Frequency Tolerance/Stability</b>	$\pm$ 100ppm Maximum over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, 260°C Reflow, Shock, and Vibration)
<b>Aging at 25°C</b>	$\pm$ 1ppm Maximum First Year
<b>Supply Voltage</b>	2.5Vdc $\pm$ 5%
<b>Input Current</b>	20mA Maximum
<b>Output Voltage Logic High (Voh)</b>	90% of Vdd Minimum (IOH=-8mA)
<b>Output Voltage Logic Low (Vol)</b>	10% of Vdd Maximum (IOL=+8mA)
<b>Rise/Fall Time</b>	2nSec Maximum (Measured from 20% to 80% of waveform)
<b>Duty Cycle</b>	50 $\pm$ 5(%) (Measured at 50% of waveform)
<b>Load Drive Capability</b>	15pF Maximum
<b>Output Logic Type</b>	CMOS
<b>Output Control Function</b>	Tri-State (Disabled Output: High Impedance)
<b>Output Control Input Voltage</b>	+0.7Vdd Minimum or No Connect to Enable Output, +0.3Vdd Maximum to Disable Output
<b>Peak to Peak Jitter (tPK)</b>	250pSec Maximum, 100pSec Typical
<b>Start Up Time</b>	50mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

<b>ESD Susceptibility</b>	MIL-STD-883, Method 3015, Class 2, HBM 2000V
<b>Flammability</b>	UL94-V0
<b>Mechanical Shock</b>	MIL-STD-883, Method 2002, Condition G, 30,000G
<b>Moisture Resistance</b>	MIL-STD-883, Method 1004
<b>Moisture Sensitivity Level</b>	J-STD-020, MSL 1
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Condition K
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Solderability</b>	MIL-STD-883, Method 2003 (Pads on Bottom of Package Only)
<b>Temperature Cycling</b>	MIL-STD-883, Method 1010, Condition B
<b>Thermal Shock</b>	MIL-STD-883, Method 1011, Condition B
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A, 20G

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## MECHANICAL DIMENSIONS (all dimensions in millimeters)

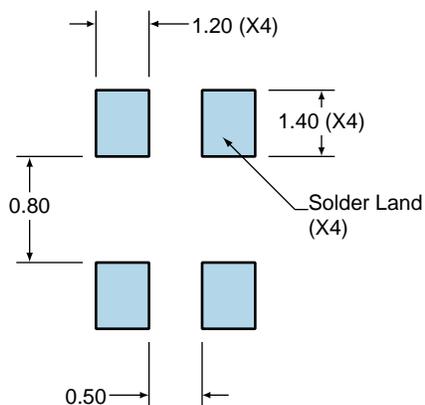


PIN	CONNECTION
1	Tri-State
2	Ground
3	Output
4	Supply Voltage

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

## Suggested Solder Pad Layout

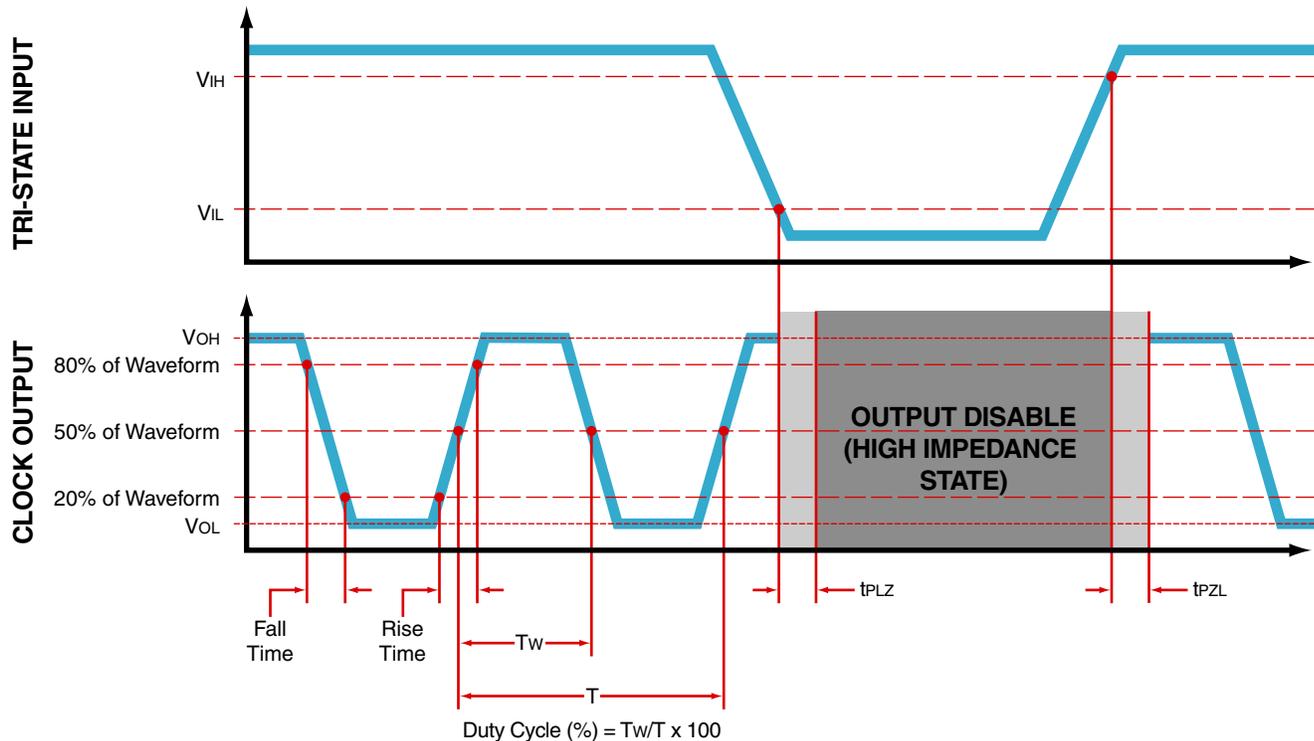
All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

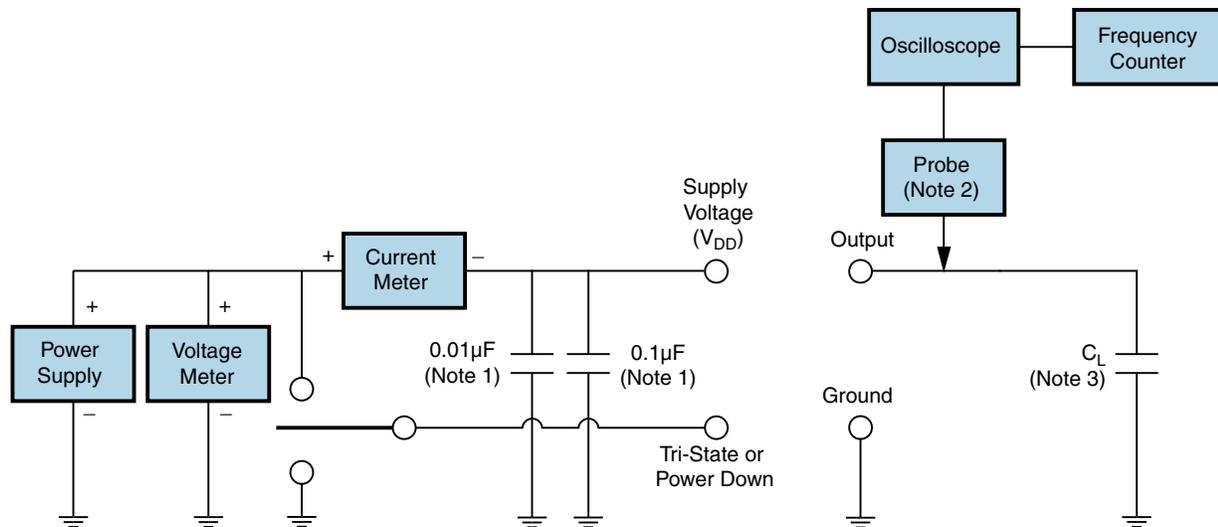
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## OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for CMOS Output



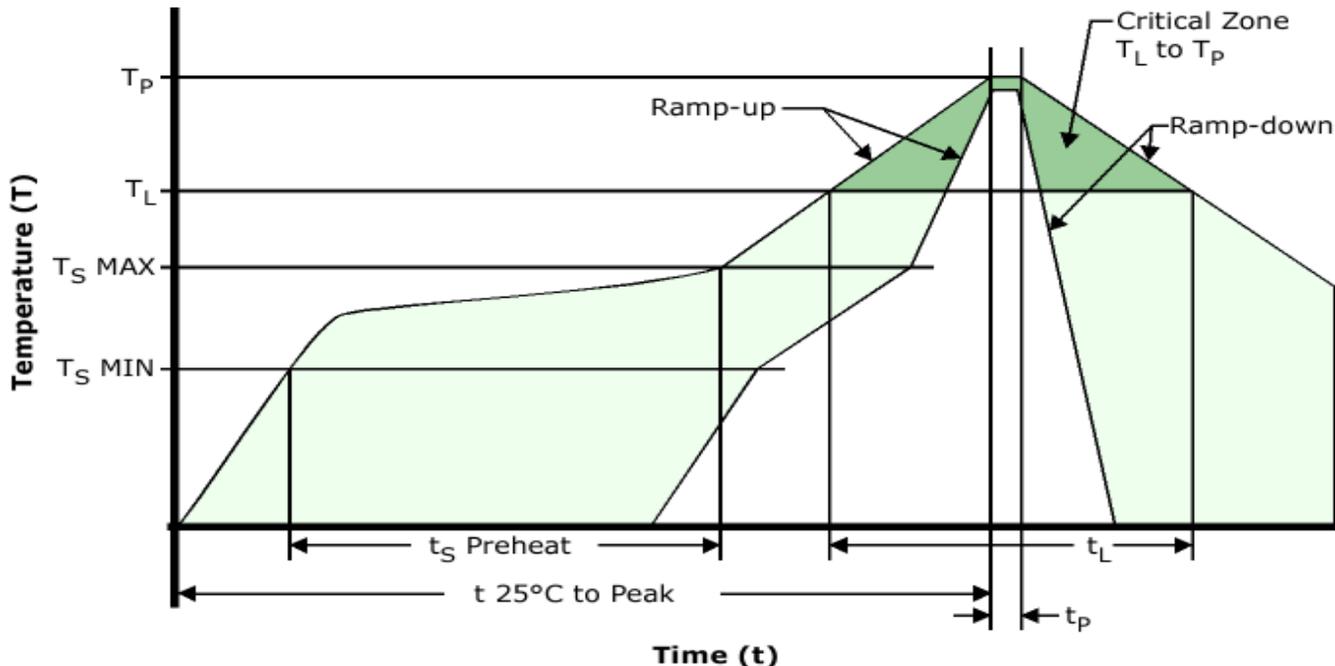
Note 1: An external  $0.01\mu\text{F}$  ceramic bypass capacitor in parallel with a  $0.1\mu\text{F}$  high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

Note 2: A low input capacitance ( $<12\text{pF}$ ), 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

$T_S$  MAX to  $T_L$  (Ramp-up Rate) 3°C/Second Maximum

### Preheat

- Temperature Minimum ( $T_S$  MIN) 150°C
- Temperature Typical ( $T_S$  TYP) 175°C
- Temperature Maximum ( $T_S$  MAX) 200°C
- Time ( $t_s$  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 ( $T_P$  Target) 250°C +0/-5°C

Time within 5°C of actual peak ( $t_p$ ) 20 - 40 Seconds

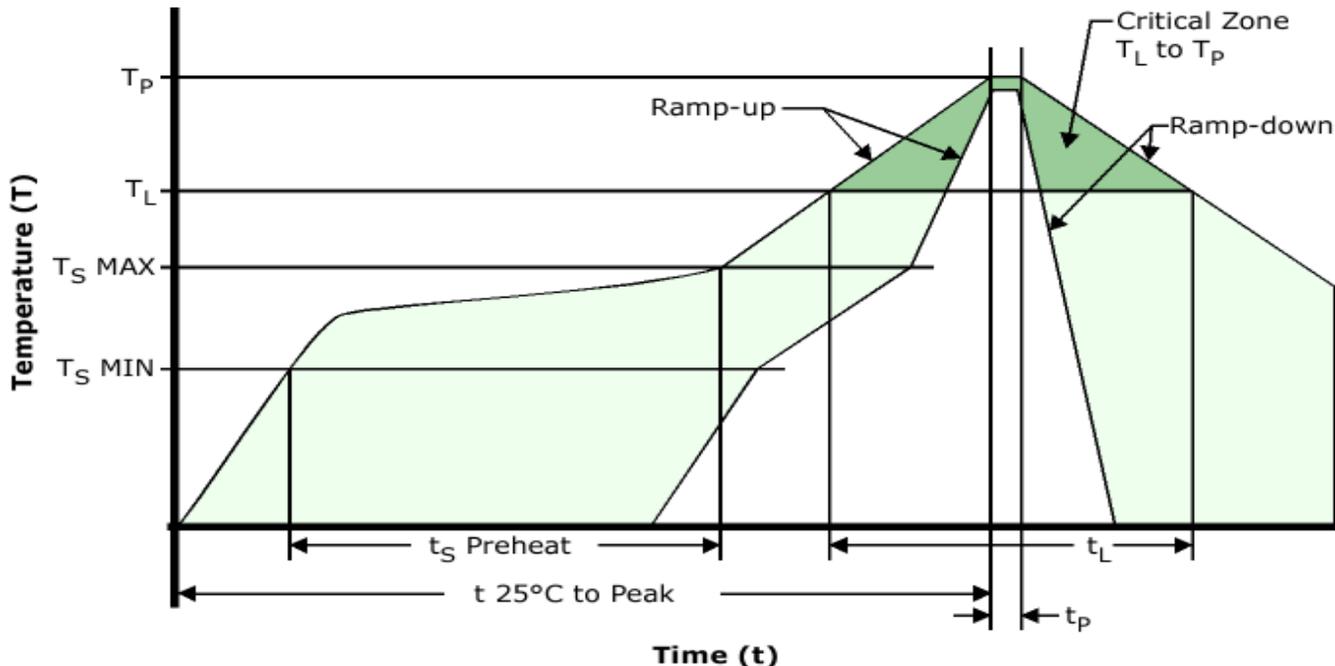
Ramp-down Rate 6°C/Second Maximum

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

$T_s$  MAX to  $T_L$  (Ramp-up Rate) 5°C/Second Maximum

#### Preheat

- Temperature Minimum ( $T_s$  MIN) N/A  
 - Temperature Typical ( $T_s$  TYP) 150°C  
 - Temperature Maximum ( $T_s$  MAX) N/A  
 - Time ( $t_s$  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 ( $T_P$  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

### 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.