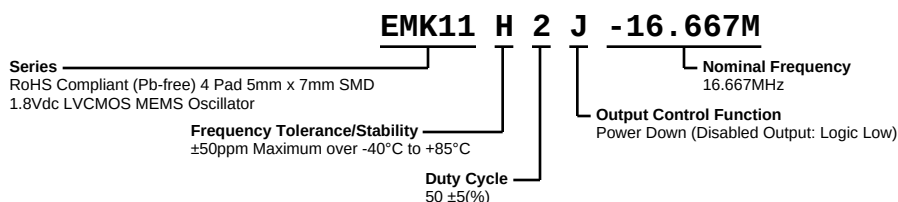


# EMK11H2J-16.667M



**ECLIPTEK**  
CORPORATION



## ELECTRICAL SPECIFICATIONS

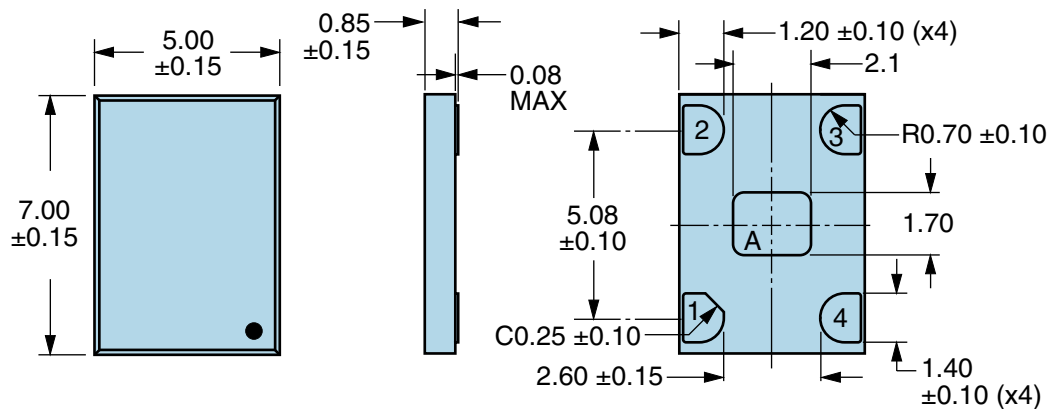
|                                 |                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency               | 16.667MHz                                                                                                                                                                                                                                                          |
| Frequency Tolerance/Stability   | ±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                   | ±1ppm Maximum First Year                                                                                                                                                                                                                                           |
| Operating Temperature Range     | -40°C to +85°C                                                                                                                                                                                                                                                     |
| Supply Voltage                  | 1.8Vdc ±5%                                                                                                                                                                                                                                                         |
| Input Current                   | 15mA 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 ±5(%) (Measured at 50% of waveform)                                                                                                                                                                                                                             |
| Load Drive Capability           | 15pF Maximum                                                                                                                                                                                                                                                       |
| Output Logic Type               | CMOS                                                                                                                                                                                                                                                               |
| Output Control Function         | Power Down (Disabled Output: Logic Low)                                                                                                                                                                                                                            |
| Output Control Input Voltage    | +0.7Vdd Minimum or No Connect to Enable Output, +0.3Vdd Maximum to Disable Output                                                                                                                                                                                  |
| Standby Current                 | 50µA Maximum (Disabled Output: Logic Low)                                                                                                                                                                                                                          |
| 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 (Four I/O 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)



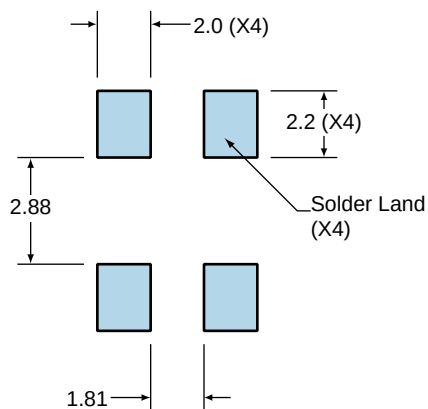
| PIN | CONNECTION             |
|-----|------------------------|
| 1   | Power Down (Logic Low) |
| 2   | Ground                 |
| 3   | Output                 |
| 4   | Supply Voltage         |

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

Note A: Center paddle is connected internally to oscillator ground (Pad 2).

## Suggested Solder Pad Layout

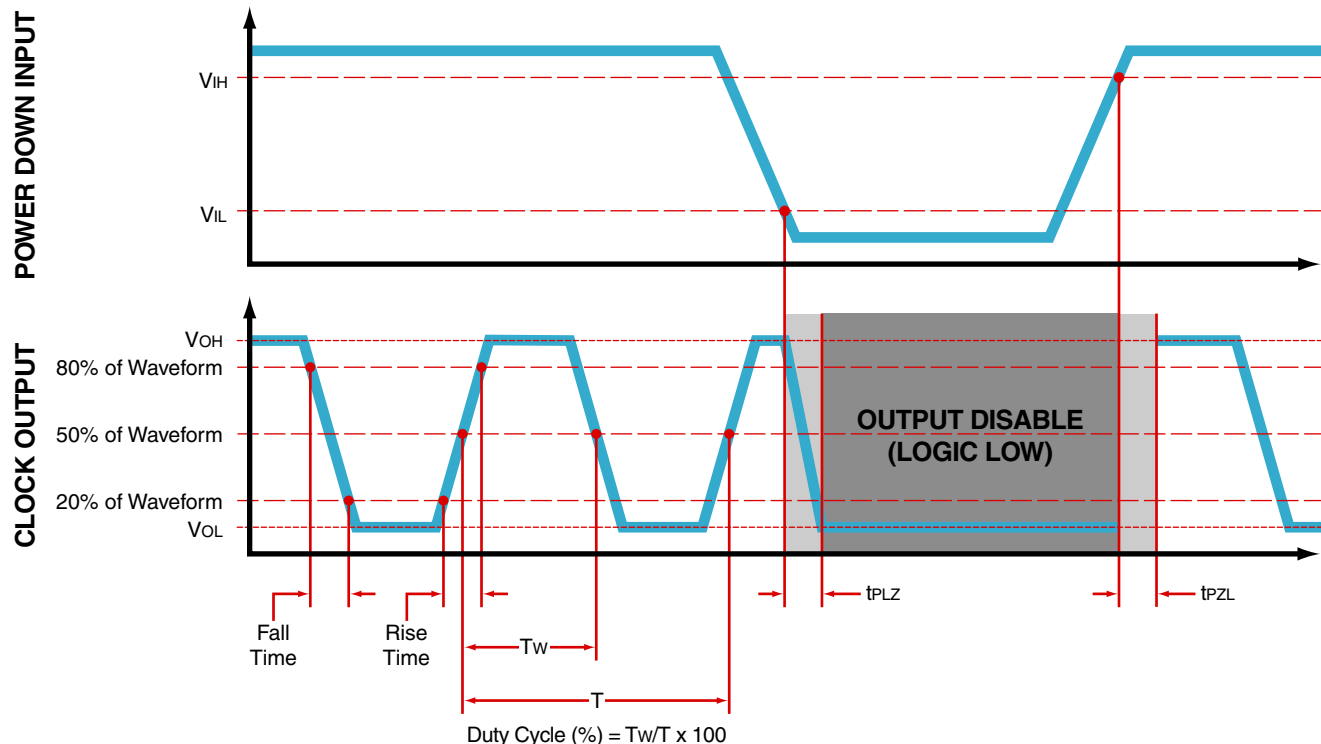
All Dimensions in Millimeters



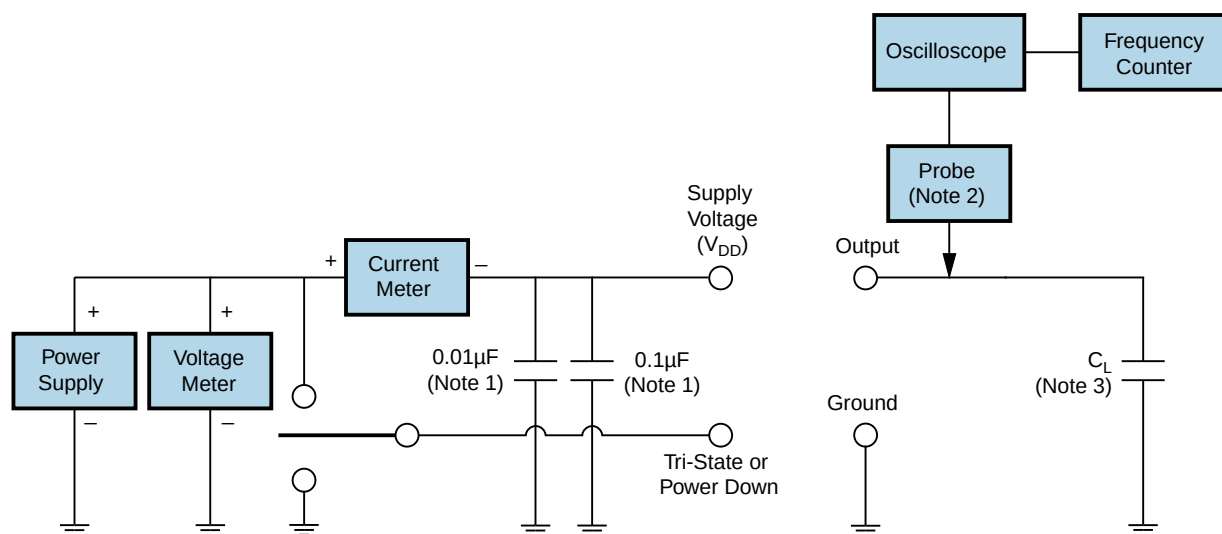
All Tolerances are  $\pm 0.1$

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## OUTPUT WAVEFORM & TIMING DIAGRAM



## Test Circuit for CMOS Output

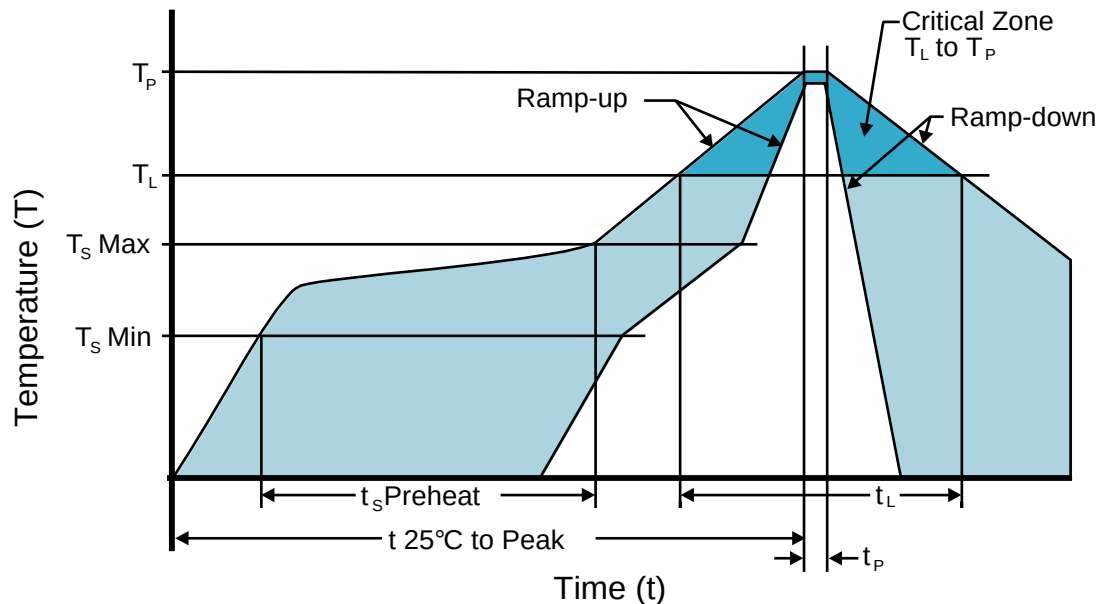


Note 1: An external  $0.1\mu F$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu F$  high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

Note 2: A low capacitance ( $<12pF$ ), 10X attenuation factor, high impedance ( $>10M\Omega$ ), and high bandwidth ( $>300MHz$ ) passive probe is recommended.

Note 3: Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

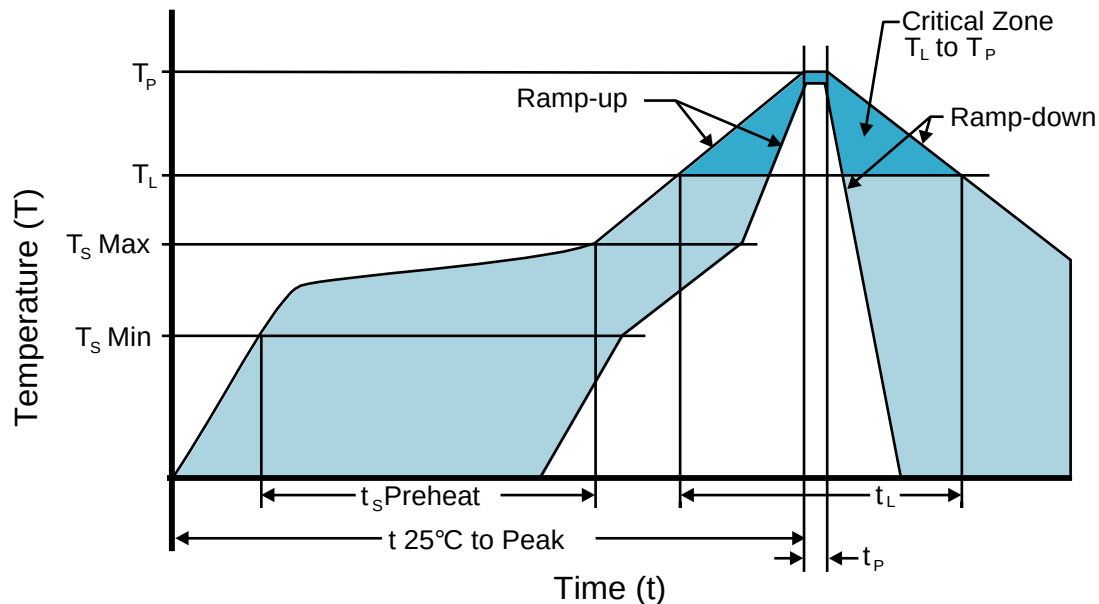
## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|                                                          |                                      |
|----------------------------------------------------------|--------------------------------------|
| <b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b> | 3°C/second Maximum                   |
| <b>Preheat</b>                                           |                                      |
| - Temperature Minimum (T <sub>s</sub> MIN)               | 150°C                                |
| - Temperature Typical (T <sub>s</sub> TYP)               | 175°C                                |
| - Temperature Maximum (T <sub>s</sub> MAX)               | 200°C                                |
| - Time (t <sub>s</sub> MIN)                              | 60 - 180 Seconds                     |
| <b>Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>)</b>     | 3°C/second Maximum                   |
| <b>Time Maintained Above:</b>                            |                                      |
| - Temperature (T <sub>L</sub> )                          | 217°C                                |
| - Time (t <sub>L</sub> )                                 | 60 - 150 Seconds                     |
| <b>Peak Temperature (T<sub>p</sub>)</b>                  | 260°C Maximum for 10 Seconds Maximum |
| <b>Target Peak Temperature (T<sub>p</sub> Target)</b>    | 250°C +0/-5°C                        |
| <b>Time within 5°C of actual peak (t<sub>p</sub>)</b>    | 20 - 40 seconds                      |
| <b>Ramp-down Rate</b>                                    | 6°C/second Maximum                   |
| <b>Time 25°C to Peak Temperature (t)</b>                 | 8 minutes Maximum                    |
| <b>Moisture Sensitivity Level</b>                        | Level 1                              |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

**T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)** 5°C/second Maximum

#### Preheat

- Temperature Minimum (T<sub>s</sub> MIN) N/A  
 - Temperature Typical (T<sub>s</sub> TYP) 150°C  
 - Temperature Maximum (T<sub>s</sub> MAX) N/A  
 - Time (t<sub>s</sub> MIN) 60 - 120 Seconds

**Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>)** 5°C/second Maximum

#### Time Maintained Above:

- Temperature (T<sub>L</sub>) 150°C  
 - Time (t<sub>L</sub>) 200 Seconds Maximum

**Peak Temperature (T<sub>p</sub>)** 240°C Maximum

**Target Peak Temperature (T<sub>p</sub> Target)** 240°C Maximum 1 Time / 230°C Maximum 2 Times

**Time within 5°C of actual peak (t<sub>p</sub>)** 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.