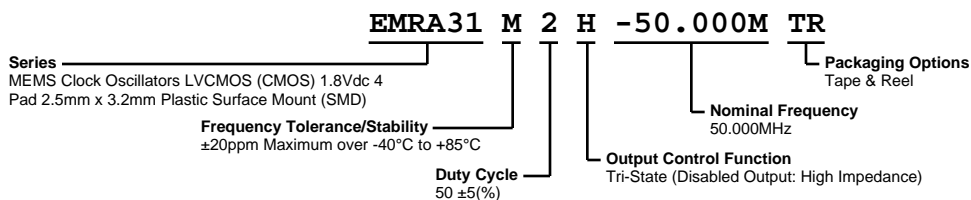


# EMRA31M2H-50.000M TR



## ELECTRICAL SPECIFICATIONS

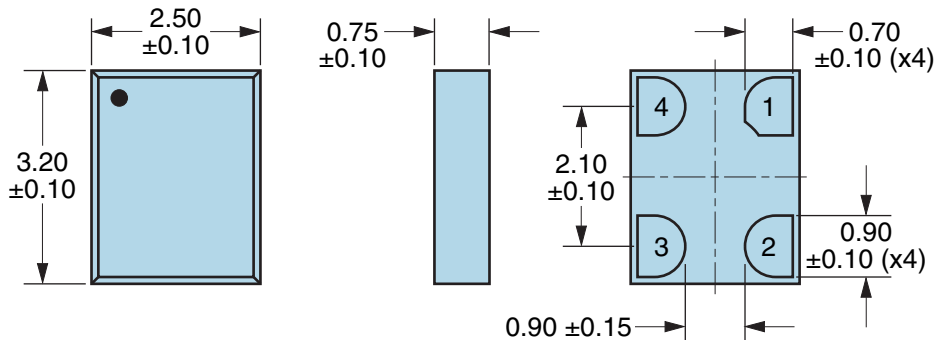
Nominal Frequency	50.000MHz
Frequency Tolerance/Stability	±20ppm Maximum over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, and Output Load Change)
Aging at 25°C	±1.5ppm Maximum First Year
Supply Voltage	1.8Vdc ±10%
Input Current	5mA Maximum (No Load)
Output Voltage Logic High (Voh)	90% of Vdd Minimum (IOH = -2mA)
Output Voltage Logic Low (Vol)	10% of Vdd Maximum (IOL = +2mA)
Rise/Fall Time	1.5nSec Typical, 3.5nSec 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	Tri-State (Disabled Output: High Impedance)
Output Control Input Voltage Logic High (Vih)	70% of Vdd Minimum or No Connect to Enable Output
Output Control Input Voltage Logic Low (Vil)	30% of Vdd Maximum to Disable Output
Tri-State Output Enable Time	150nSec Maximum
Tri-State Output Disable Time	150nSec Maximum
Period Jitter (RMS)	2pSec Typical, 5pSec Maximum
RMS Phase Jitter (Fj = 900kHz to 7.5MHz; Random)	0.5pSec Typical, 1pSec Maximum
RMS Phase Jitter (Fj = 12kHz to 20MHz; Random)	1.5pSec Typical, 3pSec Maximum
Start Up Time	5mSec Maximum
Storage Temperature Range	-65°C to +150°C

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

Mechanical Shock	MIL-STD-883, Method 2002
Moisture Sensitivity	J-STD-020, MSL 1
Solderability	MIL-STD-883, Method 2003 (Pads on bottom of package only)
Temperature Cycling	JESD22-A104
Vibration	MIL-STD-883, Method 2007

# EMRA31M2H-50.000M TR

## MECHANICAL DIMENSIONS (all dimensions in millimeters)



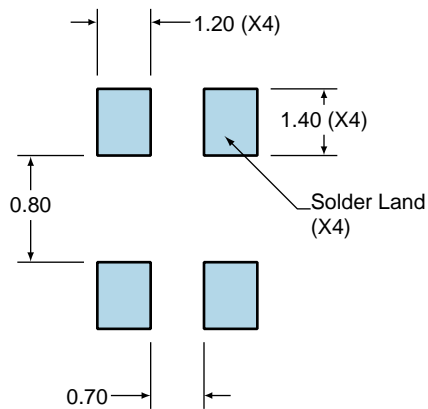
PIN	CONNECTION
1	Tri-State (High Impedance)
2	Ground
3	Output
4	Supply Voltage

LINE	MARKING
1	Ecliptek Manufacturing Identifier

## Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

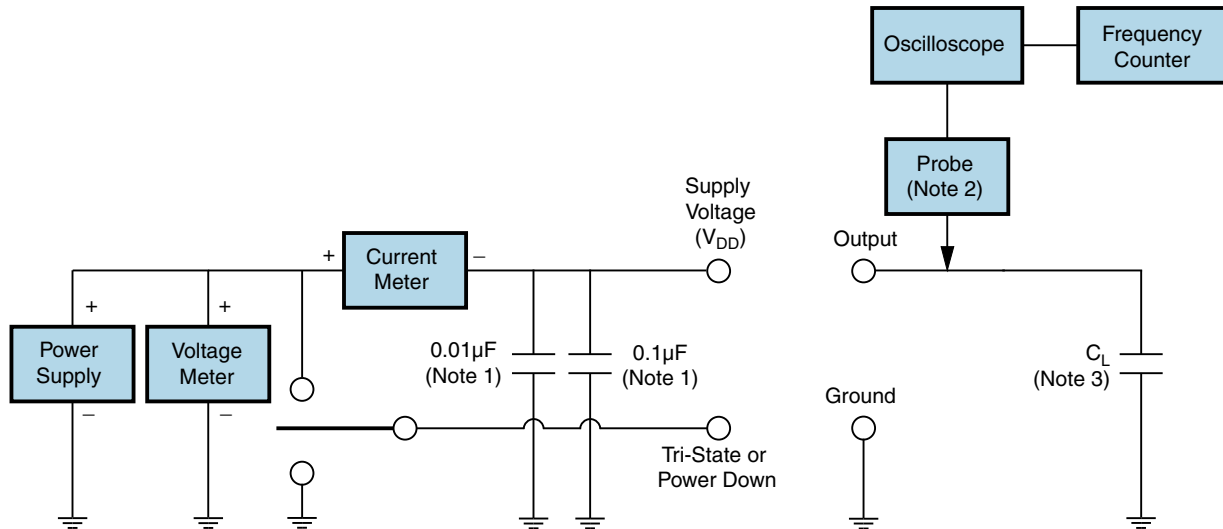
# EMRA31M2H-50.000M TR

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EMRA31M2H-50.000M TR

## Test Circuit for CMOS Output



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 CL includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.



# EMRA31M2H-50.000M TR

## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

<b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	3°C/second Maximum
<b>Preheat</b>	
- 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
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	3°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_P</math>)</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
<b>Additional Notes</b>	Temperatures shown are applied to body of device.

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

<b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	5°C/second Maximum
<b>Preheat</b>	
- 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
<b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>	5°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_p</math>)</b>	240°C Maximum
<b>Target Peak Temperature (<math>T_p</math> Target)</b>	240°C Maximum 2 Times / 230°C Maximum 1 Time
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	10 seconds Maximum 2 Times / 80 seconds Maximum 1 Time
<b>Ramp-down Rate</b>	5°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	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.)