

### EMK43 G 2 H -16.667M

Series RoHS Compliant (Pb-free) 4 Pad 2mm x 2.5mm SMD 3.3Vdc LVCMOS MEMS Oscillator

Frequency Tolerance/Stability

#100ppm Maximum over -40°C to +85°C

Nominal Frequency 16.667MHz

- Output Control Function Tri-State (Disabled Output-High Impedance)

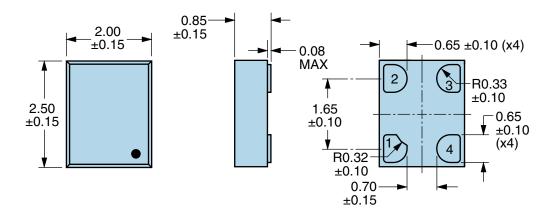
Duty Cycle —— 50 ±5(%)

ELECTRICAL SPECIFICATIONS			
Nominal Frequency	16.667MHz		
Frequency Tolerance/Stability	±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)		
Aging at 25°C	±1ppm Maximum First Year		
Operating Temperature Range	-40°C to +85°C		
Supply Voltage	3.3Vdc ±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 ±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	



### **MECHANICAL DIMENSIONS (all dimensions in millimeters)**

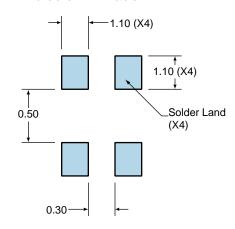


PIN	CONNECTION
1	Tri-State
2	Ground
3	Output
4	Supply Voltage

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

#### **Suggested Solder Pad Layout**

All Dimensions in Millimeters



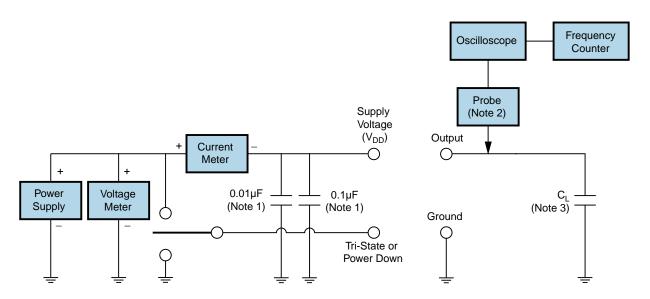
All Tolerances are ±0.1



#### **OUTPUT WAVEFORM & TIMING DIAGRAM**



#### **Test Circuit for CMOS Output**



- Note 1: An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  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 (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.
- Note 3: Capacitance value  $\dot{C}_L$  includes sum of all probe and fixture capacitance.



# **Recommended Solder Reflow Methods**



### **High Temperature Infrared/Convection**

T <sub>s</sub> MAX to T <sub>∟</sub> (Ramp-up Rate)	3°C/second Maximum
Preheat	
- 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
Ramp-up Rate (T <sub>L</sub> to T <sub>P</sub> )	3°C/second Maximum
Time Maintained Above:	
- Temperature (T∟)	217°C
- Time (t∟)	60 - 150 Seconds
Peak Temperature (T <sub>P</sub> )	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (T <sub>P</sub> 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



### **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∟)	150°C
- Time (t∟)	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 (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.