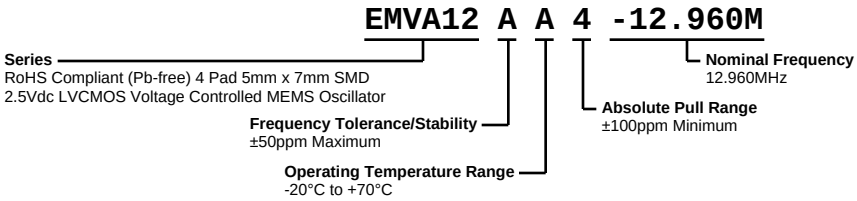
EMVA12AA4-12.960M



ELECTRICAL SPECIFICATIONS

Nominal Frequency	12.960MHz
Frequency Tolerance/Stability	±50ppm Maximum (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	-20°C to +70°C
Supply Voltage	2.5Vdc ±5%
Input Current	13mA Maximum
Output Voltage Logic High (Voh)	90% of Vdd Minimum (IOH = -4mA)
Output Voltage Logic Low (Vol)	10% of Vdd Maximum (IOL = +4mA)
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
Absolute Pull Range	±100ppm Minimum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, Vibration, and First Year Aging at 25°C over the Control Voltage (Vc).)
Control Voltage	0.05Vdc to 1.7Vdc (Test Condition for APR)
Control Voltage Range	0.0Vdc to 1.8Vdc
Linearity	1% Maximum
Transfer Function	Positive Transfer Characteristic
Modulation Bandwidth	8kHz Typical, 5kHz Minimum (Measured at -3dB, Vc = 0.875Vdc)
Input Impedance	250kOhms Minimum
Input Leakage Current	10µA Maximum
Typical Phase Noise at Offsets	-100dBc/Hz at offset of 10kHz, -115dBc/Hz at offset of 100kHz, -145dBc/Hz at offset of 1MHz, and -154dBc/Hz at offset of 10MHz
Period Jitter (RMS)	3pSec Typical, 6pSec Maximum
Period Jitter (pk-pk)	20pSec Typical, 40pSec Maximum
RMS Phase Jitter (Fj = 1.875MHz to 20MHz; Random)	0.8pSec Typical
RMS Phase Jitter (Fj = 900kHz to 7.5MHz; Random)	0.6pSec Typical
Start Up Time	10mSec 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)

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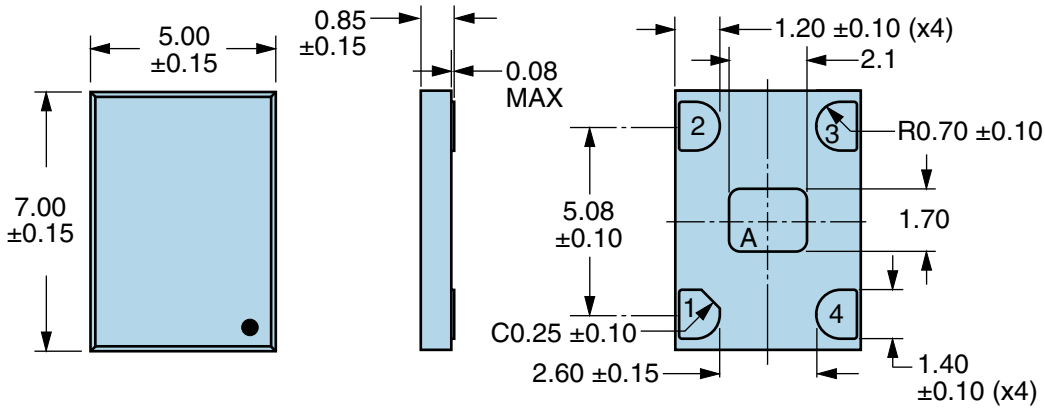
ENVIRONMENTAL & MECHANICAL SPECIFICATIONS	
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Thermal Shock	MIL-STD-883, Method 1011, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A, 20G

MECHANICAL DIMENSIONS (all dimensions in millimeters)



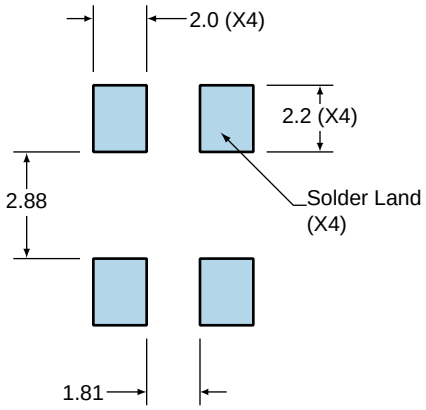
Note A: Center paddle is connected internally to oscillator ground (Pad 2).

PIN	CONNECTION
1	Control Voltage
2	Case Ground
3	Output
4	Supply Voltage

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

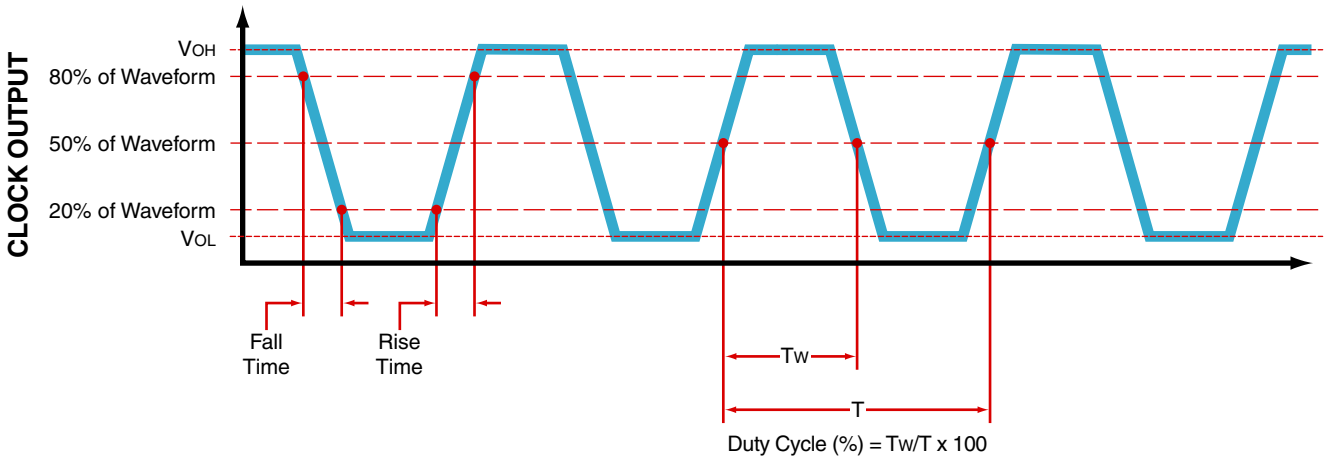
Suggested Solder Pad Layout

All Dimensions in Millimeters

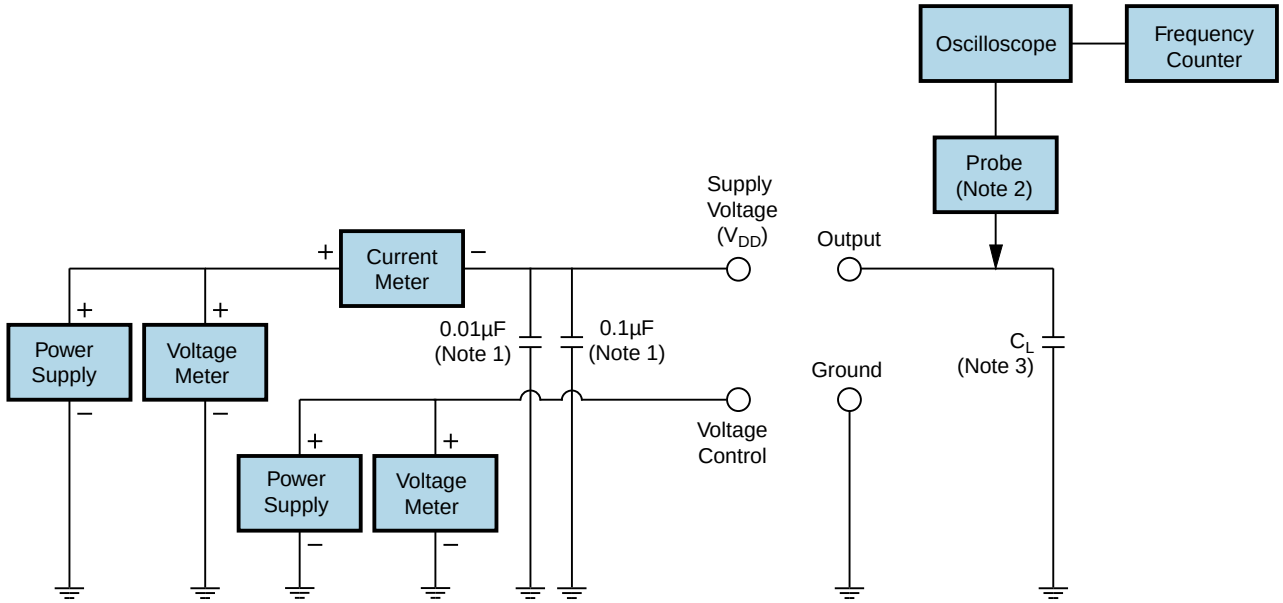


All Tolerances are ±0.1

OUTPUT WAVEFORM

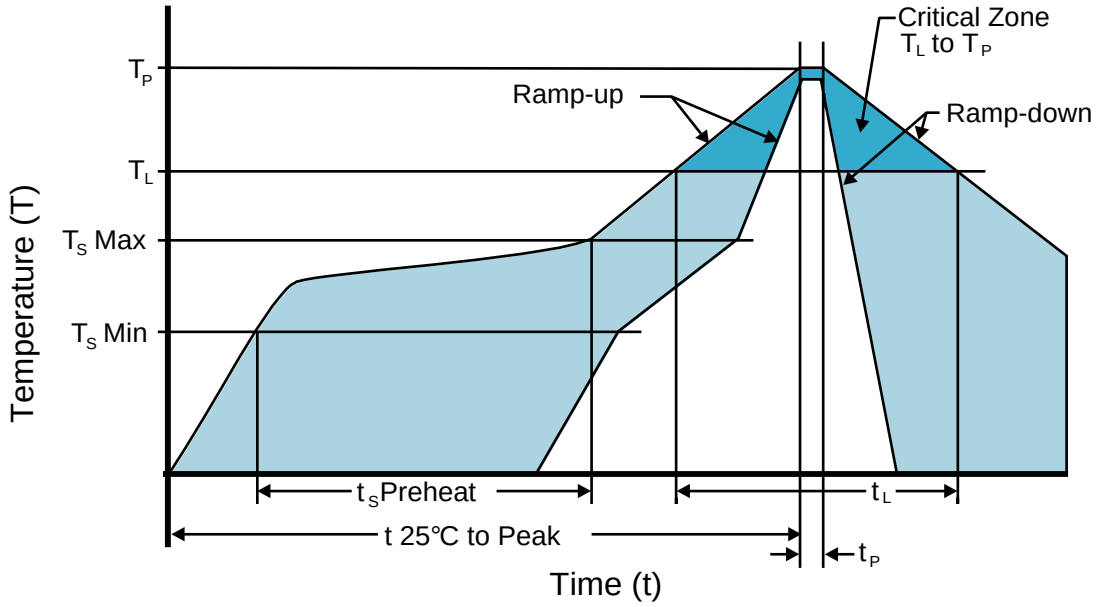


Test Circuit for CMOS Output



Note 1: An external 0.1µF low frequency tantalum bypass capacitor in parallel with a 0.01µF 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 C_L includes sum of all probe and fixture capacitance.

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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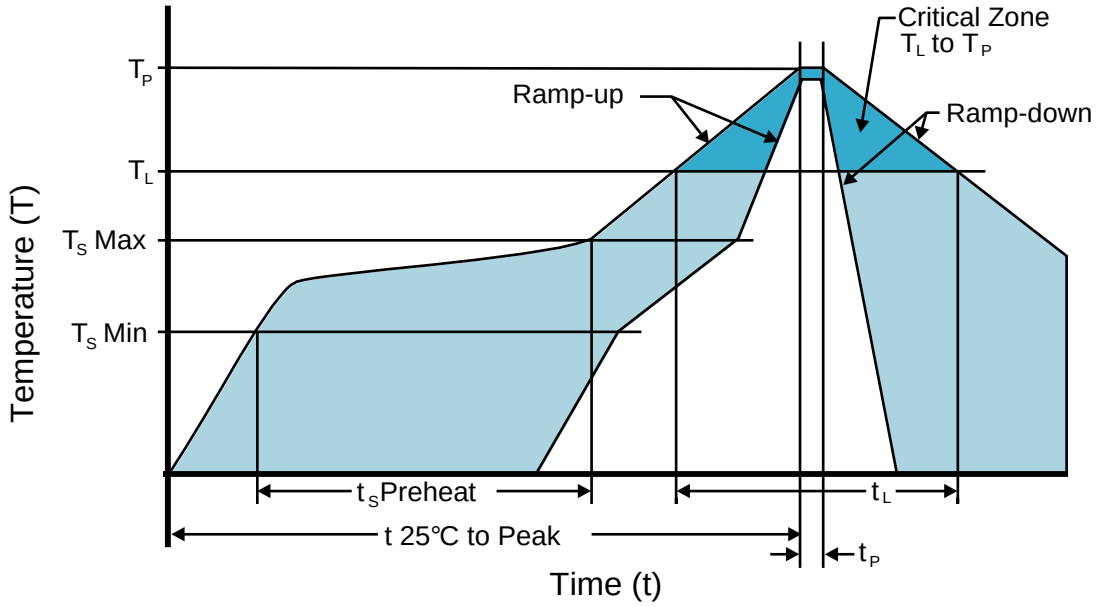
Recommended Solder Reflow Methods



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 1 Time / 230°C Maximum 2 Times
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.