

# EV34C4A4A1-8.448M TR

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## REGULATORY COMPLIANCE (Data Sheet downloaded on Nov 11, 2017)



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## ITEM DESCRIPTION

Voltage Controlled Quartz Crystal Clock Oscillators VCXO LVCMOS (CMOS) 2.5Vdc 6 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD) 8.448MHz  $\pm 50$ ppm Maximum 0°C to +70°C  $\pm 80$ ppm Minimum 10% Typical, 20% Maximum

## ELECTRICAL SPECIFICATIONS

|                                       |  |
|---------------------------------------|--|
| Nominal Frequency                     | 8.448MHz   |
| Frequency Tolerance/Stability         | $\pm 50$ ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, and Vibration.)                                      |
| Aging at 25°C                         | $\pm 2$ ppm/First Year Typical, $\pm 10$ ppm/10 Years Maximum  |
| Operating Temperature Range           | 0°C to +70°C   |
| Supply Voltage                        | 2.5Vdc $\pm 5\%$   |
| Input Current                         | 15mA 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                        | 5nSec Maximum (Measured at 20% to 80% of Waveform)   |
| Duty Cycle                            | 50 $\pm 10$ (%) (Measured at 50% of Waveform)  |
| Load Drive Capability                 | 15pF Maximum   |
| Output Logic Type                     | CMOS   |
| Absolute Pull Range                   | $\pm 80$ ppm 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 Aging over the Control Voltage (Vc).) |
| Control Voltage                       | 0.2Vdc to 2.3Vdc (Test Condition for APR)  |
| Control Voltage Range                 | 0.0Vdc to Vdd  |
| Linearity                             | 10% Typical, 20% Maximum   |
| Transfer Function                     | Positive Transfer Characteristic   |
| Modulation Bandwidth                  | 10kHz Minimum (Measured at -3dB, Vc = 1.25Vdc)   |
| Input Impedance                       | 50kOhms Minimum  |
| Input Leakage Current                 | 10 $\mu$ A Maximum   |
| Phase Noise                           | All Values are Typical<br>-65dBc/Hz at offset of 10Hz<br>-95dBc/Hz at offset of 100Hz<br>-120dBc/Hz at offset of 1kHz<br>-142dBc/Hz at offset of 10kHz<br>-152dBc/Hz at offset of 100kHz<br>-154dBc/Hz at offset of 1MHz                           |
| Tri-State Input Voltage (Vih and Vil) | 90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance)   |
| RMS Phase Jitter                      | 1pSec Maximum (Fj = 12kHz to 20MHz; Random)  |
| Start Up Time                         | 10mSec Maximum   |
| Storage Temperature Range             | -55°C to +125°C  |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                    |   |
|--------------------|---|
| ESD Susceptibility | MIL-STD-883, Method 3015, Class 1, HBM: 1500V |
| Fine Leak Test     | MIL-STD-883, Method 1014, Condition A         |
| Flammability       | UL94-V0                                       |
| Gross Leak Test    | MIL-STD-883, Method 1014, Condition C         |
| Mechanical Shock   | MIL-STD-883, Method 2002, Condition B         |

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|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <b>Moisture Resistance</b>          | MIL-STD-883, Method 1004              |
| <b>Moisture Sensitivity</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              |
| <b>Temperature Cycling</b>          | MIL-STD-883, Method 1010, Condition B |
| <b>Vibration</b>                    | MIL-STD-883, Method 2007, Condition A |

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### MECHANICAL DIMENSIONS (all dimensions in millimeters)



| PIN | CONNECTION      |
|-----|-----------------|
| 1   | Control Voltage |
| 2   | No Connect      |
| 3   | Case/Ground     |
| 4   | Output          |
| 5   | Tri-State       |
| 6   | Supply Voltage  |

| LINE | MARKING  |
|------|--|
| 1    | <b>E8.4480</b><br><i>E=Ecliptek Designator</i>                 |
| 2    | <b>XXXXX</b><br><i>XXXXX=Ecliptek Manufacturing Identifier</i> |

### Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

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## OUTPUT WAVEFORM & TIMING DIAGRAM



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## 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 capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

Note 3: Capacitance value C<sub>L</sub> includes sum of all probe and fixture capacitance.

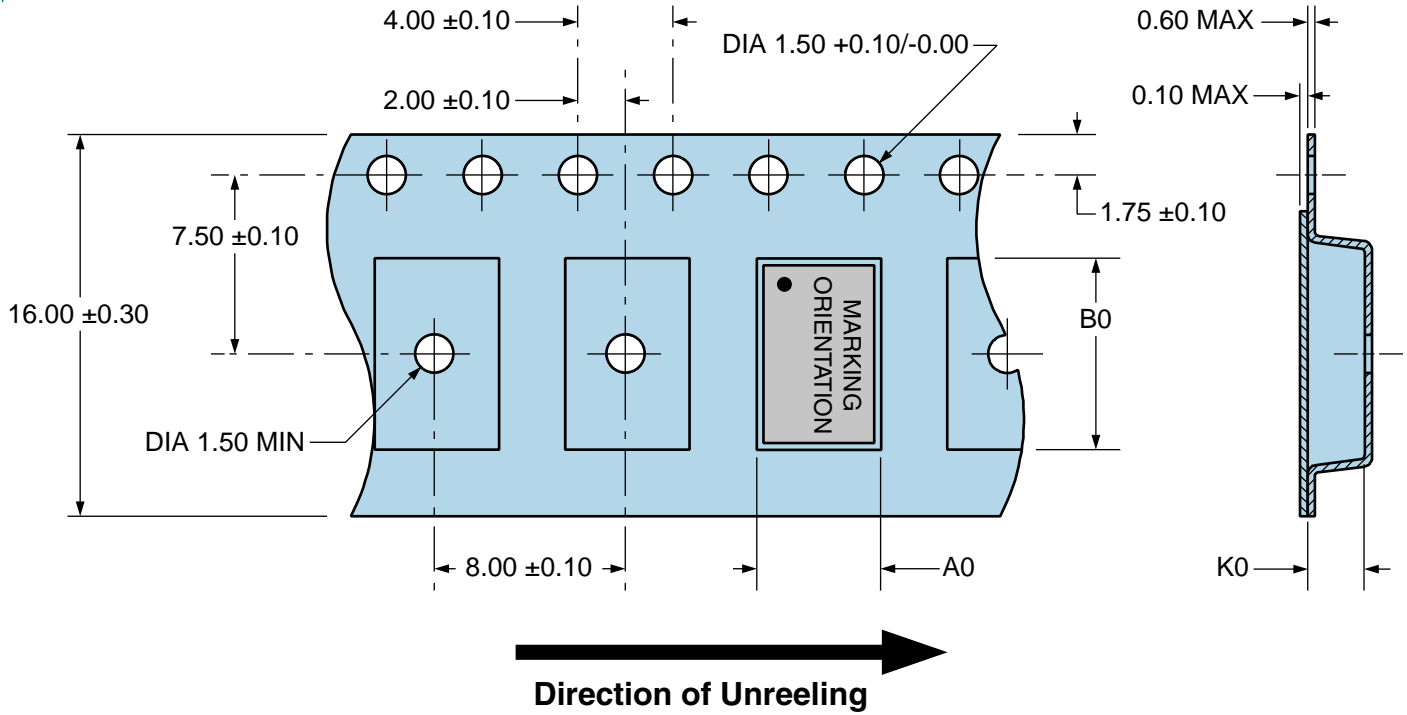
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## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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## Recommended Solder Reflow Methods

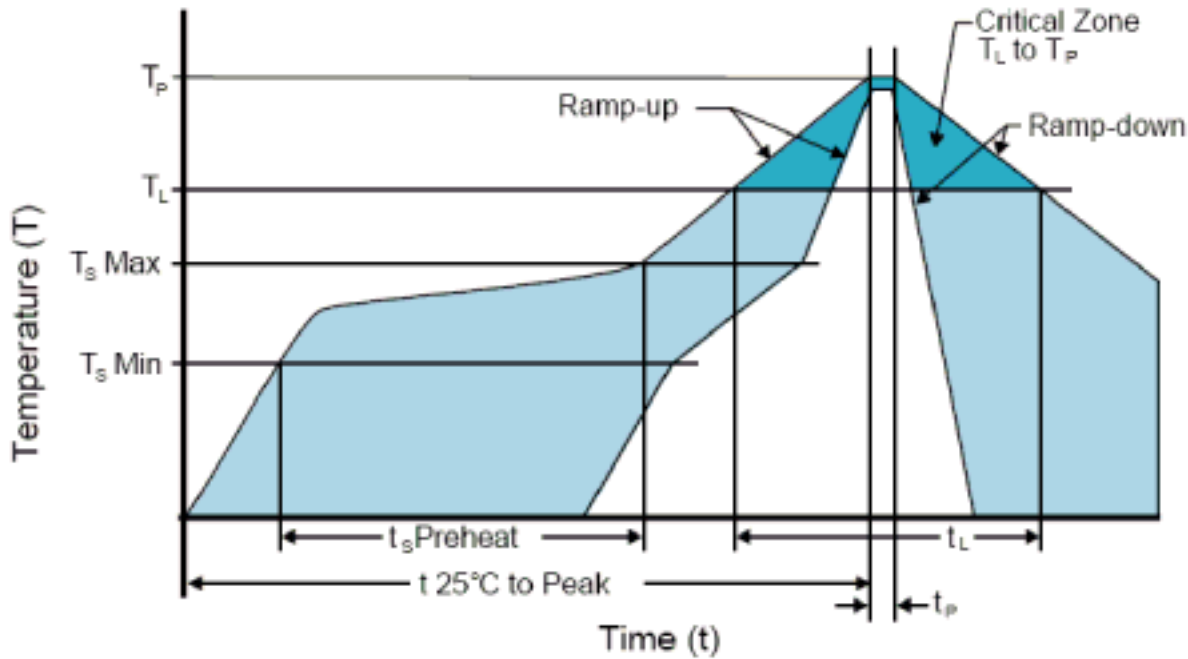


### High Temperature Infrared/Convection

|  |                                      |
|--|--------------------------------------|
| <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                              |

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| Ts MAX to TL (Ramp-up Rate)                | 5°C/Second Maximum                                     |
| <b>Preheat</b>                             |  |
| - Temperature Minimum (Ts MIN)             | N/A  |
| - Temperature Typical (Ts TYP)             | 150°C  |
| - Temperature Maximum (Ts MAX)             | N/A  |
| - Time (ts MIN)                            | 60 - 120 Seconds                                       |
| <b>Ramp-up Rate (TL to TP)</b>             | 5°C/Second Maximum                                     |
| <b>Time Maintained Above:</b>              |  |
| - Temperature (TL)                         | 150°C  |
| - Time (tL)                                | 200 Seconds Maximum                                    |
| <b>Peak Temperature (TP)</b>               | 240°C Maximum  |
| <b>Target Peak Temperature (TP Target)</b> | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| <b>Time within 5°C of actual peak (tp)</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  |

### 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.