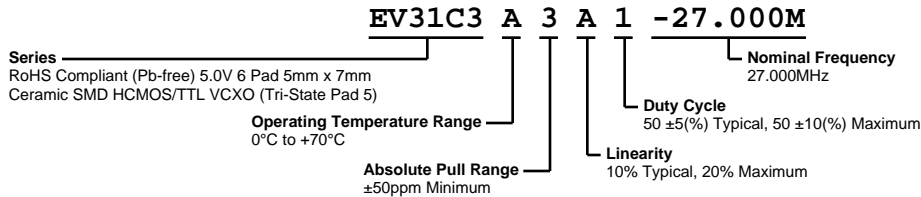


# EV31C3A3A1-27.000M



## ELECTRICAL SPECIFICATIONS

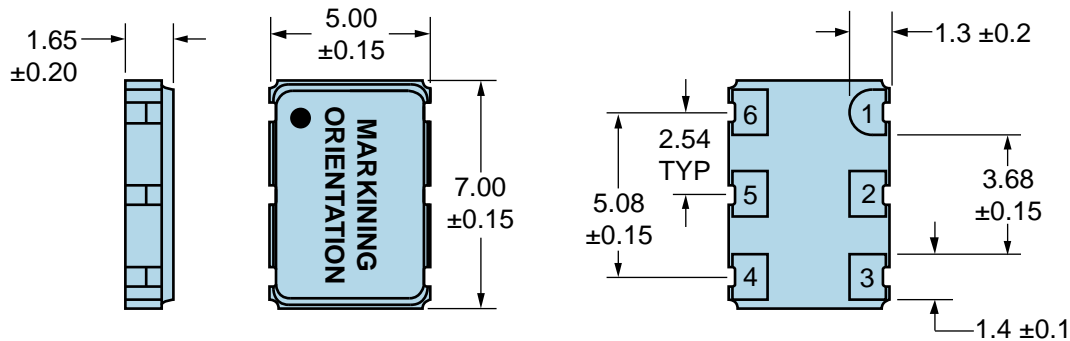
|  |  |
|--|--|
| <b>Nominal Frequency</b>                     | 27.000MHz  |
| <b>Frequency Tolerance/Stability</b>         | ±50ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, and Vibration.)                                      |
| <b>Aging at 40°C</b>                         | ±2ppm/First year typical, ±10ppm/10 Years Maximum  |
| <b>Operating Temperature Range</b>           | 0°C to +70°C   |
| <b>Supply Voltage</b>                        | 5.0Vdc ±10%  |
| <b>Input Current</b>                         | 25mA Maximum   |
| <b>Output Voltage Logic High (Voh)</b>       | 90% of Vdd Minimum (IOH = -4mA)  |
| <b>Output Voltage Logic Low (Vol)</b>        | 10% of Vdd Maximum (IOL = +4mA)  |
| <b>Rise/Fall Time</b>                        | 5nSec Maximum (Measured at 0.4Vdc to 2.4Vdc with TTL Load; Measured at 20% to 80% of waveform with HCMOS Load)   |
| <b>Duty Cycle</b>                            | 50 ±5(%) Typical, 50 ±10(%) Maximum (Measured at 1.4Vdc with TTL Load; Measured at 50% of waveform with HCMOS Load)  |
| <b>Load Drive Capability</b>                 | 10TTL Load or 30pF HCMOS Load Maximum  |
| <b>Output Logic Type</b>                     | CMOS   |
| <b>Absolute Pull Range</b>                   | ±50ppm 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).) |
| <b>Control Voltage</b>                       | 0.5Vdc to 4.5Vdc (Test condition for Absolute Pull Range)  |
| <b>Control Voltage Range</b>                 | 0.0Vdc to Vdd  |
| <b>Linearity</b>                             | 10% Typical, 20% Maximum   |
| <b>Transfer Function</b>                     | Positive Transfer Characteristic   |
| <b>Modulation Bandwidth</b>                  | 10kHz Minimum (Measured at -3dB, Vc = 2.5Vdc)  |
| <b>Input Impedance</b>                       | 50kOhms Minimum  |
| <b>Input Leakage Current</b>                 | 10µA Maximum   |
| <b>Phase Noise</b>                           | -70dBc/Hz at offset of 10Hz, -100dBc/Hz at offset of 100Hz, -130dBc/Hz at offset of 1kHz, -147dBc/Hz at offset of 10kHz, -152dBc/Hz at offset of 100kHz, and -155dBc/Hz at offset of 1MHz (Typical Values at Fo = 27MHz)                     |
| <b>Tri-State Input Voltage (Vih and Vil)</b> | +0.9Vdd Minimum to Enable Output; +0.1Vdd Maximum to Disable Output (High Impedance); No Connect to Enable Output.   |
| <b>RMS Phase Jitter</b>                      | 1pSec Maximum (Fj = 12kHz to 20MHz)  |
| <b>Start Up Time</b>                         | 10mSec Maximum   |
| <b>Storage Temperature Range</b>             | -55°C to +125°C  |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| <b>Fine Leak Test</b>               | MIL-STD-883, Method 1014 Condition A |
| <b>Gross Leak Test</b>              | MIL-STD-883, Method 1014 Condition C |
| <b>Mechanical Shock</b>             | MIL-STD-202, Method 213 Condition C  |
| <b>Resistance to Soldering Heat</b> | MIL-STD-202, Method 210              |
| <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             |
| <b>Vibration</b>                    | MIL-STD-883, Method 2007 Condition A |

# EV31C3A3A1-27.000M

## MECHANICAL DIMENSIONS (all dimensions in millimeters)

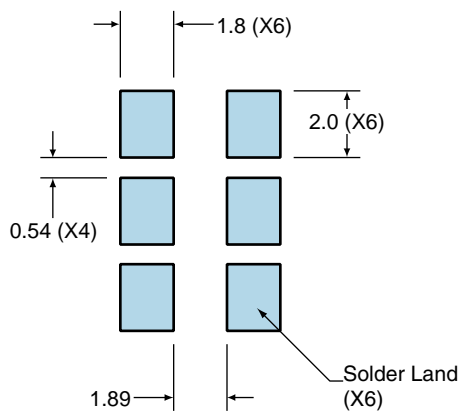


| PIN | CONNECTION      |
|-----|-----------------|
| 1   | Voltage Control |
| 2   | No Connect      |
| 3   | Case Ground     |
| 4   | Output          |
| 5   | Tri-State       |
| 6   | Supply Voltage  |

| LINE | MARKING  |
|------|--|
| 1    | ECLIPTEK   |
| 2    | 27.000M  |
| 3    | XXYYZ<br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of Year<br>ZZ=Week of Year |

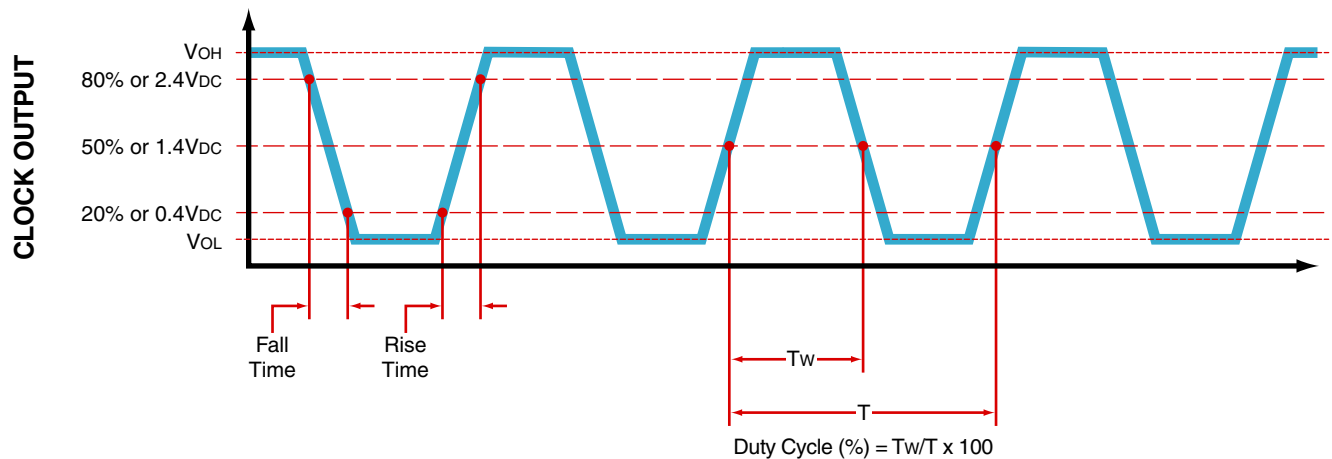
## Suggested Solder Pad Layout

All Dimensions in Millimeters



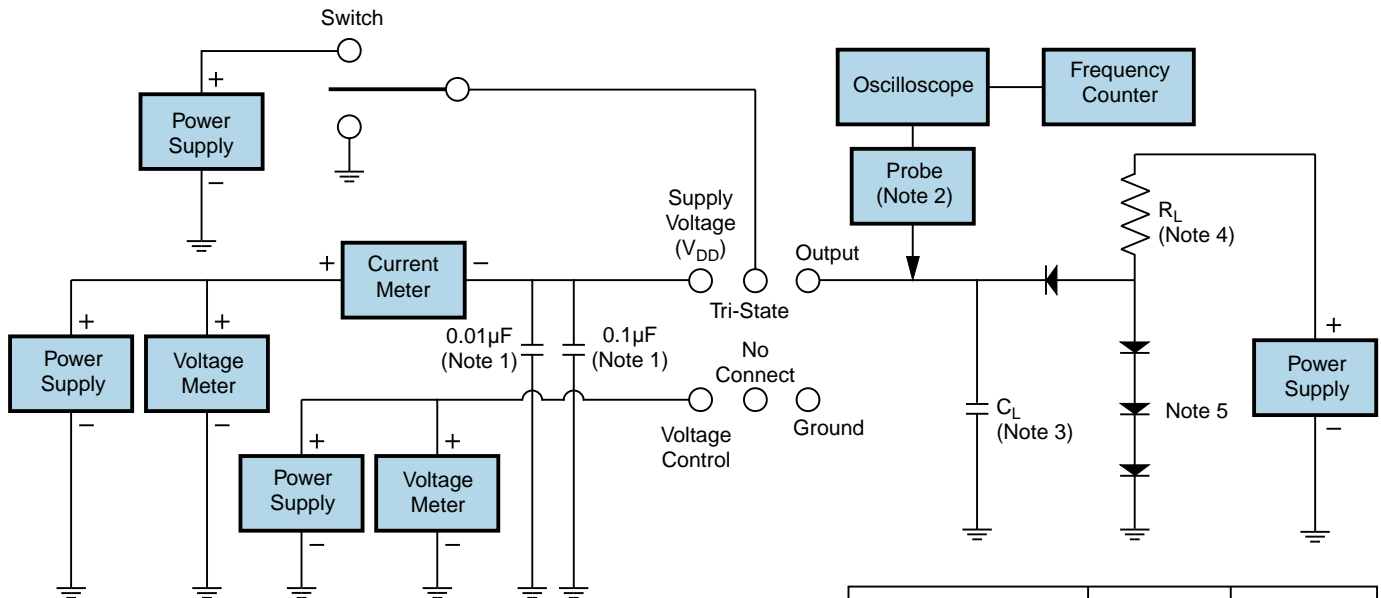
All Tolerances are ±0.1

## OUTPUT WAVEFORM



# EV31C3A3A1-27.000M

## Test Circuit for TTL 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<sub>DD</sub> 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.

Note 4: Resistance value R<sub>L</sub> is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

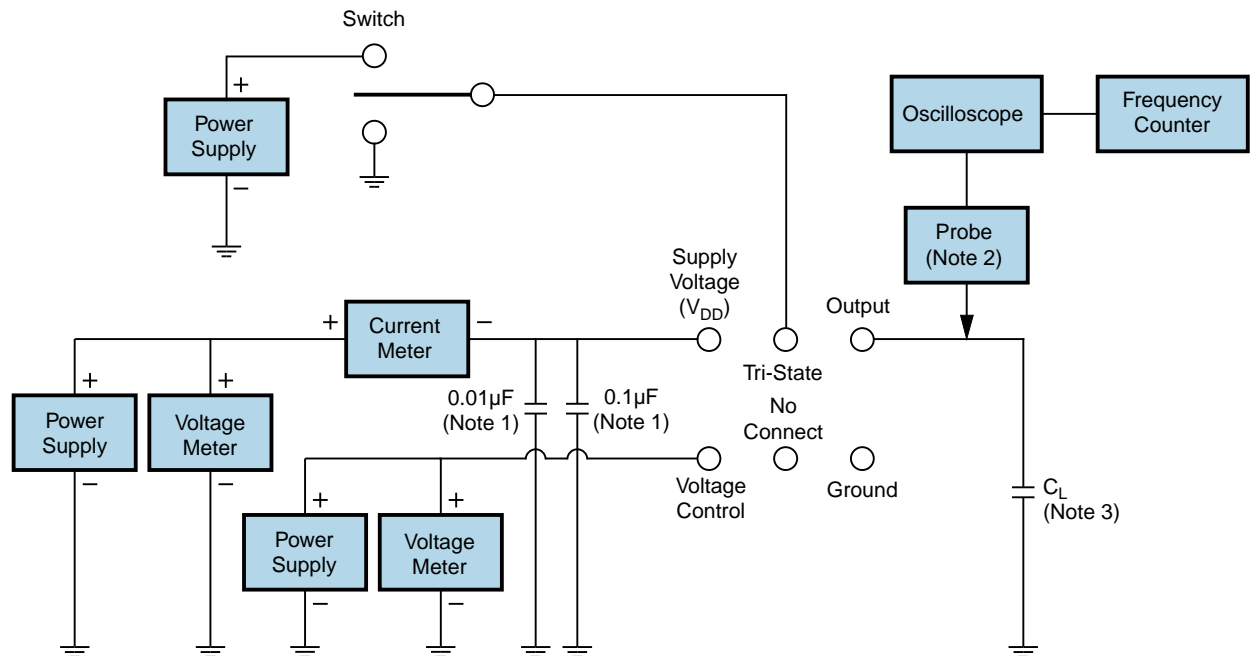
Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

| Output Load Drive Capability | R <sub>L</sub> Value (Ohms) | C <sub>L</sub> Value (pF) |
|------------------------------|-----------------------------|---------------------------|
| 10TTL                        | 390                         | 15                        |
| 5TTL                         | 780                         | 15                        |
| 2TTL                         | 1100                        | 6                         |
| 10LSTTL                      | 2000                        | 15                        |
| 1TTL                         | 2200                        | 3                         |

Table 1: R<sub>L</sub> Resistance Value and C<sub>L</sub> Capacitance Value Vs. Output Load Drive Capability

# EV31C3A3A1-27.000M

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

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

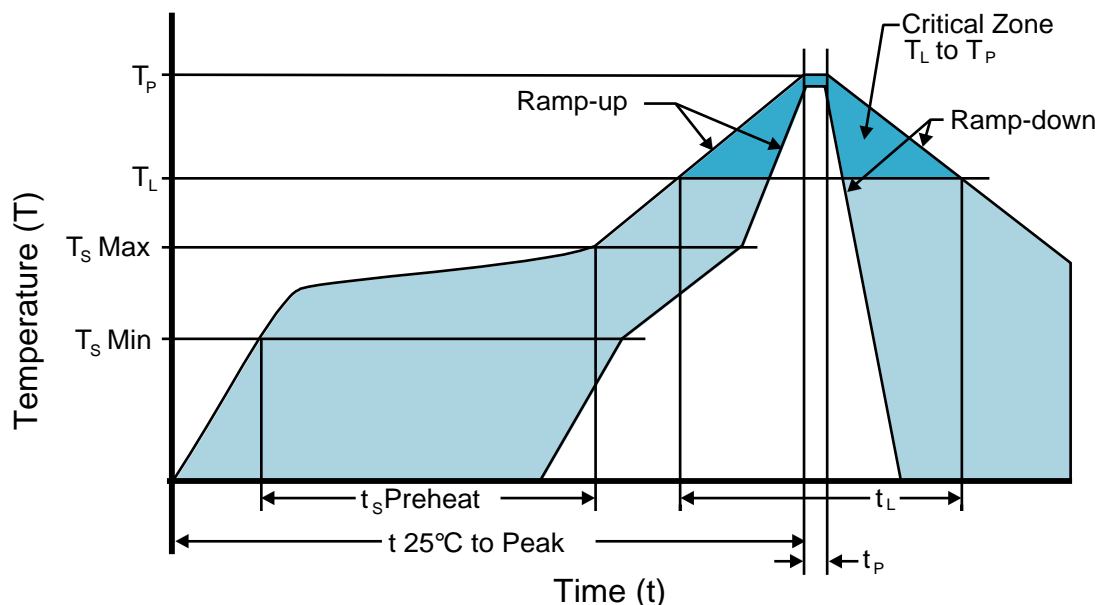
## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|  |                                      |
|--|--------------------------------------|
| <b><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                              |

## 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.