

# EV32C8B3A1-20.000M

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## REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 1, 2017)


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## ITEM DESCRIPTION

Voltage Controlled Quartz Crystal Clock Oscillators VCXO LVCMOS (CMOS) 3.3Vdc 6 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD) 20.000MHz  $\pm 50$ ppm Maximum -40°C to +85°C  $\pm 50$ ppm Minimum 10% Typical, 20% Maximum

## ELECTRICAL SPECIFICATIONS

|                                       |                                                                                                                                                                                                                                                    |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 20.000MHz                                                                                                                                                                                                                                          |
| 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           | -40°C to +85°C                                                                                                                                                                                                                                     |
| Supply Voltage                        | 3.3Vdc $\pm 10\%$                                                                                                                                                                                                                                  |
| 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                   | $\pm 50$ 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                       | 0.3Vdc to 3.0Vdc (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 = 1.65Vdc)                                                                                                                                                                                                     |
| 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   | Tri-State       |
| 3   | Case/Ground     |
| 4   | Output          |
| 5   | No Connect      |
| 6   | Supply Voltage  |

| LINE | MARKING                                                        |
|------|----------------------------------------------------------------|
| 1    | <b>E20.000</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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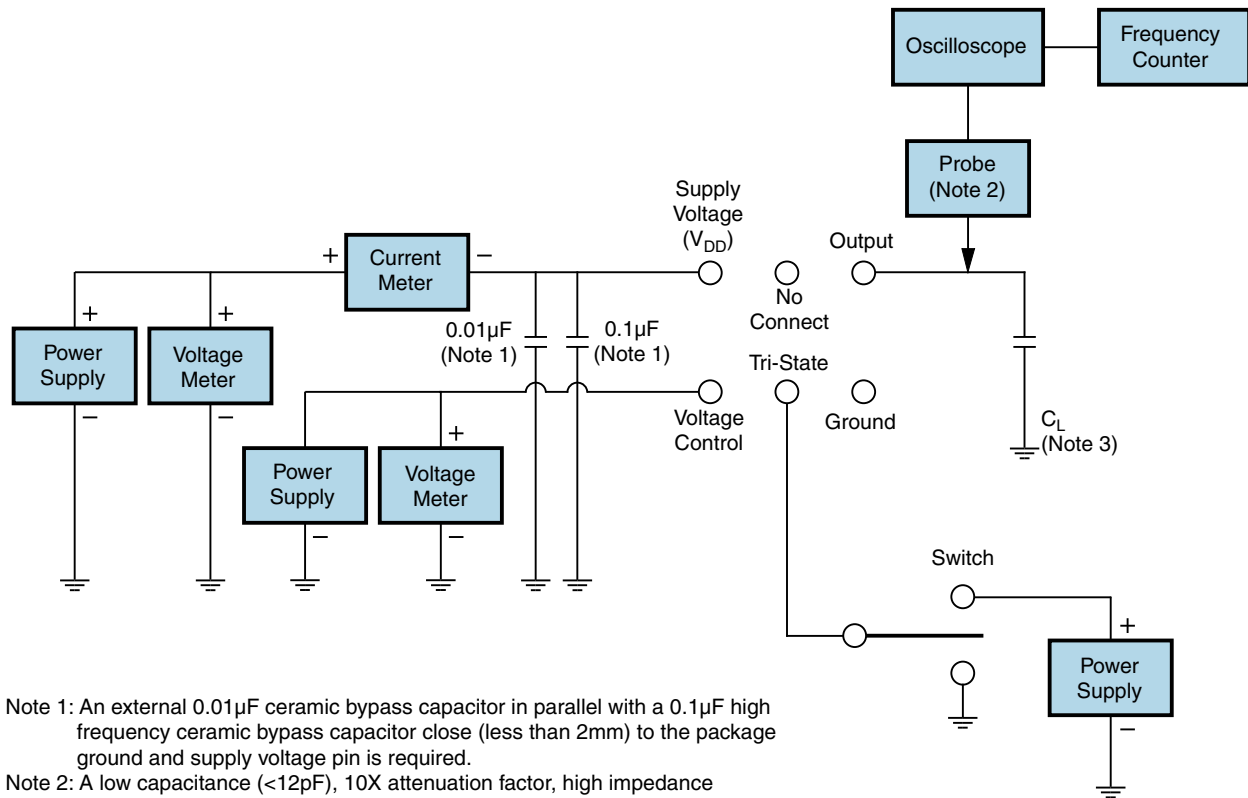
OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for CMOS Output



Note 1: An external  $0.01\mu F$  ceramic bypass capacitor in parallel with a  $0.1\mu F$  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 ( $>10M\Omega$ ), and high bandwidth ( $>300MHz$ ) passive probe is recommended.

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

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Recommended Solder Reflow Methods



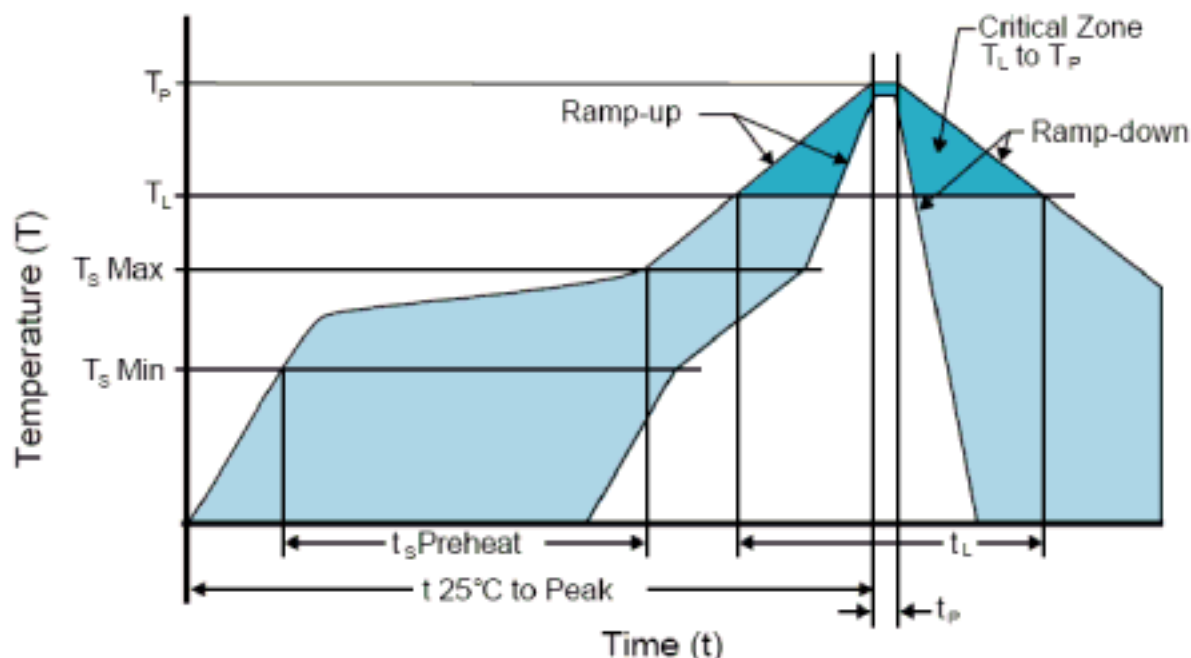
High Temperature Infrared/Convection

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| Ts MAX to TL (Ramp-up Rate)         | 3°C/Second Maximum                   |
| Preheat                             |                                      |
| - Temperature Minimum (Ts MIN)      | 150°C                                |
| - Temperature Typical (Ts TYP)      | 175°C                                |
| - Temperature Maximum (Ts MAX)      | 200°C                                |
| - Time (ts MIN)                     | 60 - 180 Seconds                     |
| Ramp-up Rate (TL to TP)             | 3°C/Second Maximum                   |
| Time Maintained Above:              |                                      |
| - Temperature (TL)                  | 217°C                                |
| - Time (tL)                         | 60 - 150 Seconds                     |
| Peak Temperature (TP)               | 260°C Maximum for 10 Seconds Maximum |
| Target Peak Temperature (TP 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                              |

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## 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 2 Times / 230°C Maximum 1 Time |
|-------------------------------------------------|----------------------------------------------|

|                                                  |                                                        |
|--------------------------------------------------|--------------------------------------------------------|
| 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.