

# EV32C6A5A1-14.318M

[Click part number to visit Part Number Details page](#)

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


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## ITEM DESCRIPTION

Voltage Controlled Quartz Crystal Clock Oscillators VCXO LVCMOS/TTL (CMOS) 3.3Vdc 6 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 14.318MHz  $\pm 50$ ppm Maximum 0°C to +70°C  $\pm 100$ ppm Minimum 10% Typical, 20% Maximum

## ELECTRICAL SPECIFICATIONS

|                                       |                                                                                                                                                                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 14.318MHz                                                                                                                                                                                                                                           |
| 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                        | 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 LVCMOS Load Maximum                                                                                                                                                                                                                            |
| Output Logic Type                     | CMOS                                                                                                                                                                                                                                                |
| Absolute Pull Range                   | $\pm 100$ 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>-70dBc/Hz at offset of 10Hz<br>-100dBc/Hz at offset of 100Hz<br>-130dBc/Hz at offset of 1kHz<br>-147dBc/Hz at offset of 10kHz<br>-152dBc/Hz at offset of 100kHz<br>-155dBc/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         |

**EV32C6A5A1-14.318M** [Click part number to visit Part Number Details page](#)**ENVIRONMENTAL & MECHANICAL SPECIFICATIONS CONTINUED**

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

 [Click part number to visit Part Number Details page](#)

Figure 1: Dimensions of the 10-pin package. The figure shows three views of the package: a side view, a top view, and a bottom view. The side view shows a width of 1.65 ± 0.20. The top view shows a length of 5.00 ± 0.15 and a height of 7.00 ± 0.15. The bottom view shows a width of 1.3 ± 0.2, a height of 3.68 ± 0.15, and a distance of 5.08 ± 0.15 from the bottom edge to the center of the pins. The pins are numbered 1 through 6. The text "MARKING ORIENTATION" is visible on the top view.

| LINE | MARKING                                               |
|------|-------------------------------------------------------|
| 1    | ECLIPTEK                                              |
| 2    | 14.318M                                               |
| 3    | XXXXXX<br>XXXXXX=Ecliptek<br>Manufacturing Identifier |

Figure 1: Dimensions of the test board. The diagram shows a 3x2 grid of blue square components. Dimensions are given in inches and multiplied by a factor of 6. The horizontal spacing between columns is 1.8 inches. The vertical spacing between rows is 2.0 inches. The width of each component is 0.54 inches. The distance from the left edge of the board to the center of the left column is 1.89 inches. A label "Solder Land (X6)" points to the bottom-right component.

1-800-ECLIPTEK or 714.433.1200

EV32C6A5A1-14.318M

[Click part number to visit Part Number Details page](#)

OUTPUT WAVEFORM & TIMING DIAGRAM



# EV32C6A5A1-14.318M

[Click part number to visit Part Number Details page](#)

## Test Circuit for CMOS Output



Note 1: An external  $0.01\mu\text{F}$  ceramic bypass capacitor in parallel with a  $0.1\mu\text{F}$  high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

Note 2: A low capacitance ( $<12\text{pF}$ ), 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.

EV32C6A5A1-14.318M [Click part number to visit Part Number Details page](#)

Test Circuit for TTL Output

| Output Load Drive Capability | R <sub>L</sub> Value (Ohms) | C <sub>L</sub> Value (pF) |
|------------------------------|-----------------------------|---------------------------|
| 10TTL                        | 390                         | 15                        |

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



- 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.
- 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.

EV32C6A5A1-14.318M

[Click part number to visit Part Number Details page](#)

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                              |

EV32C6A5A1-14.318M

[Click part number to visit Part Number Details page](#)

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

|                                     |                                                        |
|-------------------------------------|--------------------------------------------------------|
| TS MAX to TL (Ramp-up Rate)         | 5°C/Second Maximum                                     |
| Preheat                             |                                                        |
| - Temperature Minimum (TS MIN)      | N/A                                                    |
| - Temperature Typical (TS TYP)      | 150°C                                                  |
| - Temperature Maximum (TS MAX)      | N/A                                                    |
| - Time (ts MIN)                     | 60 - 120 Seconds                                       |
| Ramp-up Rate (TL to TP)             | 5°C/Second Maximum                                     |
| Time Maintained Above:              |                                                        |
| - Temperature (TL)                  | 150°C                                                  |
| - Time (tL)                         | 200 Seconds Maximum                                    |
| Peak Temperature (TP)               | 240°C Maximum                                          |
| Target Peak Temperature (TP Target) | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| 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.