

EV32C6A3A1-20.000M TR [Click part number to visit Part Number Details page](#)

REGULATORY COMPLIANCE (Data Sheet downloaded on Nov 19, 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) 20.000MHz ± 50 ppm Maximum 0°C to +70°C ± 50 ppm Minimum 10% Typical, 20% Maximum

ELECTRICAL SPECIFICATIONS

| | |
|---------------------------------------|--|
| Nominal Frequency | 20.000MHz |
| Frequency Tolerance/Stability | ± 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 | ± 2 ppm/First Year Typical, ± 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 ± 10 (%) (Measured at 50% of Waveform) |
| Load Drive Capability | 15pF LVCMOS Load Maximum |
| Output Logic Type | CMOS |
| Absolute Pull Range | ± 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 μ A Maximum |
| Phase Noise | All Values are Typical -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 -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 |

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| | |
|-------------------------------------|---------------------------------------|
| Moisture Resistance | MIL-STD-883, Method 1004 |
| Moisture Sensitivity | 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 |
| Temperature Cycling | MIL-STD-883, Method 1010, Condition B |
| Vibration | 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 | ECLIPTEK |
| 2 | 20.000M |
| 3 | XXXXX XXXXX=Ecliptek Manufacturing Identifier |

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 $0.01\mu\text{F}$ 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.

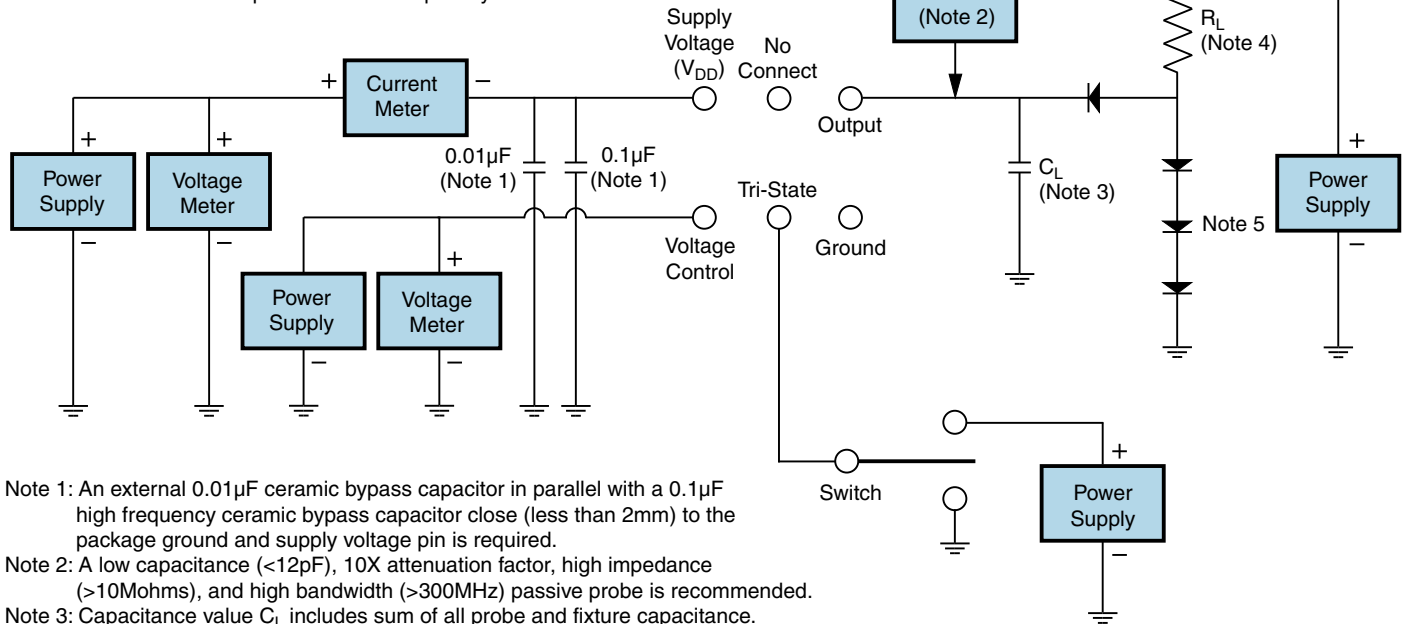
Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

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Test Circuit for TTL Output

| Output Load Drive Capability | R_L Value (Ohms) | C_L Value (pF) |
|------------------------------|--------------------|------------------|
| 10TTL | 390 | 15 |

Table 1: R_L Resistance Value and C_L Capacitance Value Vs. Output Load Drive Capability



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.

Note 4: Resistance value R_L is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

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

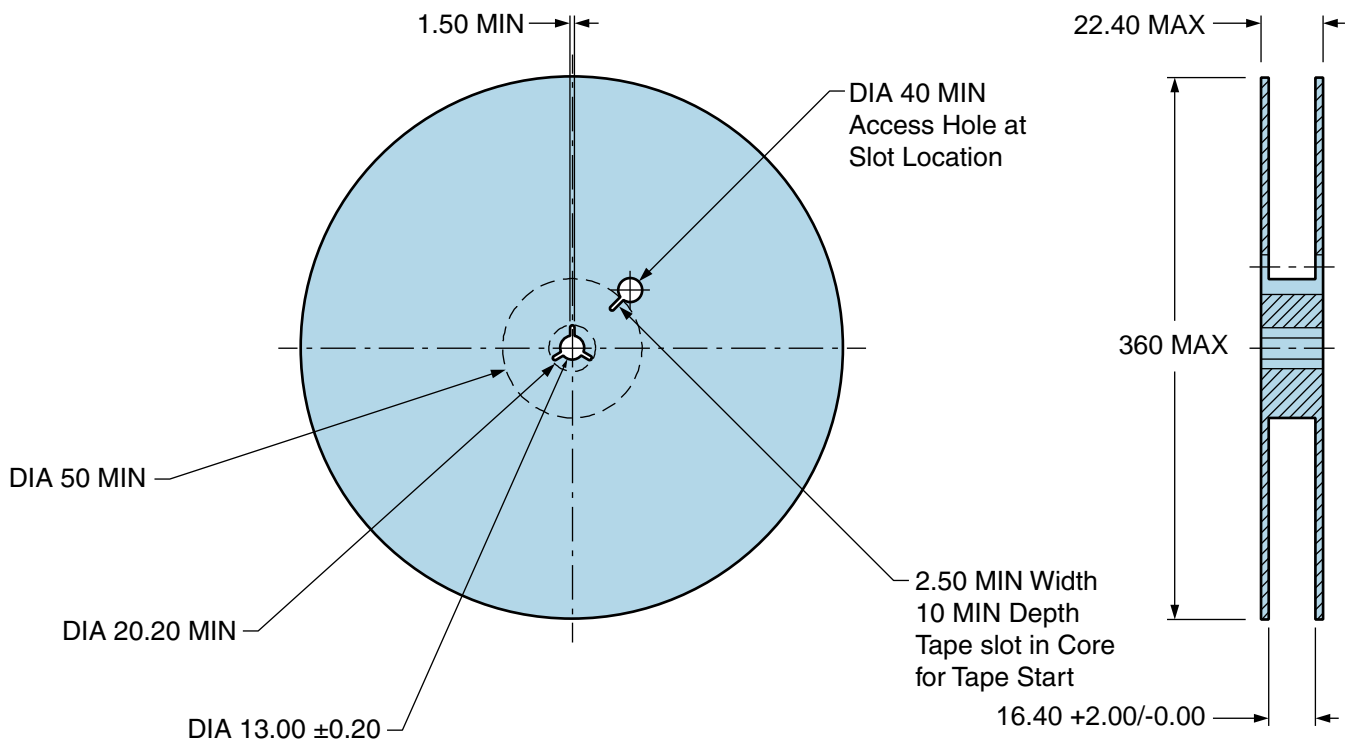
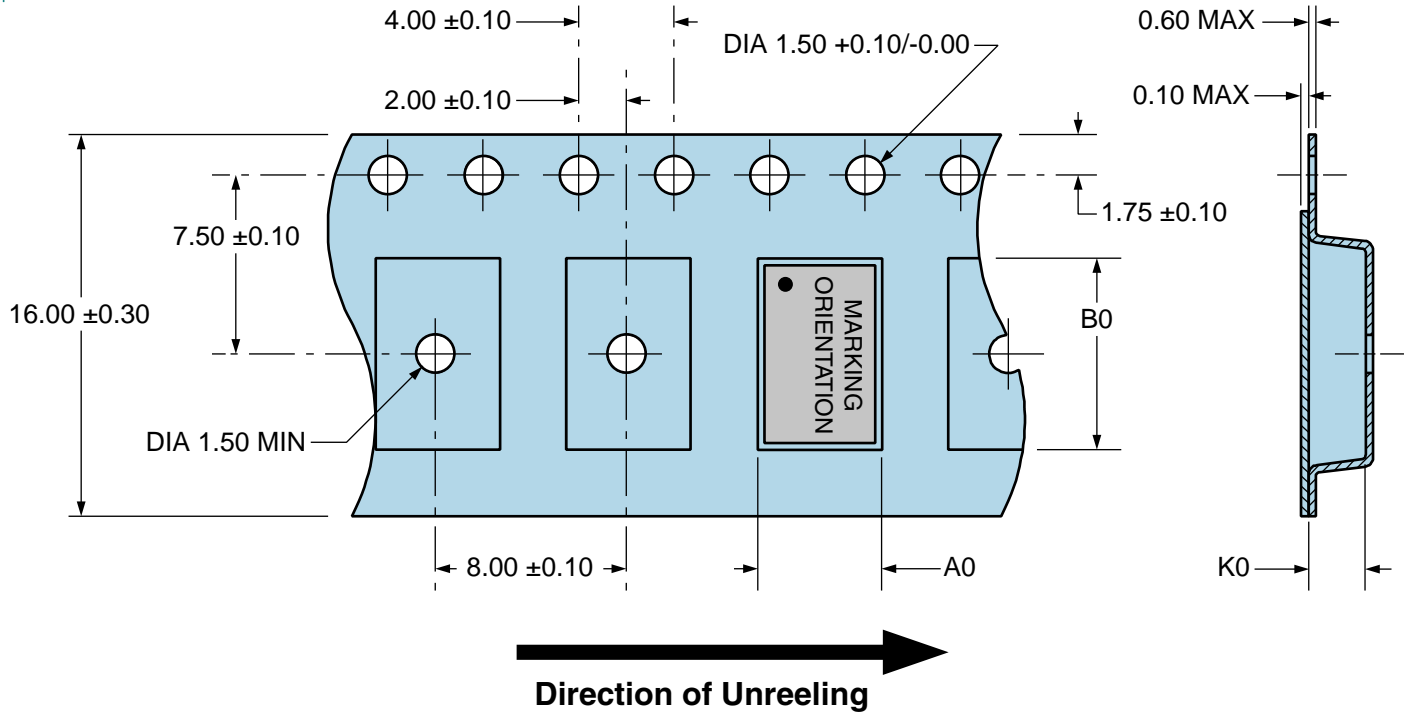
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Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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Recommended Solder Reflow Methods

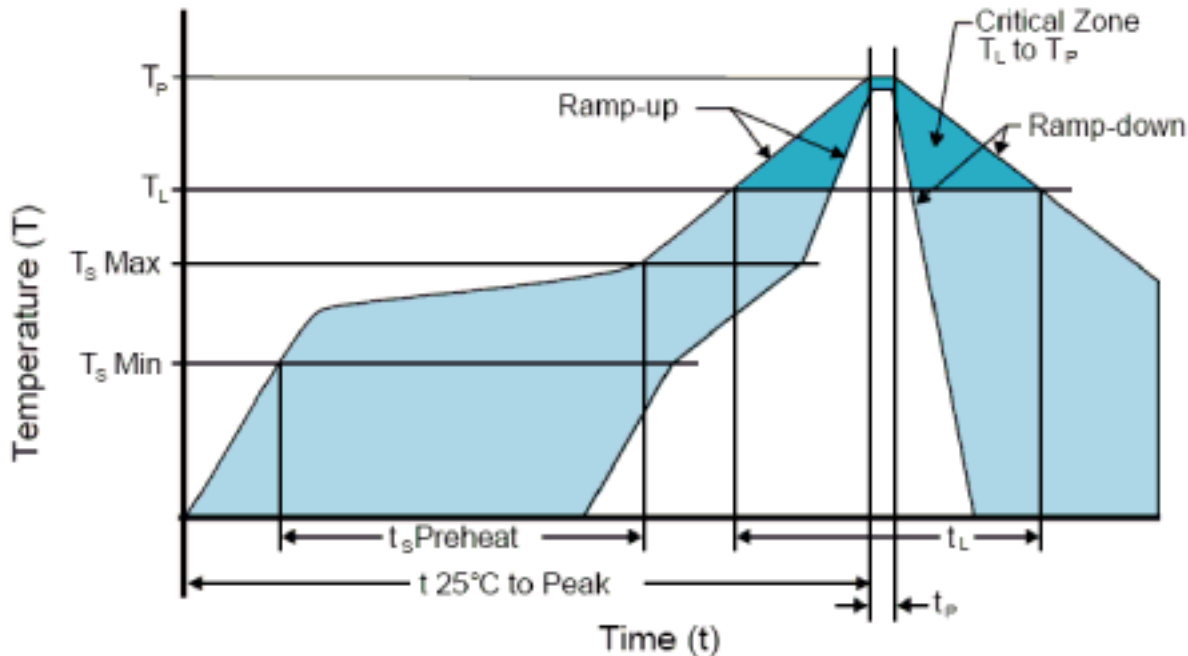


High Temperature Infrared/Convection

| | |
|--|--------------------------------------|
| 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

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