# ES51C1A10V-12.000M

ECLIPTEK CORPORATION

**ES51C1 A 10 V -12.000M**

**Series**
RoHS Compliant (Pb-free) 5mm x 7mm Ceramic SMD
5.0Vdc Clipped Sinewave TC(VC)XO

**Operating Temperature Range**
0°C to +50°C

**Frequency Stability**
±1.0ppm Maximum

**Control Voltage**
1.5Vdc ±1.0Vdc

**Nominal Frequency**
12.000MHz

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Frequency** | 12.000MHz |
| **Frequency Stability vs. Frequency Tolerance** | ±1.0ppm Maximum (Measured at 25°C ±2°C, Vdd=5.0Vdc, Vc=1.5Vdc) |
| **Frequency Stability** | ±1.0ppm Maximum |
| **Frequency Stability vs. Input Voltage** | ±0.2ppm Maximum (Vdd ±5%) |
| **Frequency Stability vs. Aging** | ±1ppm/Year Maximum (at 25°C) |
| **Frequency Stability vs. Load** | ±0.2ppm Maximum (±1kOhm//±1pF) |
| **Operating Temperature Range** | 0°C to +50°C |
| **Supply Voltage** | 5.0Vdc ±5% |
| **Input Current** | 1.5mA Maximum |
| **Output Voltage** | 0.8Vp-p Clipped Sinewave Minimum |
| **Load Drive Capability** | 10kOhms//10pF |
| **Output Logic Type** | Clipped Sinewave |
| **Control Voltage** | 1.5Vdc ±1.0Vdc |
| **Frequency Deviation** | ±8ppm Minimum |
| **Linearity** | 10% Maximum |
| **Transfer Function** | Positive Transfer Characteristic |
| **Modulation Bandwidth** | 3kHz Minimum (Measured at -3dB with a Control Voltage of 1.5Vdc) |
| **Input Impedance** | 100kOhms Minimum |
| **Phase Noise** | -80dBc/Hz at 10Hz offset, -115dBc/Hz at 100Hz offset, -135dBc/Hz at 1kHz offset, -145dBc/Hz at 10kHz offset, -145dBc/Hz at 100kHz offset (Typical Values, at 12.800MHz) |
| **Start Up Time** | 5mSec Maximum |
| **Storage Temperature Range** | -55°C to +125°C |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Fine Leak Test** | MIL-STD-883, Method 1014 Condition A |
| **Gross Leak Test** | MIL-STD-883, Method 1014 Condition C |
| **Mechanical Shock** | MIL-STD-202, Method 213 Condition C |
| **Resistance to Soldering Heat** | MIL-STD-202, Method 210 |
| **Resistance to Solvents** | MIL-STD-202, Method 215 |
| **Solderability** | MIL-STD-883, Method 2003 |
| **Temperature Cycling** | MIL-STD-883, Method 1010 |
| **Vibration** | MIL-STD-883, Method 2007 Condition A |

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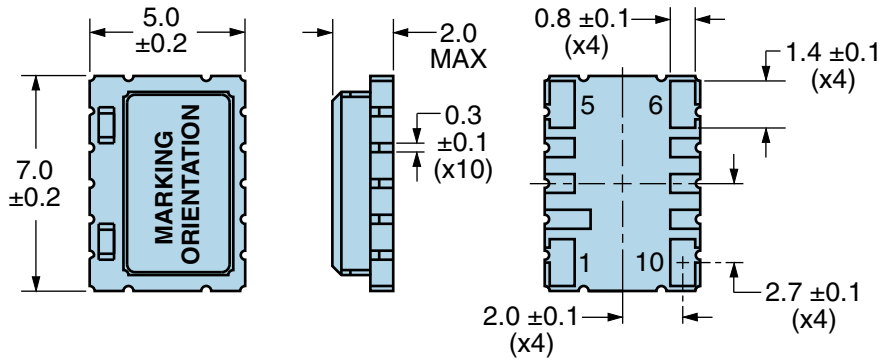
## MECHANICAL DIMENSIONS (all dimensions in millimeters)

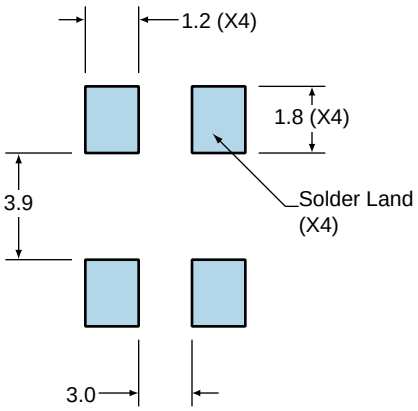



| PIN | CONNECTION |
|---|---|
| 1 | Voltage Control |
| 2 | Do Not Connect |
| 3 | Do Not Connect |
| 4 | Do Not Connect |
| 5 | Case/Ground |
| 6 | Output |
| 7 | Do Not Connect |
| 8 | Do Not Connect |
| 9 | Do Not Connect |
| 10 | Supply Voltage |

| LINE | MARKING |
|---|---|
| 1 | **E12.000**<br>*E=Ecliptek* |
| 2 | **XXYZZ**<br>*XX=Ecliptek Manufacturing Code*<br>*Y=Last Digit of the Year*<br>*ZZ=Week of the Year* |

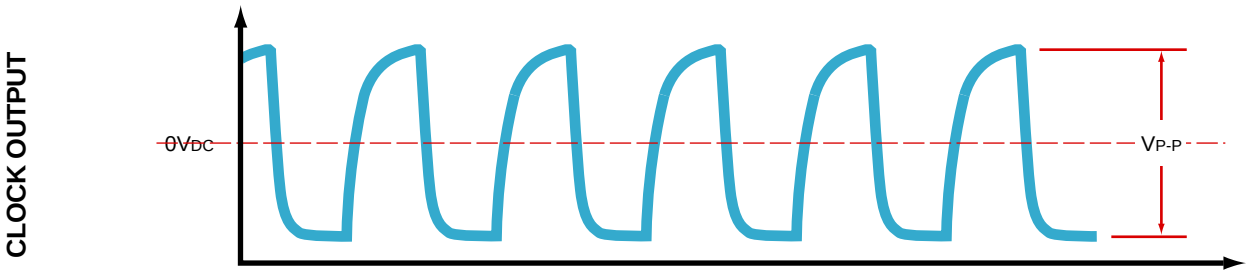
### Suggested Solder Pad Layout

All Dimensions in Millimeters

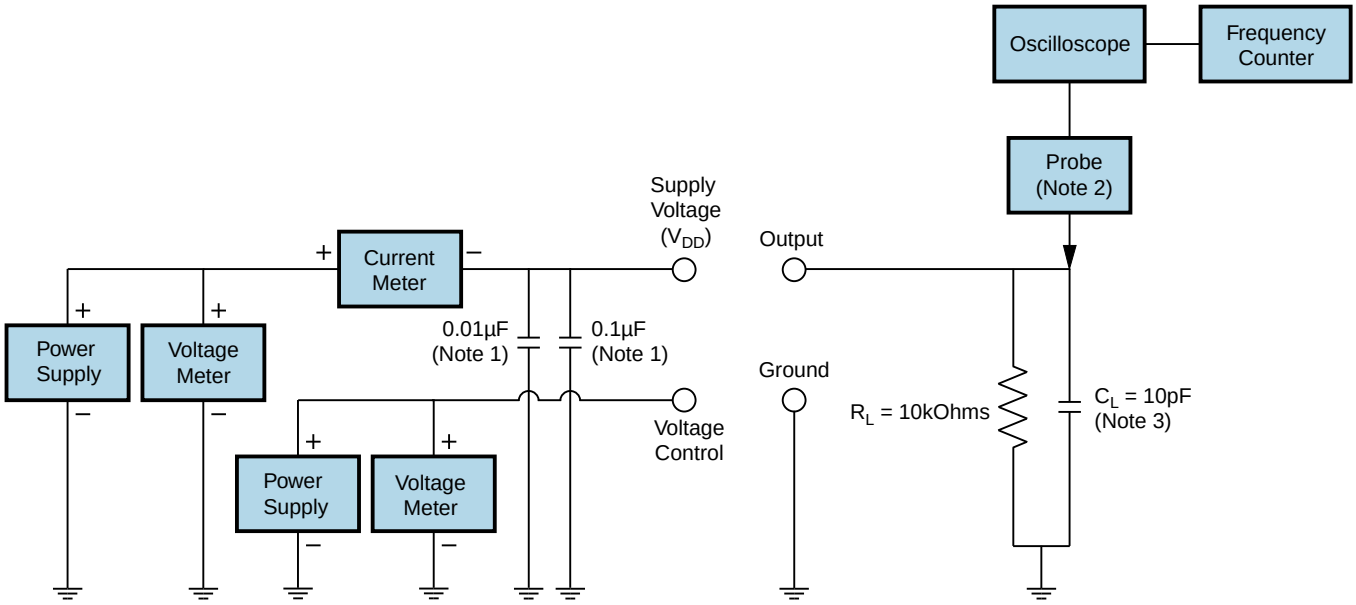



All Tolerances are ±0.1

## OUTPUT WAVEFORM




## Test Circuit for Voltage Control Option




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 $V_{DD}$ 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 $C_L$ includes sum of all probe and fixture capacitance.

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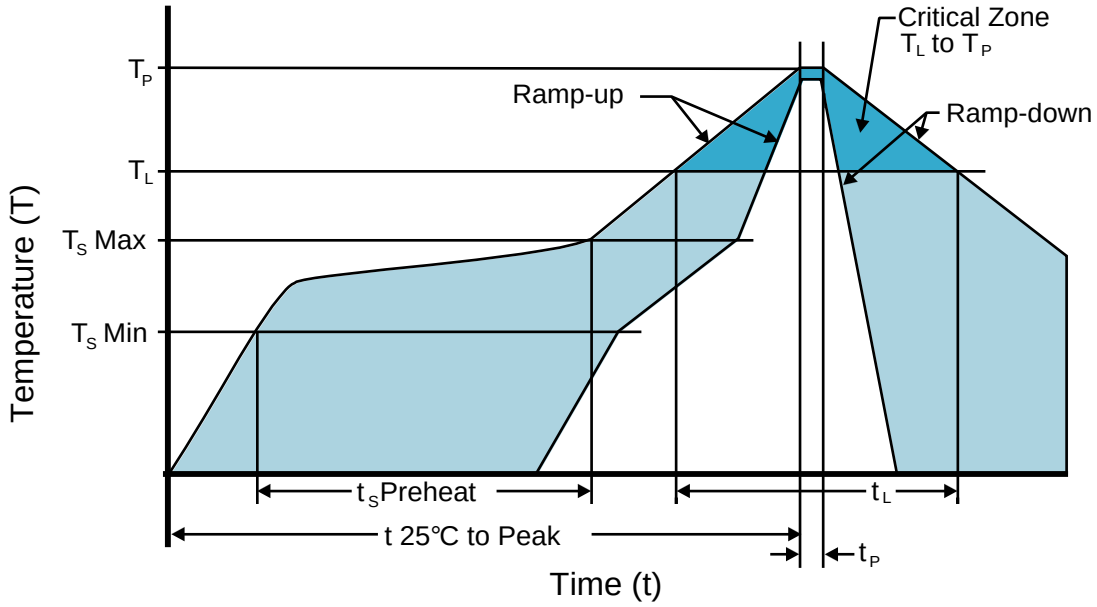
## Recommended Solder Reflow Methods




### Low Temperature Infrared/Convection 220°C

| | |
|---|---|
| **$T_S$ MAX to $T_L$ (Ramp-up Rate)** | 5°C/second Maximum |
| **Preheat** | |
| **- Temperature Minimum ($T_S$ MIN)** | N/A |
| **- Temperature Typical ($T_S$ TYP)** | 150°C |
| **- Temperature Maximum ($T_S$ MAX)** | N/A |
| **- Time ($t_S$ MIN)** | 60 - 120 Seconds |
| **Ramp-up Rate ($T_L$ to $T_P$)** | 5°C/second Maximum |
| **Time Maintained Above:** | |
| **- Temperature ($T_L$)** | 150°C |
| **- Time ($t_L$)** | 200 Seconds Maximum |
| **Peak Temperature ($T_P$)** | 220°C Maximum |
| **Target Peak Temperature ($T_P$ Target)** | 220°C Maximum 1 Time / 215°C Maximum 1 Time |
| **Time within 5°C of actual peak ($t_p$)** | 15 seconds Maximum 1 Time / 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.