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## EQU31 Series Oscillator

Temperature Compensated Voltage Controlled Quartz Crystal Clock Oscillators TCVCXO Clipped Sinewave 1.8Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD)



Revision B 06/12/2015

### Electrical Specifications

<b>Nominal Frequency</b>	10.000MHz to 32.000MHz <i>Some frequencies within this range may not be available.</i>
<b>Frequency Stability</b>	Inclusive of Operating Temperature Range, at Vdd=1.8Vdc and Vc=0.9Vdc ±3.0ppm Maximum ±2.5ppm Maximum ±2.0ppm Maximum ±1.5ppm Maximum ±1.0ppm Maximum ±0.5ppm Maximum
<b>Frequency Stability vs. Frequency Tolerance</b>	±1.0ppm Maximum (at 25°C ±2°C, at Vdd=1.8Vdc, and Vc=0.9Vdc, Pre-Reflow)
<b>Frequency Stability vs. Input Voltage</b>	±0.2ppm Maximum (±5%)
<b>Frequency Stability vs. Load</b>	±0.2ppm Maximum (±1kOhm//±1pF)
<b>Frequency Stability vs. Reflow</b>	±1ppm Maximum (at 25°C, 24 hours after reflow, 1 time)
<b>Frequency Stability vs. Aging</b>	±1ppm/Year Maximum (at 25°C)
<b>Operating Temperature Range</b>	0°C to +50°C -10°C to +60°C 0°C to +70°C -20°C to +70°C -30°C to +60°C -30°C to +75°C -30°C to +85°C -40°C to +85°C
<b>Supply Voltage</b>	1.8Vdc ±5%
<b>Input Current</b>	2.0mA Maximum over Nominal Frequency of 10MHz to 26MHz 2.5mA Maximum over Nominal Frequency of 26.000001MHz to 32MHz
<b>Output Voltage</b>	External DC-Cut capacitor required, 1000pF recommended 0.8Vp-p Clipped Sinewave Minimum
<b>Load Drive Capability</b>	10kOhms//10pF
<b>Output Logic Type</b>	Clipped Sinewave
<b>Control Voltage</b>	0.9Vdc ±0.6Vdc
<b>Frequency Deviation</b>	±5ppm Minimum
<b>Linearity</b>	10% Maximum
<b>Transfer Function</b>	Positive Transfer Characteristic
<b>Modulation Bandwidth</b>	10kHz Minimum at -3dB

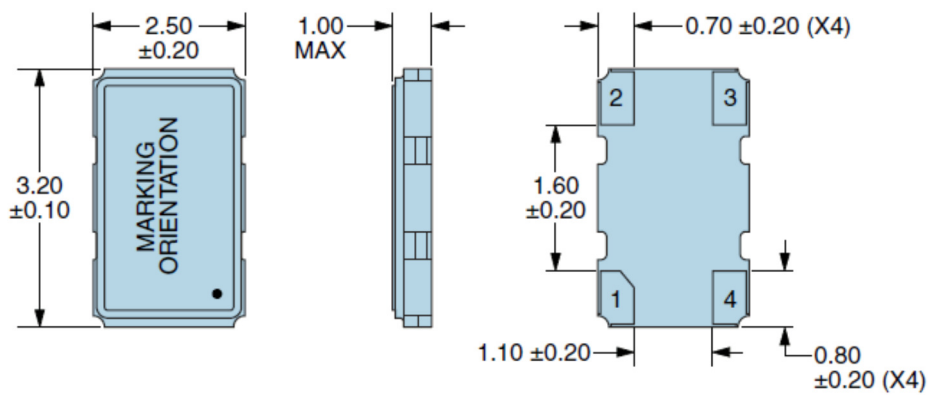
<b>Input Impedance</b>	500kohm Minimum
<b>Phase Noise</b>	<a href="#">Click to Open Phase Noise Table</a>
<b>RMS Phase Jitter</b>	Fj=12kHz to 20MHz (Random) 0.7pSec Typical, 1pSec Maximum
<b>Start Up Time</b>	2mSec Maximum
<b>Storage Temperature Range</b>	-40°C to +85°C

## Phase Noise

All Values are Typical

<i>Offset</i>	<i>Phase Noise</i>
10Hz	-89dBc/Hz
100Hz	-115dBc/Hz
1kHz	-138dBc/Hz
10kHz	-150dBc/Hz

## Mechanical Dimensions



All Dimensions in Millimeters

Pin 1: Control Voltage

Pin 2: Case/Ground

Pin 3: Output

Pin 4: Supply Voltage

## Marking Specifications

Line 1:

- **E XXXXXX**
- E = Ecliptek Designator
- XXXXXX = Nominal Frequency in MHz (5 digits + Decimal)

Line 2:

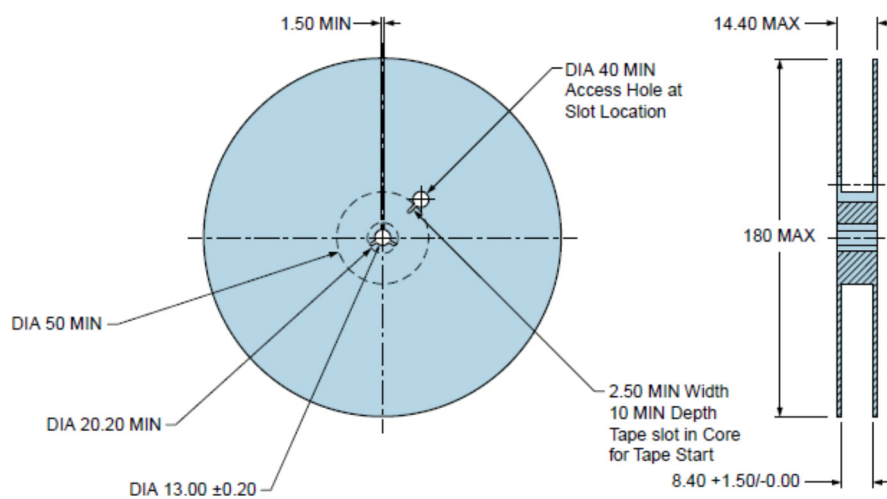
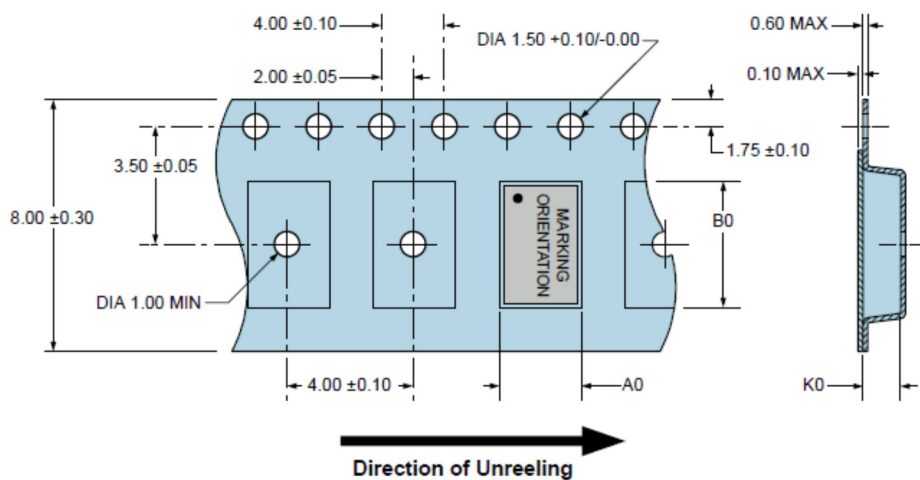
- **XXXXX**
- XXXXX = Ecliptek Manufacturing Identifier

## Environmental and Mechanical Specifications

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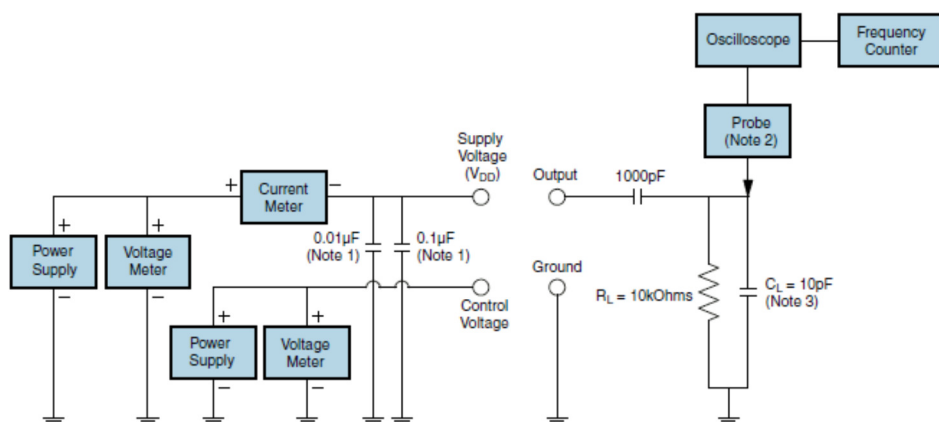
<b>ESD Susceptibility</b>	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
<b>Fine Leak Test</b>	MIL-STD-883, Method 1014, Condition A
<b>Flammability</b>	UL94-V0
<b>Gross Leak Test</b>	MIL-STD-883, Method 1014, Condition C
<b>Mechanical Shock</b>	MIL-STD-883, Method 2002, Condition B
<b>Moisture Resistance</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
<b>Thermal Resistance (<math>\theta_{JA}</math>)</b>	40°C/W (degrees Celsius per Watt)
<b>Thermal Resistance (<math>\theta_{JC}</math>)</b>	14°C/W (degrees Celsius per Watt)

### Tape & Reel Dimensions



1000 pieces per reel  
 Compliant to EIA-481  
 All Dimensions in Millimeters

## Test Circuit for Clipped Sinewave Output



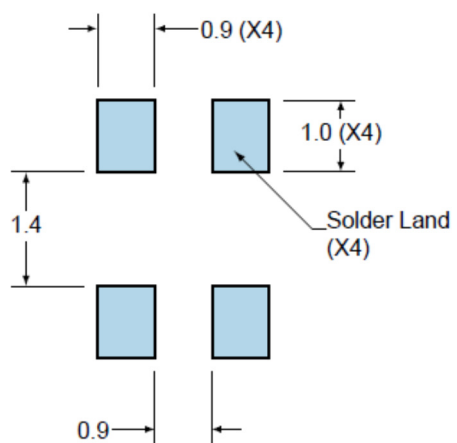
**Note 1:** An external  $0.01\mu\text{F}$  bypass capacitor in parallel with a  $0.1\mu\text{F}$  high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

**Note 2:** A low input 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.

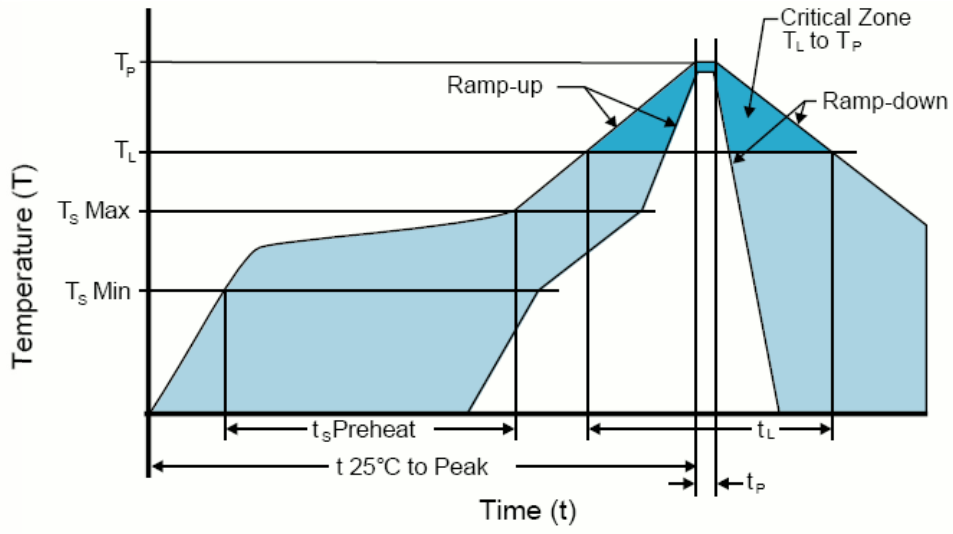
### Recommended Solder Pad Dimensions

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Tolerances =  $\pm 0.1$   
All Dimensions in Millimeters

### Solder Reflow Profile



**High Temperature Infrared/Convection**

**Note:** Temperatures shown are applied to body of device.

**T<sub>S</sub> MAX to T<sub>L</sub> (Ramp-up Rate)** 3°C/Second Maximum

**Preheat**

- Temperature Minimum (T<sub>S</sub> MIN) 150°C

- Temperature Typical (T<sub>S</sub> TYP) 175°C

- Temperature Maximum (T<sub>S</sub> MAX) 200°C

- Time (t<sub>S</sub>) 60 - 180 Seconds

**Ramp-up Rate (T<sub>L</sub> to T<sub>P</sub>)** 3°C/Second Maximum

**Time Maintained Above:**

- Temperature (T<sub>L</sub>) 217°C

- Time (t<sub>L</sub>) 60 - 150 Seconds

**Peak Temperature (T<sub>P</sub>)** 260°C Maximum for 10 Seconds Maximum

**Target Peak Temperature (T<sub>P</sub> Target)** 250°C +0/-5°C

**Time within 5°C of actual peak (t<sub>P</sub>)** 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

**Low Temperature Infrared/Convection 240°C**

**Note:** Temperatures shown are applied to body of device.

**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>)** 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

**High Temperature Manual Soldering**

**Note:** Temperatures shown are applied to body of device.  
260°C Maximum for 5 Seconds Maximum, 2 times Maximum.

**Low Temperature Manual Soldering**

**Note:** Temperatures shown are applied to body of device.  
185°C Maximum for 10 Seconds Maximum, 2 times Maximum.

## 1 - Build A Part Number

Select the parameters that meet your requirements and then click Next

**Frequency in Megahertz (10 to 32):**

*Some frequencies within this range may not be available*

**Operating Temperature Range:**

**Frequency Stability:**

**Packaging Options:**

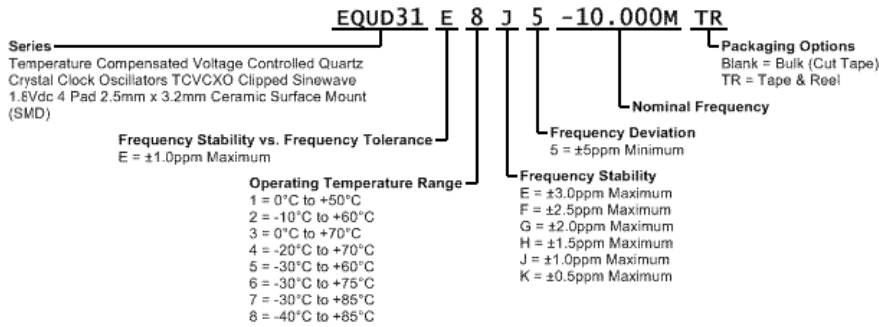
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