EQUA13 Series Oscillator

Temperature Compensated Voltage Controlled Quartz Crystal Clock Oscillators TCVCXO LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

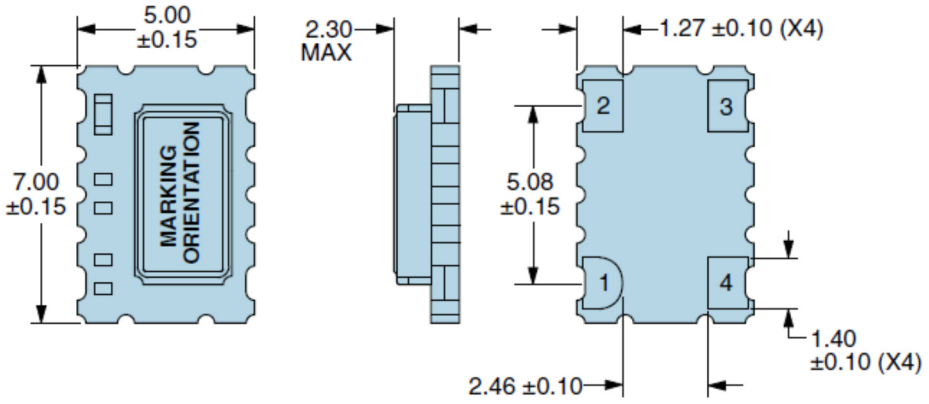
Revision B 03/20/2015

Electrical Specifications

Nominal Frequency	10.000MHz to 27.000MHz *Some frequencies within this range may not be available.*
Frequency Stability	Inclusive of Operating Temperature Range, at Vdd=3.3Vdc, at Vc=1.5Vdc ±3.0ppm Maximum ±2.5ppm Maximum ±2.0ppm Maximum ±1.5ppm Maximum ±1.0ppm Maximum ±0.5ppm Maximum
Frequency Stability vs. Frequency Tolerance	±2.0ppm Maximum (at 25°C ±2°C, at Vdd=3.3Vdc, at Vc=1.5Vdc)
Frequency Stability vs. Input Voltage	±0.2ppm Maximum (±5%)
Frequency Stability vs. Load	±0.2ppm Maximum (±2pF)
Frequency Stability vs. Reflow	±1.0ppm Maximum (at 25°C, 1 hour after reflow, 1 time)
Frequency Stability vs. Aging	±1ppm/Year Maximum (at 25°C)
Operating Temperature Range	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
Supply Voltage	3.3Vdc ±5%
Input Current	10mA Maximum
Output Voltage Logic High (Voh)	IOH = -4mA 90% of Vdd Minimum
Output Voltage Logic Low (Vol)	IOL = +4mA 10% of Vdd Maximum
Rise/Fall Time	Measured at 20% to 80% of waveform 3nSec Maximum
Duty Cycle	Measured at 50% of waveform 50% ±10%
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Control Voltage	1.5Vdc±1.0Vdc

Frequency Deviation	±5ppm Minimum
Linearity	10% Maximum
Transfer Function	Positive Transfer Characteristic
Modulation Bandwidth	Measured at -3dB 10kHz Minimum
Input Impedance	1MOhms Minimum
Phase Noise	All Values are Typical -96dBc at 10Hz Offset -120dBc at 100Hz Offset -135dBc at 1kHz Offset -142dBc at 10kHz Offset -143dBc at 100kHz Offset -149dBc at 1MHz Offset -150dBc at 10MHz Offset -154dBc at 20MHz Offset
RMS Phase Jitter	Fj=12kHz to 20MHz (Random) 1pSec Maximum
Start Up Time	5mSec Maximum
Storage Temperature Range	-40°C to +85°C

Mechanical Dimensions



All Dimensions in Millimeters

Pin 1: Control Voltage

Pin 2: Case/Ground

Pin 3: Output

Pin 4: Supply Voltage

Marking Specifications

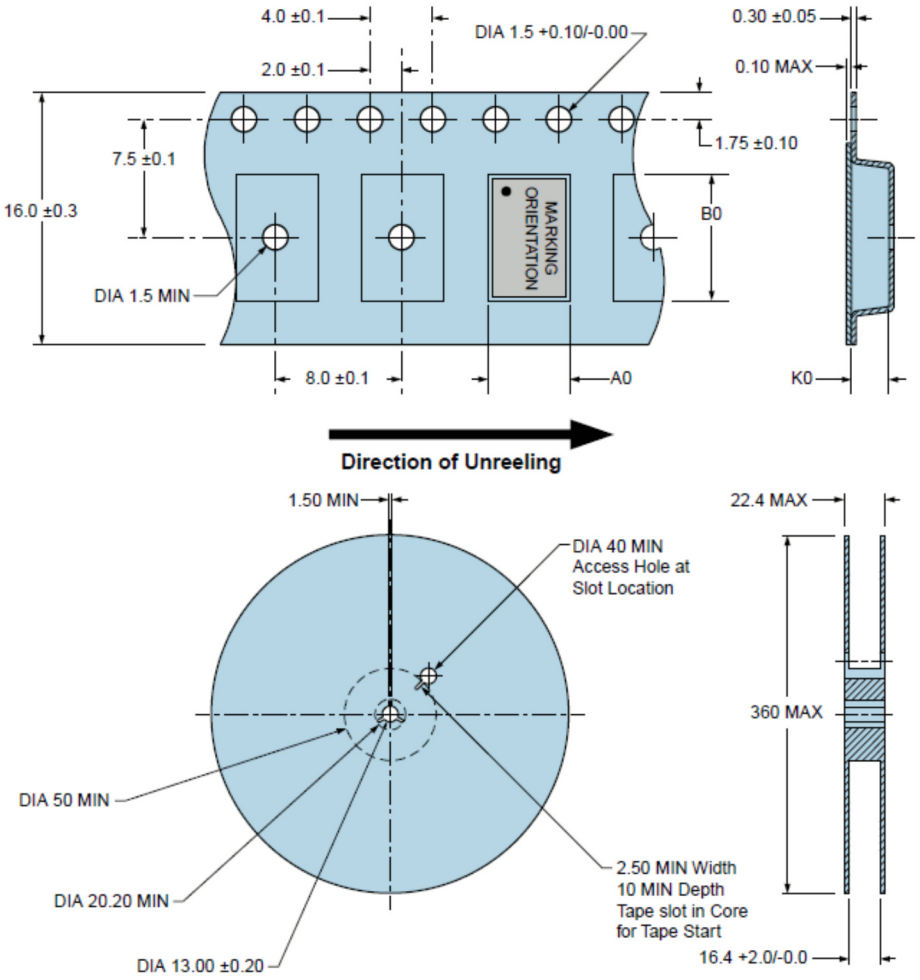
Line 1: **EXXXXXX**
- E = Ecliptek Designator
- XXXXXX = Nominal Frequency in MHz (5 digits + Decimal)

Line 2: **XXXXX**
- XXXXX = Ecliptek Manufacturing Identifier

Environmental and Mechanical Specifications

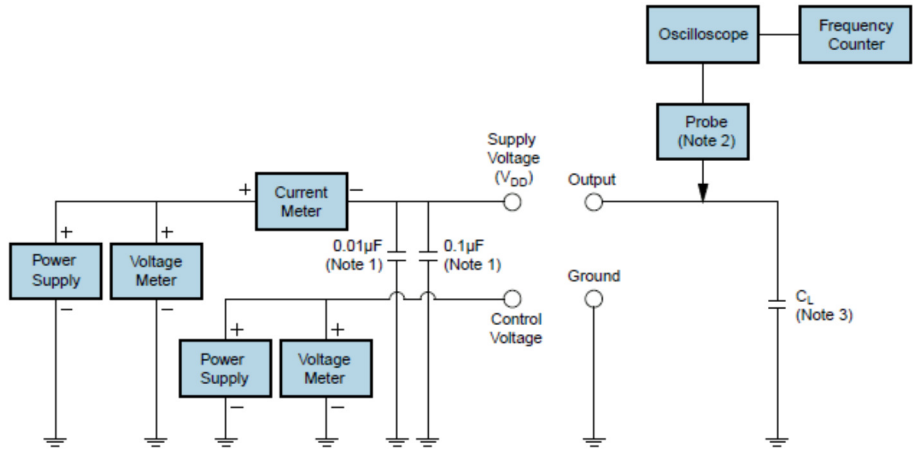
ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Moisture Resistance	MIL-STD-883, Method 1004
Moisture 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
Thermal Resistance (θ_{JA})	42°C/W (degrees Celsius per Watt)
Thermal Resistance (θ_{JC})	15°C/W (degrees Celsius per Watt)

Tape & Reel Dimensions



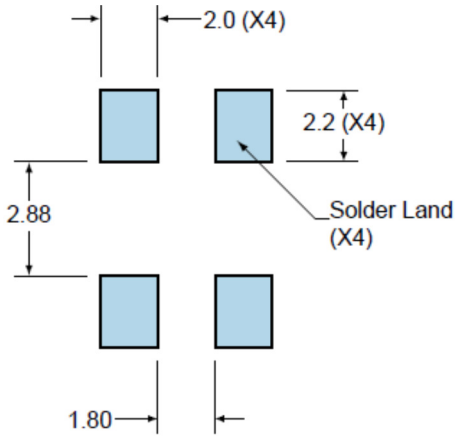
1000 pieces per reel
Compliant to EIA-481
All Dimensions in Millimeters

Test Circuit for No Connect Option



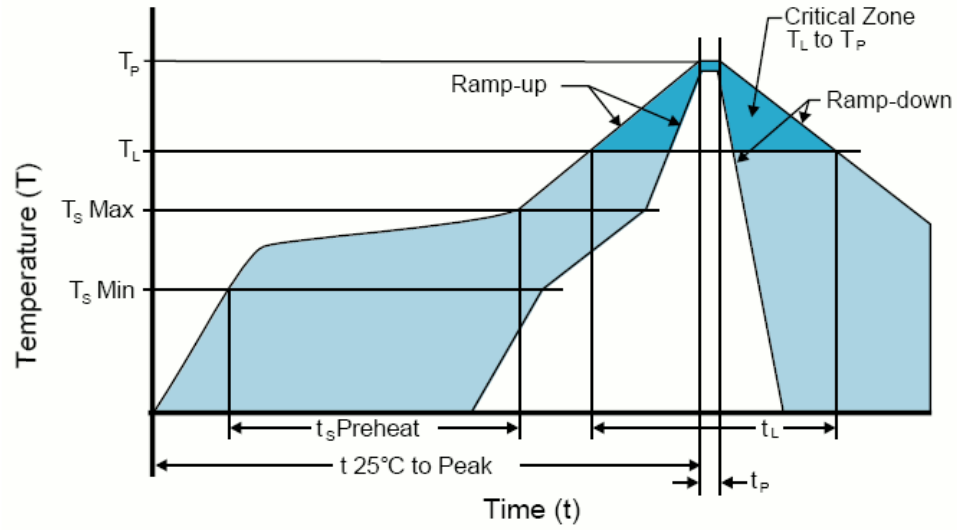
Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attentuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.
Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

Recommended Solder Pad Dimensions



Tolerances = ±0.1
All Dimensions in Millimeters

Solder Reflow Profile



High Temperature Infrared/Convection

Note: Temperatures shown are applied to body of device.

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)	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

Low Temperature Infrared/Convection 240°C

Note: Temperatures shown are applied to body of device.

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)	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)	240°C Maximum
Target Peak Temperature (T_P Target)	240°C Maximum 2 Times / 230°C Maximum 1 Time
Time within 5°C of actual peak (t_P)	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 listed are applied to body of device.
260°C Maximum for 5 Seconds Maximum, 2 times Maximum.

Low Temperature Manual Soldering

Note: Temperatures listed 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 27):
Some frequencies within this range may not be available

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

Frequency Stability: ±3.0ppm Maximum

Packaging Options: Tape & Reel

Next

2 - Next Page

Access these Part Number specific resources and tools

- P/N Specific Data Sheet
- Automated Quick Quote
- Request Sample
- Download IPC-1752
- My Parts List
- My Part Number

Part Numbering Guide

EQUA13 C 1 J 5 -13.000M TR

Series
Temperature Compensated Voltage Controlled Quartz Crystal Clock Oscillators TCVCXO LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

Frequency Stability vs. Frequency Tolerance
C = ±2.0ppm Maximum

Operating Temperature Range
1 = 0°C to +50°C
2 = -10°C to +60°C
3 = 0°C to +70°C
4 = -20°C to +70°C
5 = -30°C to +60°C
6 = -30°C to +75°C
7 = -30°C to +85°C
8 = -40°C to +85°C

Frequency Stability
E = ±3.0ppm Maximum
F = ±2.5ppm Maximum
G = ±2.0ppm Maximum
H = ±1.5ppm Maximum
J = ±1.0ppm Maximum
K = ±0.5ppm Maximum

Frequency Deviation
5 = ±5ppm Minimum

Nominal Frequency

Packaging Options
Blank = Bulk (Cut Tape)
TR = Tape & Reel