EQRG32 Series Oscillator

Quartz Crystal Clock Oscillators XO (SPXO) HCSL 2.5Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD)

Revision C 06/26/2014

Electrical Specifications

Nominal Frequency	62.500MHz to 164.000MHz *Some frequencies within this range may not be available.*
Frequency Tolerance/Stability	Inclusive of all conditions: Calibration Tolerance (at 25°C), Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration ±100ppm Maximum ±50ppm Maximum ±25ppm Maximum ±20ppm Maximum
Operating Temperature Range	0°C to +70°C -20°C to +70°C -40°C to +85°C
Aging at 25°C	±3ppm Maximum First Year
Supply Voltage	$2.5V_{DC}$ ±5%
Input Current	Without Load 30mA Maximum
Output Voltage Logic High (V_{OH})	580mV_{DC} Minimum, 740mV_{DC} Typical, 850mV_{DC} Maximum
Output Voltage Logic Low (V_{OL})	-150mV_{DC} Minimum, 0mV_{DC} Typical, 150mV_{DC} Maximum
Duty Cycle	Measured at 50% of waveform 50 ±10(%) 50 ±5(%)
Rise Time/Fall Time	Measured at 0.175V_{DC} to 0.525V_{DC} of waveform 500pSec Maximum
Output Swing (dVOpp)	600mV Minimum, 740mV Typical, 850mV Maximum
Load Drive Capability	Between Output and Ground 50 Ohms
Output Logic Type	HCSL
Phase Noise	Click to Open Phase Noise Table
Output Control Function	Standby (on Pad 1) Standby (on Pad 2)
Output Control Input Voltage Logic High (Vih)	70% of V_{DD} Minimum or No Connect to Enable Output and Complementary Output
Output Control Input Voltage Logic Low (Vil)	30% of V_{DD} Maximum to Disable Output and Complementary Output (High Impedance)
Standby Output Enable Time	10mSec Maximum

Standby Output Disable Time	200nSec Maximum
Standby Current	Without Load 10µA Maximum
RMS Phase Jitter	Click to Open RMS Phase Jitter Table
Period Jitter (Deterministic)	0.2pSec Typical
Period Jitter (Random)	1.0pSec Typical
Period Jitter (One Sigma)	1.5pSec Typical
Period Jitter (tp-p)	40pSec Maximum
Storage Temperature Range	-55°C to +125°C
Start Up Time	10mSec Maximum

Phase Noise

All Values are Typical

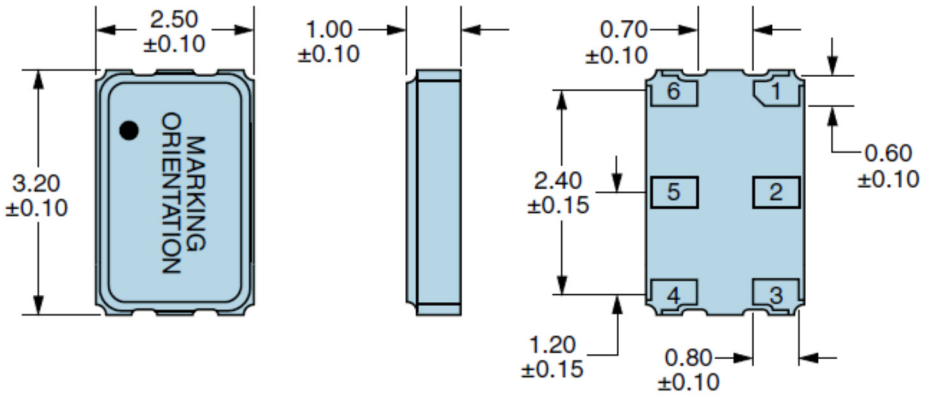
Offset	*Phase Noise*
10Hz	-50dBc/Hz
100Hz	-82dBc/Hz
1kHz	-116dBc/Hz
10kHz	-138dBc/Hz
100kHz	-144dBc/Hz
1MHz	-149dBc/Hz
10MHz	-155dBc/Hz
20MHz	-155dBc/Hz

RMS Phase Jitter

Fj=12kHz to 20MHz (Random)

Nominal Frequency Range	*RMS Phase Jitter*
62.5MHz to 99.999999MHz	450fSec Maximum
100MHz to 164MHz	200fSec Maximum

Mechanical Dimensions



All Dimensions in Millimeters

Pin 1: No Connect Or Standby

Pin 2: No Connect Or Standby

Pin 3: Case/Ground

Pin 4: Output

Pin 5: Complementary Output

Pin 6: Supply Voltage

Marking Specifications

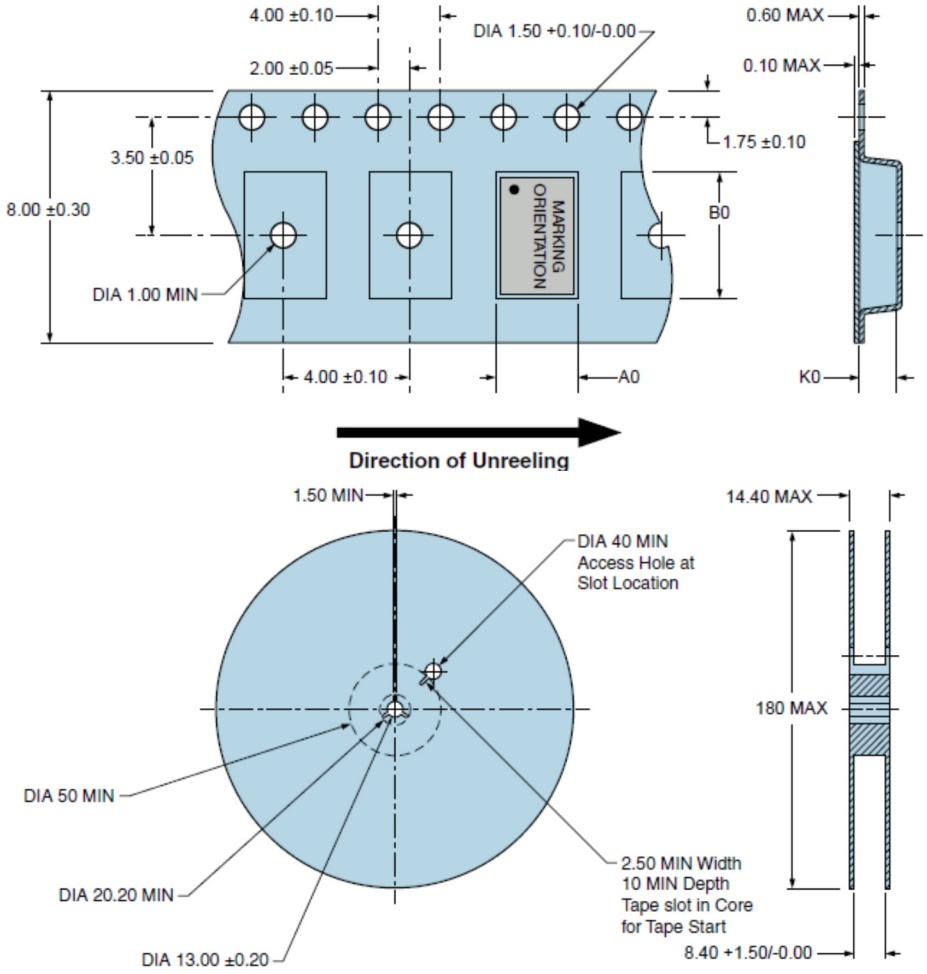
Line 1: **E XXXXXX**
- E = Ecliptek Designator
- XXXXXX = Nominal Frequency in MHz (5 digits + Decimal)

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

Environmental and Mechanical Specifications

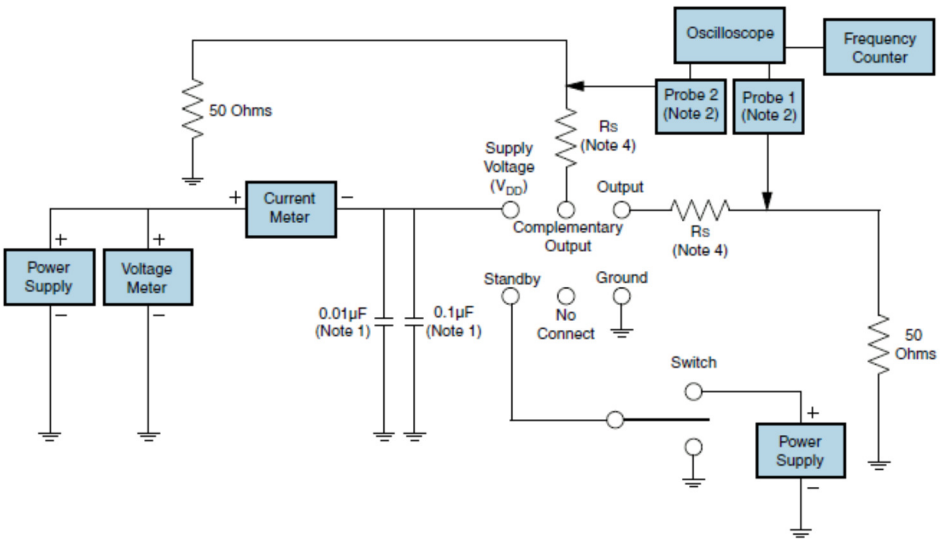
ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Moisture Resistance	MIL-STD-883, Method 1004
Moisture 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})	40°C/W (degrees Celsius per Watt)
Thermal Resistance (θ_{JC})	14°C/W (degrees Celsius per Watt)

Tape & Reel Dimensions



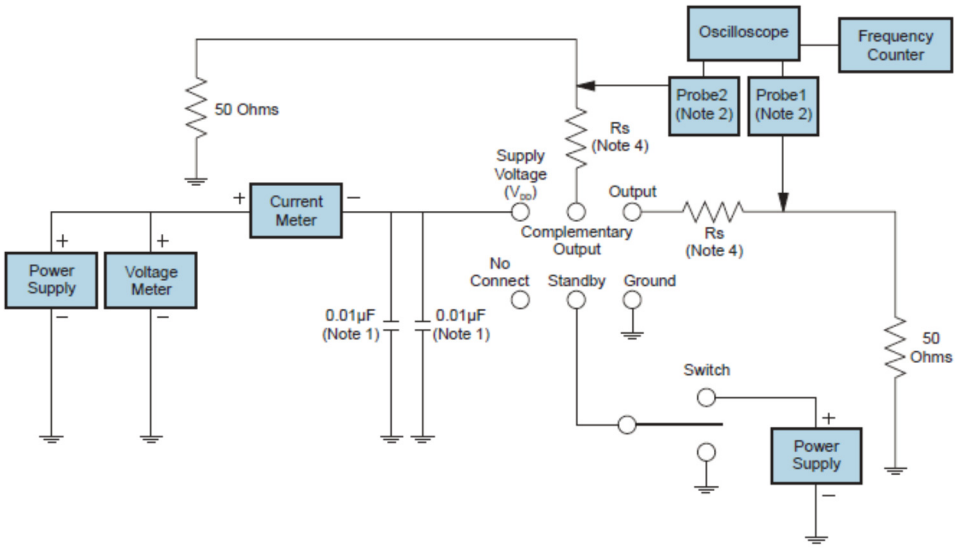
1000 pieces per reel
Compliant to EIA-481
All Dimensions in Millimeters

Test Circuit for Standby (Pad 1) and Complementary Output



Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close to (less than 2mm) the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X Attentuation Factor, High Impedance (>10Mohms), and High bandwidth (>500MHz) passive probe is recommended.
Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.
Note 4: A 10 ohm to 33 ohm series resistor is required to limit overshoot. Rs value is circuit layout dependant.

Test Circuit for Standby (Pad 2) and Complementary Output



Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close to (less than 2mm) the package ground and supply voltage pin is required.
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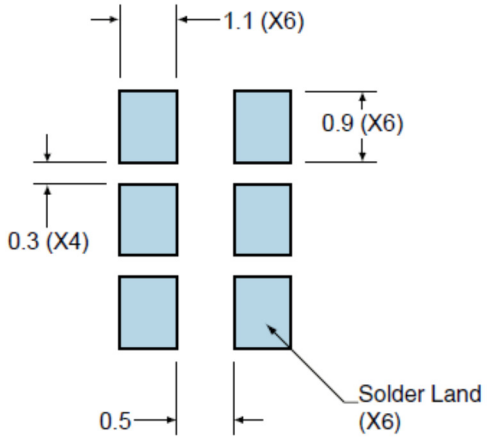
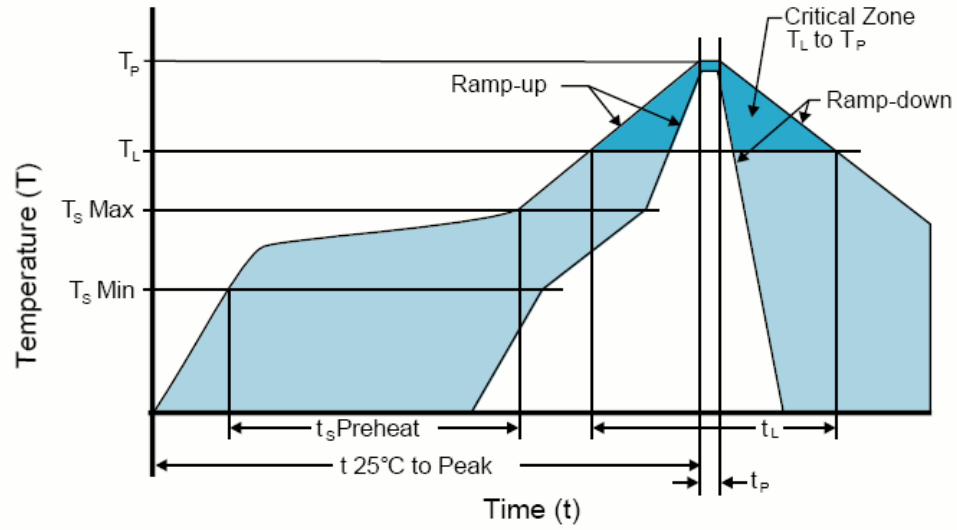
Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.
Note 4: A 10 ohm to 33 ohm series resistor is required to limit overshoot. Rs value is circuit layout dependant.

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 (62.5 to 164):
Some frequencies within this range may not be available

Frequency Tolerance/Stability: ±100ppm Maximum over 0°C to +70°C

Duty Cycle: 50 ±10(%)

Output Control Function: Standby (on Pad 1)

Packaging Options: Tape & Reel

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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

EQRG32 A 2 J -106.250M TR

Series
Quartz Crystal Clock Oscillators XO (SPXO) HCSL
2.5Vdc 6 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD)

Frequency Tolerance/Stability
A = ±100ppm Maximum over 0°C to +70°C
B = ±50ppm Maximum over 0°C to +70°C
C = ±25ppm Maximum over 0°C to +70°C
D = ±20ppm Maximum over 0°C to +70°C
E = ±100ppm Maximum over -20°C to +70°C
F = ±50ppm Maximum over -20°C to +70°C
G = ±25ppm Maximum over -20°C to +70°C
H = ±20ppm Maximum over -20°C to +70°C
J = ±100ppm Maximum over -40°C to +85°C
K = ±50ppm Maximum over -40°C to +85°C
L = ±25ppm Maximum over -40°C to +85°C

Duty Cycle
1 = 50 ±10(%)
2 = 50 ±5(%)

Output Control Function
J = Standby (on Pad 1)
L = Standby (on Pad 2)

Nominal Frequency

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

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