

EL13C7D2F-166.000M
[Click part number to visit Part Number Details page](#)
REGULATORY COMPLIANCE (Data Sheet downloaded on Nov 22, 2017)
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**ITEM DESCRIPTION**

Quartz Crystal Clock Oscillators XO (SPXO) LVDS (DS) 3.3Vdc 6 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)
166.000MHz ± 50 ppm over 0°C to +70°C

ELECTRICAL SPECIFICATIONS

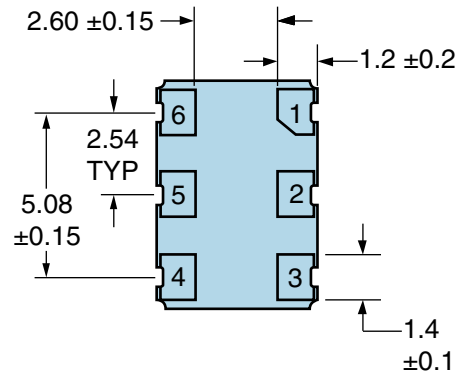
Nominal Frequency	166.000MHz
Frequency Tolerance/Stability	± 50 ppm Maximum over 0°C to +70°C (Inclusive of all conditions: Calibration Tolerance (at 25°C), Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration)
Supply Voltage	3.3Vdc $\pm 5\%$
Input Current	66mA Maximum
Output Voltage Logic High (Voh)	1.43Vdc Typical, 1.6Vdc Maximum
Output Voltage Logic Low (Vol)	1.1Vdc Typical, 0.9Vdc Minimum
Differential Output Error (dVod)	50mV Maximum
Differential Output Voltage (Vod)	247mV Minimum, 330mV Typical, 454mV Maximum
Offset Voltage (Vos)	1.125V Minimum, 1.250V Typical, 1.375V Maximum
Rise/Fall Time	300pSec Typical, 700pSec Maximum (Measured over 20% to 80% of waveform)
Duty Cycle	50 ± 5 (%) (Measured at 50% of waveform or at the crossing point)
Offset Error (dVos)	150mV Maximum
Load Drive Capability	100 Ohms Between Output and Complementary Output
Output Logic Type	LVDS
Phase Noise	-60dBc/Hz at 10Hz Offset, -95dBc/Hz at 100Hz Offset, -125dBc/Hz at 1kHz Offset, -143dBc/Hz at 10kHz Offset, -145dBc/Hz at 100kHz Offset, -145dBc/Hz at 1MHz Offset, -146dBc/Hz at 10MHz Offset (All Values are Typical)
Logic Control / Additional Output	Tri-State and Complementary Output
Tri-State Input Voltage (Vih and Vil)	Vih of 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output, Vil of 30% of Vdd Maximum to Disable High Impedance Output and Complementary Output
Standby Current	30 μ A Maximum (Without Load)
RMS Phase Jitter	0.4pSec Typical, 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
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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Figure 1: Dimensions of the 1000mAh 3.7V Li-ion battery. The diagram shows two views of the battery. The top view (left) shows a width of 2.00 MAX. The bottom view (right) shows a length of 5.00 ± 0.15 and a height of 7.00 ± 0.15 . The bottom view also includes a marking 'MARKING ORIENTATION' and a small circle indicating the positive terminal.



LINE	MARKING
1	ECLIPTEK
2	166.00M
3	XXXXXX XXXXXX=Ecliptek Manufacturing Identifier

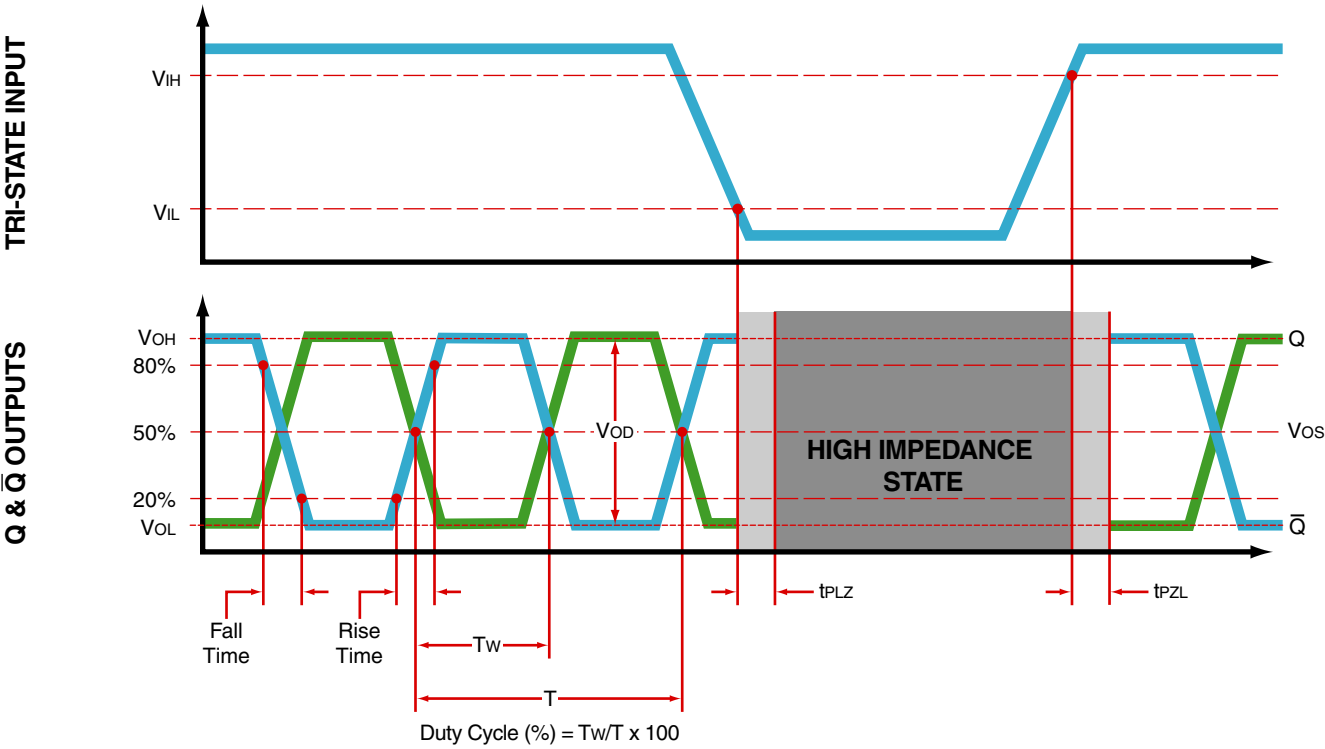
Figure 1: Dimensions of the test board. The diagram shows a 3x2 grid of blue square components. Dimensions are given in inches with multipliers in parentheses. Horizontal dimensions: 1.80 (X6) between columns, 2.39 (X3) from left edge to first column, and 2.00 (X6) from second column to right edge. Vertical dimensions: 0.54 (X4) between rows, and 2.00 (X6) from top edge to first row. A 'Solder Land (X6)' is indicated at the bottom right.

1-800-ECLIPTEK or 714.433.1200

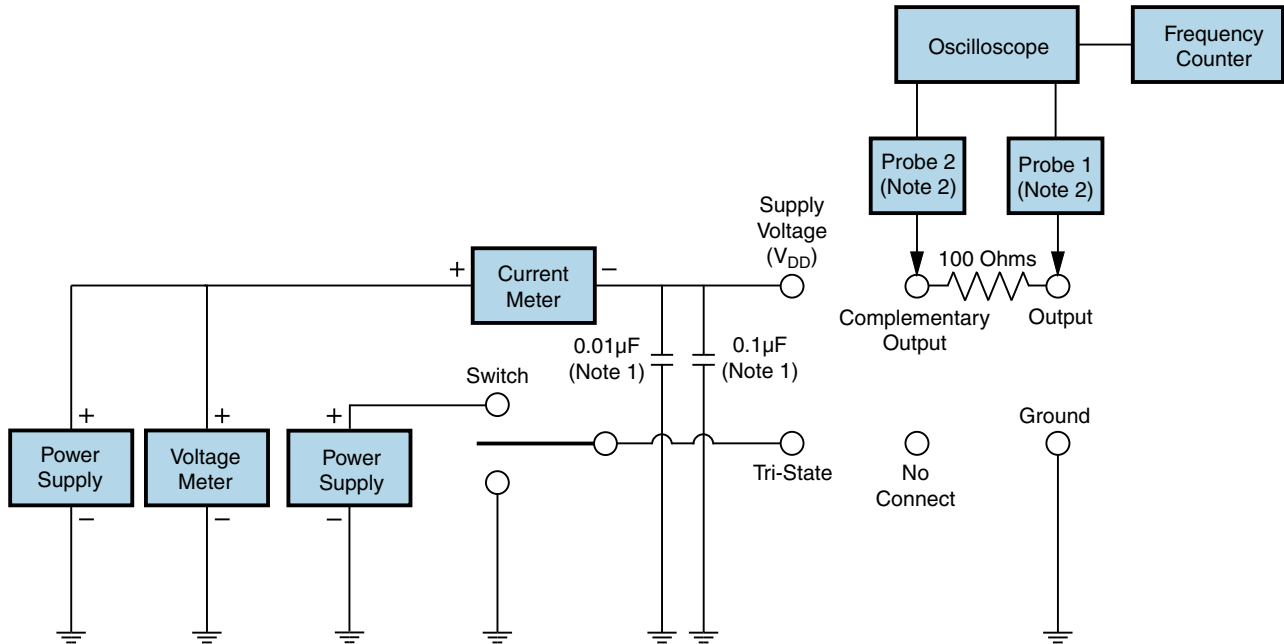
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OUTPUT WAVEFORM & TIMING DIAGRAM



Test Circuit for Tri-State and Complementary 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 ($>500\text{MHz}$) passive probe is recommended.

Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

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Recommended Solder Reflow Methods



High Temperature Infrared/Convection

Ts MAX to TL (Ramp-up Rate)	3°C/Second Maximum
Preheat	
- Temperature Minimum (Ts MIN)	150°C
- Temperature Typical (Ts TYP)	175°C
- Temperature Maximum (Ts MAX)	200°C
- Time (ts MIN)	60 - 180 Seconds
Ramp-up Rate (TL to TP)	3°C/Second Maximum
Time Maintained Above:	
- Temperature (TL)	217°C
- Time (tL)	60 - 150 Seconds
Peak Temperature (TP)	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (TP Target)	250°C +0/-5°C
Time within 5°C of actual peak (tp)	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
Additional Notes	Temperatures shown are applied to body of device.

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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
Additional Notes	Temperatures shown are applied to body of device.

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to body of device.)

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to body of device.)