# EQRD13J2J-53.125M

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## REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 5, 2019)

Lead Free COMPLIANT | EU RoHS 2011/65 + 2015/863 COMPLIANT | China RoHS COMPLIANT | REACH 191 SVHC COMPLIANT

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Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.

DRC CONFLICT FREE

## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVPECL (PECL) 3.3Vdc 6 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 53.125MHz ±100ppm over -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Frequency** | 53.125MHz |
| **Frequency Tolerance/Stability** | ±100ppm Maximum over -40°C to +85°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) |
| **Aging at 25°C** | ±3ppm Maximum First Year |
| **Supply Voltage** | 3.3Vdc ±5% |
| **Input Current** | 50mA Maximum |
| **Output Voltage Logic High (Voh)** | Vdd-1.025Vdc Minimum, 2.35Vdc Typical, Vdd-0.88Vdc Maximum |
| **Output Voltage Logic Low (Vol)** | Vdd-1.81Vdc Minimum, 1.60Vdc Typical, Vdd-1.62Vdc Maximum |
| **Rise/Fall Time** | 400pSec Maximum (Measured at 20% to 80% of Waveform) |
| **Duty Cycle** | 50 ±5(%) (Measured at 50% of Waveform) |
| **Load Drive Capability** | 50 Ohms into Vdd-2.0Vdc |
| **Output Logic Type** | LVPECL |
| **Phase Noise** | All Values are Typical<br>-50dBc/Hz at 10Hz Offset<br>-82dBc/Hz at 100Hz Offset<br>-116dBc/Hz at 1kHz Offset<br>-138dBc/Hz at 10kHz Offset<br>-144dBc/Hz at 100kHz Offset<br>-149dBc/Hz at 1MHz Offset<br>-155dBc/Hz at 10MHz Offset<br>-155dBc/Hz at 20MHz Offset |
| **Output Control Function** | Standby (on Pad 1) |
| **Output Control Input Voltage Logic High (Vih)** | 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output |
| **Output Control Input Voltage Logic Low (Vil)** | 30% of Vdd Maximum to Disable Output and Complementary Output (High Impedance) |
| **Standby Output Enable Time** | 10mSec Maximum |
| **Standby Output Disable Time** | 200nSec Maximum |
| **Standby Current** | 10µA Maximum (Without Load) |
| **RMS Phase Jitter** | 450fSec Maximum (Fj=12kHz to 20MHz (Random)) |
| **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 |
| **Start Up Time** | 10mSec Maximum |
| **Storage Temperature Range** | -55°C to +125°C |



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## 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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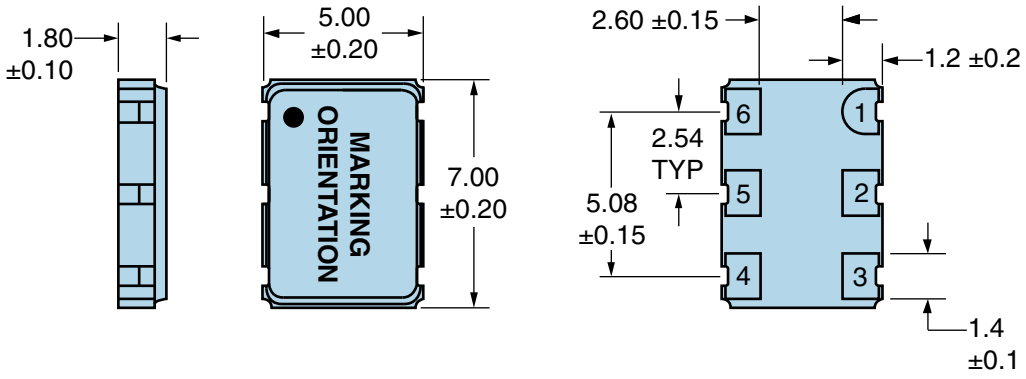
## MECHANICAL DIMENSIONS (all dimensions in millimeters)

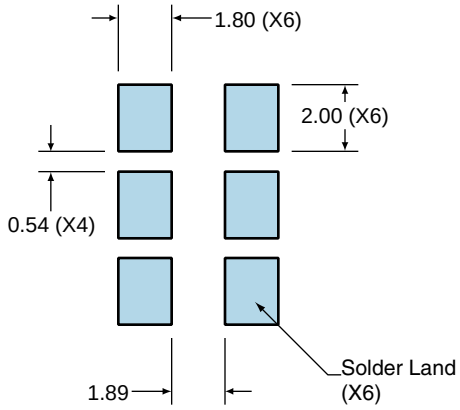



| PIN | CONNECTION |
|---|---|
| 1 | Standby |
| 2 | No Connect |
| 3 | Case Ground |
| 4 | Output |
| 5 | Complementary Output |
| 6 | Supply Voltage |

| LINE | MARKING |
|---|---|
| 1 | **ECLIPTEK** |
| 2 | **53.125M** |
| 3 | **XXXXX**<br>*XXXXX=Ecliptek Manufacturing Identifier* |

## Suggested Solder Pad Layout

All Dimensions in Millimeters




All Tolerances are ±0.1



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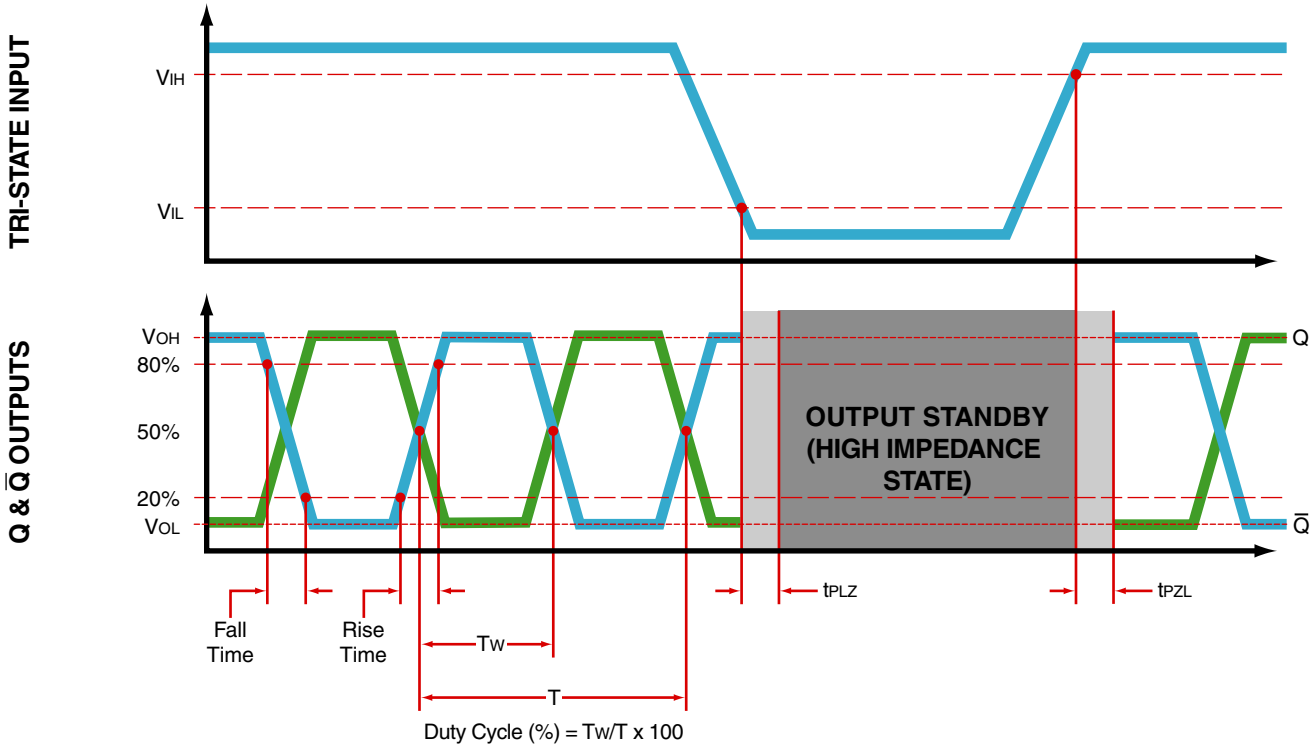
## OUTPUT WAVEFORM & TIMING DIAGRAM



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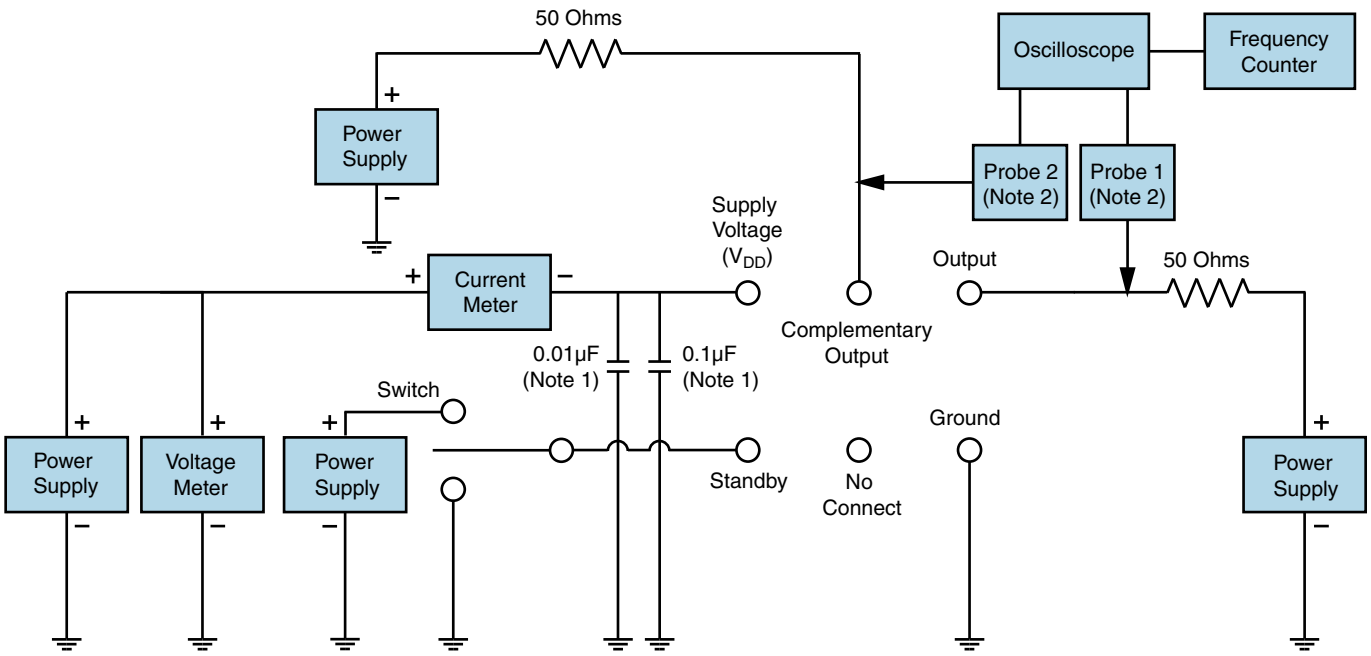
## Test Circuit for Standby (Pad 1) and Complementary Output




Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation 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.



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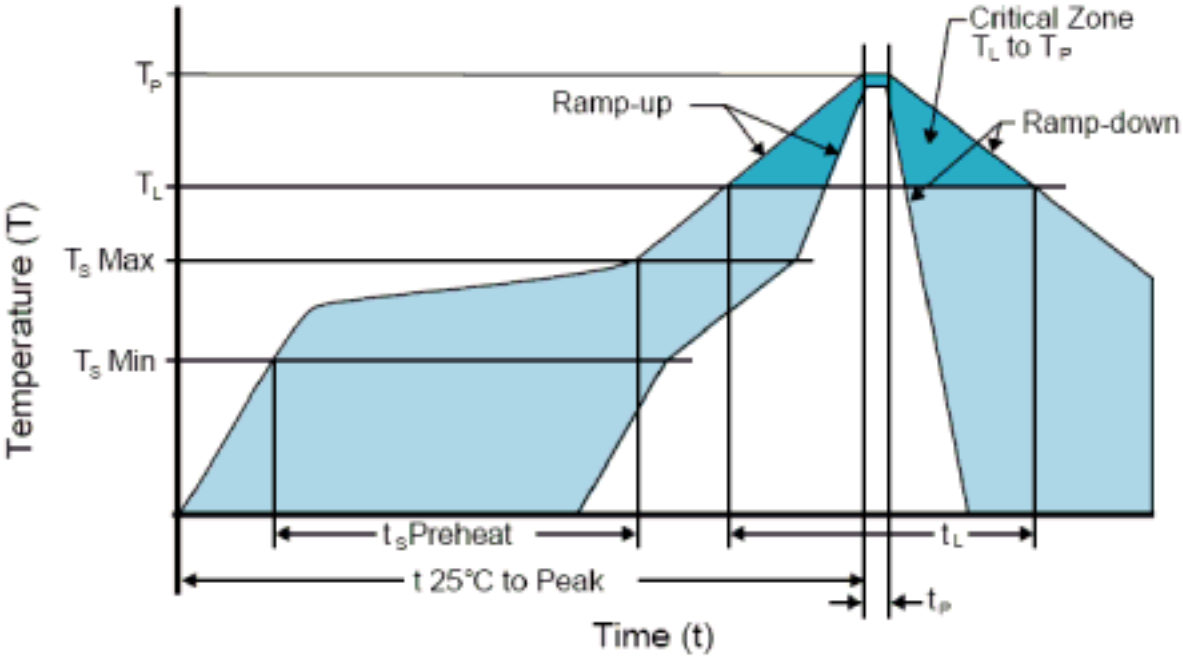
## Recommended Solder Reflow Methods




## 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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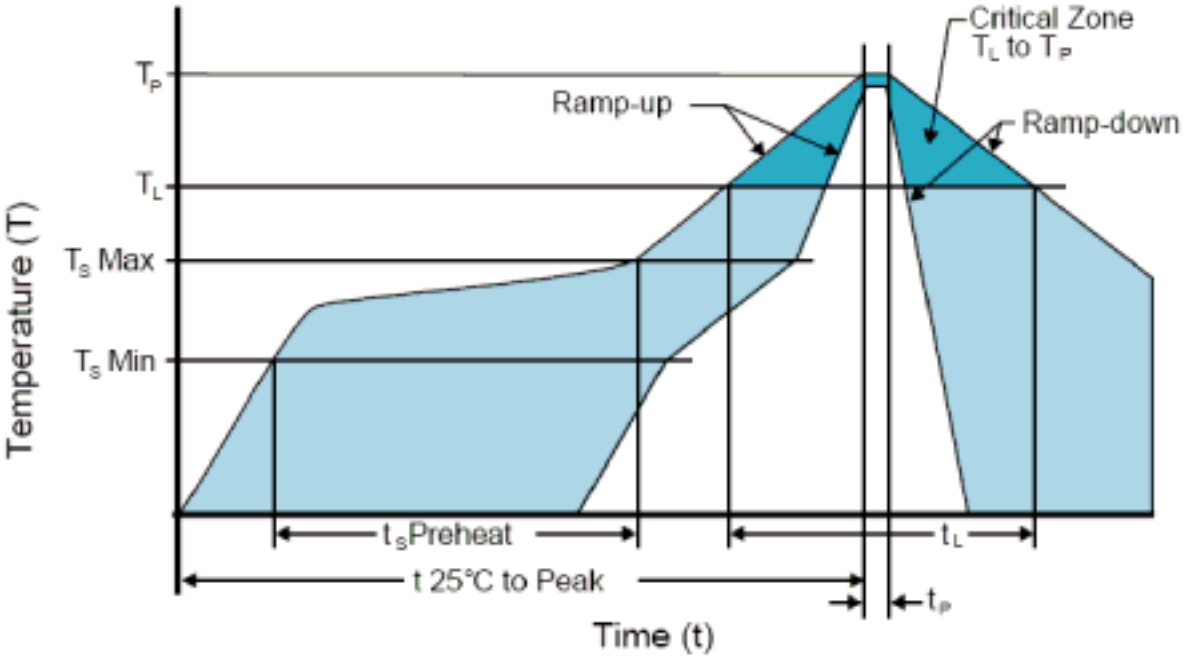


## Low Temperature Infrared/Convection 240°C

| | |
|---|---|
| **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.)



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