

# EQRA24B2H-33.55443M

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## REGULATORY COMPLIANCE (Data Sheet downloaded on May 25, 2020)


[Click badges to download compliance docs](#)

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.



## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 2.8Vdc 6 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD) 33.55443MHz  $\pm 50$ ppm over 0°C to +70°C

## ELECTRICAL SPECIFICATIONS

Nominal Frequency	33.55443MHz
Frequency Tolerance/Stability	$\pm 50$ 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 and Output Load Change)
Aging at 25°C	$\pm 2$ ppm Maximum First Year, $\pm 10$ ppm/10 Years Maximum
Supply Voltage	2.8Vdc $\pm 5\%$
Input Current	20mA Maximum (Unloaded)
Output Voltage Logic High (Voh)	90% of Vdd Minimum (IOH = -4mA)
Output Voltage Logic Low (Vol)	10% of Vdd Maximum (IOL = +4mA)
Rise/Fall Time	3nSec Maximum (Measured at 10% to 90% of Waveform)
Duty Cycle	50 $\pm 5$ (%) (Measured at 50% of Waveform)
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Phase Noise	-64dBc/Hz at 10Hz offset; -96dBc/Hz at 100Hz offset; -124dBc/Hz at 1kHz offset; -131dBc/Hz at 10kHz offset; -132dBc/Hz at 100kHz offset; -149dBc/Hz at 1MHz offset; -157dBc/Hz at 10MHz offset; -159dBc/Hz at 20MHz offset (All Values are Typical)
Output Control Function	Output Enable (OE)
Output Control Input Voltage Logic High (Vih)	90% of Vdd Minimum or No Connect to Enable Output
Output Control Input Voltage Logic Low (Vil)	10% of Vdd Maximum to Disable Output (High Impedance)
Output Enable Time	100nSec Maximum
Output Disable Time	50nSec Maximum
Output Enable Current	15mA Maximum (Without Load (Pin 1 = Ground))
RMS Phase Jitter	1.5pSec Maximum (Fj=12kHz to 20MHz (Random))
Period Jitter (Deterministic)	0.2pSec Typical
Period Jitter (Random)	2pSec Typical
Period Jitter (RMS)	3pSec Maximum
Period Jitter (pk-pk)	30pSec Maximum
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

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<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

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### MECHANICAL DIMENSIONS (all dimensions in millimeters)

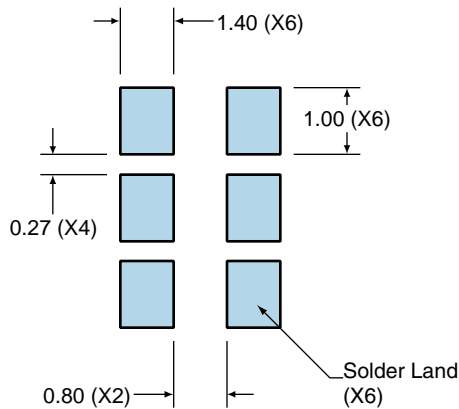


PIN	CONNECTION
1	Output Enable (OE)
2	Do Not Connect
3	Case/Ground
4	Output
5	Do Not Connect
6	Supply Voltage

LINE	MARKING
1	<b>E33.554</b> <i>E=Ecliptek Designator</i>
2	<b>XXXXX</b> <i>XXXXX=Ecliptek Manufacturing Identifier</i>

### Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

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**OUTPUT WAVEFORM & TIMING DIAGRAM**



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## Test Circuit for CMOS 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 (>300MHz) passive probe is recommended.

Note 3: Capacitance value C<sub>L</sub> includes sum of all probe and fixture capacitance.

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## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

Ts MAX to TL (Ramp-up Rate)	3°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum (Ts MIN)	150°C
- Temperature Typical (Ts TYP)	175°C
- Temperature Maximum (Ts MAX)	200°C
- Time (ts MIN)	60 - 180 Seconds
<b>Ramp-up Rate (TL to TP)</b>	3°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature (TL)	217°C
- Time (tL)	60 - 150 Seconds
<b>Peak Temperature (TP)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (TP Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (tp)</b>	20 - 40 Seconds
<b>Ramp-down Rate</b>	6°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	8 Minutes Maximum
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to body of device.

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection $240^\circ\text{C}$

$T_s \text{ MAX}$ to $T_L$ (Ramp-up Rate)	$5^\circ\text{C}/\text{Second}$ Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_s \text{ MIN}$ )	N/A
- Temperature Typical ( $T_s \text{ TYP}$ )	$150^\circ\text{C}$
- Temperature Maximum ( $T_s \text{ MAX}$ )	N/A
- Time ( $t_s \text{ MIN}$ )	60 - 120 Seconds
Ramp-up Rate ( $T_L$ to $T_P$ )	$5^\circ\text{C}/\text{Second}$ Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	$150^\circ\text{C}$
- Time ( $t_L$ )	200 Seconds Maximum
Peak Temperature ( $T_P$ )	$240^\circ\text{C}$ Maximum
Target Peak Temperature ( $T_P \text{ Target}$ )	$240^\circ\text{C}$ Maximum 2 Times / $230^\circ\text{C}$ Maximum 1 Time
Time within $5^\circ\text{C}$ of actual peak ( $t_p$ )	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
Ramp-down Rate	$5^\circ\text{C}/\text{Second}$ Maximum
Time $25^\circ\text{C}$ 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

$185^\circ\text{C}$  Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)

### High Temperature Manual Soldering

$260^\circ\text{C}$  Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)