

EB13E2H2H-20.000M

[Click part number to visit Part Number Details page](#)

REGULATORY COMPLIANCE (Data Sheet downloaded on Sep 22, 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) 3.3Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 20.000MHz ± 50 ppm over -40°C to $+85^{\circ}\text{C}$

ELECTRICAL SPECIFICATIONS

| | |
|---------------------------------------|--|
| Nominal Frequency | 20.000MHz |
| Frequency Tolerance/Stability | ± 50 ppm Maximum over -40°C to $+85^{\circ}\text{C}$ (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 | 5mA Maximum |
| 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 | 5nSec Maximum (Measured at 20% to 80% of waveform) |
| Duty Cycle | 50 ± 5 (%) (Measured at 50% of waveform) |
| Load Drive Capability | 15pF Maximum |
| Output Logic Type | CMOS |
| Pin 1 Connection | Tri-State (High Impedance) |
| Tri-State Input Voltage (Vih and Vil) | 80% of Vdd Minimum or No Connect to Enable Output, 20% of Vdd Maximum to Disable Output (High Impedance) |
| Standby Current | 10 μ A Maximum (Disabled Output: High Impedance) |
| RMS Phase Jitter | 1pSec Maximum (Fj = 12kHz to 20MHz) |
| Start Up Time | 10mSec Maximum |
| Storage Temperature Range | -55°C to $+125^{\circ}\text{C}$ |

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 |

EB13E2H2H-20.000M [Click part number to visit Part Number Details page](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)



| PIN | CONNECTION |
|-----|----------------|
| 1 | Tri-State |
| 2 | Case/Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|------|---|
| 1 | E20.0 E=Ecliptek Designator |
| 2 | XXXXX XXXXX=Ecliptek Manufacturing Identifier |

Suggested Solder Pad Layout

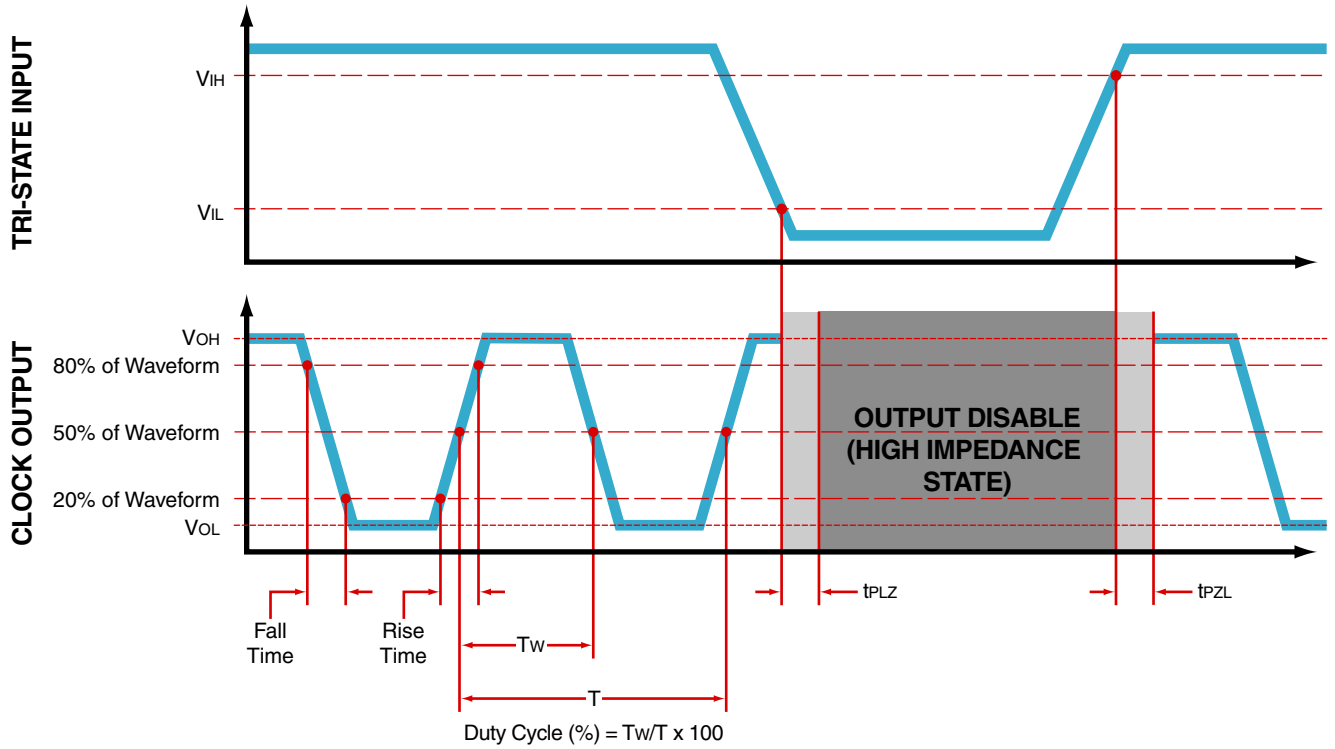
All Dimensions in Millimeters



All Tolerances are ± 0.1

EB13E2H2H-20.000M [Click part number to visit Part Number Details page](#)

OUTPUT WAVEFORM & TIMING DIAGRAM



EB13E2H2H-20.000M

[Click part number to visit Part Number Details page](#)

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.

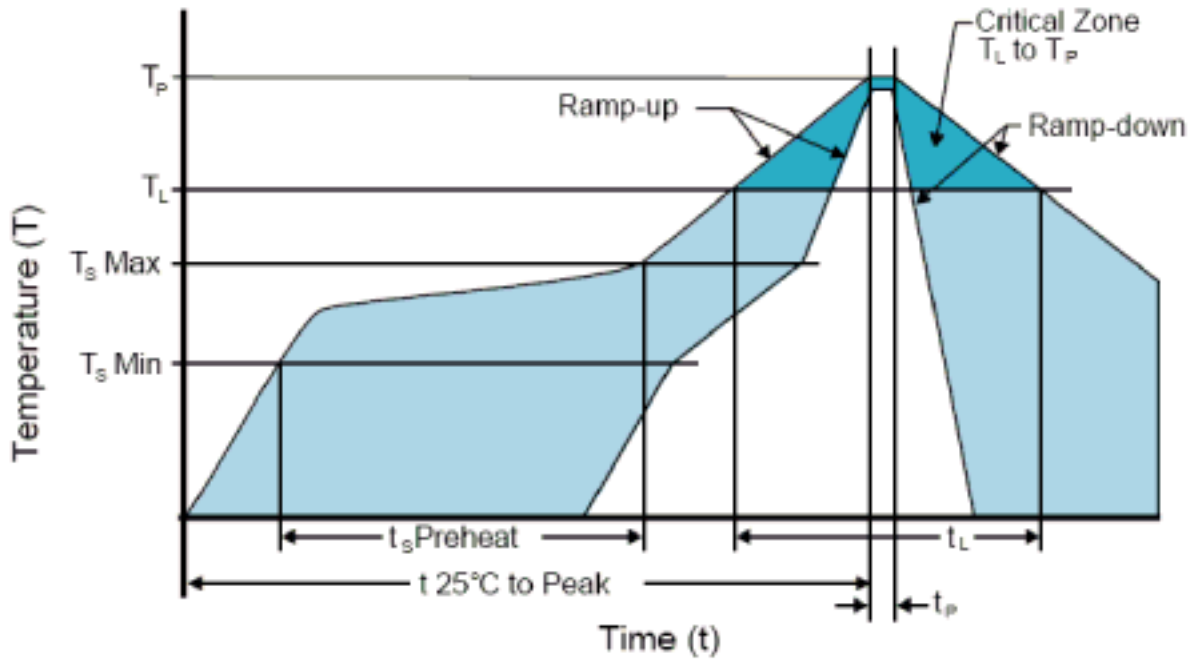
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

EB13E2H2H-20.000M

[Click part number to visit Part Number Details page](#)

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 |
|-----------------------------------|---------|

EB13E2H2H-20.000M

[Click part number to visit Part Number Details page](#)

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

| | |
|--|--|
| 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 MIN) | 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 |

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum.

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum.