

EHH1145TS-4.608M

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REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 6, 2018)


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ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) HCMOS/TTL (CMOS) 5.0Vdc 8 Pin DIP Metal Thru-Hole 4.608MHz ± 50 ppm 0°C to +70°C

ELECTRICAL SPECIFICATIONS

| | |
|---------------------------------------|---|
| Nominal Frequency | 4.608MHz |
| Frequency Tolerance/Stability | ± 50 ppm Maximum (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 | ± 5 ppm/year Maximum |
| Operating Temperature Range | 0°C to +70°C |
| Supply Voltage | 5.0Vdc $\pm 10\%$ |
| Input Current | 50mA Maximum (No Load) |
| Output Voltage Logic High (Voh) | 2.4Vdc Minimum with TTL Load, Vdd-0.4Vdc Minimum with HCMOS Load (IOH = -16mA) |
| Output Voltage Logic Low (Vol) | 0.4Vdc Maximum with TTL Load, 0.5Vdc Maximum with HCMOS Load (IOL = +16mA) |
| Rise/Fall Time | 6nSec Maximum (Measured at 0.8Vdc to 2.0Vdc with TTL Load; Measured at 20% to 80% of waveform with HCMOS Load) |
| Duty Cycle | 50 ± 10 (%) (Measured at 1.4Vdc with TTL Load or at 50% of waveform with HCMOS Load) |
| Load Drive Capability | 10TTL Load or 50pF HCMOS Load Maximum |
| Output Logic Type | CMOS |
| Pin 1 Connection | Tri-State (Disabled Output: High Impedance) |
| Tri-State Input Voltage (Vih and Vil) | +2.2Vdc Minimum to enable output, +0.8Vdc Maximum to disable output (High Impedance), No Connect to enable output. |
| Absolute Clock Jitter | ± 250 pSec Maximum, ± 100 pSec Typical |
| One Sigma Clock Period Jitter | ± 50 pSec Maximum, ± 30 pSec Typical |
| Start Up Time | 10mSec Maximum |
| Storage Temperature Range | -55°C to +125°C |

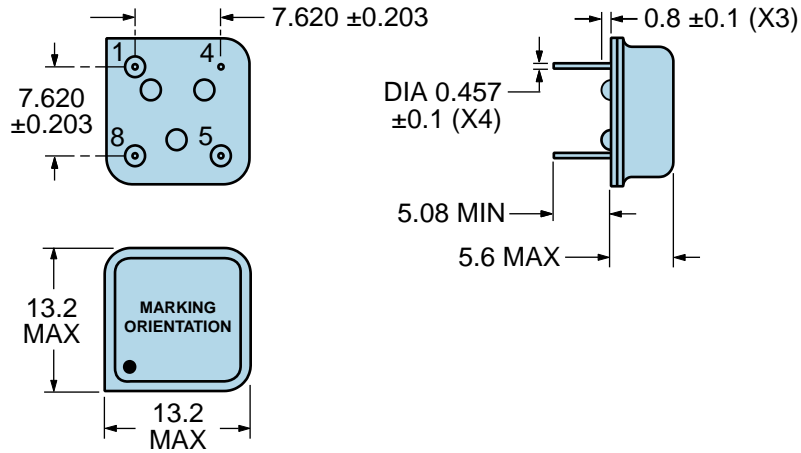
ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|------------------------------|---------------------------------------|
| Fine Leak Test | MIL-STD-883, Method 1014, Condition A |
| Gross Leak Test | MIL-STD-883, Method 1014, Condition C |
| Lead Integrity | MIL-STD-883, Method 2004 |
| Mechanical Shock | MIL-STD-202, Method 213, Condition C |
| Resistance to Soldering Heat | MIL-STD-202, Method 210 |
| Resistance to Solvents | MIL-STD-202, Method 215 |
| Solderability | MIL-STD-883, Method 2003 |
| Temperature Cycling | MIL-STD-883, Method 1010 |
| Vibration | MIL-STD-883, Method 2007, Condition A |

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MECHANICAL DIMENSIONS (all dimensions in millimeters)

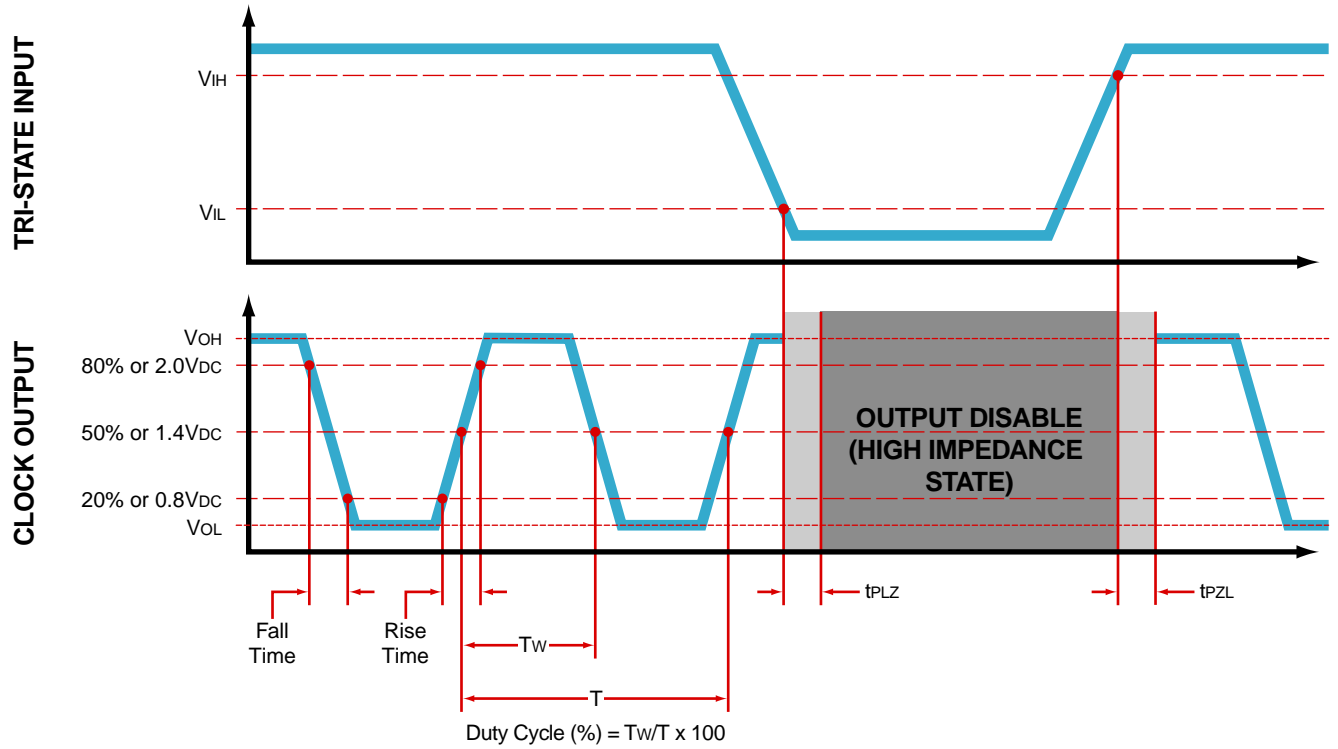


| PIN | CONNECTION |
|-----|----------------------------|
| 1 | Tri-State (High Impedance) |
| 4 | Ground/Case Ground |
| 5 | Output |
| 8 | Supply Voltage |

| LINE | MARKING |
|------|--|
| 1 | ECLIPTEK |
| 2 | 4.6080M |
| 3 | XXXXX XXXXX=Ecliptek Manufacturing Identifier |

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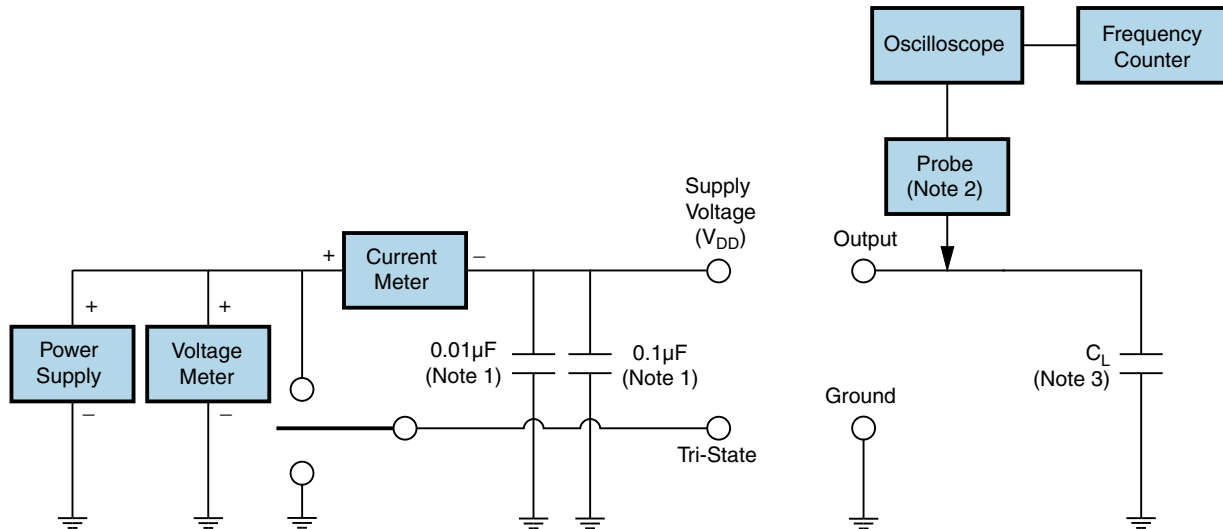
OUTPUT WAVEFORM & TIMING DIAGRAM



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Test Circuit for CMOS 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 ($>300\text{MHz}$) passive probe is recommended.

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

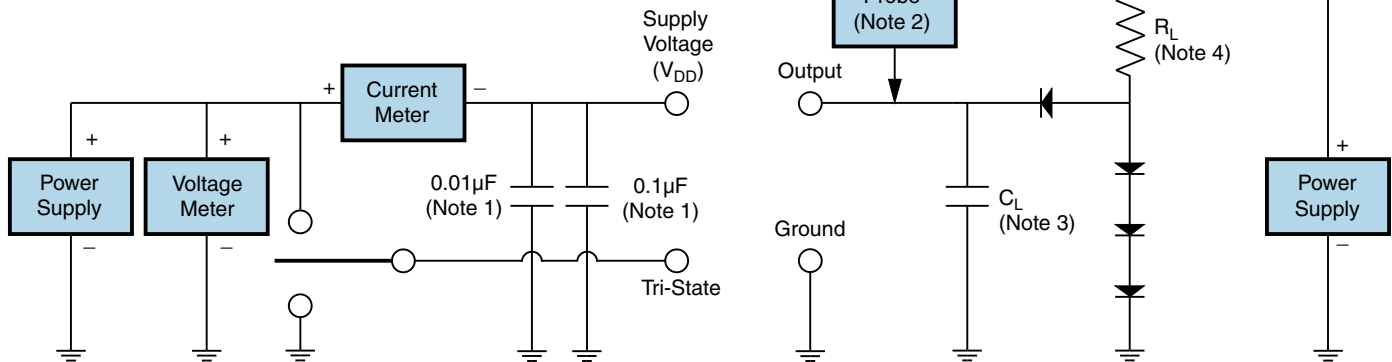
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Test Circuit for TTL Output

| Output Load Drive Capability | R_L Value (Ohms) | C_L Value (pF) |
|------------------------------|--------------------|------------------|
| 10TTL | 390 | 15 |
| 5TTL | 780 | 15 |

Table 1: R_L Resistance Value and C_L Capacitance Value Vs. Output Load Drive Capability



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.

Note 4: Resistance value R_L is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

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Recommended Solder Reflow Methods



High Temperature Solder Bath (Wave Solder)

| | |
|--|--|
| 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 back of PCB board and device leads only. Do not use this method for product with the Gull Wing option. |

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Recommended Solder Reflow Methods



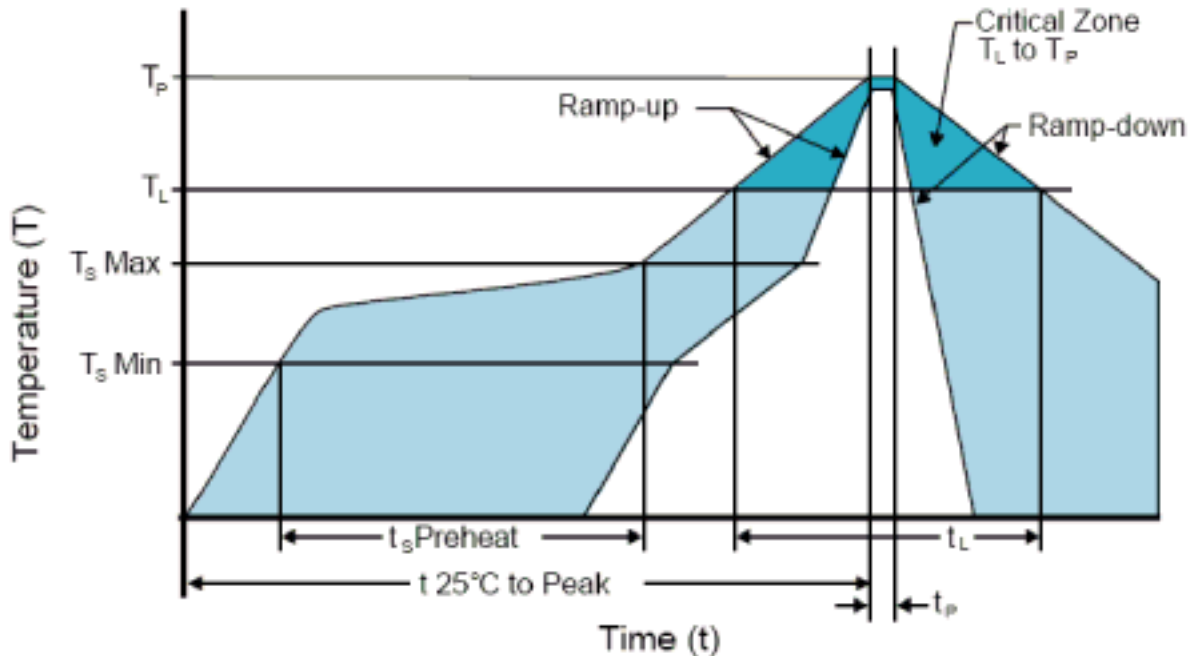
Low Temperature Infrared/Convection 185°C

| | |
|--|---|
| 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) | 185°C Maximum |
| Target Peak Temperature (T_P Target) | 185°C Maximum 2 Times |
| Time within 5°C of actual peak (t_p) | 10 Seconds Maximum 2 Times |
| 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. Use this method only for product with the Gull Wing option. |

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Recommended Solder Reflow Methods



Low Temperature Solder Bath (Wave Solder)

| | |
|--|--|
| 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) | 30 - 60 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) | 245°C Maximum |
| Target Peak Temperature (TP Target) | 245°C Maximum 1 Time / 235°C Maximum 2 Times |
| Time within 5°C of actual peak (tp) | 5 Seconds Maximum 1 Time / 15 Seconds Maximum 2 Times |
| 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 back of PCB board and device leads only. Do not use this method for product with the Gull Wing option. |

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)

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