

# EP1100PDL-1.506M



## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) HCMOS/TTL (CMOS) 5.0Vdc 14 Pin DIP Metal Thru-Hole 1.506MHz  $\pm 100$ ppm - 20°C to +70°C

## ELECTRICAL SPECIFICATIONS

|                                   |                                                                                                                                                                                                                                         |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                 | 1.506MHz                                                                                                                                                                                                                                |
| Frequency Tolerance/Stability     | $\pm 100$ 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                     | $\pm 5$ ppm/year Maximum                                                                                                                                                                                                                |
| Operating Temperature Range       | -20°C to +70°C                                                                                                                                                                                                                          |
| Supply Voltage                    | 5.0Vdc $\pm 10\%$                                                                                                                                                                                                                       |
| Input Current                     | 45mA Maximum (Unloaded)                                                                                                                                                                                                                 |
| Output Voltage Logic High (Voh)   | 2.4Vdc Minimum (IOH = -16mA)                                                                                                                                                                                                            |
| Output Voltage Logic Low (Vol)    | 0.4Vdc Maximum (IOL = +16mA)                                                                                                                                                                                                            |
| Rise/Fall Time                    | 4nSec Maximum (Measured at 0.8Vdc to 2.0Vdc)                                                                                                                                                                                            |
| Duty Cycle                        | 50 $\pm 10\%$ (Measured at 1.4Vdc with TTL Load; Measured at 50% of waveform with HCMOS Load)                                                                                                                                           |
| Load Drive Capability             | 10TTL Load Maximum                                                                                                                                                                                                                      |
| Output Logic Type                 | TTL                                                                                                                                                                                                                                     |
| Pin 1 Connection                  | Power Down (Disable Output: Logic Low)                                                                                                                                                                                                  |
| Pin 1 Input Voltage (Vih and Vil) | +2.0Vdc Minimum to enable output, +0.8Vdc to disable output, No Connect to enable output.                                                                                                                                               |
| Disable Current                   | 30mA Maximum (Pin 1 = Ground)                                                                                                                                                                                                           |
| Standby Current                   | 50 $\mu$ A Maximum (Pin 1 = Ground)                                                                                                                                                                                                     |
| Peak to Peak Jitter (tPK)         | 500pSec Maximum, 90pSec Typical                                                                                                                                                                                                         |
| RMS Period Jitter (tRMS)          | 50pSec Maximum, 13pSec 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 |

EP1100PDL-1.506M 

MECHANICAL DIMENSIONS (all dimensions in millimeters)

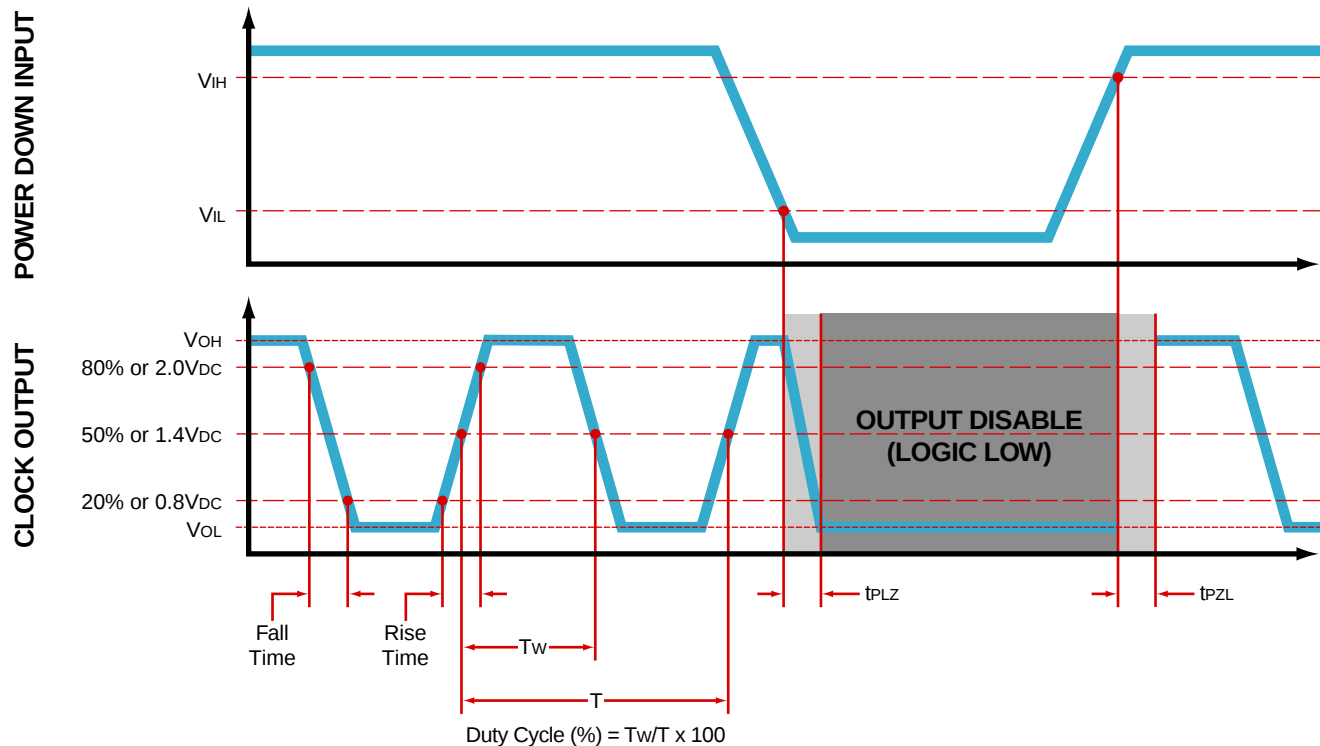


| PIN | CONNECTION             |
|-----|------------------------|
| 1   | Power Down (Logic Low) |
| 7   | Ground/Case Ground     |
| 8   | Output                 |
| 14  | Supply Voltage         |

| LINE | MARKING                                                                                    |
|------|--------------------------------------------------------------------------------------------|
| 1    | ECLIPTEK                                                                                   |
| 2    | EP11PD<br>EP11=Product Series                                                              |
| 3    | 1.5060M                                                                                    |
| 4    | XXYYZ<br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of the Year<br>ZZ=Week of the Year |

# EP1100PDL-1.506M [↗](#)

## OUTPUT WAVEFORM & TIMING DIAGRAM



| Output Load<br>Drive Capability | R <sub>L</sub> Value<br>(Ohms) | C <sub>L</sub> Value<br>(pF) |
|---------------------------------|--------------------------------|------------------------------|
| 10TTL                           | 390                            | 15                           |
| 5TTL                            | 780                            | 15                           |
| 2TTL                            | 1100                           | 6                            |
| 10LSTTL                         | 2000                           | 15                           |
| 1TTL                            | 2200                           | 3                            |

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

# EP1100PDL-1.506M [↗](#)

## Test Circuit for CMOS Output

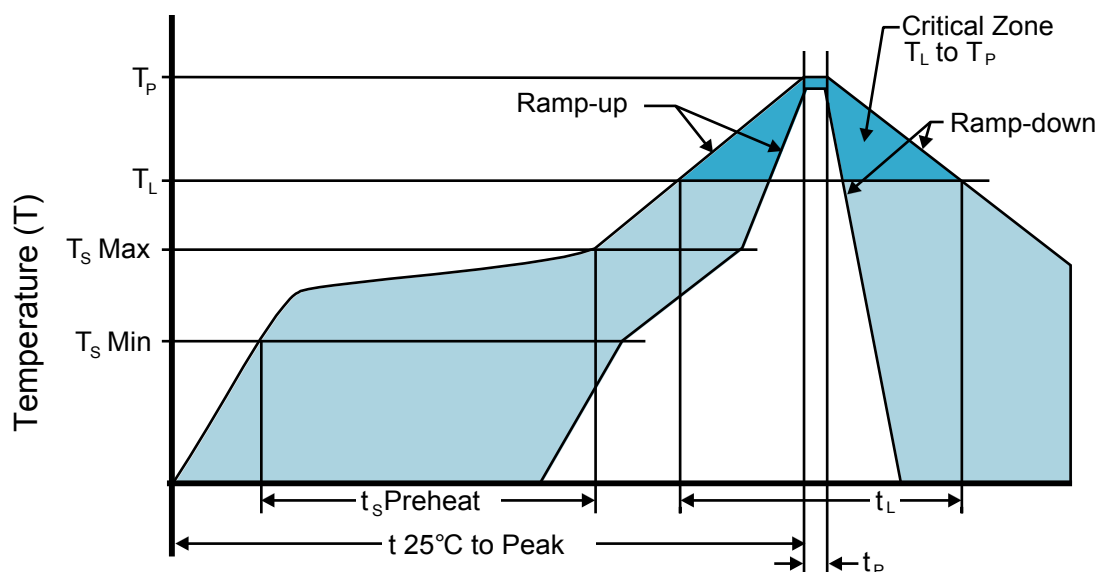


Note 1: An external 0.1 $\mu$ F low frequency tantalum bypass capacitor in parallel with a 0.01 $\mu$ F high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

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.

## Recommended Solder Reflow Methods



### High Temperature Solder Bath (Wave Solder) Time (t)

|                                            |                                                                                                                                          |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ts MAX to Tl (Ramp-up Rate)</b>         | 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 back of PCB board and device leads only. Do not use this method for product with the Gull Wing option. |

# EP1100PDL-1.506M [↗](#)

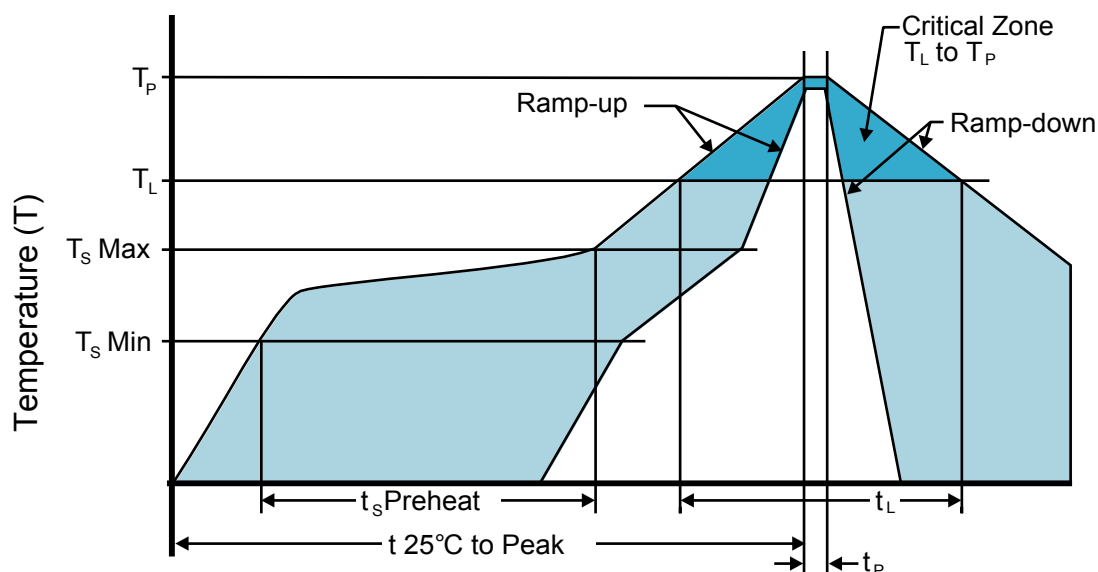
## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 185°C

|                                            |                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Ts MAX to Tl (Ramp-up Rate)</b>         | 5°C/Second Maximum                                                                                            |
| <b>Preheat</b>                             |                                                                                                               |
| - Temperature Minimum (Ts MIN)             | N/A                                                                                                           |
| - Temperature Typical (Ts TYP)             | 150°C                                                                                                         |
| - Temperature Maximum (Ts MAX)             | N/A                                                                                                           |
| - Time (ts MIN)                            | 60 - 120 Seconds                                                                                              |
| <b>Ramp-up Rate (Tl to Tp)</b>             | 5°C/Second Maximum                                                                                            |
| <b>Time Maintained Above:</b>              |                                                                                                               |
| - Temperature (Tl)                         | 150°C                                                                                                         |
| - Time (tL)                                | 200 Seconds Maximum                                                                                           |
| <b>Peak Temperature (Tp)</b>               | 185°C Maximum                                                                                                 |
| <b>Target Peak Temperature (Tp Target)</b> | 185°C Maximum 2 Times                                                                                         |
| <b>Time within 5°C of actual peak (tp)</b> | 10 Seconds Maximum 2 Times                                                                                    |
| <b>Ramp-down Rate</b>                      | 5°C/Second Maximum                                                                                            |
| <b>Time 25°C to Peak Temperature (t)</b>   | N/A                                                                                                           |
| <b>Moisture Sensitivity Level</b>          | Level 1                                                                                                       |
| <b>Additional Notes</b>                    | Temperatures shown are applied to body of device. Use this method only for product with the Gull Wing option. |

## Recommended Solder Reflow Methods



### Low Temperature Solder Bath (Wave Solder) Time (t)

|                                                                |                                                                                                                                          |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b> | 5°C/Second Maximum                                                                                                                       |
| <b>Preheat</b>                                                 |                                                                                                                                          |
| - 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)                                            | 30 - 60 Seconds                                                                                                                          |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>     | 5°C/Second Maximum                                                                                                                       |
| <b>Time Maintained Above:</b>                                  |                                                                                                                                          |
| - Temperature ( $T_L$ )                                        | 150°C                                                                                                                                    |
| - Time ( $t_L$ )                                               | 200 Seconds Maximum                                                                                                                      |
| <b>Peak Temperature (<math>T_P</math>)</b>                     | 245°C Maximum                                                                                                                            |
| <b>Target Peak Temperature (<math>T_P</math> Target)</b>       | 245°C Maximum 1 Time / 235°C Maximum 2 Times                                                                                             |
| <b>Time within 5°C of actual peak (<math>t_P</math>)</b>       | 5 Seconds Maximum 1 Time / 15 Seconds Maximum 2 Times                                                                                    |
| <b>Ramp-down Rate</b>                                          | 5°C/Second Maximum                                                                                                                       |
| <b>Time 25°C to Peak Temperature (t)</b>                       | N/A                                                                                                                                      |
| <b>Moisture Sensitivity Level</b>                              | Level 1                                                                                                                                  |
| <b>Additional Notes</b>                                        | 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.)