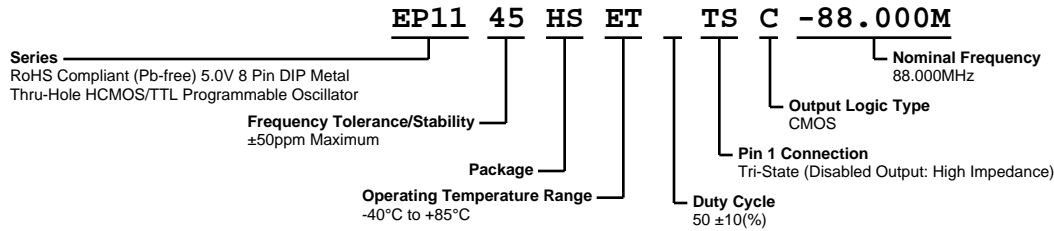


# EP1145HSETTSC-88.000M



**ECLIPTEK**  
CORPORATION



## ELECTRICAL SPECIFICATIONS

|                                   |  |
|-----------------------------------|--|
| Nominal Frequency                 | 88.000MHz  |
| Frequency Tolerance/Stability     | ±50ppm 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                     | ±5ppm/year Maximum   |
| Operating Temperature Range       | -40°C to +85°C   |
| Supply Voltage                    | 5.0Vdc ±10%  |
| Input Current                     | 45mA Maximum (Unloaded)  |
| Output Voltage Logic High (Voh)   | Vdd-0.4Vdc Minimum (IOH=-16mA)   |
| Output Voltage Logic Low (Vol)    | 0.4Vdc Maximum (IOL=+16mA)   |
| Rise/Fall Time                    | 4nSec Maximum (Measured at 20% to 80% of waveform)   |
| Duty Cycle                        | 50 ±10(%) (Measured at 1.4Vdc with TTL Load; Measured at 50% of waveform with HCMOS Load)  |
| Load Drive Capability             | 15pF HCMOS Load Maximum  |
| Output Logic Type                 | CMOS   |
| Pin 1 Connection                  | Tri-State (Disabled Output: High Impedance)  |
| Pin 1 Input Voltage (Vih and Vil) | +2.0Vdc Minimum to enable output, +0.8Vdc Maximum to disable output, No Connect to enable output.  |
| Standby Current                   | 50µA Maximum (Pin 1 = Ground)  |
| Disable Current                   | 30mA Maximum (Pin 1 = Ground)  |
| Peak to Peak Jitter (tPK)         | 100pSec Maximum, 50pSec Typical  |
| RMS Period Jitter (tRMS)          | 13pSec Maximum, 8pSec 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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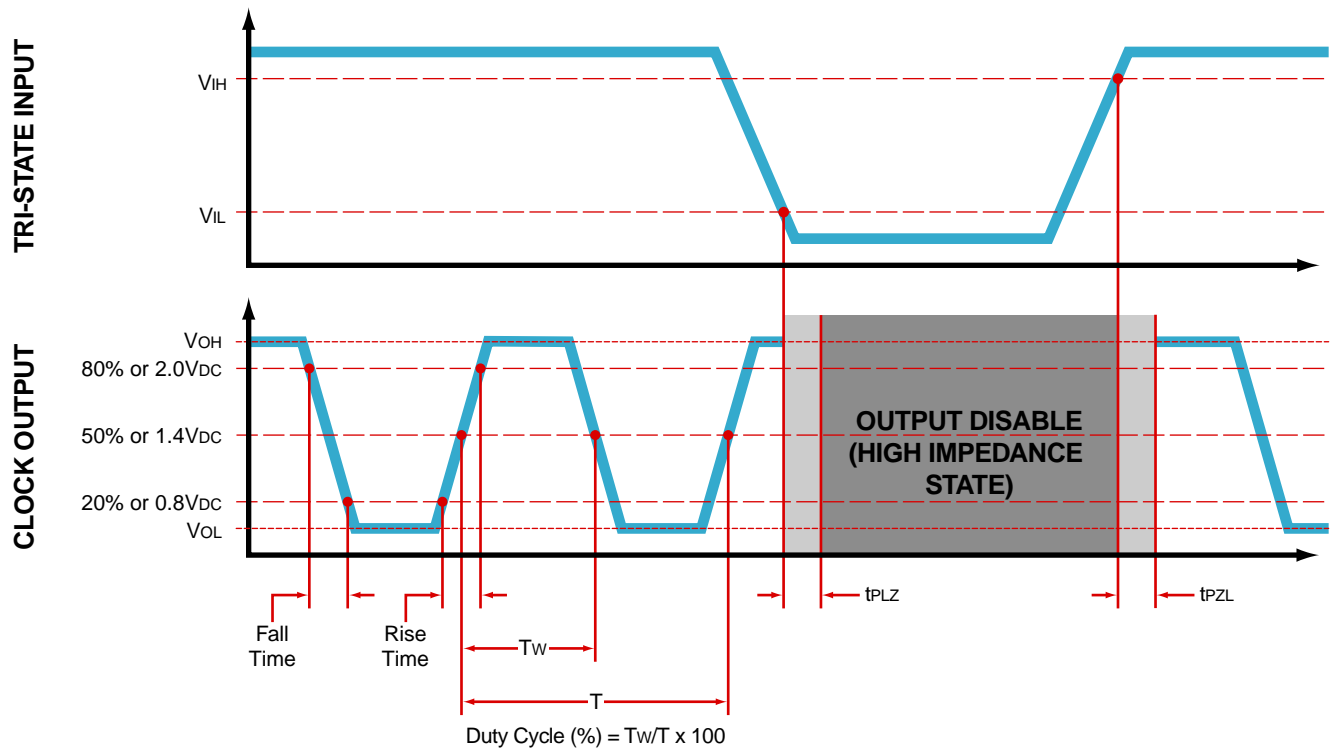
## MECHANICAL DIMENSIONS (all dimensions in millimeters)



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

| LINE | MARKING   |
|------|---|
| 1    | <b>ECLIPTEK</b>   |
| 2    | <b>EP11TS</b><br>EP11=Product Series  |
| 3    | <b>88.000M</b>  |
| 4    | <b>XXYYZ</b><br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of the Year<br>ZZ=Week of the Year |

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EP1145HSETTSC-88.000M

## Test Circuit for TTL Output

| Output Load Drive Capability | $R_L$ Value (Ohms) | $C_L$ Value (pF) |
|------------------------------|--------------------|------------------|
| 10TTL                        | 390                | 15               |
| 5TTL                         | 780                | 15               |
| 2TTL                         | 1100               | 6                |
| 10LSTTL                      | 2000               | 15               |
| 1TTL                         | 2200               | 3                |

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



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

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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## Test Circuit for CMOS Output



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

## Recommended Solder Reflow Methods



### High Temperature Solder Bath (Wave Solder)

|  |                                      |
|--|--------------------------------------|
| <b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b> | 3°C/second Maximum                   |
| <b>Preheat</b>   |                                      |
| - Temperature Minimum ( $T_s$ MIN)                             | 150°C                                |
| - Temperature Typical ( $T_s$ TYP)                             | 175°C                                |
| - Temperature Maximum ( $T_s$ MAX)                             | 200°C                                |
| - Time ( $t_s$ MIN)  | 60 - 180 Seconds                     |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>     | 3°C/second Maximum                   |
| <b>Time Maintained Above:</b>                                  |                                      |
| - Temperature ( $T_L$ )  | 217°C                                |
| - Time ( $t_L$ )   | 60 - 150 Seconds                     |
| <b>Peak Temperature (<math>T_p</math>)</b>                     | 260°C Maximum for 10 Seconds Maximum |
| <b>Target Peak Temperature (<math>T_p</math> Target)</b>       | 250°C +0/-5°C                        |
| <b>Time within 5°C of actual peak (<math>t_p</math>)</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                              |

## 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

## Recommended Solder Reflow Methods



### Low Temperature Solder Bath (Wave Solder)

|  |   |
|--|---|
| <b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b> | 5°C/second Maximum                                    |
| <b>Preheat</b>   |   |
| - Temperature Minimum (T <sub>s</sub> MIN)               | N/A   |
| - Temperature Typical (T <sub>s</sub> TYP)               | 150°C   |
| - Temperature Maximum (T <sub>s</sub> MAX)               | N/A   |
| - Time (t <sub>s</sub> MIN)                              | 30 - 60 Seconds                                       |
| <b>Ramp-up Rate (T<sub>L</sub> to T<sub>P</sub>)</b>     | 5°C/second Maximum                                    |
| <b>Time Maintained Above:</b>                            |   |
| - Temperature (T <sub>L</sub> )                          | 150°C   |
| - Time (t <sub>L</sub> )                                 | 200 Seconds Maximum                                   |
| <b>Peak Temperature (T<sub>P</sub>)</b>                  | 245°C Maximum   |
| <b>Target Peak Temperature (T<sub>P</sub> Target)</b>    | 245°C Maximum 1 Time / 235°C Maximum 2 Times          |
| <b>Time within 5°C of actual peak (t<sub>p</sub>)</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   |

### 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.