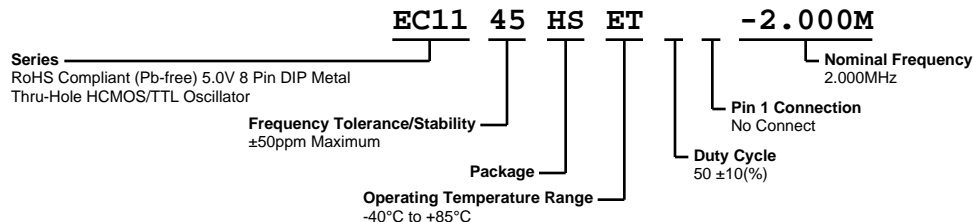


# EC1145HSET-2.000M



## ELECTRICAL SPECIFICATIONS

|                                       |  |
|---------------------------------------|--|
| Nominal Frequency                     | 2.000MHz   |
| Frequency Tolerance/Stability         | $\pm 50$ ppm Maximum (Inclusive of all conditions: Calibration Tolerance at $25^{\circ}\text{C}$ , Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at $25^{\circ}\text{C}$ , Shock, and Vibration) |
| Aging at $25^{\circ}\text{C}$         | $\pm 5$ ppm/year Maximum   |
| Operating Temperature Range           | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$   |
| Supply Voltage                        | 5.0Vdc $\pm 10\%$  |
| Input Current                         | 45mA Maximum   |
| Output Voltage Logic High (Voh)       | 2.4Vdc Minimum with TTL Load, Vdd-0.5Vdc Minimum with HCMOS Load   |
| Output Voltage Logic Low (Vol)        | 0.4Vdc Maximum with TTL Load, 0.5Vdc Maximum with HCMOS Load   |
| Rise/Fall Time                        | 6nSec Maximum (Measured at 0.4Vdc to 2.4Vdc with TTL Load; Measured at 20% to 80% of waveform with HCMOS Load)   |
| Duty Cycle                            | $50 \pm 10\%$ (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                      | No Connect   |
| Tri-State Input Voltage (Vih and Vil) | +2.2Vdc Minimum to enable output, +0.8Vdc to disable output (High Impedance), No connect to enable output.   |
| Absolute Clock Jitter                 | $\pm 100$ pSec Maximum   |
| One Sigma Clock Period Jitter         | $\pm 25$ pSec Maximum  |
| Start Up Time                         | 10mSec Maximum   |
| Storage Temperature Range             | $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$  |

## 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 |

# EC1145HSET-2.000M

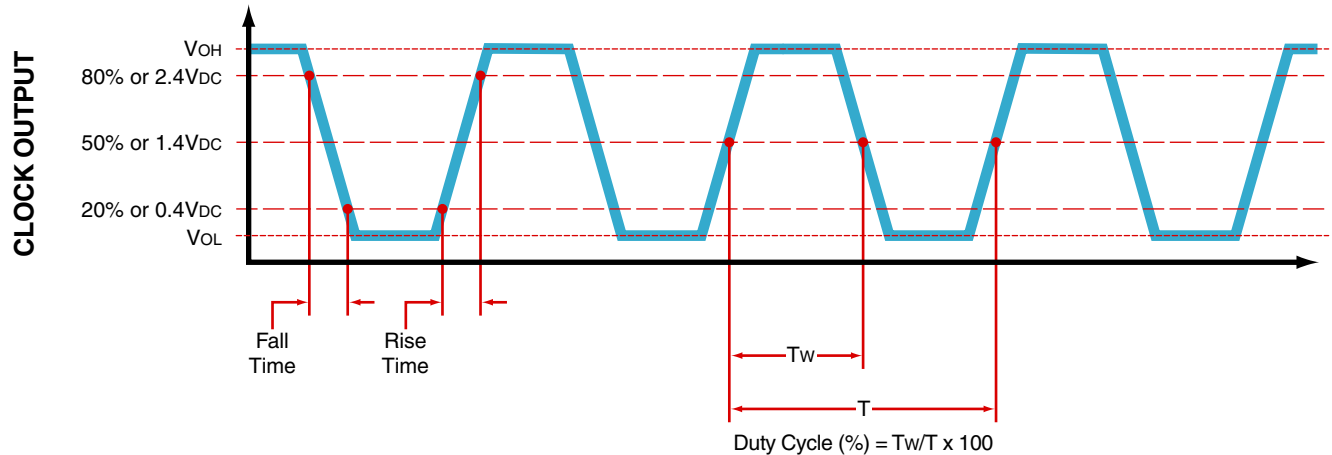
## MECHANICAL DIMENSIONS (all dimensions in millimeters)



| PIN | CONNECTION     |
|-----|----------------|
| 1   | No Connect     |
| 4   | Case Ground    |
| 5   | Output         |
| 8   | Supply Voltage |

| LINE | MARKING   |
|------|---|
| 1    | <b>ECLIPTEK</b>   |
| 2    | <b>EC11</b><br>EC11=Product Series  |
| 3    | <b>2.000M</b>   |
| 4    | <b>XXYYZ</b><br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of Year<br>ZZ=Week of Year |

## OUTPUT WAVEFORM



# EC1145HSET-2.000M

## Test Circuit for TTL Output

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

Table 1: R<sub>L</sub> Resistance Value and C<sub>L</sub> Capacitance Value Vs. Output Load Drive Capability



Note 1: An external 0.1μF low frequency tantalum bypass capacitor in parallel with a 0.01μF high frequency ceramic bypass capacitor close to the package ground and V<sub>DD</sub> 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.

Note 4: Resistance value R<sub>L</sub> is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

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

# EC1145HSET-2.000M

## 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)

**$T_s$  MAX to  $T_L$  (Ramp-up Rate)** 3°C/second Maximum

#### Preheat

- 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

**Ramp-up Rate ( $T_L$  to  $T_p$ )** 3°C/second Maximum

#### Time Maintained Above:

- Temperature ( $T_L$ ) 217°C
- Time ( $t_L$ ) 60 - 150 Seconds

**Peak Temperature ( $T_p$ )** 260°C Maximum for 10 Seconds Maximum

**Target Peak Temperature ( $T_p$  Target)** 250°C +0/-5°C

**Time within 5°C of actual peak ( $t_p$ )** 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

## 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><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   |

### 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.