# EH2545TS-38.880M

EH25 45 TS -38.880M

**Series**
RoHS Compliant (Pb-free) 5.0V 4 Pad 5mm x 7mm
Ceramic SMD HCMOS/TTL High Frequency Oscillator

**Frequency Tolerance/Stability**
±50ppm Maximum

**Operating Temperature Range**
0°C to +70°C

**Duty Cycle**
50 ±10(%)

**Pin 1 Connection**
Tri-State (High Impedance)

**Nominal Frequency**
38.880MHz

## ELECTRICAL SPECIFICATIONS

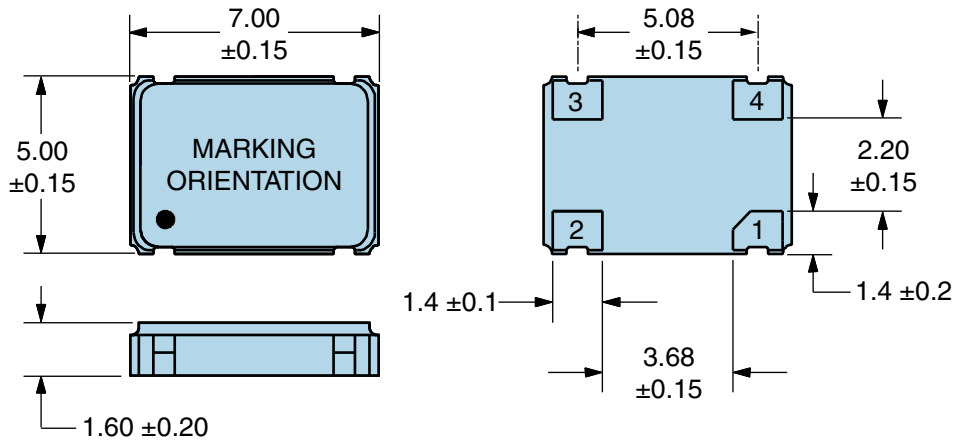
| | |
|---|---|
| **Nominal Frequency** | 38.880MHz |
| **Frequency Tolerance/Stability** | ±50ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration) |
| **Aging at 25°C** | ±5ppm/year Maximum |
| **Operating Temperature Range** | 0°C to +70°C |
| **Supply Voltage** | 5.0Vdc ±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 (IOH= +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; Measured 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 (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** | ±250pSec Maximum, ±100pSec Typical |
| **One Sigma Clock Period Jitter** | ±50pSec Maximum, ±30pSec Typical |
| **Start Up Time** | 10mSec Maximum |
| **Storage Temperature Range** | -55°C to +125°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 |

# EH2545TS-38.880M

## MECHANICAL DIMENSIONS (all dimensions in millimeters)

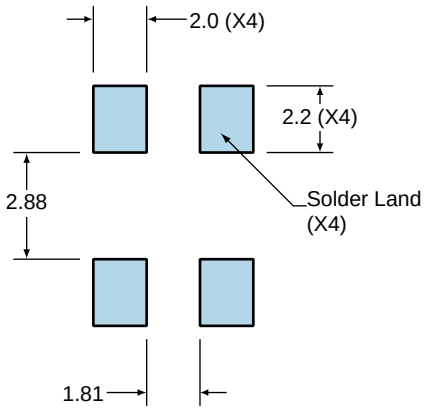



| PIN | CONNECTION |
|---|---|
| 1 | Tri-State |
| 2 | Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|---|---|
| 1 | **ECLIPTEK** |
| 2 | **38.880M** |
| 3 | **XXXXXX**<br>*XXXXXX=Ecliptek Manufacturing Identifier* |

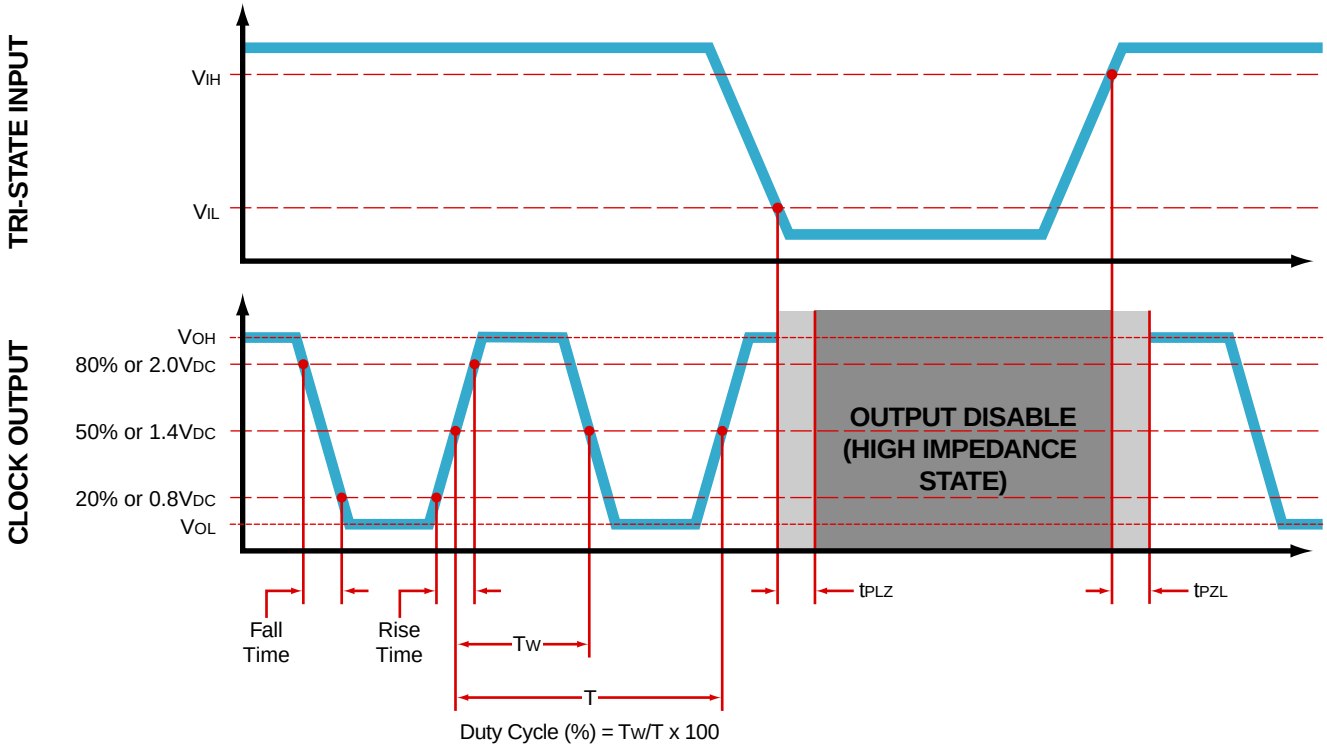
### Suggested Solder Pad Layout

All Dimensions in Millimeters




All Tolerances are ±0.1

## OUTPUT WAVEFORM & TIMING DIAGRAM

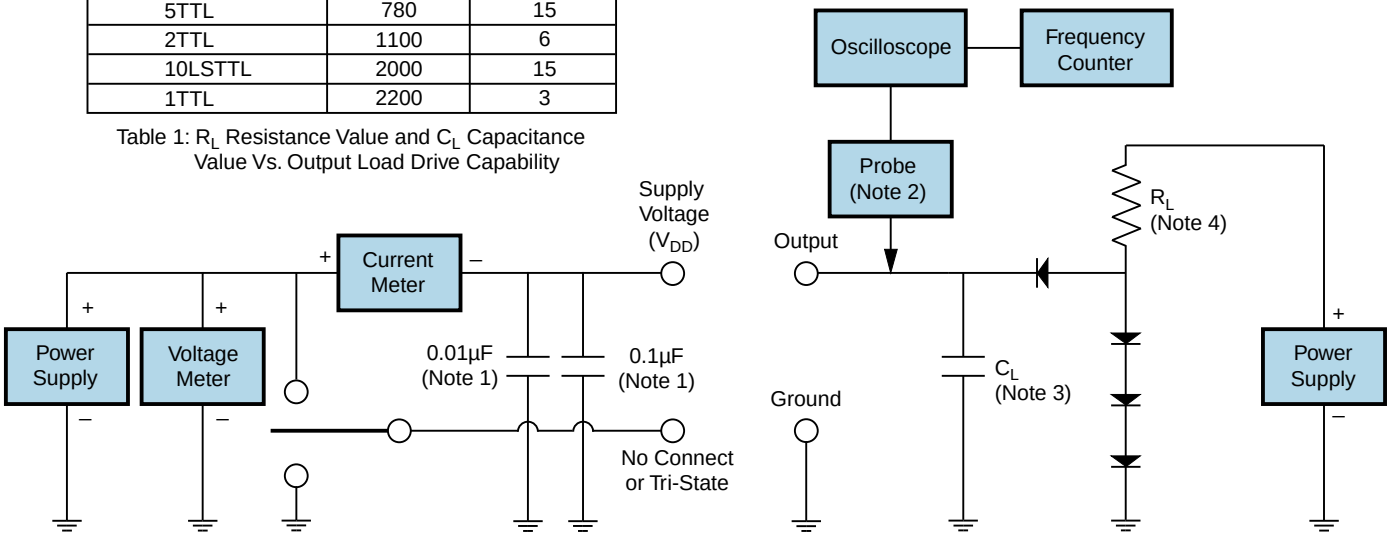



Duty Cycle (%) = Tw/T x 100

## Test Circuit for TTL Output

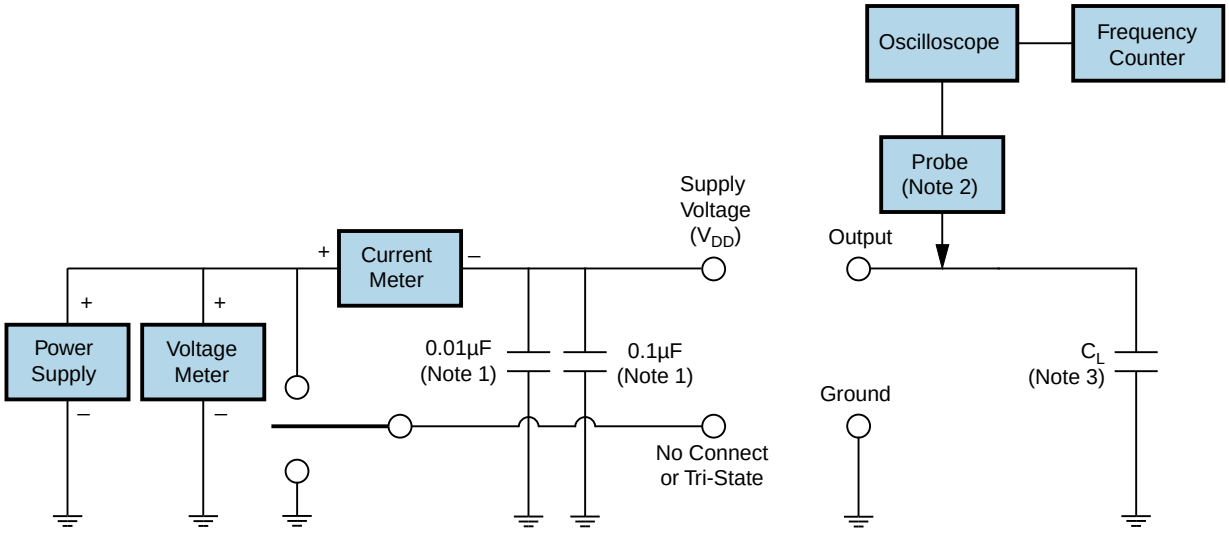
| Output Load Drive Capability | $R_L$ Value (Ohms) | $C_L$ Value (pF) |
|---|---|---|
| 10TTL | 390 | 15 |
| 5TTL | 780 | 15 |
| 2TTL | 1100 | 6 |
| 10LSTTL | 2000 | 15 |
| 1TTL | 2200 | 3 |

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



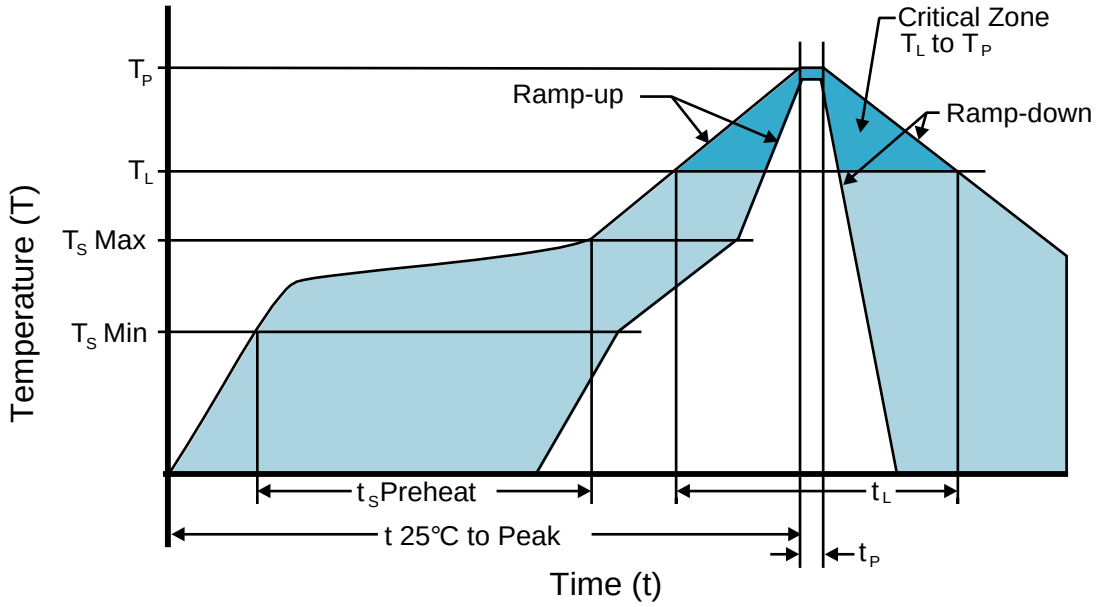

Note 1: An external 0.1µF low frequency tantalum bypass capacitor in parallel with a 0.01µF high frequency ceramic bypass capacitor close to the package ground and $V_{DD}$ pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.
Note 3: Capacitance value $C_L$ includes sum of all probe and fixture capacitance.
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.

## Test Circuit for CMOS Output




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 $V_{DD}$ 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.

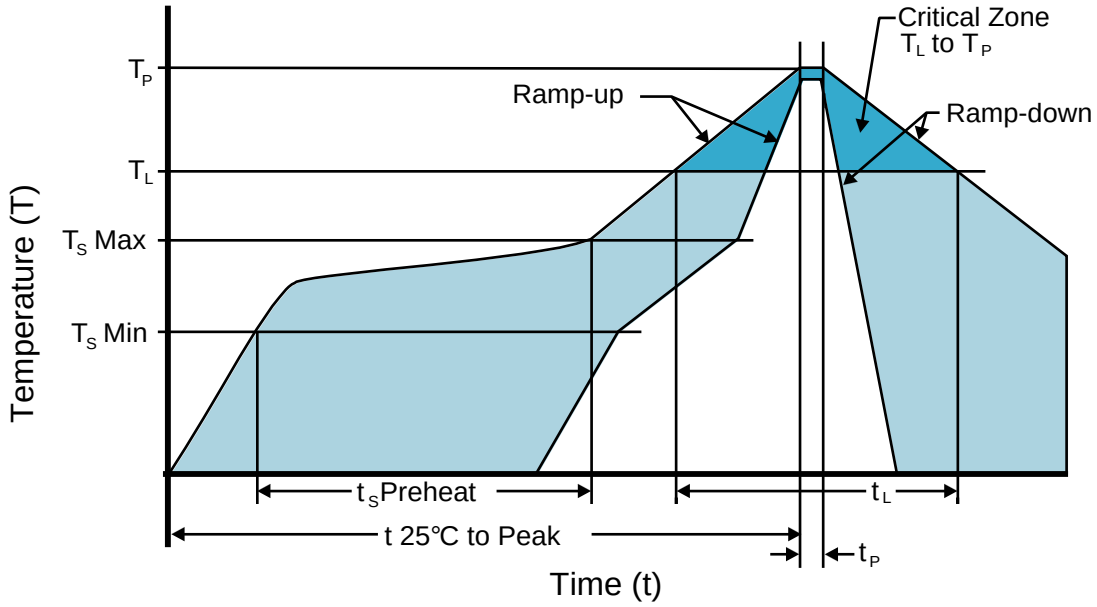
# Recommended Solder Reflow Methods




## High Temperature Infrared/Convection

| | |
|---|---|
| **$T_S$ 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 |
| **Additional Notes** | Temperatures shown are applied to body of device. |

# 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 1 Time / 230°C Maximum 2 Times |
| **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 |
| **Additional Notes** | Temperatures shown are applied to body of device. |

## Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)

## High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)