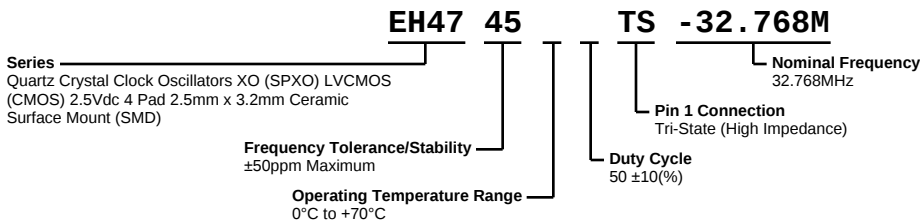


# EH4745TS-32.768M



## ELECTRICAL SPECIFICATIONS

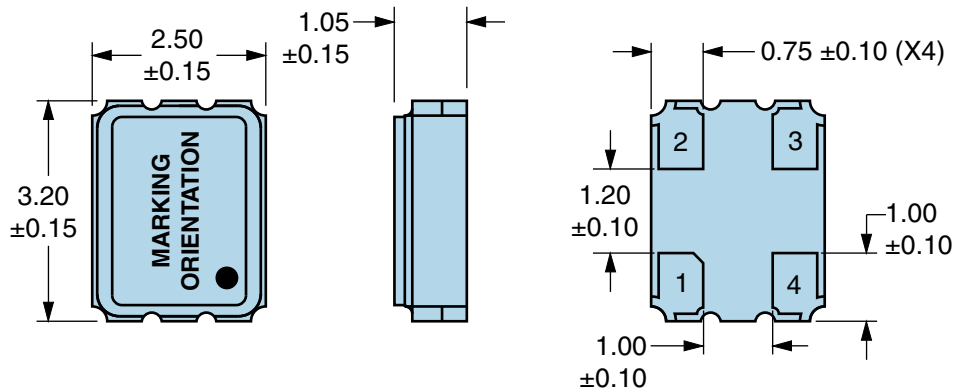
|                                       |                                                                                                                                                                                                                                               |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 32.768MHz                                                                                                                                                                                                                                     |
| 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°, 260°C Reflow, Shock, and Vibration) |
| Aging at 25°C                         | ±5ppm/Year Maximum                                                                                                                                                                                                                            |
| Operating Temperature Range           | 0°C to +70°C                                                                                                                                                                                                                                  |
| Supply Voltage                        | 2.5Vdc ±5%                                                                                                                                                                                                                                    |
| Input Current                         | 7mA Maximum (No Load)                                                                                                                                                                                                                         |
| Output Voltage Logic High (Voh)       | 90% of Vdd Minimum (IOH = -8mA)                                                                                                                                                                                                               |
| Output Voltage Logic Low (Vol)        | 10% of Vdd Maximum (IOL = +8mA)                                                                                                                                                                                                               |
| Rise/Fall Time                        | 6nSec Maximum (Measured at 20% to 80% of waveform)                                                                                                                                                                                            |
| Duty Cycle                            | 50 ±10(%) (Measured at 50% of waveform)                                                                                                                                                                                                       |
| Load Drive Capability                 | 15pF Maximum                                                                                                                                                                                                                                  |
| Output Logic Type                     | CMOS                                                                                                                                                                                                                                          |
| Pin 1 Connection                      | Tri-State (High Impedance)                                                                                                                                                                                                                    |
| Tri-State Input Voltage (Vih and Vil) | 90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance)                                                                                                                                      |
| Standby Current                       | 10µA Maximum (Pin 1 = Ground)                                                                                                                                                                                                                 |
| RMS Phase Jitter                      | 20pSec Typical, 30pSec Maximum (Fj = 12kHz to 20MHz)                                                                                                                                                                                          |
| Period Jitter (RMS)                   | 13pSec Typical                                                                                                                                                                                                                                |
| Period Jitter (pk-pk)                 | 85pSec Typical, 100pSec Maximum                                                                                                                                                                                                               |
| 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: 1500Vdc |
| 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           |

# EH4745TS-32.768M

## MECHANICAL DIMENSIONS (all dimensions in millimeters)

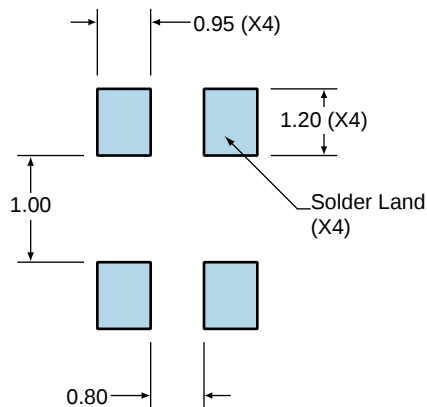


| PIN | CONNECTION     |
|-----|----------------|
| 1   | Tri-State      |
| 2   | Case Ground    |
| 3   | Output         |
| 4   | Supply Voltage |

| LINE | MARKING                                                      |
|------|--------------------------------------------------------------|
| 1    | <b>E32.768</b><br>E=Ecliptek Designator                      |
| 2    | <b>XXXXXX</b><br>XXXXXX=Ecliptek<br>Manufacturing Identifier |

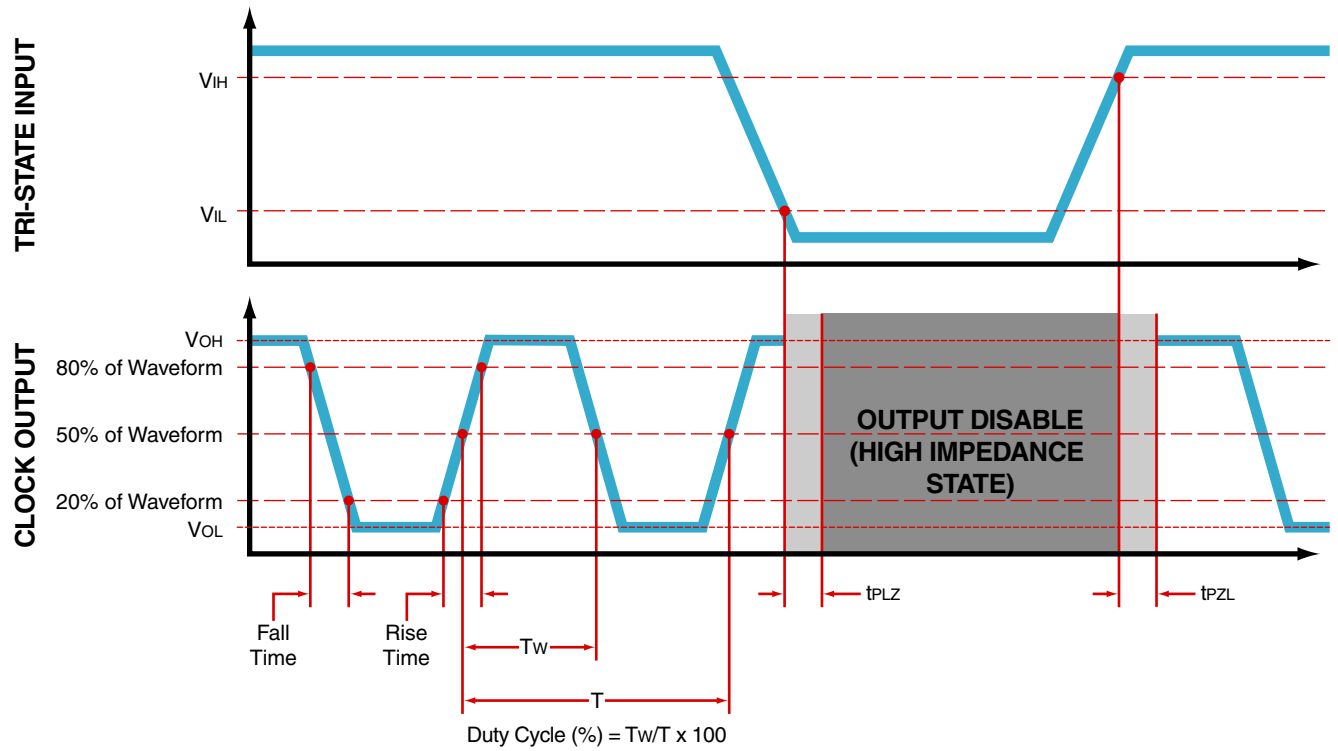
## Suggested Solder Pad Layout

All Dimensions in Millimeters



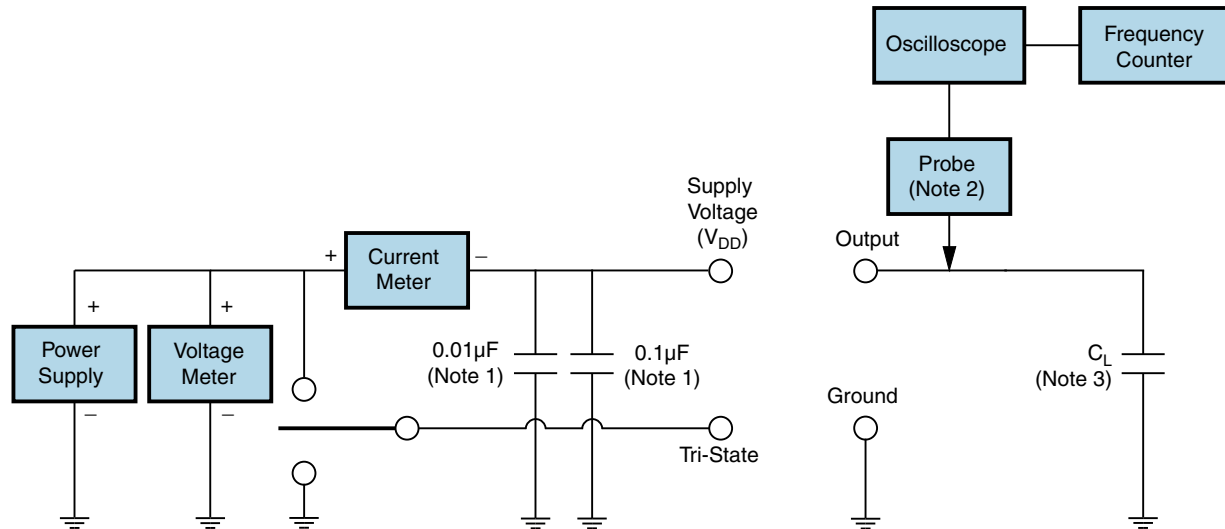
All Tolerances are  $\pm 0.1$

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EH4745TS-32.768M

## Test Circuit for CMOS Output

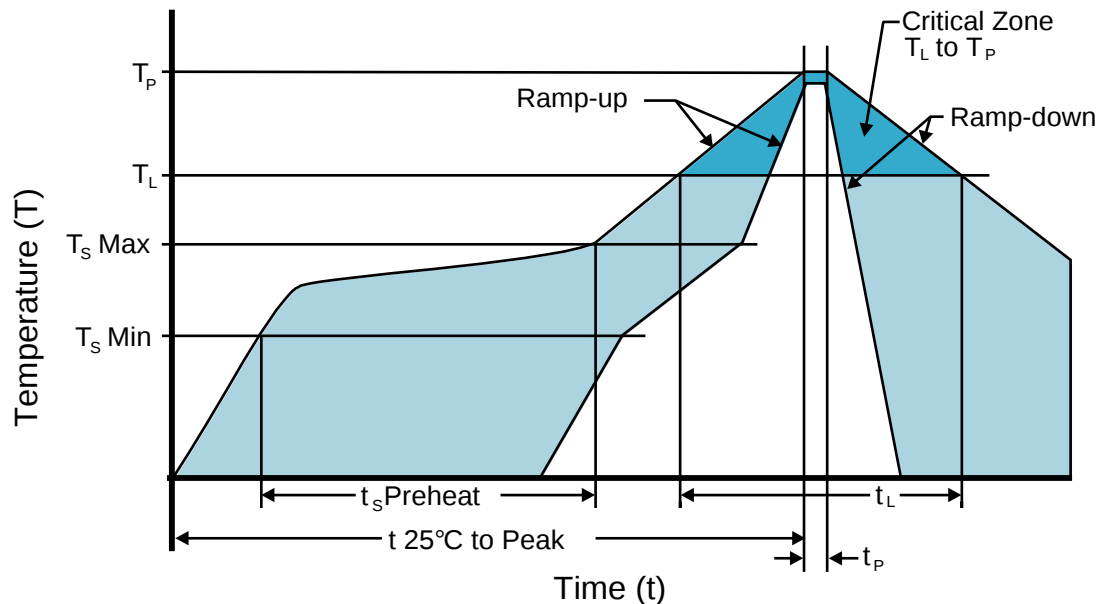


Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

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.

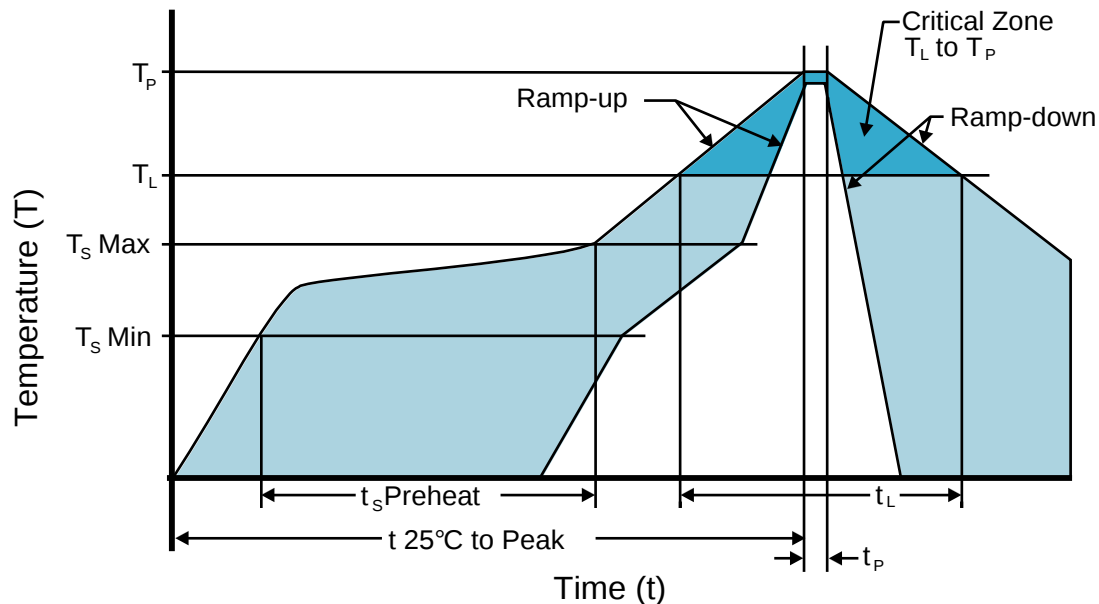
## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|                                            |                                      |
|--------------------------------------------|--------------------------------------|
| <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                              |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

**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) 60 - 120 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)** 240°C Maximum

**Target Peak Temperature (Tp Target)** 240°C Maximum 2 Times / 230°C Maximum 1 Time

**Time within 5°C of actual peak (tp)** 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

### 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.