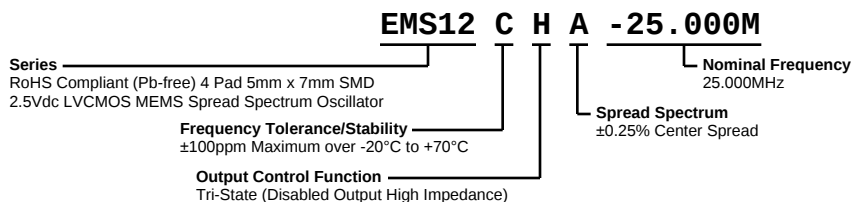


# EMS12CHA-25.000M



**ECLIPTEK**  
CORPORATION



## ELECTRICAL SPECIFICATIONS

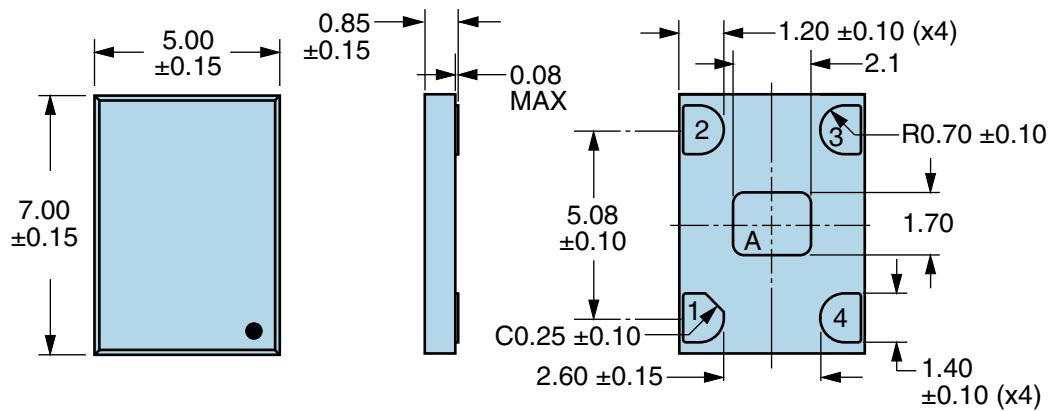
|                                       |                                                                                                                                                                                                                                                                     |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 25.000MHz                                                                                                                                                                                                                                                           |
| Frequency Tolerance/Stability         | ±100ppm Maximum over -20°C to +70°C (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, 260°C Reflow, Shock, and Vibration) |
| Aging at 25°C                         | ±1ppm Maximum First Year                                                                                                                                                                                                                                            |
| Supply Voltage                        | 2.5Vdc ±10%                                                                                                                                                                                                                                                         |
| Maximum Supply Voltage                | -0.5Vdc to +3.65Vdc                                                                                                                                                                                                                                                 |
| Input Current                         | 25mA Maximum (Unloaded; Nominal Vdd)                                                                                                                                                                                                                                |
| 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                        | 2nSec Maximum (Measured from 20% to 80% of waveform)                                                                                                                                                                                                                |
| Duty Cycle                            | 50 ±5% (Measured at 50% of waveform)                                                                                                                                                                                                                                |
| Load Drive Capability                 | 15pF Maximum                                                                                                                                                                                                                                                        |
| Output Logic Type                     | CMOS                                                                                                                                                                                                                                                                |
| Output Control Function               | Tri-State (Disabled Output High Impedance)                                                                                                                                                                                                                          |
| Tri-State Input Voltage (Vih and Vil) | 70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output                                                                                                                                                                          |
| Disable Current                       | 20mA Maximum (Disabled Output: High Impedance) (Pad 1=Ground)                                                                                                                                                                                                       |
| Spread Spectrum                       | ±0.25% Center Spread                                                                                                                                                                                                                                                |
| Modulation Frequency                  | 30kHz Minimum, 32kHz Typical, 35kHz Maximum                                                                                                                                                                                                                         |
| Period Jitter                         | 40pSec Maximum (Cycle to Cycle; Spread Spectrum-On; Fo=133.333M, Vdd=2.5Vdc)                                                                                                                                                                                        |
| Start Up Time                         | 10mSec Maximum                                                                                                                                                                                                                                                      |
| Storage Temperature Range             | -55°C to +125°C                                                                                                                                                                                                                                                     |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                              |                                                                    |
|------------------------------|--------------------------------------------------------------------|
| ESD Susceptibility           | MIL-STD-883, Method 3015, Class 2, HBM 2000V                       |
| Flammability                 | UL94-V0                                                            |
| Mechanical Shock             | MIL-STD-883, Method 2002, Condition G, 30,000G                     |
| Moisture Resistance          | MIL-STD-883, Method 1004                                           |
| Moisture Sensitivity Level   | 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 (Four I/O Pads on bottom of package only) |
| Temperature Cycling          | MIL-STD-883, Method 1010, Condition B                              |
| Thermal Shock                | MIL-STD-883, Method 1011, Condition B                              |
| Vibration                    | MIL-STD-883, Method 2007, Condition A, 20G                         |

# EMS12CHA-25.000M

## MECHANICAL DIMENSIONS (all dimensions in millimeters)



Note A: Center paddle is connected internally to oscillator ground (Pad 2).

| PIN | CONNECTION                 |
|-----|----------------------------|
| 1   | Tri-State (High Impedance) |
| 2   | Ground                     |
| 3   | Output                     |
| 4   | Supply Voltage             |

| LINE | MARKING                                                           |
|------|-------------------------------------------------------------------|
| 1    | XXXX or XXXXX<br>XXXX or XXXXX=Ecliptek<br>Manufacturing Lot Code |

## Suggested Solder Pad Layout

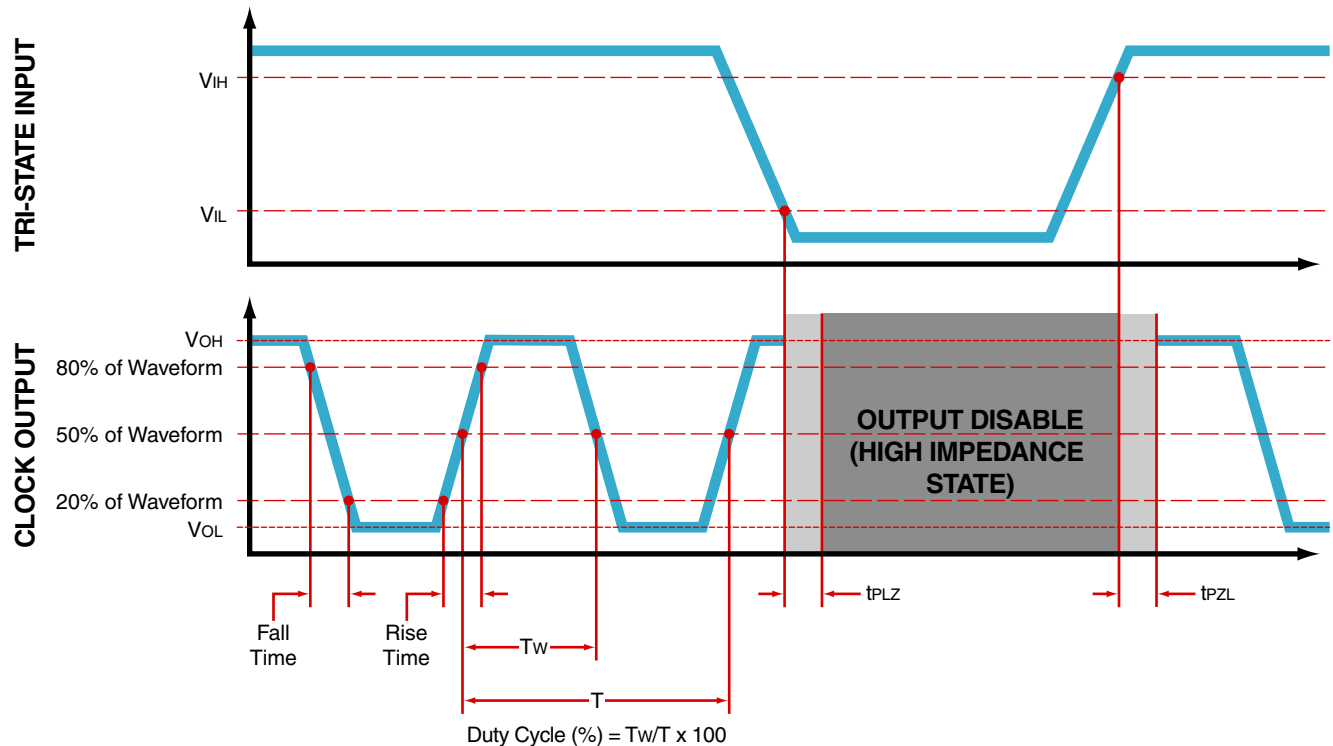
All Dimensions in Millimeters



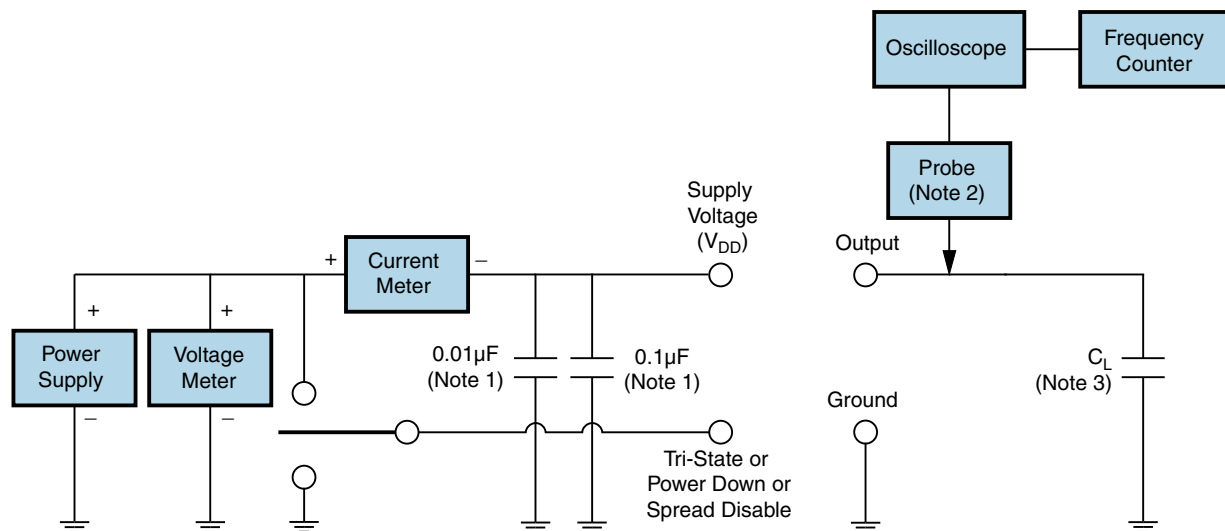
All Tolerances are  $\pm 0.1$

# EMS12CHA-25.000M

## OUTPUT WAVEFORM & TIMING DIAGRAM



## 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 (<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

|                                          |                    |
|------------------------------------------|--------------------|
| $T_s \text{ MAX to } T_L$ (Ramp-up Rate) | 3°C/second Maximum |
|------------------------------------------|--------------------|

#### Preheat

|                                             |                  |
|---------------------------------------------|------------------|
| - Temperature Minimum ( $T_s \text{ MIN}$ ) | 150°C            |
| - Temperature Typical ( $T_s \text{ TYP}$ ) | 175°C            |
| - Temperature Maximum ( $T_s \text{ MAX}$ ) | 200°C            |
| - Time ( $t_s \text{ MIN}$ )                | 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 ( $T_p \text{ Target}$ ) | 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 240°C

T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate) 5°C/second Maximum

#### Preheat

- 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) 60 - 120 Seconds

Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>) 5°C/second Maximum

#### Time Maintained Above:

- Temperature (T<sub>L</sub>) 150°C
- Time (t<sub>L</sub>) 200 Seconds Maximum

Peak Temperature (T<sub>p</sub>) 240°C Maximum

Target Peak Temperature (T<sub>p</sub> Target) 240°C Maximum 1 Time / 230°C Maximum 2 Times

Time within 5°C of actual peak (t<sub>p</sub>) 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.