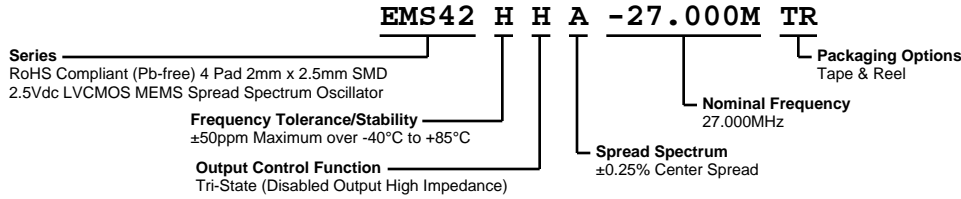


EMS42HHA-27.000M TR



ECLIPTEK[®]
CORPORATION



ELECTRICAL SPECIFICATIONS

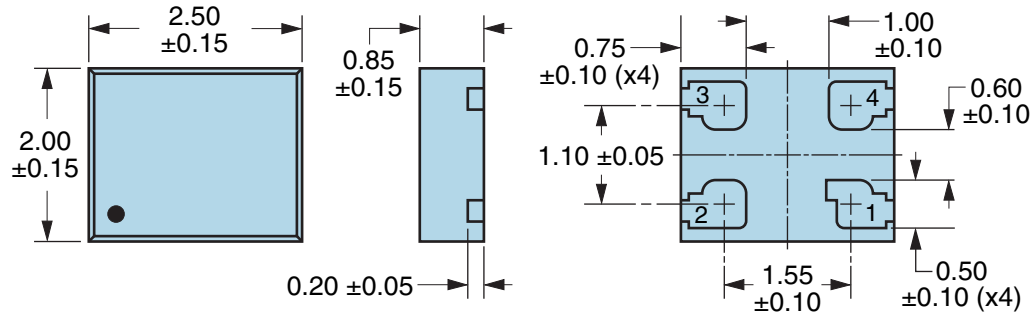
| | |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency | 27.000MHz |
| Frequency Tolerance/Stability | ± 50 ppm Maximum over -40°C to $+85^{\circ}\text{C}$ (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 | ± 1 ppm Maximum First Year |
| Supply Voltage | 2.5Vdc $\pm 10\%$ |
| Maximum Supply Voltage | -0.5Vdc to $+3.65\text{Vdc}$ |
| Input Current | 35mA 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= $+8\text{mA}$) |
| Rise/Fall Time | 2nSec Maximum (Measured from 20% to 80% of waveform) |
| Duty Cycle | 50 $\pm 5\%$ (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 | $\pm 0.25\%$ 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 $+125^{\circ}\text{C}$ |

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 (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 |

EMS42HHA-27.000M TR

MECHANICAL DIMENSIONS (all dimensions in millimeters)

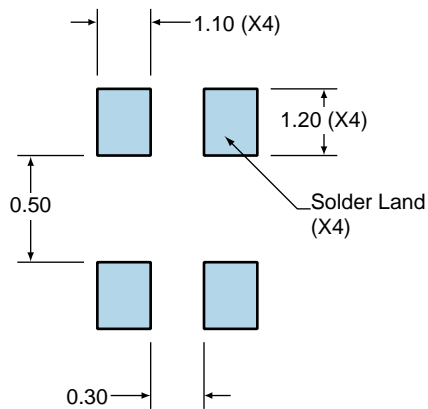


| PIN | CONNECTION |
|-----|----------------------------|
| 1 | Tri-State (High Impedance) |
| 2 | Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|------|-------------------------------------------------|
| 1 | XXXX XXXX=Ecliptek Manufacturing Lot Code |

Suggested Solder Pad Layout

All Dimensions in Millimeters



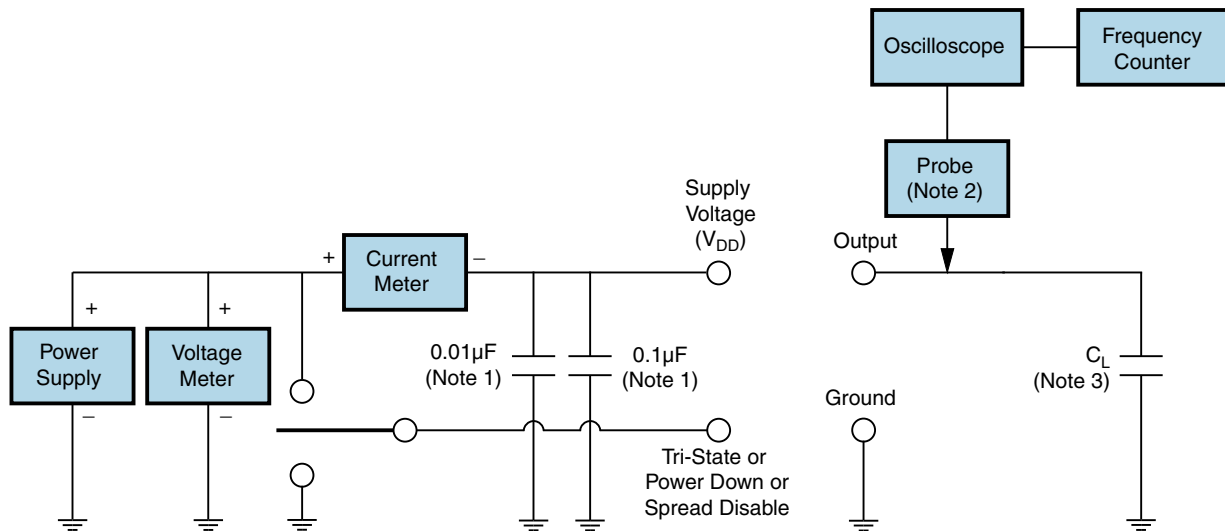
All Tolerances are ± 0.1

EMS42HHA-27.000M TR

OUTPUT WAVEFORM & TIMING DIAGRAM



Test Circuit for CMOS Output



Note 1: An external 0.1 μ F low frequency tantalum bypass capacitor in parallel with a 0.01 μ F high frequency ceramic bypass capacitor close to the package ground and V_{DD} pin is required.

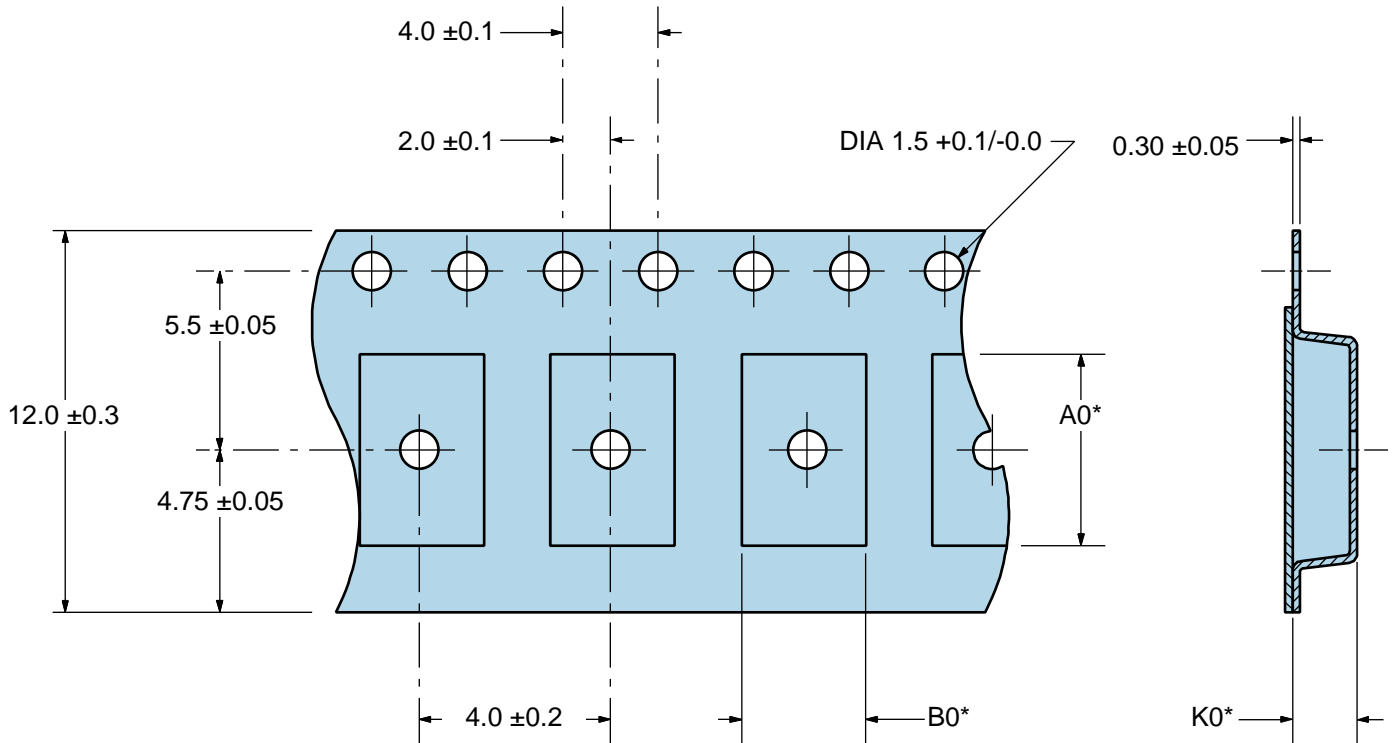
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

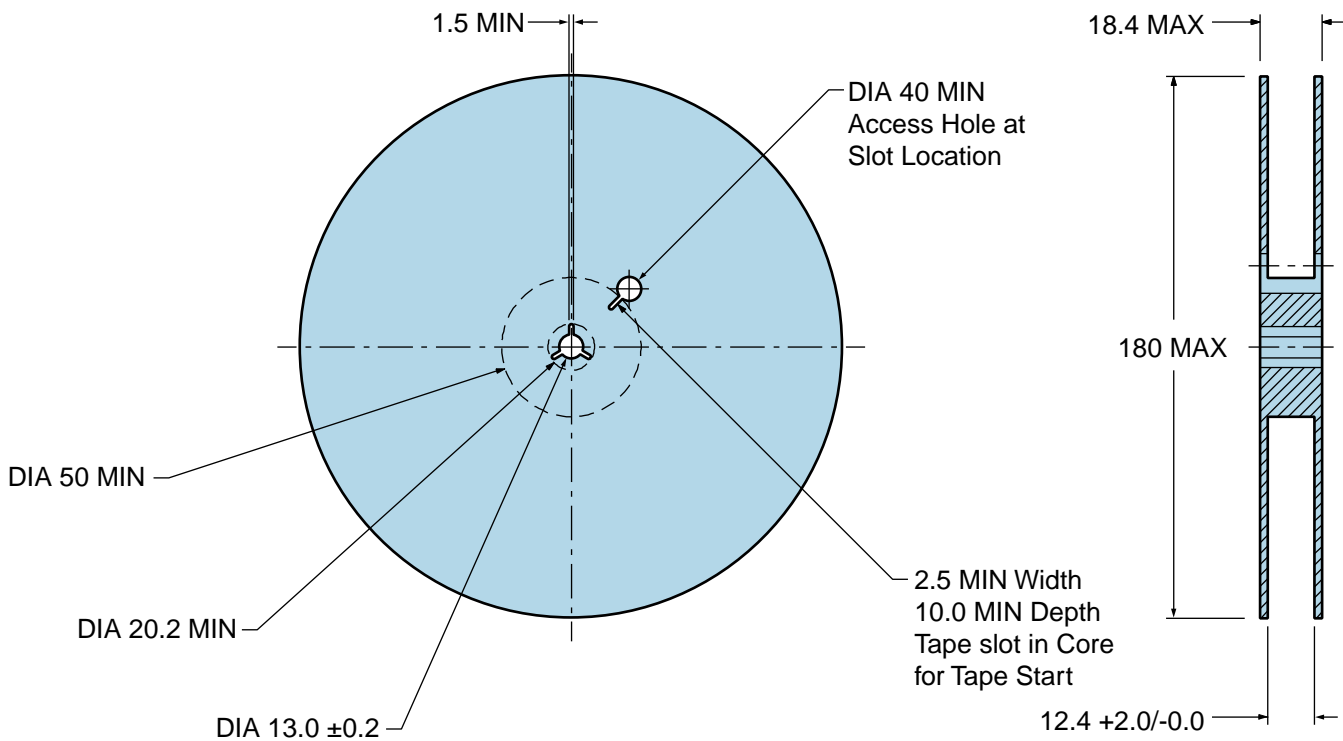
EMS42HHA-27.000M TR

Tape & Reel Dimensions

Quantity Per Reel: 1,000 units



*Compliant to EIA 481A



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 |

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 |

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.