

EMRA53U2H-29.4912M TR

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REGULATORY COMPLIANCE (Data Sheet downloaded on Jun 20, 2020)



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ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 1.6mm x 2.0mm Plastic Surface Mount (SMD) 29.4912MHz ±25ppm over -40°C to +125°C

ELECTRICAL SPECIFICATIONS

| | |
|--|---|
| Nominal Frequency | 29.4912MHz |
| Frequency Tolerance/Stability | ±25ppm Maximum over -40°C to +125°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, and Output Load Change) |
| Aging at 25°C | ±1.5ppm Maximum First Year |
| Supply Voltage | 3.3Vdc ±10% |
| Input Current | 6mA Maximum (No Load) |
| Output Voltage Logic High (Voh) | 90% of Vdd Minimum (IOH = -4mA) |
| Output Voltage Logic Low (Vol) | 10% of Vdd Maximum (IOL = +4mA) |
| Rise/Fall Time | 1.2nSec Typical, 3nSec 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) |
| Output Control Input Voltage Logic High (Vih) | 70% of Vdd Minimum or No Connect to Enable Output |
| Output Control Input Voltage Logic Low (Vil) | 30% of Vdd Maximum to Disable Output |
| Tri-State Output Enable Time | 150nSec Maximum |
| Tri-State Output Disable Time | 150nSec Maximum |
| Period Jitter (RMS) | 2pSec Typical, 4pSec Maximum |
| RMS Phase Jitter (Fj = 900kHz to 7.5MHz; Random) | 0.5pSec Typical, 1pSec Maximum |
| RMS Phase Jitter (Fj = 12kHz to 20MHz; Random) | 1.5pSec Typical, 3pSec Maximum |
| Start Up Time | 5mSec Maximum |
| Storage Temperature Range | -65°C to +150°C |

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|----------------------|--|
| ESD Susceptibility | JESD22-A114, HBM, 2000V |
| Flammability | UL94-V0 |
| Mechanical Shock | MIL-STD-883, Method 2002, Condition E, 10,000G |
| Moisture Sensitivity | J-STD-020, MSL 1 |
| Solderability | MIL-STD-883, Method 2003 (Four I/O Pads on bottom of package only) |
| Temperature Cycling | JESD22-A104, Condition B |
| Vibration | MIL-STD-883, Method 2007, Condition A, 20G |

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MECHANICAL DIMENSIONS (all dimensions in millimeters)



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

| LINE | MARKING |
|------|---|
| 1 | Ecliptek Manufacturing Identifier |
| 2 | Ecliptek Manufacturing Identifier (continued) |

Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

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OUTPUT WAVEFORM & TIMING DIAGRAM



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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 input 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. See applicable specification sheet for 'Load Drive Capability'.

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Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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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 |
| Additional Notes | Temperature shown are applied to body of device. |

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Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

| | |
|--|--|
| $T_S \text{ MAX}$ to T_L (Ramp-up Rate) | 5°C/Second Maximum |
| Preheat | |
| - Temperature Minimum ($T_S \text{ MIN}$) | N/A |
| - Temperature Typical ($T_S \text{ TYP}$) | 150°C |
| - Temperature Maximum ($T_S \text{ MAX}$) | N/A |
| - Time ($t_s \text{ MIN}$) | 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 ($T_P \text{ Target}$) | 240°C Maximum 2 Times / 230°C Maximum 1 Time |
| 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 | Temperature shown are applied to body of device. |

Low Temperature Manual Soldering

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

High Temperature Manual Soldering

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

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