

EMDS13E2H-27.027M TR

[Click part number to visit Part Number Details page](#)

REGULATORY COMPLIANCE (Data Sheet downloaded on Nov 19, 2017)


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ITEM DESCRIPTION

MEMS Clock Oscillators LVDS (DS) 3.3Vdc 6 Pad 5.0mm x 7.0mm Plastic Surface Mount (SMD) 27.027MHz ± 25 ppm over 0°C to +70°C

ELECTRICAL SPECIFICATIONS

Nominal Frequency	27.027MHz
Frequency Tolerance/Stability	± 25 ppm Maximum over 0°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, Reflow, Shock, and Vibration)
Aging at 25°C	± 1 ppm Maximum First Year
Supply Voltage	3.3Vdc $\pm 10\%$
Input Current	80mA Maximum (Excluding Load Termination Current)
Output Voltage Logic High (Voh)	1.425Vdc Typical
Output Voltage Logic Low (Vol)	1.075Vdc Typical
Differential Output Error (dVod)	50mVdc Maximum
Differential Output Voltage (Vod)	247mVdc Minimum, 350mVdc Typical, 454mVdc Maximum
Offset Voltage (Vos)	1.125V Minimum, 1.250V Typical, 1.375V Maximum
Rise/Fall Time	225pSec Typical, 325pSec Maximum (Measured over 20% to 80% of waveform)
Duty Cycle	50 ± 5 (%) (Measured at 50% of waveform)
Offset Error (dVos)	50mVdc Maximum
Load Drive Capability	100 Ohms Between Output and Complementary Output
Output Logic Type	LVDS
Logic Control / Additional Output	Output Enable (OE) and Complementary Output
Output Control Input Voltage	Vih of 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output, Vil of 30% of Vdd Maximum to Disable Output and Complementary Output (High Impedance)
Output Enable Current	75mA Maximum (Without Load)
Period Jitter (Deterministic)	0.2pSec Typical
Period Jitter (Random)	2.0pSec Typical
Period Jitter (RMS)	1.8pSec Typical, 2.5pSec Maximum
Period Jitter (pk-pk)	25pSec Typical, 30pSec Maximum
RMS Phase Jitter (Fj = 637kHz to 10MHz; Random)	2.1pSec Typical
RMS Phase Jitter (Fj = 1MHz to 20MHz; Random)	1.7pSec Typical
RMS Phase Jitter (Fj = 1.875MHz to 20MHz; Random)	1.5pSec 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 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

EMDS13E2H-27.027M TR

 [Click part number to visit Part Number Details page](#)

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS CONTINUED	
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 (Six 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

 Click part number to visit
Part Number Details page

Technical drawing of a 12V 100Ah battery showing front, side, and top views with dimensions in mm.

Front View:

- Overall width: 5.00 ± 0.15
- Overall height: 7.00 ± 0.15
- Marking: "MARKING ORIENTATION" (vertical text)

Side View:

- Overall thickness: 0.85 ± 0.15
- Terminal height: 0.08 MAX

Top View:

- Overall length: $1.20 \pm 0.10 \text{ (x6)}$
- Overall width: $1.40 \pm 0.10 \text{ (x6)}$
- Terminal spacing (center-to-center): $1.20 \pm 0.10 \text{ (x6)}$
- Terminal width: 1.47
- Terminal height: 2.30
- Terminal pitch (center-to-center): 2.54 TYP
- Terminal width (inner): 2.60 ± 0.15
- Terminal height (inner): 5.08 ± 0.10
- Terminal pitch (inner): 2.54 TYP
- Terminal width (outer): $1.40 \pm 0.10 \text{ (x6)}$
- Terminal height (outer): 2.30
- Terminal pitch (outer): 2.54 TYP
- Terminal width (inner): 2.60 ± 0.15
- Terminal height (inner): 5.08 ± 0.10
- Terminal pitch (inner): 2.54 TYP
- Terminal width (outer): $1.40 \pm 0.10 \text{ (x6)}$
- Terminal height (outer): 2.30
- Terminal pitch (outer): 2.54 TYP

LINE	MARKING
1	XXXX or XXXXX XXXX or XXXXX=Ecliptek Manufacturing Identifier

Figure 1: Dimensions of the test board. The diagram shows a 3x2 grid of blue square components. Dimensions are given in inches and multiplied by a factor in parentheses. Horizontal dimensions: 1.80 (X6) between columns, 2.39 between the left column and the left edge, and 2.00 (X6) between the right column and the right edge. Vertical dimensions: 0.54 (X4) between rows, and 2.00 (X6) between the top row and the top edge. A label 'Solder Land (X6)' points to the bottom-right component.

1-800-ECLIPTEK or 714.433.1200

EMDS13E2H-27.027M TR

 [Click part number to visit Part Number Details page](#)

OUTPUT WAVEFORM & TIMING DIAGRAM



EMDS13E2H-27.027M TR
[Click part number to visit Part Number Details page](#)
**Test Circuit for Output Enable and Complementary 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 (>500MHz) passive probe is recommended.

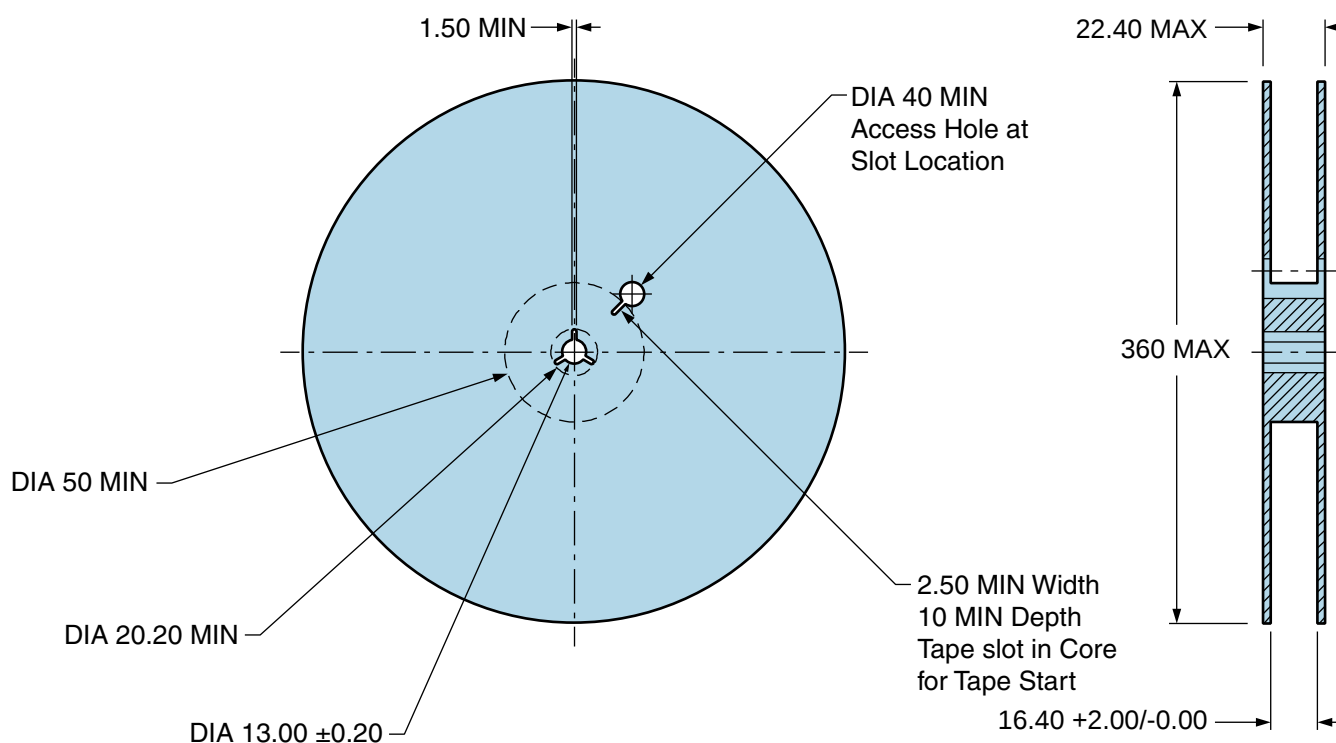
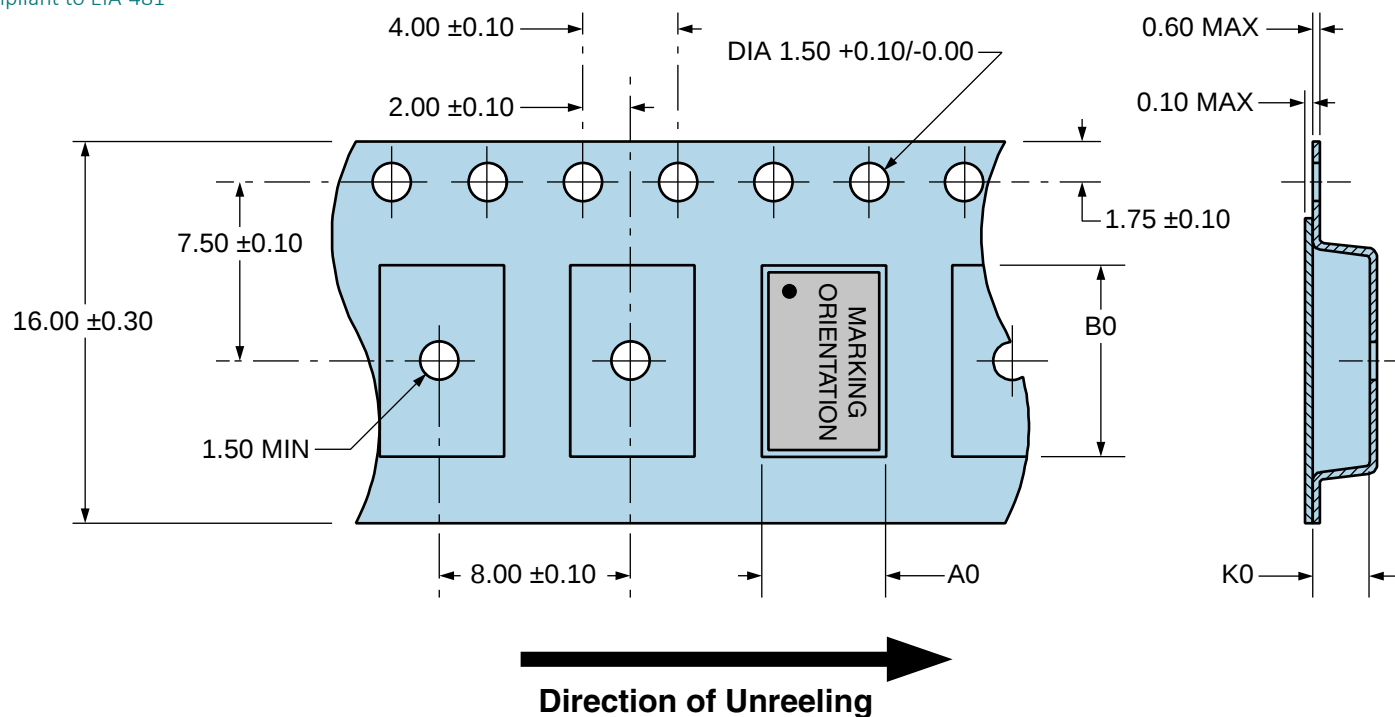
Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



EMDS13E2H-27.027M TR

 [Click part number to visit Part Number Details page](#)

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

EMDS13E2H-27.027M TR

[Click part number to visit Part Number Details page](#)

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.