

**EMRE22E1H-16.875M**
[Click part number to visit Part Number Details page](#)
**REGULATORY COMPLIANCE** (Data Sheet downloaded on Jun 1, 2020)
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**ITEM DESCRIPTION**

MEMS Clock Oscillators LVDS (DS) 2.5Vdc 6 Pad 3.2mm x 5.0mm Plastic Surface Mount (SMD) 16.875MHz  $\pm 25$ ppm over 0°C to +70°C

**ELECTRICAL SPECIFICATIONS**

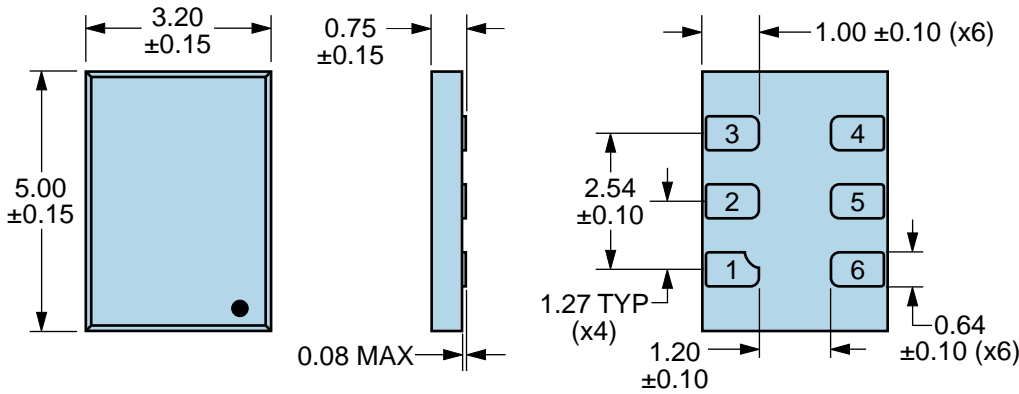
<b>Nominal Frequency</b>	16.875MHz
<b>Frequency Tolerance/Stability</b>	$\pm 25$ ppm Maximum over 0°C to +70°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, 1st Year Aging at 25°C, Reflow, Shock, and Vibration)
<b>Aging at 25°C</b>	$\pm 1$ ppm Maximum First Year
<b>Supply Voltage</b>	2.5Vdc $\pm 10\%$
<b>Input Current</b>	45mA Typical, 55mA Maximum (Excluding Load Termination Current)
<b>Differential Output Error (dVod)</b>	50mVdc Maximum
<b>Differential Output Voltage (Vod)</b>	200mVdc Minimum, 350mVdc Typical, 500mVdc Maximum
<b>Offset Voltage (Vos)</b>	1.125V Minimum, 1.20V Typical, 1.375V Maximum
<b>Rise/Fall Time</b>	500pSec Typical, 600pSec Maximum (Measured over 20% to 80% of waveform)
<b>Duty Cycle</b>	50 $\pm 10$ (%) (Measured at 50% of waveform)
<b>Offset Error (dVos)</b>	50mVdc Maximum
<b>Load Drive Capability</b>	100 Ohms Between Output and Complementary Output
<b>Output Logic Type</b>	LVDS
<b>Logic Control / Additional Output</b>	Output Enable (OE) and Complementary Output
<b>Output Control Input Voltage</b>	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)
<b>Output Enable Current</b>	35mA Maximum (OE) Without Load
<b>RMS Phase Jitter</b>	0.5pSec Typical, 1pSec Maximum (Fj = 12kHz to 20MHz; Random)
<b>Period Jitter (Deterministic)</b>	0.2pSec Typical
<b>Period Jitter (Random)</b>	1.0pSec Typical
<b>Period Jitter (RMS)</b>	1.4pSec Typical, 1.7pSec Maximum
<b>Period Jitter (pk-pk)</b>	15pSec Typical, 20pSec Maximum
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

**ENVIRONMENTAL & MECHANICAL SPECIFICATIONS**

<b>ESD Susceptibility</b>	MIL-STD-883, Method 3015, Class 2, HBM 2000V
<b>Flammability</b>	UL94-V0
<b>Mechanical Shock</b>	MIL-STD-883, Method 2002, Condition G, 30,000G
<b>Moisture Resistance</b>	MIL-STD-883, Method 1004
<b>Moisture Sensitivity Level</b>	J-STD-020, MSL 1
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Condition K
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Solderability</b>	MIL-STD-883, Method 2003 (Six I/O Pads on bottom of package only)
<b>Temperature Cycling</b>	MIL-STD-883, Method 1010, Condition B
<b>Thermal Shock</b>	MIL-STD-883, Method 1011, Condition B
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A, 20G

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### MECHANICAL DIMENSIONS (all dimensions in millimeters)

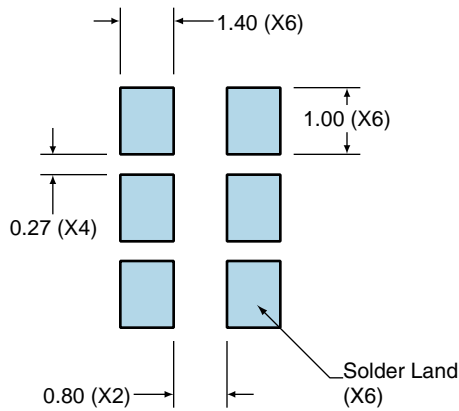


PIN	CONNECTION
1	Output Enable (OE)
2	No Connect
3	Case Ground
4	Output
5	Complementary Output
6	Supply Voltage

LINE	MARKING
1	XXXXXX XXXXXX=Ecliptek Manufacturing Lot Code

### Suggested Solder Pad Layout

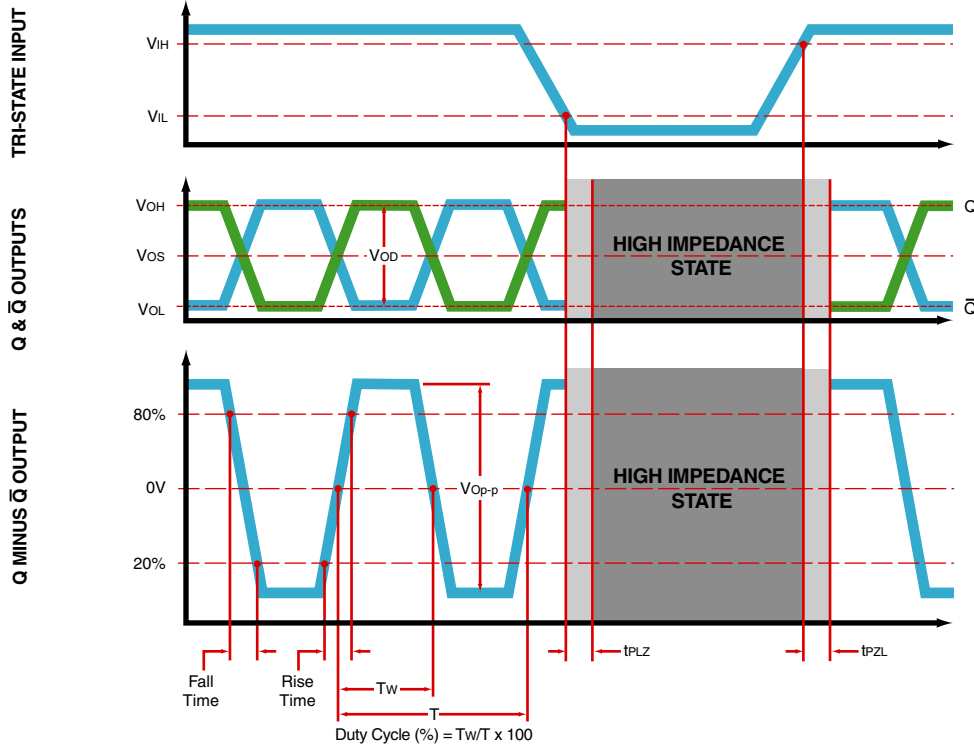
All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

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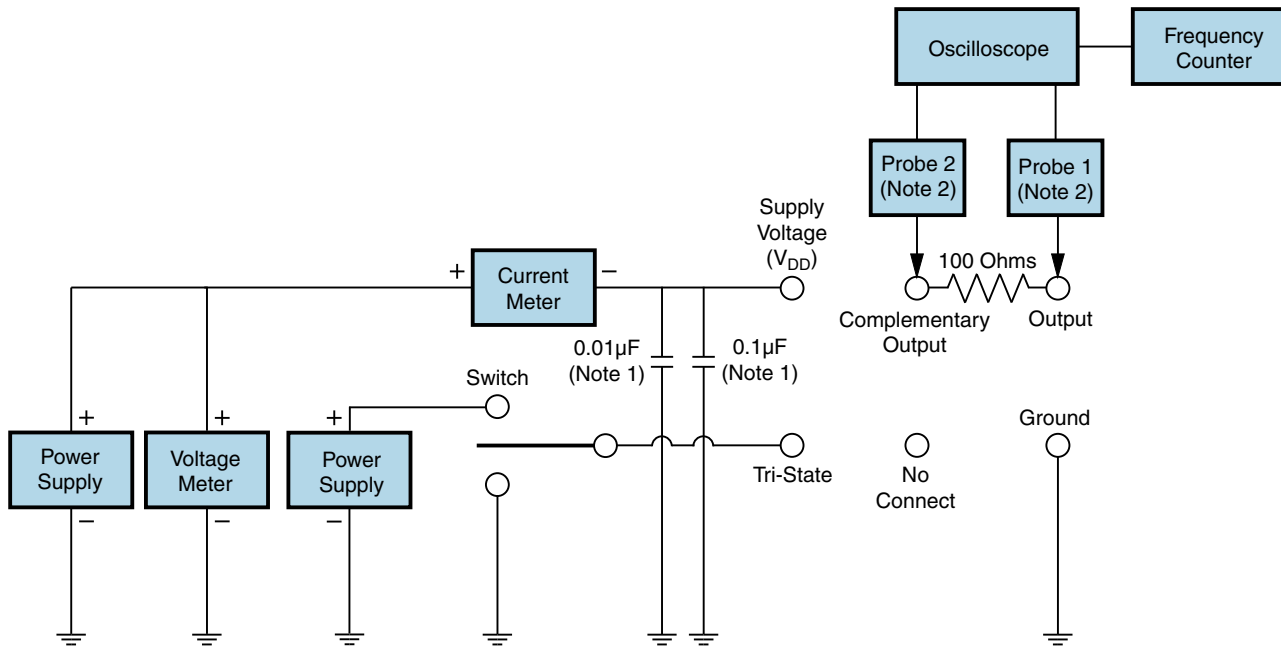
## OUTPUT WAVEFORM & TIMING DIAGRAM



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## Test Circuit for Tri-State and Complementary Output



Note 1: An external 0.01  $\mu\text{F}$  ceramic bypass capacitor in parallel with a 0.1  $\mu\text{F}$  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.

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## 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

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection $240^\circ\text{C}$

$T_s \text{ MAX}$ to $T_L$ (Ramp-up Rate)	$5^\circ\text{C/Second Maximum}$
<b>Preheat</b>	
- Temperature Minimum ( $T_s \text{ MIN}$ )	N/A
- Temperature Typical ( $T_s \text{ TYP}$ )	$150^\circ\text{C}$
- Temperature Maximum ( $T_s \text{ MAX}$ )	N/A
- Time ( $t_s \text{ MIN}$ )	60 - 120 Seconds
Ramp-up Rate ( $T_L$ to $T_P$ )	$5^\circ\text{C/Second Maximum}$
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	$150^\circ\text{C}$
- Time ( $t_L$ )	200 Seconds Maximum
Peak Temperature ( $T_P$ )	$240^\circ\text{C Maximum}$
Target Peak Temperature ( $T_P \text{ Target}$ )	$240^\circ\text{C Maximum 2 Times / } 230^\circ\text{C Maximum 1 Time}$
Time within $5^\circ\text{C}$ of actual peak ( $t_p$ )	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
Ramp-down Rate	$5^\circ\text{C/Second Maximum}$
Time $25^\circ\text{C}$ to Peak Temperature (t)	N/A
Moisture Sensitivity Level	Level 1

### Low Temperature Manual Soldering

$185^\circ\text{C Maximum}$  for 10 Seconds Maximum, 2 times Maximum.

### High Temperature Manual Soldering

$260^\circ\text{C Maximum}$  for 5 Seconds Maximum, 2 times Maximum.