

# EMRA13U2H-12.000M TR

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

## REGULATORY COMPLIANCE (Data Sheet downloaded on Jun 18, 2020)


[Click badges to download compliance docs](#)

Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.



## ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Plastic Surface Mount (SMD) 12.000MHz  $\pm$ 25ppm over -40°C to +125°C

## ELECTRICAL SPECIFICATIONS

Nominal Frequency	12.000MHz
Frequency Tolerance/Stability	$\pm$ 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	$\pm$ 1.5ppm Maximum First Year
Supply Voltage	3.3Vdc $\pm$ 10%
Input Current	5mA 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 $\pm$ 5(%) (Measured at 50% of waveform)
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Output Control Function	Tri-State (Disabled Output: High Impedance)
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

## EMRA13U2H-12.000M TR [Click part number to visit Part Number Details page](#)

### 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

### Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

# EMRA13U2H-12.000M TR [Click part number to visit Part Number Details page](#)

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EMRA13U2H-12.000M TR [Click part number to visit Part Number Details page](#)

## 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<sub>L</sub> includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

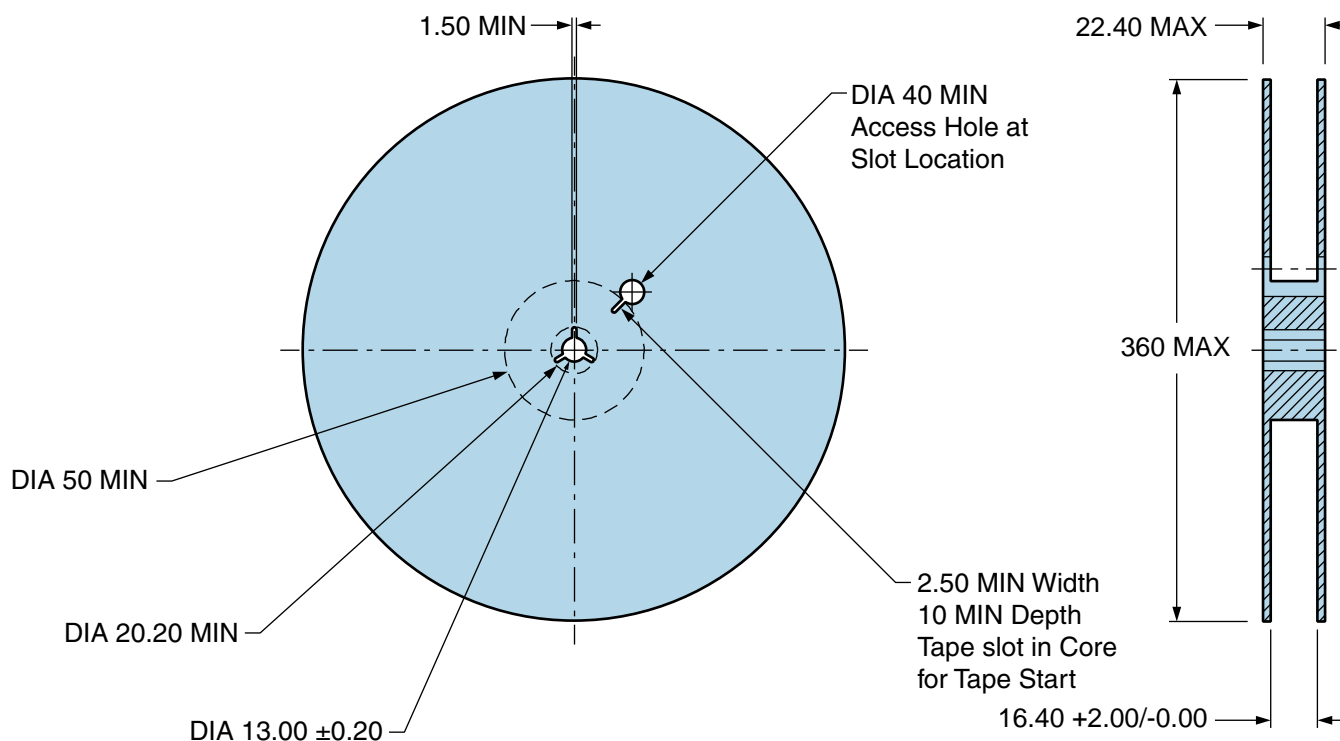
# EMRA13U2H-12.000M TR

## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



# EMRA13U2H-12.000M TR [Click part number to visit Part Number Details page](#)

## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

<b><math>T_S \text{ MAX}</math> to <math>T_L</math> (Ramp-up Rate)</b>	3°C/Second Maximum
<b>Preheat</b>	
- 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
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	3°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_P \text{ Target}</math>)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_p</math>)</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
<b>Additional Notes</b>	Temperature shown are applied to body of device.

# EMRA13U2H-12.000M TR

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

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

$T_s$ MAX to $T_L$ (Ramp-up Rate)	5°C/Second Maximum
<b>Preheat</b>	
- 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
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	5°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_P</math>)</b>	240°C Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	240°C Maximum 2 Times / 230°C Maximum 1 Time
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
<b>Ramp-down Rate</b>	5°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	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.)

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Ecliptek:](#)

[EMRA13U2H-12.000M TR](#)





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.