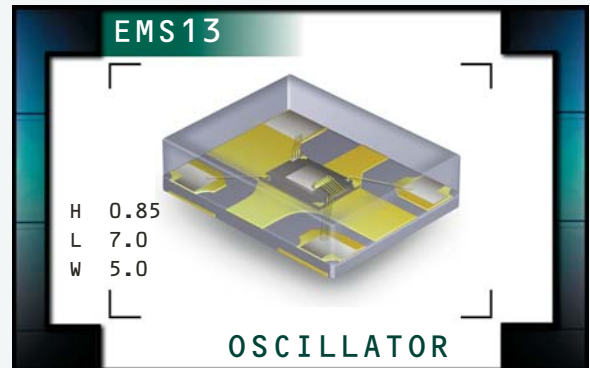


# EMS13 Series



- Spread Spectrum MEMS Clock Oscillators
- Low EMI LVCMOS Output
- +3.3V Supply Voltage
- Tri-State, Power Down, and Spread Disable Options
- Center Spread and Down Spread Modulation Options
- 4 Pad Plastic SMD Package
- 30,000 G Shock Resistance
- RoHS Compliant (Pb-Free)



## ELECTRICAL SPECIFICATIONS

<b>Nominal Frequency</b>		1MHz to 87MHz, 93MHz to 175MHz
<b>Operating Temperature Range</b>		-20°C to +70°C, or -40°C to +85°C
<b>Storage Temperature Range</b>		-55°C to +125°C
<b>Supply Voltage (V<sub>DD</sub>)</b>		3.3V <sub>DC</sub> ±10%
<b>Maximum Supply Voltage (V<sub>DD</sub>)</b>		-0.5Vdc to +3.65Vdc
<b>Input Current</b>	≤ 25.000MHz (Unloaded; Nominal Vdd)	30mA Maximum
	> 25.000MHz (Unloaded; Nominal Vdd)	40mA Maximum
<b>Frequency Tolerance / Stability</b>	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, 260°C Reflow, Shock, and Vibration	±50ppm or ±100ppm Maximum
<b>Output Voltage Logic High (V<sub>OH</sub>)</b>	I <sub>OH</sub> = -8mA	90% of V <sub>DD</sub> Minimum
<b>Output Voltage Logic Low (V<sub>OL</sub>)</b>	I <sub>OL</sub> = +8mA	10% of V <sub>DD</sub> Maximum
<b>Rise Time / Fall Time</b>	20% to 80% of waveform	2nSeconds Maximum
<b>Duty Cycle</b>	≤ 75.000MHz (at 50% of waveform)	50 ±5(%)
	> 75.000MHz (at 50% of waveform)	50 ±10(%)
<b>Load Drive Capability</b>		15pF Maximum
<b>Output Control Function</b>		Tri-State (High Impedance) Power Down (Logic Low) Spread Disabled (Disabled)
<b>Tri-State Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	70% of V <sub>DD</sub> Minimum or No Connection to Enable Output, 30% of V <sub>DD</sub> Maximum to Disable at Output Control Function of Tri-State	Disabled Output: High Impedance
<b>Power Down Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	70% of V <sub>DD</sub> Minimum or No Connection to Enable Output, 30% of V <sub>DD</sub> Maximum to Disable at Output Control Function of Power Down	Disabled Output: Logic Low
<b>Spread Spectrum Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	70% of V <sub>DD</sub> Minimum or No Connection to Enable Output, 30% of V <sub>DD</sub> Maximum to Disable at Output Control Function of Spread Disable	Spread Spectrum Output: Disabled
<b>Standby Current</b>	Pad 1=Ground (at Output Control Function of Power Down)	50µA Maximum
<b>Disable Current</b>	Pad 1=Ground (at Output Control Function of Tri-State)	20mA Maximum
<b>Spread Spectrum</b>	Center Spread not available with Output Control Function of Spread Disable	±0.25%, ±0.50%, ±1.00%, -0.50%, -1.00%, or -2.00%
<b>Modulation Frequency</b>		30kHz Min, 32kHz Typ, 35kHz Max
<b>Period Jitter</b>	Cycle to Cycle; Spread Spectrum-On; Fo=133.333M, Vdd=3.3Vdc	30pSec Maximum
<b>Aging</b>	First Year at 25°C	±1ppm Maximum
<b>Start Up Time</b>		10mSec Maximum

MANUFACTURER  
ECLIPTEK CORP.

CATEGORY  
OSCILLATOR

SERIES  
EMS13

PACKAGE  
PLASTIC

VOLTAGE  
3.3V

CLASS  
OS6C

REV. DATE  
01/10

## PART NUMBERING GUIDE

### EMS13 C H A - 50.00M TR

**FREQUENCY TOLERANCE & STABILITY/  
OPERATING TEMPERATURE RANGE**

C = ±100ppm Maximum over -20°C to +70°C  
 D = ±50ppm Maximum over -20°C to +70°C  
 G = ±100ppm Maximum over -40°C to +85°C  
 H = ±50ppm Maximum over -40°C to +85°C

**OUTPUT CONTROL FUNCTION**

H = Tri-State (Disabled Output: High Impedance)  
 J = Power Down (Disabled Output: Logic Low)  
 K = Spread Disable (Spread Spectrum Output: Disabled)

**AVAILABLE OPTIONS**

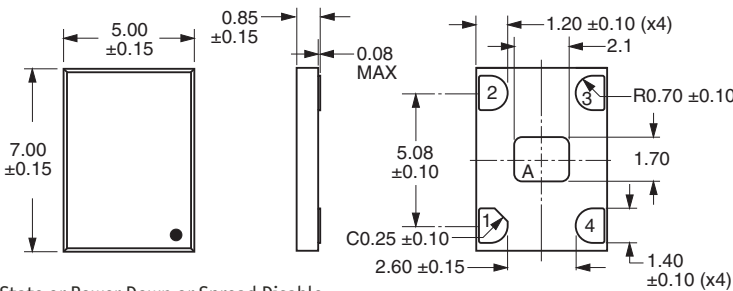
Blank = Bulk  
 TR = Tape & Reel

**FREQUENCY**

**SPREAD SPECTRUM**

A = ±0.25% Center Spread  
 B = ±0.50% Center Spread  
 C = ±1.00% Center Spread  
 D = -0.50% Down Spread  
 E = -1.00% Down Spread  
 F = -2.00% Down Spread

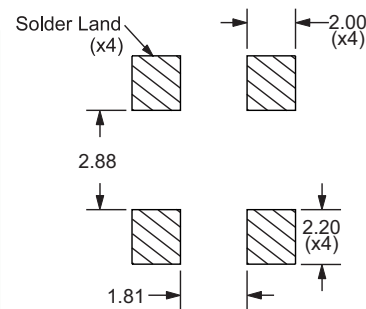
**MECHANICAL DIMENSIONS**  
ALL DIMENSIONS IN MILLIMETERS



Pad 1: Tri-State or Power Down or Spread Disable  
 Pad 2: Case Ground  
 Pad 3: Output  
 Pad 4: Supply Voltage

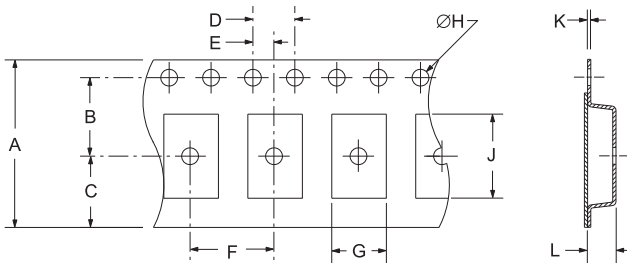
Note A: Center paddle is connected internally to oscillator ground (Pad 2).

**SUGGESTED SOLDER PAD LAYOUT**  
ALL DIMENSIONS IN MILLIMETERS

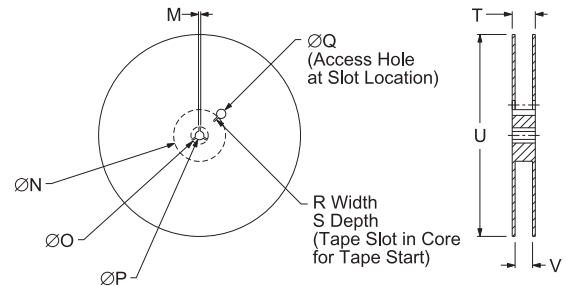


Tolerances = ±0.1

**TAPE AND REEL DIMENSIONS**  
ALL DIMENSIONS IN MILLIMETERS



TAPE	A	B	C	D	E
	16.0 ±0.3	7.5 ±0.2	6.75 ±0.2	4.0 ±0.2	2.0 ±0.2
F	G	H	J	K	L
	8.0 ±0.2	A0*	1.5 ±0.1	B0*	0.30 ±0.05



REEL	M	N	O	P	Q
	1.5 MIN	50 MIN	20.2 MIN	13.0 ±0.2	40 MIN
R	S	T	U	V	QTY/REEL
	2.5 MIN	10 MIN	22.4 MAX	180 MAX	16.4 +2/-0

\*Compliant to EIA 481C

**ENVIRONMENTAL/MECHANICAL SPECIFICATIONS**

Characteristic	Specification
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 (Four 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

**MARKING SPECIFICATIONS**

Line 1: XXXX  
 Ecliptek Manufacturing Lot Code

MANUFACTURER	CATEGORY	SERIES	PACKAGE	VOLTAGE	CLASS	REV. DATE
ECLIPTEK CORP.	OSCILLATOR	EMS13	PLASTIC	3.3V	OS6C	01/10