



## P1145-HCM-32.768K CMOS Clock Oscillator

July 2007

- Pletronics' P1145-HCM is a quartz crystal controlled precision square wave generator with a CMOS output.
- Minimizes RFI radiation, eases meeting FCC Class B emissions standards.
- Tube packaging is available.
- 32.768 KHz
- Full Size Thru-Hole DIP package
- Enable/Disable Function on pin 1 with low power consumption
- **Fast Start-up Time of 500 mS or less**

**Pletronics Inc. certifies this device is in accordance with the  
RoHS 5/6 (2002/95/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead (< 1000 ppm), Mercury, PBB's, PBDE's

Weight of the Device: 3.72 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020C

Second Level Interconnect code: e1

### Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +7.0V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

### Thermal Characteristics

The maximum die or junction temperature is 155°C

The thermal resistance junction to board is 120°C/Watt depending on the solder pads, ground plane and construction of the PCB.



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## Part Number:

P1145-HCM	- 32.768K	-XX	
			Internal code or blank
			Frequency in kHz
			Series Model

## Part Marking:

PLE	or	PLE
P11HCM		PHCMX
32.768K		32.768K
• YMDXX		• YYWWXX

### Legend:

PLE = Pletronics

YMD or YYWW = Date of Manufacture (Year - month - day or year and week)

All other marking is internal factory codes

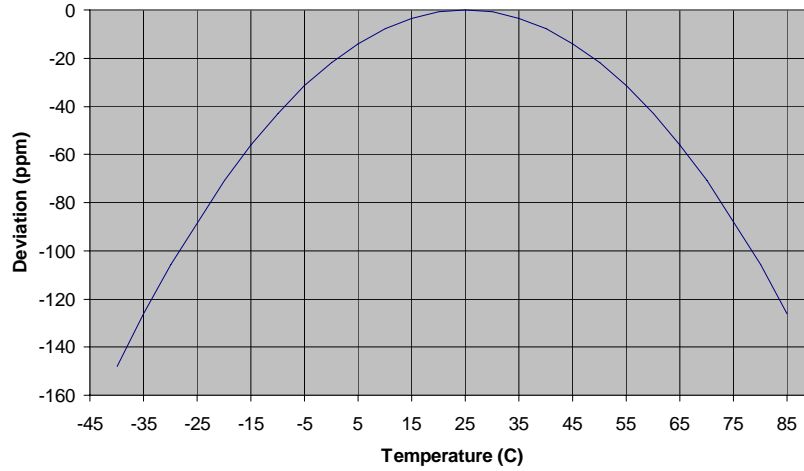
Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from the marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

### Electrical Specification for V<sub>CC</sub> 1.5V to 5.0V over - 40 to +85°C

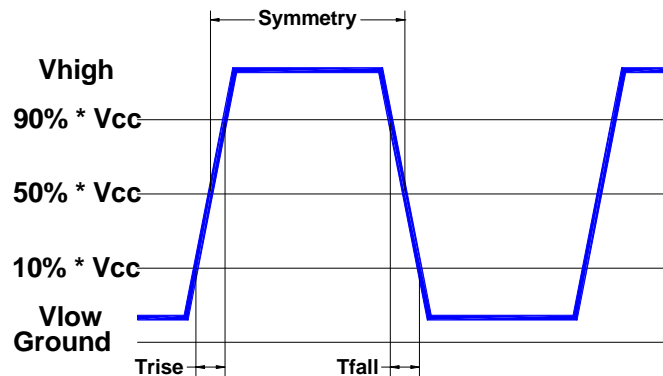
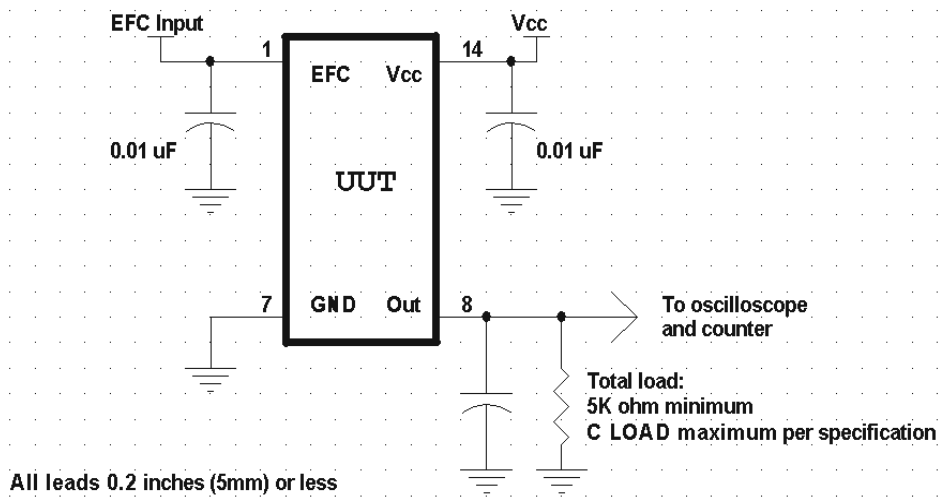
Item	Min	Typ	Max	Unit	Condition	
Frequency	32.768			kHz		
Frequency Calibration Tolerance	-30	0	+30	ppm	at 25 °C	
Frequency Stability *	-60	-	+30	ppm	when operating at 0 to +70 °C	
	-200	-	+30	ppm	when operating at -40 to +85 °C	
Output Waveform	CMOS					
Output High Level	90	-	-	%	of V <sub>CC</sub> (See load circuit)	
Output Low Level	-	-	10	%		
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	100	150	nS	C <sub>LOAD</sub> = 15pF T <sub>R</sub> / T <sub>F</sub> 10% to 90% and D.C. at 50% point of V <sub>CC</sub> (See load circuit)	
Output Symmetry	45	50	55	%		
Enable/Disable Internal Pull-up	1	-	-	Mohm	to V <sub>CC</sub>	
V disable	-	-	30	%	of V <sub>CC</sub> applied to pad 1	
V enable	70	-	-	%		
Output leakage V <sub>OUT</sub> = V <sub>CC</sub>	-10	-	+10	uA	Pad 1 low, device disabled	
V <sub>OUT</sub> = 0V	-10	-	+10	uA		
Supply Current (I <sub>CC</sub> )	-	3.3	9.0	uA	V <sub>CC</sub> = 1.5V	C <sub>LOAD</sub> = 15 pF
	-	4.0	10.0	uA	V <sub>CC</sub> = 1.8V	
	-	4.2	11.0	uA	V <sub>CC</sub> = 2.0V	
	-	5.0	12.0	uA	V <sub>CC</sub> = 2.7V	
	-	6.0	15.0	uA	V <sub>CC</sub> = 3.3V	
	-	8.0	20.0	uA	V <sub>CC</sub> = 5.0V	
Standby Current I <sub>CC</sub>	-	-	3	uA	Pad 1 low, device disabled	
Enable time	-	-	100	nS	Time for output to reach a logic state	
Disable time	-	-	100	nS	Time for output to reach a high Z state	
Start up time	-	-	500	mS	Time for output to reach specified frequency	
Operating Temperature Range	-40	-	+85	°C		
Storage Temperature Range	-55	-	+125	°C		

\*For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures  
Specifications with Pin 1 E/D open circuit

## Typical Frequency versus Temperature Characteristics



## Load Circuit and Test Waveform



## Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A




## ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

## Package Labeling

Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial

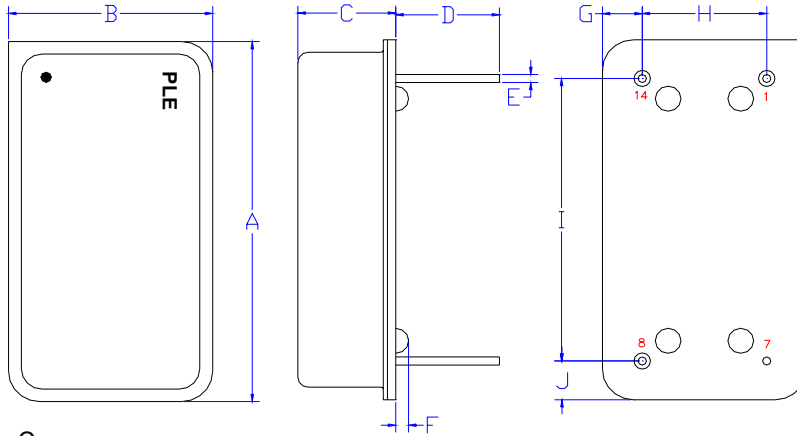
P/N:		
	P1145-HCM-32.768K	
Customer P/N:		
	12345678	
Qty:		D/C 
	1000	0627B6

Pb Free
2nd Lvl Interconnect Category=e1
Max Safe Temp=245C for 10s (Reflow only) 2X Max
Max Safe Temp=280C for 15s (Wave solder only)

## PCB Mounting

Wave solder at 255°C to 280°C with maximum wave exposure of 15 seconds  
Reflow solder maximum exposure of 245°C for 15 seconds  
Soldering done in a nitrogen atmosphere enhances the solder joint quality.

### Mechanical:



Cover:  
Kovar  
Electroless Nickel Plated  
1 μinch (25 μm) typical  
Resistance welded to base

Base:  
Kovar  
Glass to metal sealed leads

Label:  
White Kapton with Black Letters  
-or-  
Blue Epoxy heat cure ink with laser  
marked lettering

Pin 7 Connected to case

**Not to scale**

	Inches	mm
A	0.787 ±0.005	20.00 ±0.13
B	0.487 ±0.005	12.37 ±0.13
C	0.225 ±0.011	5.72 ±0.28
D <sup>1</sup>	0.250	6.35
E <sup>1</sup>	0.020	0.51
F <sup>1</sup>	0.031	0.79
G <sup>1</sup>	0.094	2.37
H <sup>1</sup>	0.300	7.62
I <sup>1</sup>	0.600	15.24
J <sup>1</sup>	0.094	2.37

<sup>1</sup> Nominal dimension

Pin	Function	Note
1	Output Enable/Disable	When this pin is not connected the oscillator shall operate. When this pin is logic low the output will be inhibited (high impedance state.) Recommend connecting this pad to V <sub>CC</sub> if the oscillator is to be always on.
7	Ground (GND)	
8	Output	
14	Supply Voltage (V <sub>CC</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

### Layout and application information

For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.



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