

P1145-HCM-32.768K CMOS Clock Oscillator

February 2013

- 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 _{CC} Supply Voltage	-0.5V to +7.0V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 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.

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

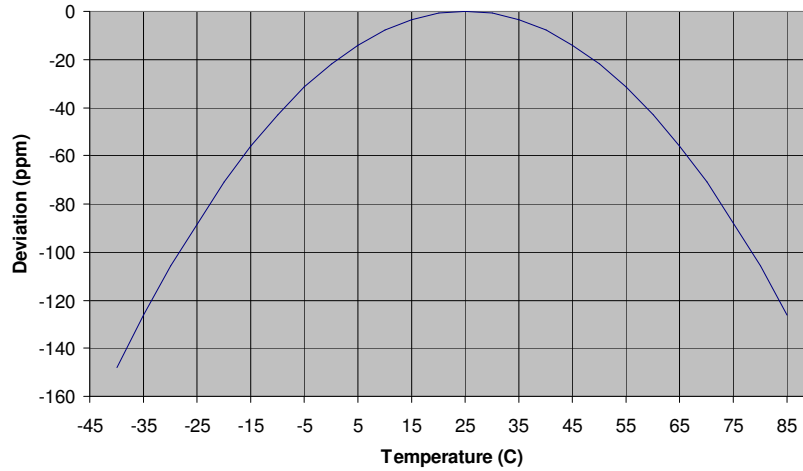
Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from the marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Electrical Specification for V_{CC} 1.5V to 5.0V over - 40 to +85 °C

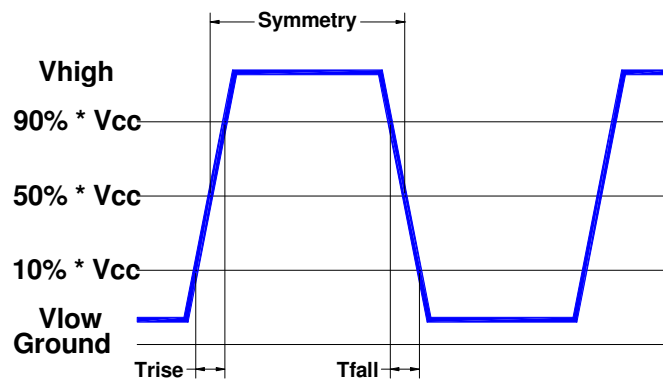
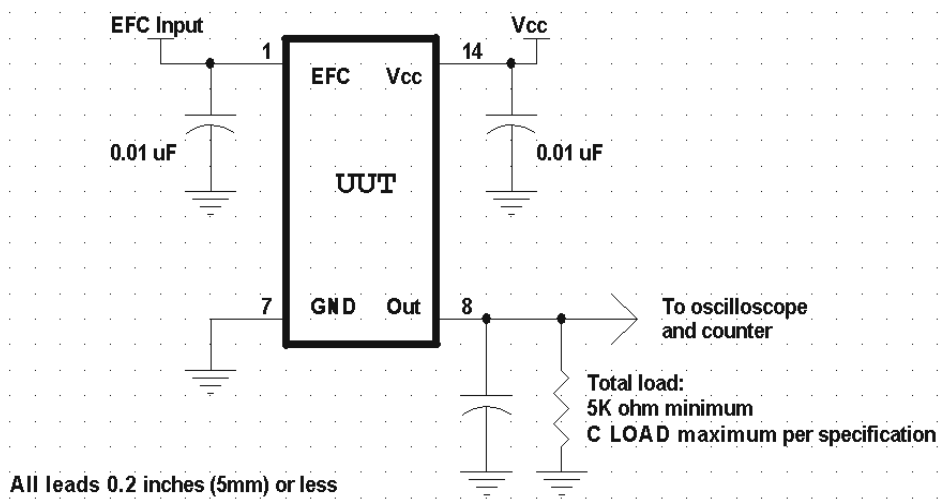
Item	Min	Typ	Max	Unit	Condition	
Frequency	32.768			kHz		
Frequency Calibration Tolerance	-30	0	+30	ppm	at 25 °C	
Frequency Stability *	-60	-	+30	ppm	when operating at 0 to +70 °C	
	-200	-	+30	ppm	when operating at -40 to +85 °C	
Output Waveform	CMOS					
Output High Level	90	-	-	%	of V _{CC} (See load circuit)	
Output Low Level	-	-	10	%		
Output T _{RISE} and T _{FALL}	-	100	150	nS	C _{LOAD} = 15pF T _R / T _F 10% to 90% and D.C. at 50% point of V _{CC} (See load circuit)	
Output Symmetry	40	50	60	%		
Enable/Disable Internal Pull-up	1	-	-	Mohm	to V _{CC}	
V disable	-	-	30	%	of V _{CC} applied to pad 1	
V enable	70	-	-	%		
Output leakage V _{OUT} = V _{CC}	-10	-	+10	uA	Pad 1 low, device disabled	
V _{OUT} = 0V	-10	-	+10	uA		
Supply Current (I _{CC})	-	3.3	9.0	uA	V _{CC} = 1.5V	C _{LOAD} = 15 pF
	-	4.0	10.0	uA	V _{CC} = 1.8V	
	-	4.2	11.0	uA	V _{CC} = 2.0V	
	-	5.0	12.0	uA	V _{CC} = 2.7V	
	-	6.0	15.0	uA	V _{CC} = 3.3V	
	-	8.0	20.0	uA	V _{CC} = 5.0V	
Standby Current I _{CC}	-	-	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

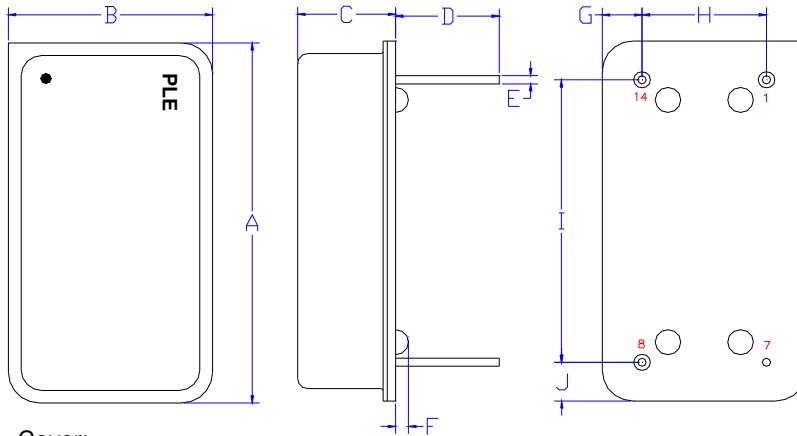
P/N:		
	P1145-HCM-32.768K	
Customer P/N:		
	12345678	
Qty:		D/C 
	1000	0627B6

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 ¹	0.250	6.35
E ¹	0.020	0.51
F ¹	0.031	0.79
G ¹	0.094	2.37
H ¹	0.300	7.62
I ¹	0.600	15.24
J ¹	0.094	2.37

¹ 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 _{CC} if the oscillator is to be always on.
7	Ground (GND)	
8	Output	
14	Supply Voltage (V _{CC})	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.

IMPORTANT NOTICE

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's limited warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

PLE assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using PLE components. To minimize the risks associated with the customer products and applications, customers should provide adequate design and operating safeguards.

PLE products are not designed, intended, authorized or warranted to be suitable for use in life support applications, devices or systems or other critical applications that may involve potential risks of death, personal injury or severe property or environmental damage. Inclusion of PLE products in such applications is understood to be fully at the risk of the customer. Use of PLE products in such applications requires the written approval of an appropriate PLE officer. Questions concerning potential risk applications should be directed to PLE.

PLE does not warrant or represent that any license, either express or implied, is granted under any PLE patent right, copyright, artwork or other intellectual property right relating to any combination, machine or process which PLE product or services are used. Information published by PLE regarding third-party products or services does not constitute a license from PLE to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from PLE under the patents or other intellectual property of PLE.

Reproduction of information in PLE data sheets or web site is permissible only if the reproduction is without alteration and is accompanied by associated warranties, conditions, limitations and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. PLE is not responsible or liable for such altered documents.

Resale of PLE products or services with statements different from or beyond the parameters stated by PLE for that product or service voids all express and implied warranties for the associated PLE product or service and is an unfair or deceptive business practice. PLE is not responsible for any such statements.

Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

Copyright © 2006, 2007 Pletronics Inc.