



# PLETRONICS HC77J Series 3.3V HCSL Clock Oscillator



HC77JV  
5.0 x 7.0 x 1.7 mm  
LCC Ceramic Package

## Features

- Pletronics' HC77J Series is a Quartz crystal controlled Precision Square Wave Oscillator
- HCSL Output
- Enable/Disable Function on pad 1
- Low Jitter
- 3.3V nominal Supply Voltage
- 100-175 MHz Frequency Range (3rd OT & Fund. Mode)

## Applications

Driving A/Ds, D/As, FPGAs  
Fibre Channel  
Ethernet, GbE, SynchE  
Medical  
Storage Area Networking  
COTS  
Telecom  
PON

## Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range <sup>2</sup>	100	-	175	MHz	Consult factory for other options
Frequency Stability vs. Temperature <sup>2</sup> ± 20 = <b>20</b> , ± 25 = <b>44</b> , ± 50 = <b>45</b>	-20	-	+50	ppm	For all supply voltages, load changes, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures
Operating Temperature Range <sup>2</sup>	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range <b>C</b> option Extended range <b>E</b> option
Supply Voltage <sup>1,2</sup> V <sub>CC</sub>	2.97	3.30	3.63	V	
Supply Current I <sub>CC</sub>	-	40	50	mA	
Output Waveform	HCSL				
Output High Level V <sub>OH</sub>	0.66	-	0.85	V	See load circuit
Output Low Level V <sub>OL</sub>	-0.15	-	0.15	V	See load circuit
Output Swing	0.4	-	-	V	See load circuit
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	0.2	0.5	ns	V <sub>th</sub> is 20% and 80% of waveform
Startup Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	50% of V <sub>CC</sub> (See Load Circuit)
V <sub>DISABLE</sub>	-	-	30	%V <sub>CC</sub>	Referenced to ground
V <sub>ENABLE</sub>	70	-			
Enable Time	-	-	2	ms	Time for output to reach a logic high state
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Output Leakage V <sub>OUT</sub> = V <sub>CC</sub> V <sub>OUT</sub> = 0V	-10 -10	-	+10 +10	µA	Pad 1 low, device disabled
Standby Current	-	-	15	µA	
Jitter	-	0.1		ps	12 kHz to 20 MHz from the output frequency at 156.25MHz
Phase Noise 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-74 -100 -126 -142 -146 -152 -156	-	dBc/Hz	25°C ± 2°C at 100 MHz
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit

<sup>1</sup> Place an appropriate power supply bypass capacitor next to device for correct operation

<sup>2</sup> Specified by part number



# PLETRONICS HC77J Series 3.3V HCSL Clock Oscillator

## Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage $V_{CC}$	Frequency in MHz	Optional T&R Packaging code
HC77	45	J	E	V	- 100.0M	-XX
	45 = $\pm 50$ ppm (STD) 44 = $\pm 25$ ppm 20 = $\pm 20$ ppm		Blank = -10 to +70°C (STD) C = -20 to +70°C E = -40 to +85°C	V = 3.3V $\pm$ 10%	100-175 MHz	T250 = 250 per Reel T500 = 500 per Reel T1K = 1000 per Reel (Std for 1K pcs)

## Device Marking

PLE HC77  
FFF.FF M  
• YMDxx

PLE = Pletronics  
FFF.FF = Frequency in MHz  
YMD = Date Code, All other marking is internal codes

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

Codes for Date Code YMD (Year Month Day)

Code	7	8	9	0	1	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2017	2018	2019	2020	2021	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

## Package Labeling

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

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

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

P/N:	
	HC7745JEV-100.0M
Customer P/N:	
	12345678
Qty:	
	1000
D/C	
	9DW
MSL: 1	

RoHS Compliant
2nd Lvl Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

Pletronics Inc. certifies this device is in accordance with the RoHS 3 (2015/863) and WEEE 2 (2012/19/EU) directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.16 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4

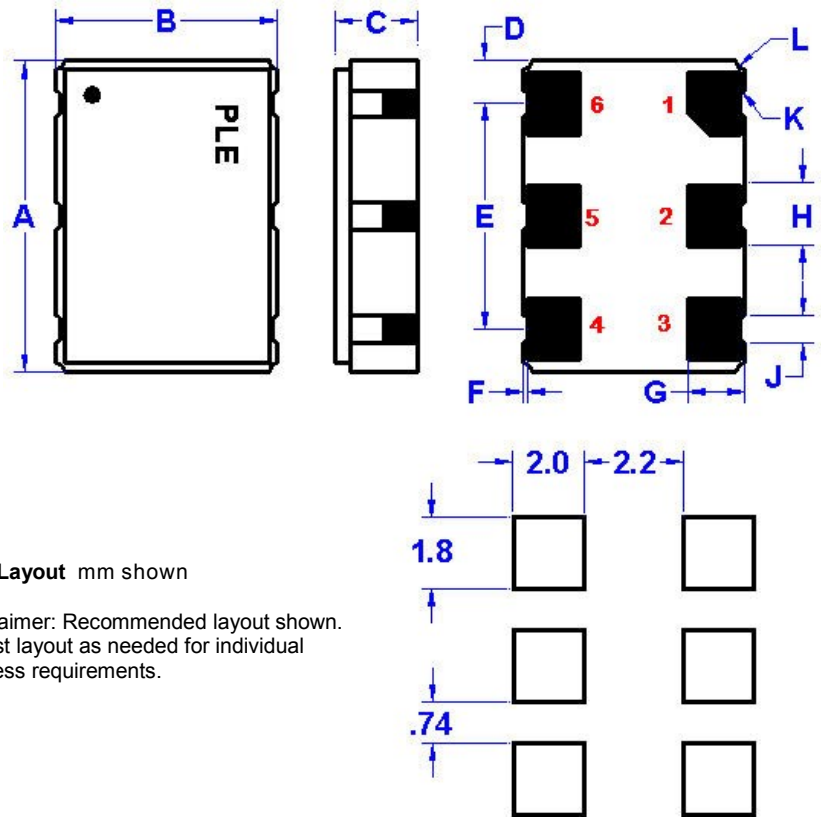
## Mechanical Dimensions

	Inches	mm
A	0.276 ± 0.006	7.00 ± 0.15
B	0.197 ± 0.006	5.00 ± 0.15
C	0.067 max	1.70 max
D <sup>1</sup>	0.038	0.96
E <sup>1</sup>	0.200	5.08
F <sup>1</sup>	0.004	0.10
G <sup>1</sup>	0.050	1.27
H <sup>1</sup>	0.055	1.40
I <sup>1</sup>	0.024	0.60
J <sup>1</sup>	0.006R	0.15R
K <sup>1</sup>	0.008R	0.20R

<sup>1</sup> Typical dimensions

**Pad Layout** mm shown

Disclaimer: Recommended layout shown.  
Adjust layout as needed for individual  
process requirements.



(Not to Scale)

**Contacts (pads):** Gold 11.8 to 39.4 µinches (0.3 to 1.0 µm) over Nickel 50 to 350 µinches (1.27 to 8.89 µm)

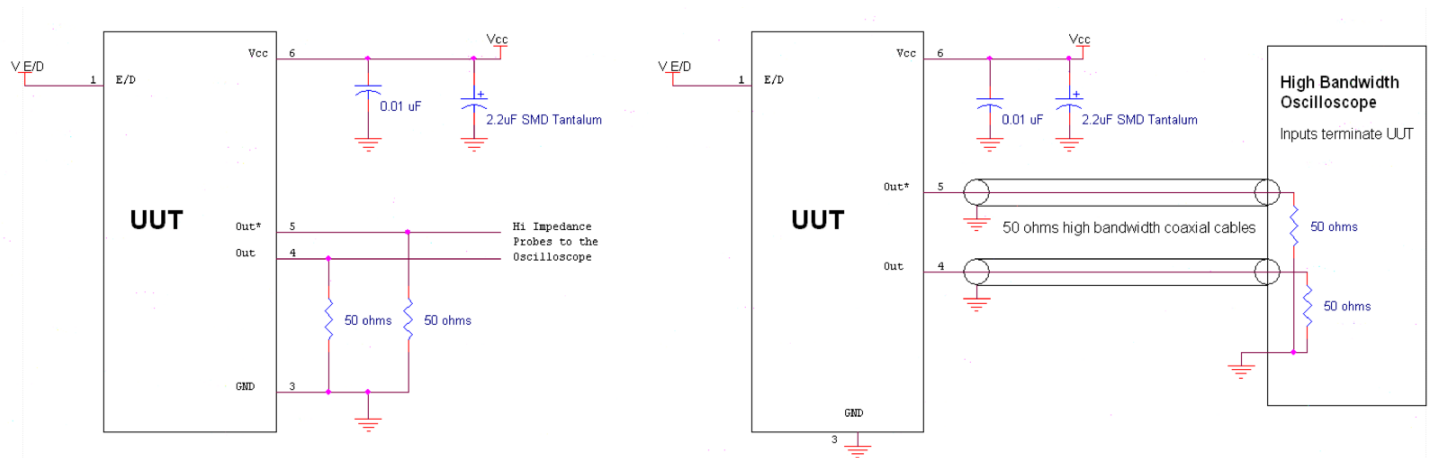
## Layout

Pad	Function	Note
1	Output Enable/Disable	The oscillator shall operate when this pad is not connected. The output will be inhibited (high impedance state) when this pad is logic low. Recommend connecting this pad to V <sub>CC</sub> if the oscillator is to be always on.
2	No connect	There is no internal connection to this pad. Recommend connecting to pad 1 to permit E/D input on either pad for layout.
3	Ground (GND)	
4	Output	Both outputs must be terminated and biased for proper operation. The ideal termination is 100 ohms between the outputs
5	Output*	
6	V <sub>CC</sub> Supply Voltage	Connect an appropriate power supply bypass capacitor as close as possible to pad 4

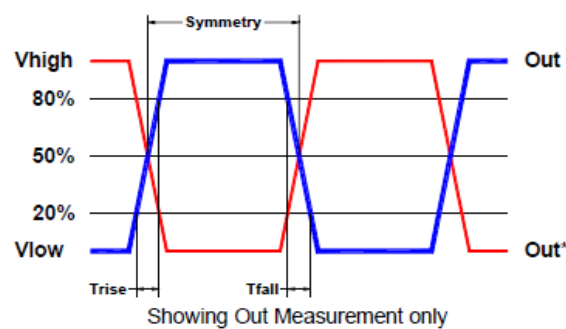
For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans

## Electrical Test /Load Circuit



## Test Waveform



## Environmental / ESD Ratings

### Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

### ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

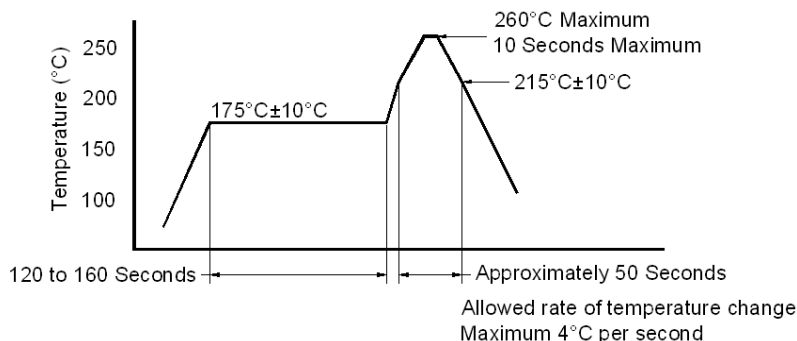
### Absolute Maximum Ratings

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +5.0V
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:

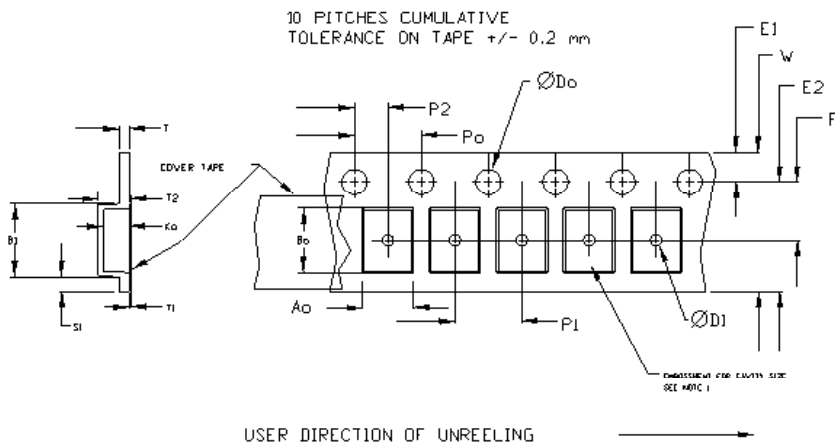
The maximum die or junction temperature is 155°C  
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

### Reflow Cycle



The part may be reflowed 2 times without degradation (typical for lead free processing).

### Tape and Reel



Tape Constant Dimensions Table 1

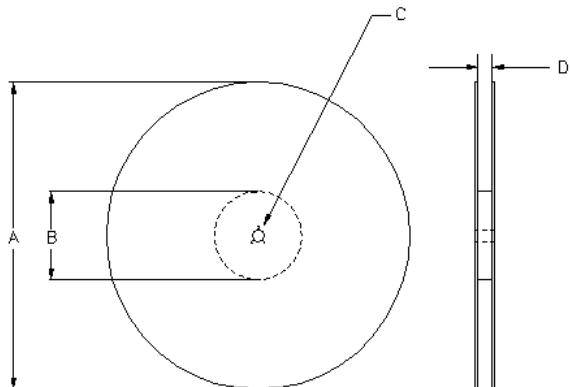
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5	1.0	1.75	4.0	2.0	0.6	0.6	0.1
12mm		1.5			±0.05			
16mm	+0.1 -0.0	1.5	±0.1	±0.1	2.0	0.6	0.6	0.1
24mm		1.5			±0.1			

Tape Variable Dimensions Table 2

Tape Size	B1 max	E2 min	F	P1	T2 max	W max	Ao, Bo & Ko
16mm	12.1	14.25	7.5 ±0.1	8.0 ±0.1	8.0	16.3	Note 1

Dimensions in mm Drawing Not to scale

Note 1: Embossed cavity to conform to EIA-481-B



Reel Dimensions (may vary) Table 3

	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		



# **PLETRONICS HC77J Series 3.3V**

## **HCSL Clock Oscillator**

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