



# PLETRONICS HC77J Series 2.5V HCSL Clock Oscillator



HC77JW  
7.0 x 5.0 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
- 2.5V nominal Supply Voltage
- 100 - 175 MHz Frequency Range (3rd OT & Fund.)

## 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> (Fo)	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. *limited frequencies, see Page 2
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> )	2.25	2.50	2.75	V	
Supply Current (I <sub>CC</sub> )	-	40	50	mA	
Output Type	HCSL				Load = 50 Ω to ground
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 (V <sub>OPP</sub> )	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 V <sub>OPP</sub>
Startup Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	50% of V <sub>OPP</sub> (See Load Circuit)
V <sub>DISABLE</sub> (V <sub>IL</sub> )	-	-	30	%V <sub>CC</sub>	Referenced to ground
V <sub>ENABLE</sub> (V <sub>IH</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
Enable/Disable Internal Pullup	30	70	150	KΩ	To V <sub>CC</sub> , Pin 1 open or ≥ 0.7V <sub>CC</sub>
Output Leakage	V <sub>OUT</sub> = V <sub>CC</sub> V <sub>OUT</sub> = 0V		- -10 +10 -	μA	Pad 1 low, device disabled
Standby Current	-	-	15	μA	
Jitter	-	0.1		ps	12 kHz to 20 MHz offset
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 156.25 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 as close to V<sub>CC</sub> as possible for best performance

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



# PLETRONICS HC77J Series 2.5V HCSL Clock Oscillator

## Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V <sub>CC</sub>	Frequency in MHz	Optional T&R Packaging code
HC77	45	J	E	W	- 100.0M	-XX
	45 = ± 50 ppm (STD) 44 = ± 25 ppm 20* = ± 20 ppm		Blank = -10 to +70°C (STD) C = -20 to +70°C E = -40 to +85°C	W = 2.5V ± 10%	100 - 175 MHz	T250 = 250 per Reel T500 = 500 per Reel T1K = 1000 per Reel (Std)

\* Contact PLE sales for limited frequencies. Full frequency range available which excludes aging.

## 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)

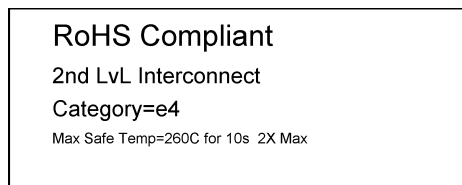
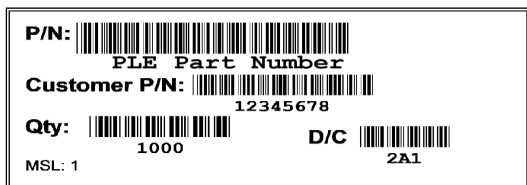
Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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

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

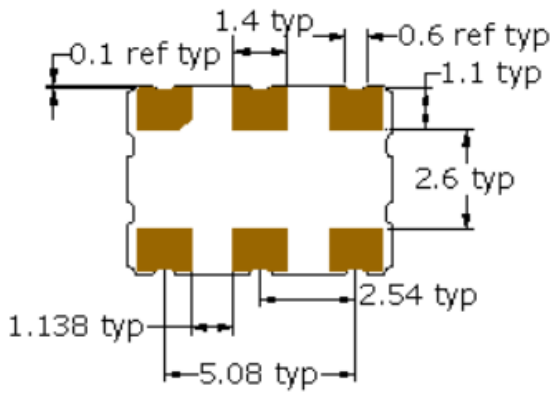
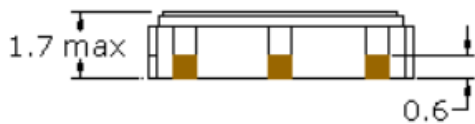
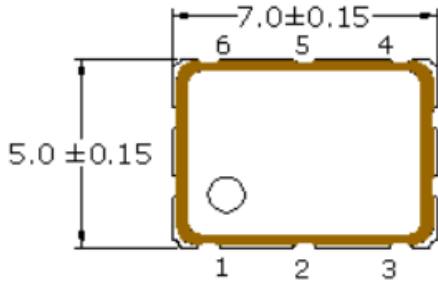
RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial



Pletronics Inc. certifies this device is in accordance with the RoHS and REACH 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



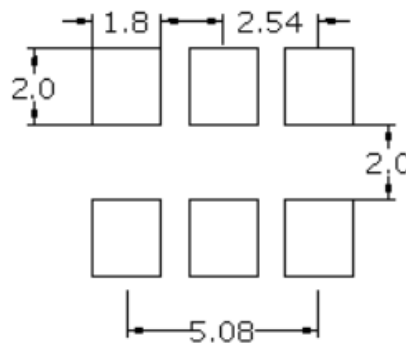
Dimensions in mm

## Pad Connections

Pad	Function
1	Enable/Disable
2	No Connect
3	Ground/Lid
4	Output
5	Output-N
6	V <sub>CC</sub>

ENABLE/DISABLE	
Pad 1	Output
V <sub>IH</sub> /Open	Active
V <sub>IL</sub> /Gnd	Disabled/Tristate

## Solder pad layout



### Pad Layout

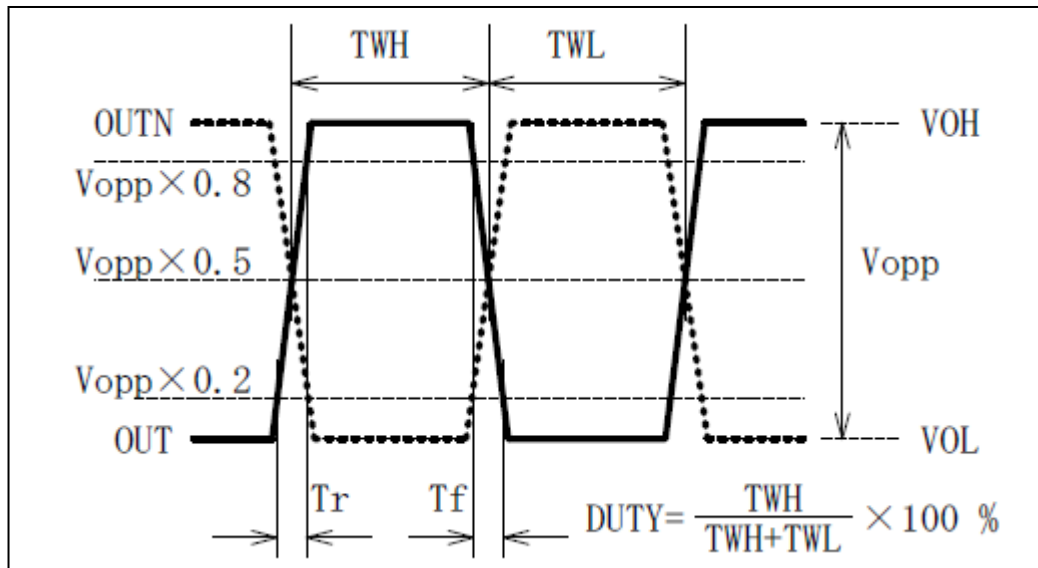
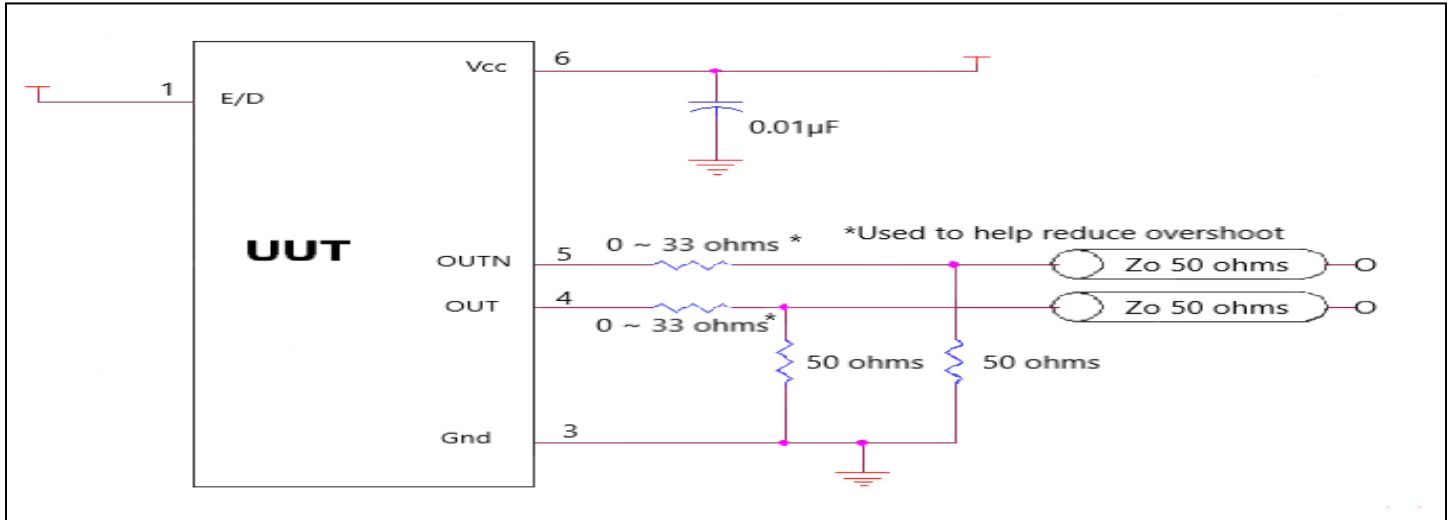
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

**Contacts (pads): Gold (0.3 to 1.0 μm) over Nickel (1.27 to 8.89 μm)**

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



## Environmental / ESD Ratings

Reliability: Environmental

ESD Rating

Parameter	Condition
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A
Solderability	IPC J-STD-002
Thermal Cycle	MIL-STD-883 Method 1010, Condition B

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Machine Model	200V	JESD22-A115

Absolute Maximum Ratings

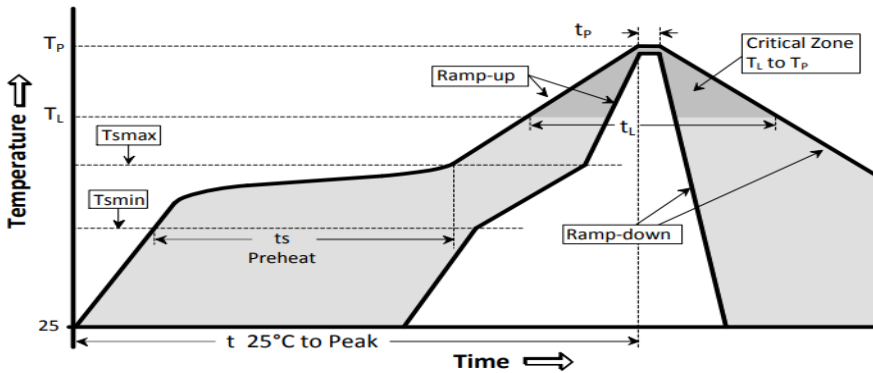
Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.3V to +4.0V
V <sub>i</sub> Input Voltage	-0.3V to V <sub>CC</sub> + 0.3V
V <sub>o</sub> Output Voltage	-0.3V to V <sub>CC</sub> + 0.3V

### Thermal Characteristics:

The maximum die or junction temperature is 150°C

## Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

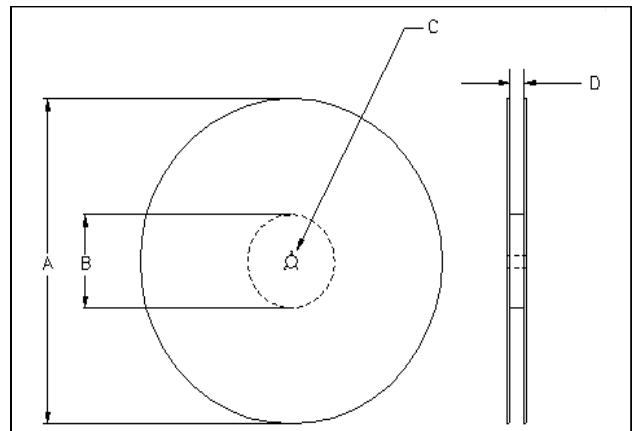
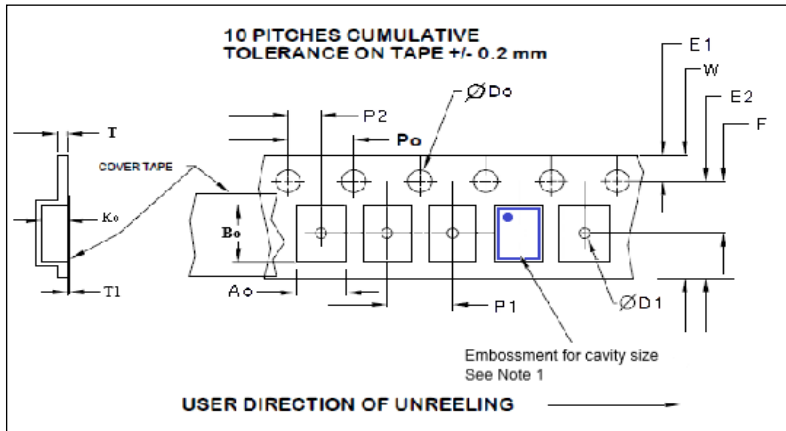


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	( $T_{S_{max}}$ to $T_P$ )	3°C / second max	°C / s
Ramp down Rate	$T_{cool}$	6°C / second max	°C / s
Time $T_{25°C}$ to Peak Temperature	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
Peak Temperature	$T_P$	260	°C
Time within 5°C of peak temperature	$t_p$	20 – 40	sec

## Tape and Reel

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



Tape Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	5.56 ±0.1	7.85 ±0.1	2.0 ±0.1

Reel Dimensions (may vary) Table 3

Reel Size	A		B		C	D
	Inches	mm	Inches	mm		
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
13	13.0	330	3.75	100		

Dimensions in mm Drawing Not to scale  
Note 1: Embossed cavity to conform to EIA-481-B

Tape Constant Dimensions Table 1

Tape Size	Do	D1 typ	E1	Po	P2	T max	T1 max
16mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	0.3	0.1



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