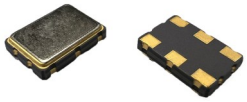
PLETRONICS HC77D Series 3.3V HCSL Clock Oscillator



HC77DV
7.0 x 5.0 x 1.7 mm
LCC Ceramic Package

Features

- Quartz crystal controlled Precision Square Wave Oscillator
- HCSL Output
- Enable/Disable Function on pad 1
- Low Jitter
- 3.3V nominal Supply Voltage
- 13-220 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 [2]	13	-	220	MHz	Consult factory for other options
Frequency Stability vs. Temperature [2] ± 20 = **20**, ± 25 = **44**, ± 50 = **45**	± 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 [2]	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range **C** option Extended range **E** option
Supply Voltage [1, 2] V_{CC}	2.97	3.3	3.63	V	
Supply Current I_{CC}	-	18 19 20	28 29 30	mA	<130 MHz ≥ 130 MHz and ≤ 170 MHz > 170 MHz — See Load Circuit
Output Waveform	HCSL				
Output High Level V_{OH}	0.66	0.74	0.85	V	See load circuit
Output Low Level V_{OL}	-	0	0.15	V	See load circuit
Output T_{RISE} and T_{FALL}	-	0.3	0.5	ns	Vth is 20% and 80% of waveform
Startup Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	50% of V_{CC} (See Load Circuit)
$V_{DISABLE}$	-	-	30	%Vcc	Referenced to ground
V_{ENABLE}	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 $V_{OUT} = V_{CC}$ $V_{OUT} = 0V$	- -10	-	+10 -	µA	Pad 1 low, device disabled
Standby Current	-	-	20	µA	
Jitter	-	0.2	0.6	ps RMS	12 kHz to 20 MHz from the output frequency
		-	2.8		10 Hz to 1 MHz from the output frequency
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit
[1] Place an appropriate power supply bypass capacitor as close to Vcc as possible for best performance.
[2] Specified by part number

Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V_{CC}	Frequency in MHz	Optional T&R Packaging code
HC77	**45**	**D**	**E**	**V**	**- 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	**V** = 3.3V±10%	13-220 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.

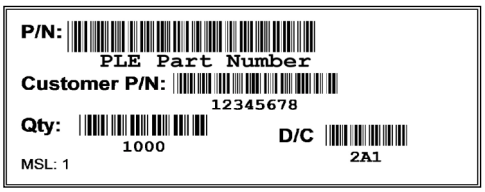
Codes for Date Code YMD (Year Month Day)

Code	1	2	3	4	5	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2021	2022	2023	2024	2025	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

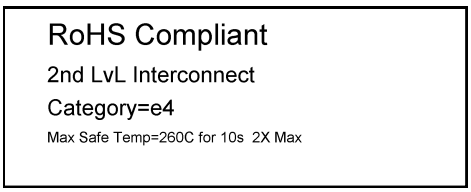
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

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



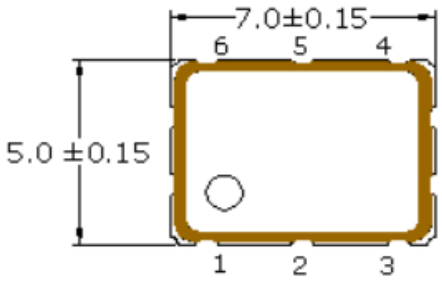
RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



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

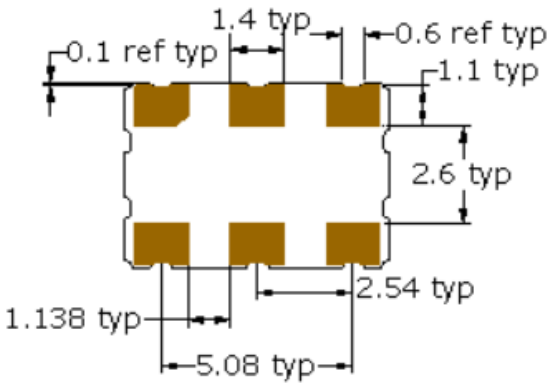
Mechanical Dimensions



Pad Connections

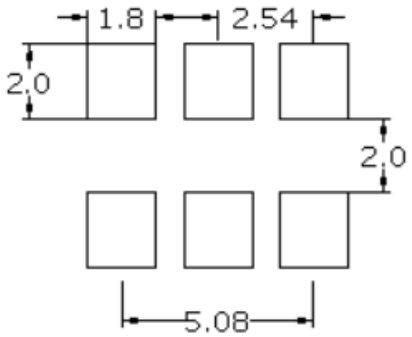
Pad	Function
1	Enable/Disable
2	No Connect
3	Ground/Lid
4	Output
5	Output-N
6	Vcc

ENABLE/DISABLE	
Pad 1	Output
VIH/Open	Active
VIL/Gnd	Disabled/Tristate



Dimensions in mm

Solder pad layout



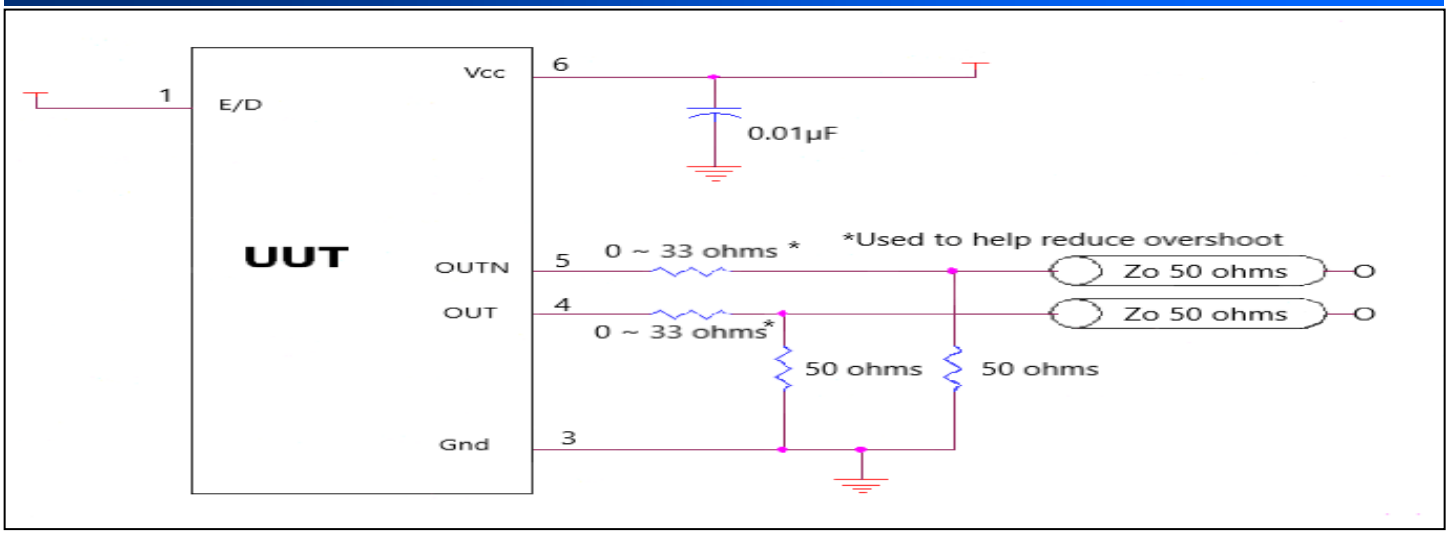
Pad Layout
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

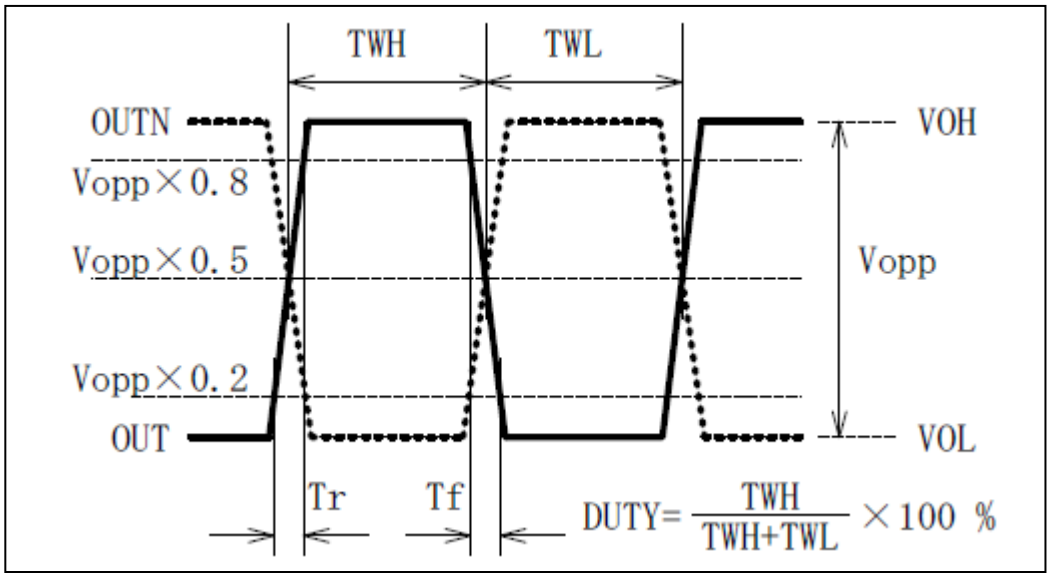
Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

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

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
Machine Model	200V	JESD22-A115

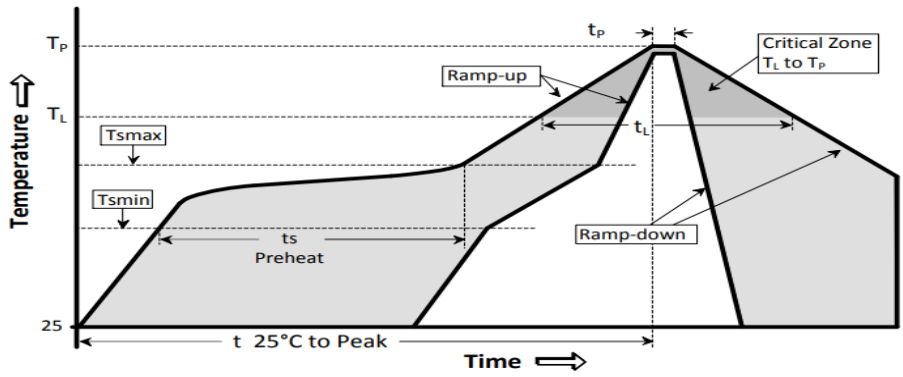
Ab-solute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +5.0V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V

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"

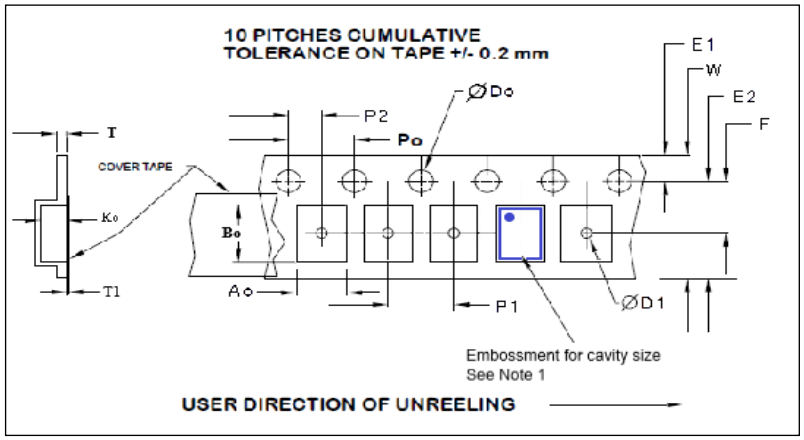


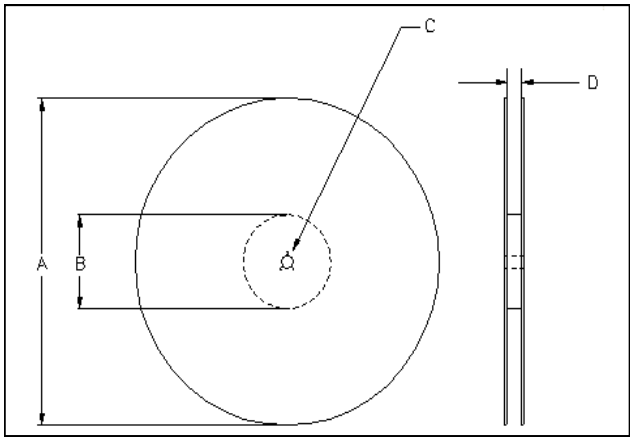
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time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

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

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

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	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

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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