

SM77D142-xxx.xxxM CMOS Clock Oscillators

January 2015



- Pletronics' SM77D142 series is a quartz crystal controlled precision square wave generator with a CMOS output.
- The SM77D series will directly interface TTL devices also.
- The package is designed for high density surface mount designs.
- This is a low cost mass produced oscillator.
- Tape and Reel or cut tape packaging is available.
- 110.100 - 170.000 MHz
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function
- Disable function includes low standby power mode
- 3rd Overtone Crystals used
- Improved circuit to minimize oscillator issues such as multi-mode output signal.
- Low Jitter

X Microwave device

Common Frequencies: (Contact Pletronics for other frequencies.)

125.000 MHz	133.000 MHz
155.520 MHz	156.250 MHz
161.1328 MHz	

Part Marking and Marking Legend:

PLE SM77 FF.FFF M • YMDxx	PLE SM77 FF.FFF M • YYWWxx	7xYWWxx FF.FFF M • PLE xxx
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PLE = Pletronics
FF.FFF M = Frequency in MHz
YYWW or YWW or YMD = Date of Manufacture (year and week, or year-month-day)
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.

Codes for Date Code YMD

Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2013	2014	2015	2016	2017	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

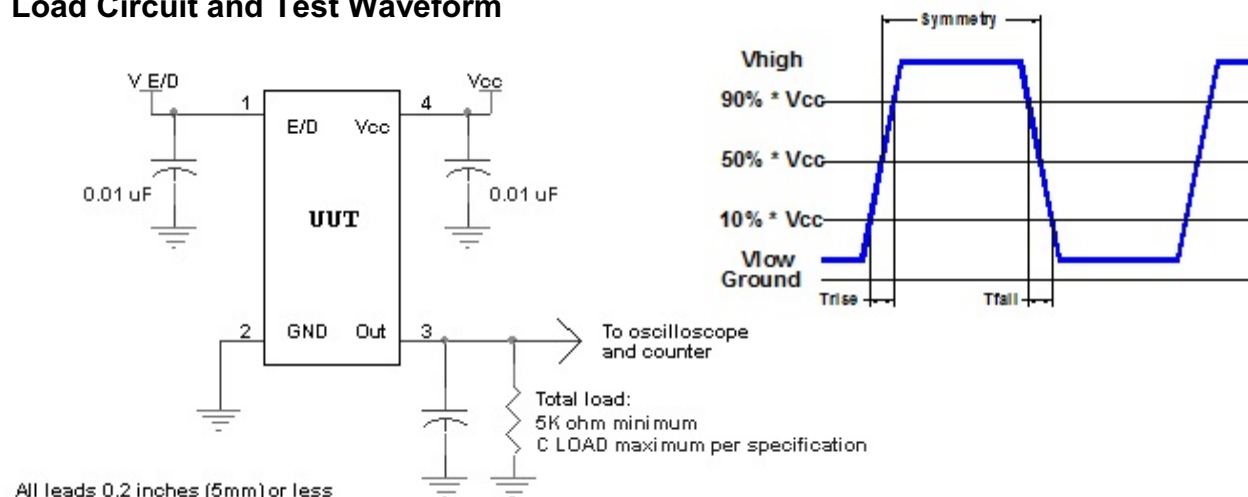
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Electrical Specification

Item	Min	Typ	Max	Unit	Condition	
Frequency Range	110.1	-	170	MHz		
Frequency Accuracy over operating temperature range (-40°C to +85°C)	-20	-	+20	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures	
Supply Voltage (V _{CC})	2.7	-	3.6	V		
Output Waveform	CMOS					
Output Voltage High (V _{OH})	2.2	2.4	-	V	V _{CC} = 2.7 to 3.6V, I _{OH} = +8 mA	
Output Voltage Low (V _{OL})	-	0.3	0.4	V	V _{CC} = 2.7 to 3.6V, I _{OL} = -8 mA	
Output Symmetry (Duty Cycle)	45	50	55	%	at 50% point of V _{CC}	
Jitter (typical at 125.0MHz)	-	-	0.6	pS RMS	12KHz to 20MHz from output freq	
	-	-	2.5	pS RMS	10Hz to 1MHz from output freq	
INHN pull-up resistance R	50	100	150	kΩ	to V _{CC}	
Input Voltage High (V _{IH})	-	-	30	%	of V _{CC} applied to pad 1	
Input Voltage Low (V _{IL})	70	-	-	%		
Output leakage V _{OH} = V _{CC}	-	-	+10	μA	Pad 1 low, device disabled	
V _{OL} = 0V	-10	-	-	μA		
Standby Current I _{ST}	-	-	5	μA		
Output T _{RISE} and T _{FALL}	-	1.5	4.0	nS	C _{LOAD} =15 pF, 10% to 90% of V _{CC}	
Enable time	-	-	100	nS	Time for output to reach a logic state	
Output disable delay time t _{OD}	-	-	100	nS	Time for output to reach a high Z state	
Startup time	-	-	10	mS	Time for output to reach specified frequency	
Operating Temperature Range	-40	-	+85	°C	Extended Temperature Range	
Storage Temperature Range	-55	-	+125	°C		
V _{CC} Supply Current (I _{CC})	-	20	50	mA	90 MHz	C _{LOAD} = 15pF
	-	25	60	mA	125 MHz	
	-	30	70	mA	135 MHz	
	-	40	100	mA	170 MHz	

Specifications with Pad 1 E/D open circuit

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:	
	SM77D141-100.0M
Customer P/N:	
	12345678
Qty:	
	1000
D/C	
	0JX-MTG
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 6/6 (2011/65/EC) and WEEE (2002/96/EC) directives.**

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

Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

Weight of the Device: 0.17 grams

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

Second Level Interconnect code: e4

Absolute Maximum Ratings:

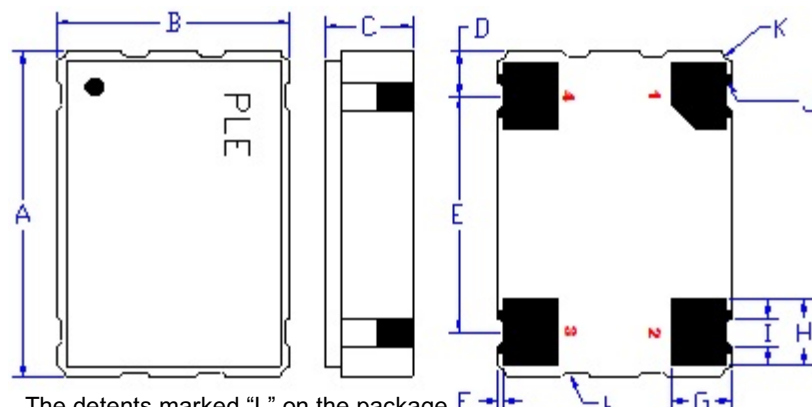
Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +7.0V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V
Storage temperature range	-65 to +150 Deg C
I _{OUT} Output Current	25 mA

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.

Mechanical:



The detents marked "L" on the package ends are optional

Not to Scale

¹ Typical dimensions

	Inches	mm
A	0.276 \pm 0.006	7.00 \pm 0.15
B	0.197 \pm 0.006	5.00 \pm 0.15
C	0.068 \pm 0.018	1.73 \pm 0.44
D ¹	0.038	0.96
E ¹	0.200	5.08
F ¹	0.004	0.10
G ¹	0.050	1.27
H ¹	0.055	1.40
I ¹	0.024	0.60
J ¹	0.004	0.10R
K ¹	0.008	0.020R

Contacts (pads) :

Gold 11.8 to 39.4 μ m (0.3 to 1.0 μ m) over Nickel 50 to 350 μ m (1.27 to 8.89 μ m)

Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad 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.
2	Ground (GND)	
3	Output	
4	Supply Voltage (V _{cc})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

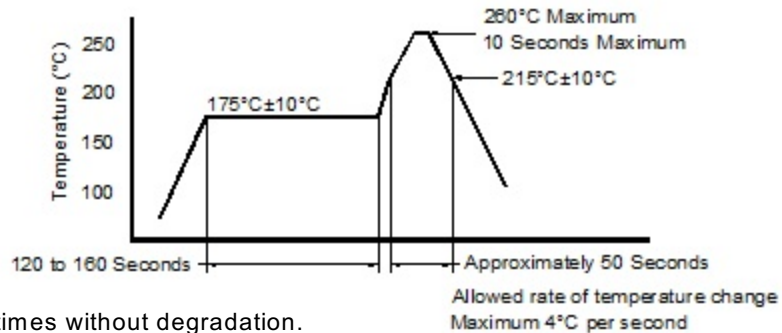
Layout and application information

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.



Reflow Cycle (typical for lead free processing)



The part may be reflowed 3 times without degradation.

Tape and Reel: available for quantities of 250 to 1000 per reel (< 250 = cut tape)

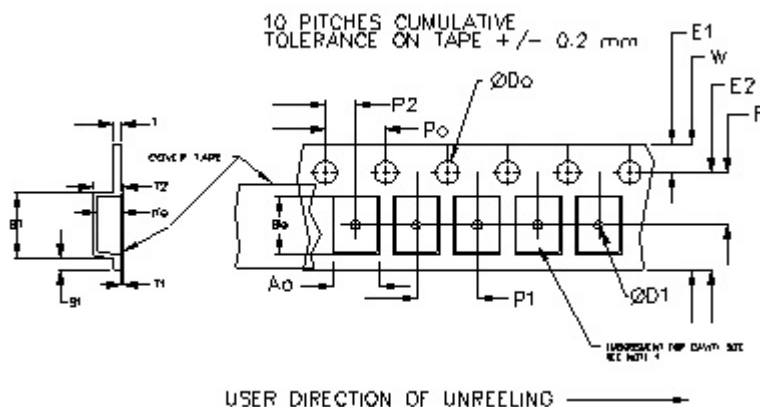
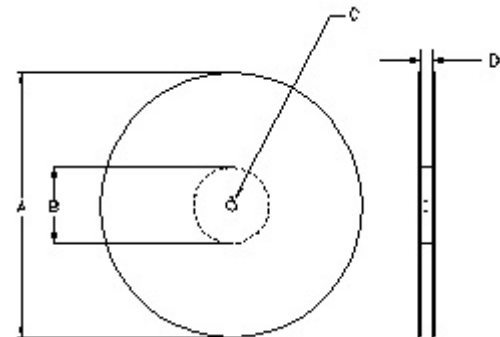
Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5			2.0 ±0.1			
16mm		1.5						
24mm		1.5						

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
16 mm	12.1	14.25	7.5 ± 0.1	8.0 ± 0.1	8.0	16.3	Note 1

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

Dimensions in mm

Not to scale



REEL DIMENSIONS				
A	inches	7.0	10.0	13.0
	mm	177.8	254.0	330.2
B	inches	2.50	4.00	3.75
	mm	63.5	101.6	95.3
C	mm	13.0 +0.5 / -0.2		
D	mm	16.4	16.4	16.4
		+2.0 -0.0	+2.0 -0.0	+2.0 -0.0

Reel dimensions may vary from the above

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