

SM77D131-125.0M 2.5V CMOS Clock Oscillator

April 2011

- Pletronics' SM77D Series is a quartz crystal controlled precision square wave generator with a CMOS output.
- The package is designed for high density surface mount designs.
- Tape and Reel or cut tape packaging is available.
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function
- Disable function includes low standby power mode
- 3rd Overtone Crystals used
- Low Jitter
- Capable of driving up to 50pF capacitive loads

**Pletronics Inc. certifies this device is in accordance with the
RoHS 6/6 (2002/95/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

ESD Rating

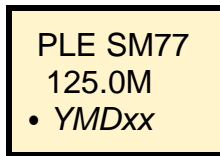
Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

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.

Marking Legend:



PLE = Pletronics
 125.0M = Frequency in MHZ
 YMD = Date of Manufacture
 All other marking is internal factory codes

Codes for Date Code YMD

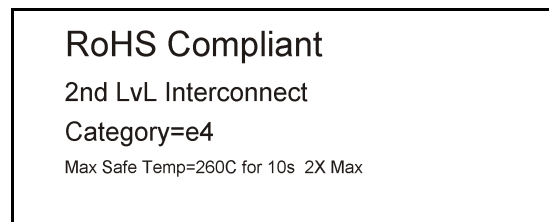
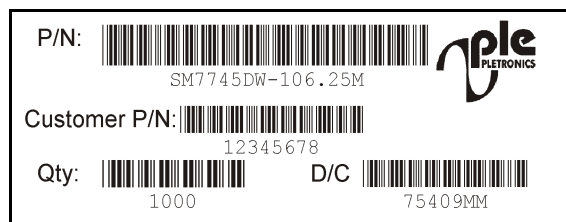
Code	10	1	2	3	4	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2010	2011	2012	2013	2014	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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

Label is 1" x 2.6" (25.4mm x 66.7mm)
 Font is Courier New
 Bar code is 39-Full ASCII
 (the actual PN will appear: SM77D131-125.0M)

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



Reliability: Environmental Compliance

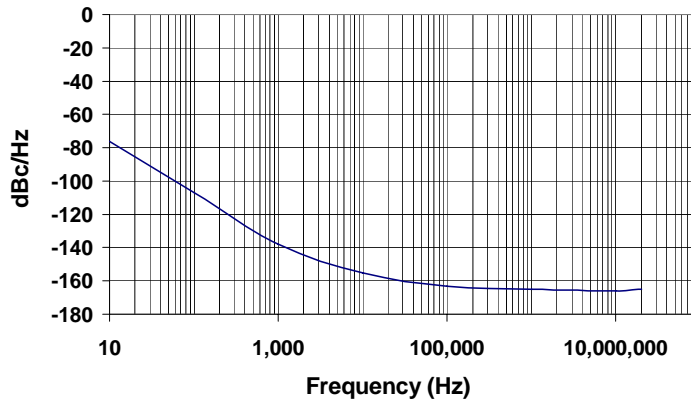
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

Electrical Specification for 2.50V $\pm 10\%$ over the specified temperature range

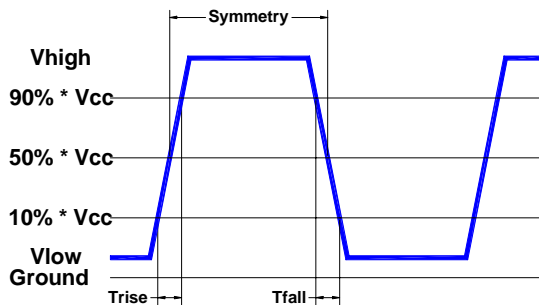
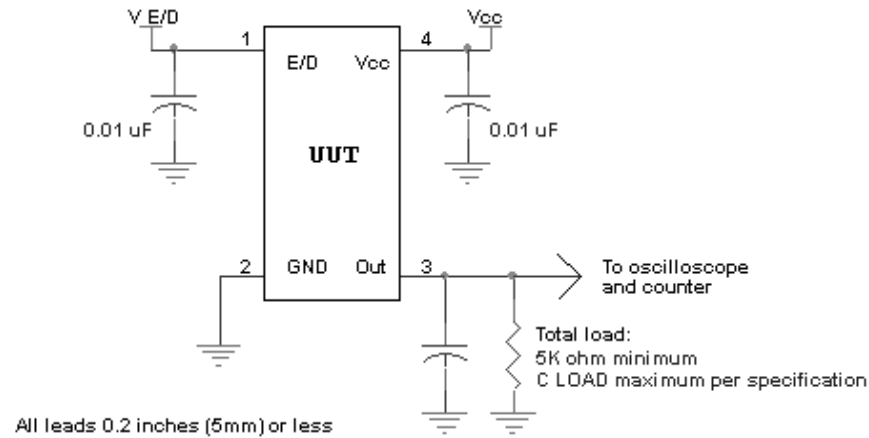
Item	Min	Typ	Max	Unit	Condition	
Frequency Accuracy	-50	0	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperature	
Output Waveform	CMOS					
Output High Level	90	-	-	%	of V_{CC}	See load circuit
Output Low Level	-	-	10	%	of V_{CC}	
Output Symmetry	45	50	55	%	at 50% point of V_{CC}	
V_{OUT} High (V_{OH})	1.4	1.6	-	V	$V_{CC} = 2.25V$, $I_{OH} = +8$ mA	
V_{OUT} Low (V_{OL})	-	0.3	0.4	V	$V_{CC} = 2.25V$, $I_{OL} = -8$ mA	
Jitter	-	-	0.6	pS RMS	12 KHz to 20 MHz from the output frequency	
	-	-	2.5	pS RMS	10 Hz to 1 MHz from the output frequency	
Output T_{RISE} and T_{FALL}	-	1.0	3	pS	$C_{LOAD} = 15$ pF	See load circuit
	-	2.5	3.7	pS	$C_{LOAD} = 30$ pF	
	-	3.5	4.4	pS	$C_{LOAD} = 50$ pF	
V_{CC} Supply Current (I_{CC})	-	25	60	mA	$C_{LOAD} = 15$ pF	
	-	38	70	mA	$C_{LOAD} = 30$ pF	
	-	47	77	mA	$C_{LOAD} = 50$ pF	
Enable/Disable Internal Pull-up	50		-	Kohm	to V_{CC}	
V disable	-		30	%	of V_{CC} applied to pad 1	
V enable	70		-	%	of V_{CC} applied to pad 1	
Output leakage	-10		+10	uA	$V_{OUT} = V_{CC}$	Pad 1 low device disabled
	-10		+10	uA	$V_{OUT} = 0V$	
Standby Current I_{CC}	-		3	uA		
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	-		10	mS	Time for output to reach specified frequency	
Operating Temperature Range	-10		+70	°C		
Storage Temperature Range	-55		+125	°C		

Specifications with Pad 1 E/D open circuit unless otherwise stated

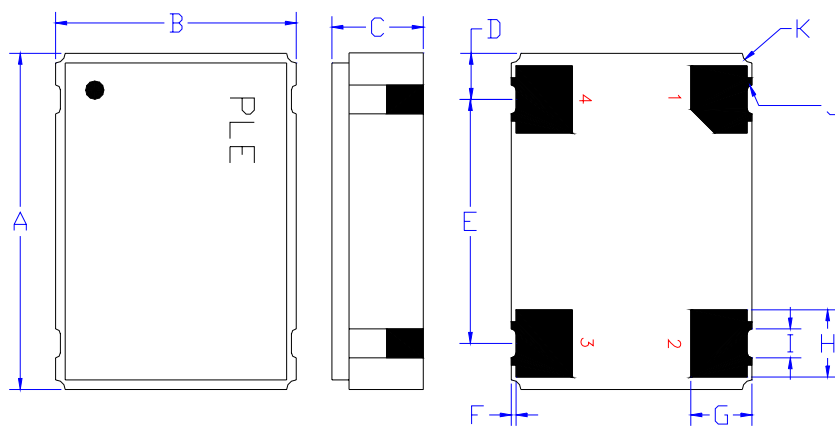
Typical phase-noise characteristics at 106.25MHz



Load Circuit and Test Waveform



Mechanical:



	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.068 ±0.018	1.73 ±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

Not to Scale

¹ Typical dimensions

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)

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.

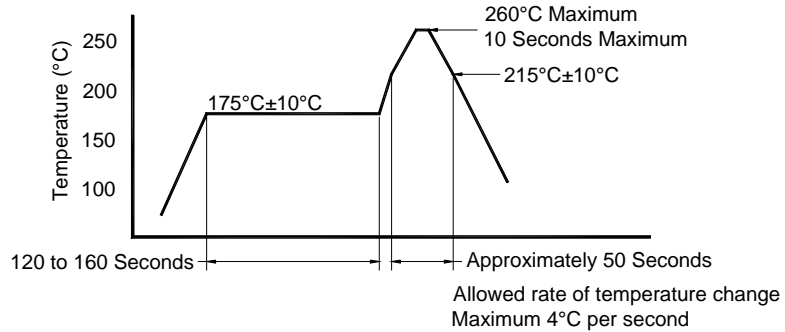


Layout and application information

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)



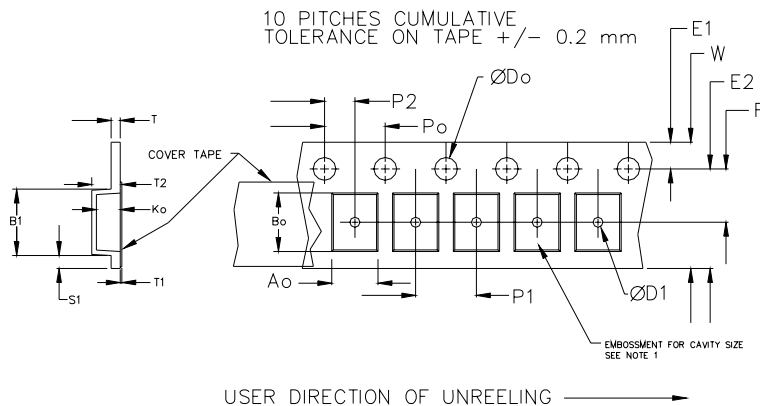
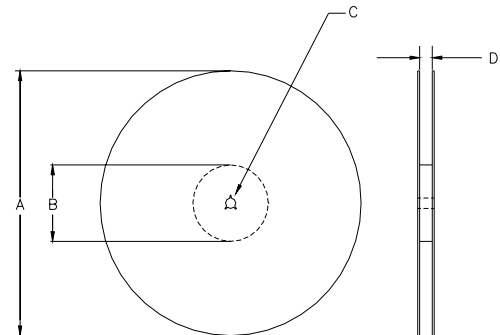
The part may be reflowed 2 times without degradation.

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	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm		+0.1 -0.0			± 0.1			
24mm		1.5			± 0.1			

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	Tape Width
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	

Reel dimensions may vary from the above



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