PLETRONICS
www.pletronics.com 425-776-1880

SM55L Series 1.8 V
CMOS Clock Oscillators

June 2013

Lead Free

- Pletronics' SM55 Series is a quartz crystal controlled precision square wave generator with a CMOS output.
- 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.
- 0.5 to 50 MHz
- 3.2 x 5 mm LCC Ceramic Package
- Enable/Disable Function
- Disable function includes low standby power mode
- Low Jitter

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: 0.064 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
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V
Io Output Current	+25 mA to -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.

Part Number:

SM55	10	L	E	X	-24.0M	-XX	
							Packaging code or blank **T250** = 250 per Tape and Reel **T500** = 500 per Tape and Reel **T1K** = 1000 per Tape and Reel
							Frequency in MHz
							Supply Voltage V_{CC} **X** = 1.8V 10%
							Optional Enhanced OTR Blank = Temp. range -10 to +70°C **C** = Temp. range -20 to +70°C **E** = Temp. range -40 to +85°C
							Series Model
							Frequency Stability **10** = 10 ppm
							Series Model

Part Marking and Legend:

P ***ff.fff*** **M**
• ***YMDxx***

P = Pletronics
ff.fff M = Frequency in MHz
YMD = Date of Manufacture (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	0	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

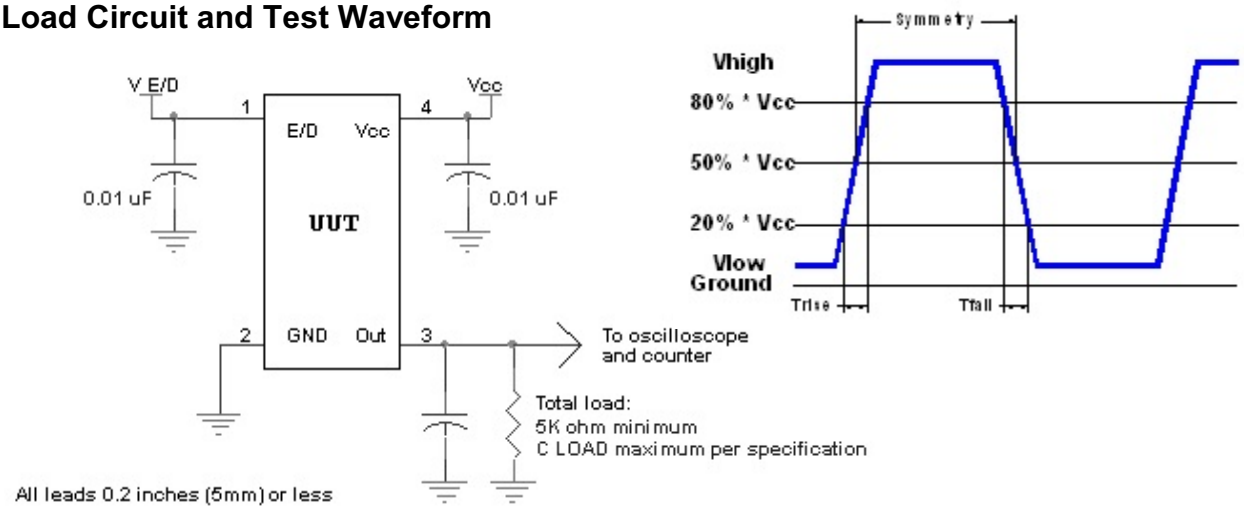
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**R**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Electrical Specification for 1.80V ±10% over the specified temperature range

Item	Min	Max	Unit	Condition	
Frequency Range	0.5	50	MHz		
Frequency Accuracy "10"	-10	+10	ppm	For all supply voltages, load changes, and temperature	
Frequency Accuracy "05"	-5	+5	ppm		
Output Waveform	CMOS				
Output High Level	90	-	%	of V_{CC} (See load circuit)	
Output Low Level	-	10	%		
Output Symmetry	45	55	%	at 50% point of V_{CC} (See load circuit)	
Enable/Disable Internal Pull-up	50	-	Kohm	to V_{CC}	
V disable	-	30	%	of V_{CC} applied to pin 1	
V enable	70	-	%		
Output leakage $V_{OUT} = V_{CC}$	-10	+10	uA	Pin 1 low, device disabled	
$V_{OUT} = 0V$	-10	+10	uA		
Standby Current I_{CC}	-	10	uA		
Enable time	-	3	mS	Time for output to reach the specified frequency and the output to turn on	
Disable time	-	100	nS	Time for output to reach a high Z state	
Start up time	-	3	mS	Time for output to reach specified frequency	
Operating Temperature Range	-10	+70	°C	Standard Temperature Range	
	-20	+70	°C	Extended Temperature Range "C" Option	
	-40	+85	°C	Extended Temperature Range "E" Option	
Storage Temperature Range	-55	+125	°C		
Output T_{RISE} and T_{FALL}	-	5.0	nS	< 50 MHz	C_{LOAD} = 15 pF 20% to 80% of V_{CC} See Load Circuit
V_{CC} Supply Current (I_{CC})	-	5.0	mA	at 25.0 MHz	C_{LOAD} = 15 pF
	-	6.5	mA	at 50.0 MHz	
Phase Noise	**Typical**		Units	Condition	
at 10 Hz	-100		dBc/Hz	at 25.0MHz	
at 100 Hz	-131		dBc/Hz	at 25.0MHz	
at 1 kHz	-152		dBc/Hz	at 25.0MHz	
at 10 kHz	-160		dBc/Hz	at 25.0MHz	
at 100 kHz	-161		dBc/Hz	at 25.0MHz	

Specifications with Pin 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

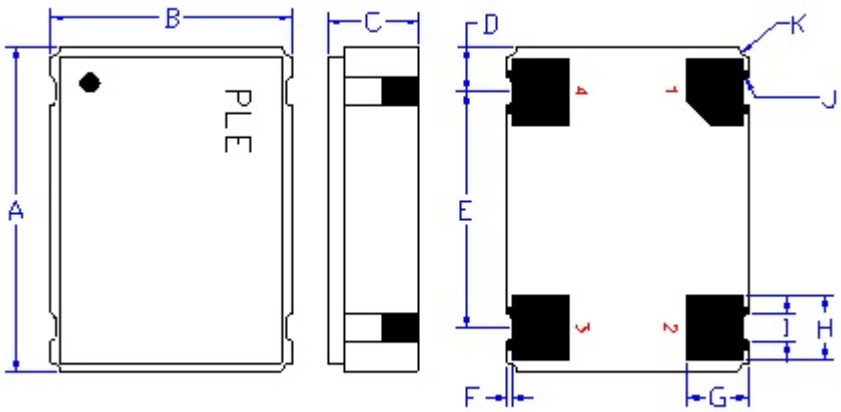
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

P/N: SM5510LEX-24.0M
Customer P/N: 12345678
Qty: 1000 D/C 0JX-MTG
MSL: 1

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

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

Mechanical:



	Inches	mm
A	0.197 ±0.006	5.00 ±0.15
B	0.126 ±0.006	3.20 ±0.15
C	0.045 ±0.004	1.15 ±0.10
D[1]	0.048	1.23
E[1]	0.100	2.54
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 :
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)

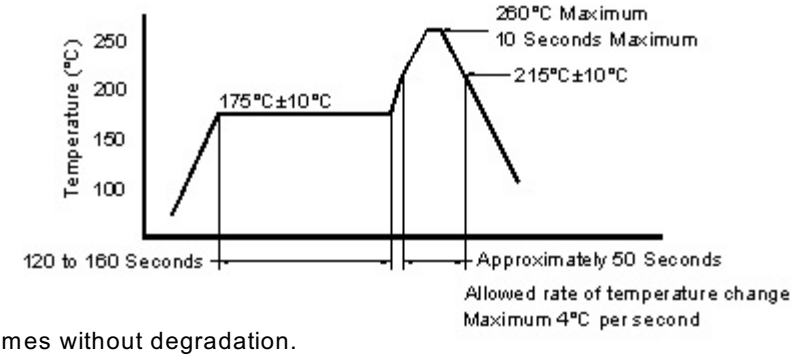
Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is logic low the output will be inhibited (high impedance state.) Recommend connecting this pad to V_{CC} if the oscillator is to be always on.
2	Ground (GND)	
3	Output	
4	Supply Voltage (V_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Layout and application information

Lead Free

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)



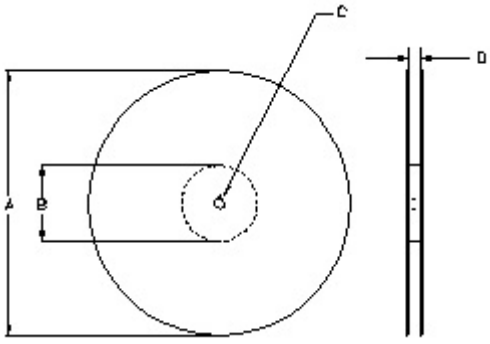
The part may be reflowed 3 times without degradation.

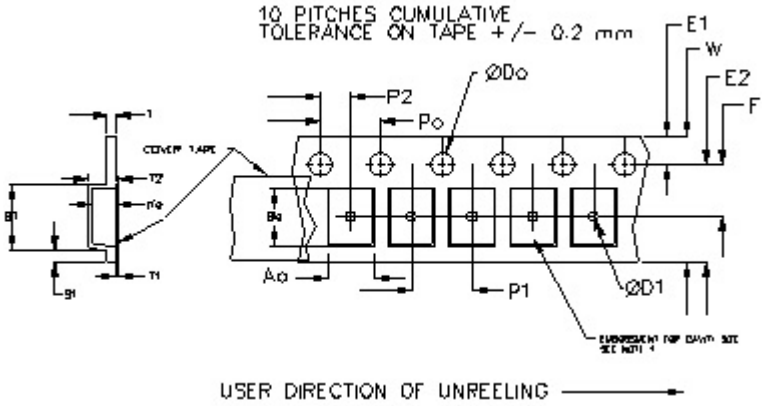
Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

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	Tape Width
C	mm	13.0 +0.5 / -0.2			
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.0

Reel dimensions may vary from the above

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