



# PLETRONICS SM55T Series 1.8V CMOS Clock Oscillator



SM55TX  
5.0 x 3.2 x 1.2 mm  
LCC Ceramic Package

## Features

- Pletronics' SM55T Series is a quartz crystal controlled precision square wave oscillator
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function includes low standby power
- Low Jitter
- 1.8V nominal Supply Voltage
- 1.0 - 165 MHz Frequency Range

## Applications

- Driving A/Ds, D/As, FPGAs
- Digital Video
- Ethernet, GbE
- Medical
- Storage Area Networking
- COTS
- Broad Band Access
- SONET/SDH/DWDM
- Base Stations/ Picocell
- Test & Measurement

## Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range <sup>2</sup>	1.0	-	165	MHz	Consult factory for other options
Frequency Stability <sup>2</sup> $\pm 20 = 20^*$ , $\pm 25 = 44$ , $\pm 50 = 45$	$\pm 20$	-	$\pm 50$	ppm	Includes supply voltage change, load change, aging for 1 year at $25^\circ\text{C} \pm 2^\circ\text{C}$ , shock, vibration and temperatures. *limited frequencies, see page 3
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> ( $V_{CC}$ )	1.62	1.80	1.98	V	$1.8\text{V} \pm 10\%$
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	at 50% of $V_{CC}$
Output $V_{HIGH}$ ( $V_{OH}$ )	90	-	-	%	of $V_{CC}$
Output $V_{LOW}$ ( $V_{OL}$ )	-	-	10	%	of $V_{CC}$
Startup Time	-	-	10	ms	Time for output to reach specified frequency
$V_{DISABLE}$	-	-	30	%	Of $V_{CC}$ applied to Pad 1
$V_{ENABLE}$	70	-	-		
Enable Time	-	-	250	ns	Time for output to reach a logic state
Disable Time	-	-	250	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	30	70	150	$\text{K}\Omega$	To $V_{CC}$ , Pin 1 open or $\geq 0.7V_{CC}$
Output Leakage $V_{OUT} = V_{CC}$ $V_{OUT} = 0\text{V}$	-10	-	+10 -	$\mu\text{A}$	Pad 1 low, device disabled
Standby Current	-	-	10	$\mu\text{A}$	
Jitter	Output 1 to 15MHz Output >15 to 35MHz Output >35 to 50MHz Output >50 to 70MHz Output >70MHz	-	6.0 5.0 4.0 3.0 2.5	pS RMS	10 Hz to 1 MHz from the output frequency
Jitter	Output 25 to 70MHz Output >70MHz	-	0.7 0.6	pS RMS	12 kHz to 20 MHz from the output frequency
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 next to device for correct operation

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

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



# PLETRONICS SMC55T Series 1.8V CMOS Clock Oscillator

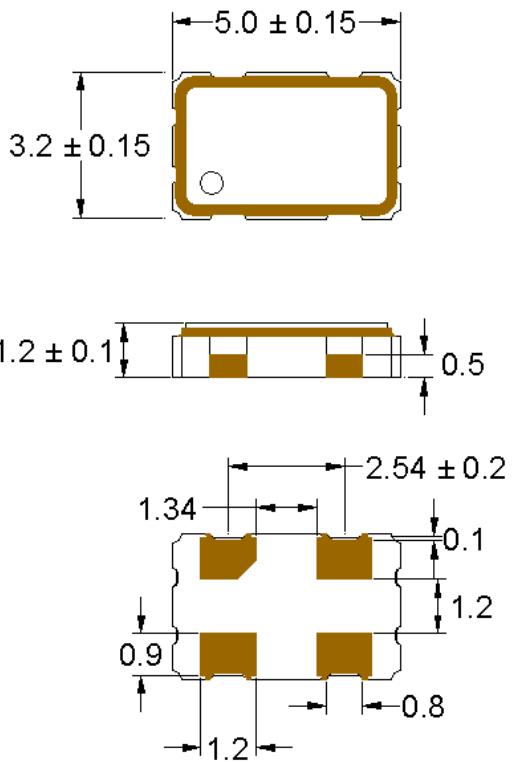
## Electrical Characteristics

Parameter	Typ	Max	Unit	Condition	
Output $T_{RISE}$ and $T_{FALL}$	2.0	5.0	nS	$< 35$ MHz	$C_{LOAD} = 15$ pF 10% to 90% of $V_{CC}$ See Load Circuit
	1.7	3.5		$\geq 35$ MHz and $< 70$ MHz	
	-	2.5		$\geq 70$ MHz	

Parameter	Typ	Max	Unit	Condition	
$V_{CC}$ Supply Current ( $I_{CC}$ )	-	4	mA	$< 8$ MHz	$C_{LOAD} = 15$ pF
	-	5		$\geq 8$ MHz and $< 16$ MHz	
	-	8		$\geq 16$ MHz and $< 35$ MHz	
	-	18		$\geq 35$ MHz and $< 70$ MHz	
	-	27		$\geq 70$ MHz and $< 120$ MHz	
	-	37		$\geq 120$ MHz	

Specifications with Pad 1 E/D circuit open

## Mechanical Dimensions



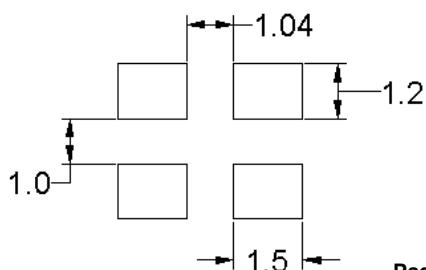
Dimensions in mm

## Pad Connections

Pad	Function
1	Enable/Disable
2	Ground
3	Output
4	Vcc

### ENABLE/DISABLE

Pad 1	Output
$V_{IH}/\text{Open}$	Active
$V_{IL}/\text{Gnd}$	Disabled/Tristate



### Pad Layout

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

Contacts (pads): Gold (0.3 to 1.0  $\mu\text{m}$ ) over Nickel (1.27 to 8.89  $\mu\text{m}$ )



# PLETRONICS SMC55T Series 1.8V CMOS 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
<b>SM55</b>	<b>45</b>	<b>T</b>	<b>E</b>	<b>X</b>	<b>-125.0M</b>	<b>-XX</b>
	<b>45</b> = ± 50 ppm (STD) <b>44</b> = ± 25 ppm <b>20*</b> = ± 20 ppm		<b>Blank</b> = -10 to +70°C (STD) <b>C</b> = -20 to +70°C <b>E</b> = -40 to +85°C	<b>X</b> = 1.8V ± 10%	1.0 - 165 MHz	<b>T250</b> = 250 per Reel <b>T500</b> = 500 per Reel <b>T1K</b> = 1000 per Reel (Std for 1K pcs)

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

## Device Marking

<b>Pff.fff M</b> • YMDxx	<b>P ff.fff M</b> • YYWWxx	<b>P5xYWWx</b> • ff.fff M	<b>PLE SM55</b> ff.fff M • YMDxx	<b>5xYWWxx</b> ff.fff M • PLExx
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P or PLE  
ff.fff  
YMD or YWW or YYWW  
= Pletronics  
= Frequency in MHz  
= 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)

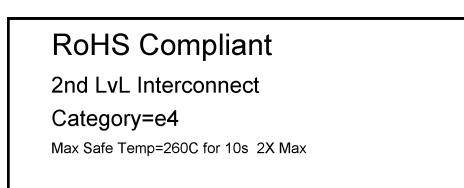
Code	2	3	4	5	6	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2022	2023	2024	2025	2026	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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

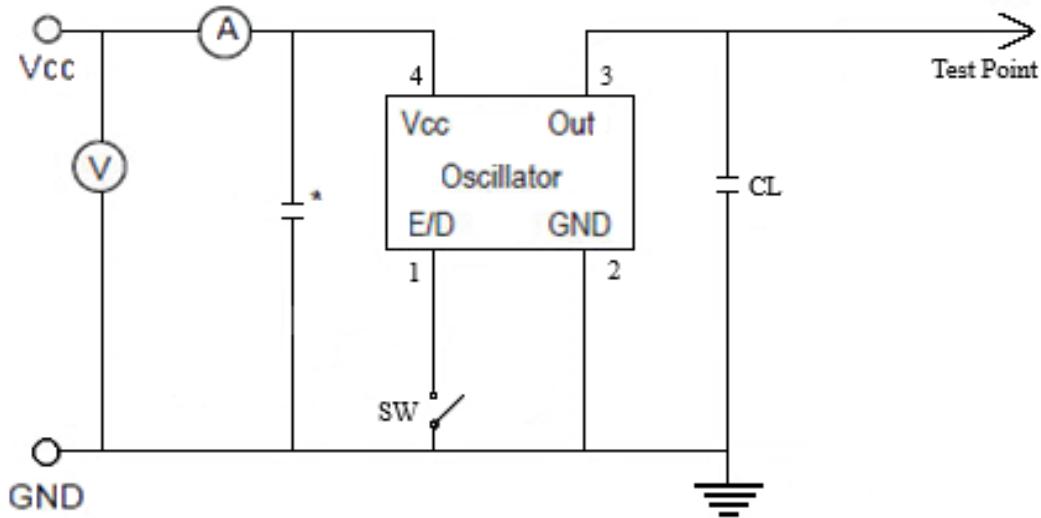
RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial



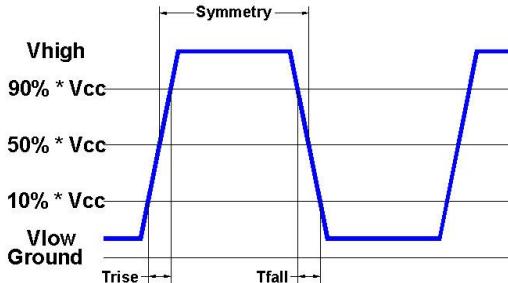
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.06 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4

## Electrical Test / Load Circuit



Notes:  
 CL: 15 pF Includes the input capacitance of oscilloscope  
 \* 0.01~0.1μF external by-pass filter is recommended



## Environmental / ESD Ratings

### Reliability: Environmental

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

### ESD Rating

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

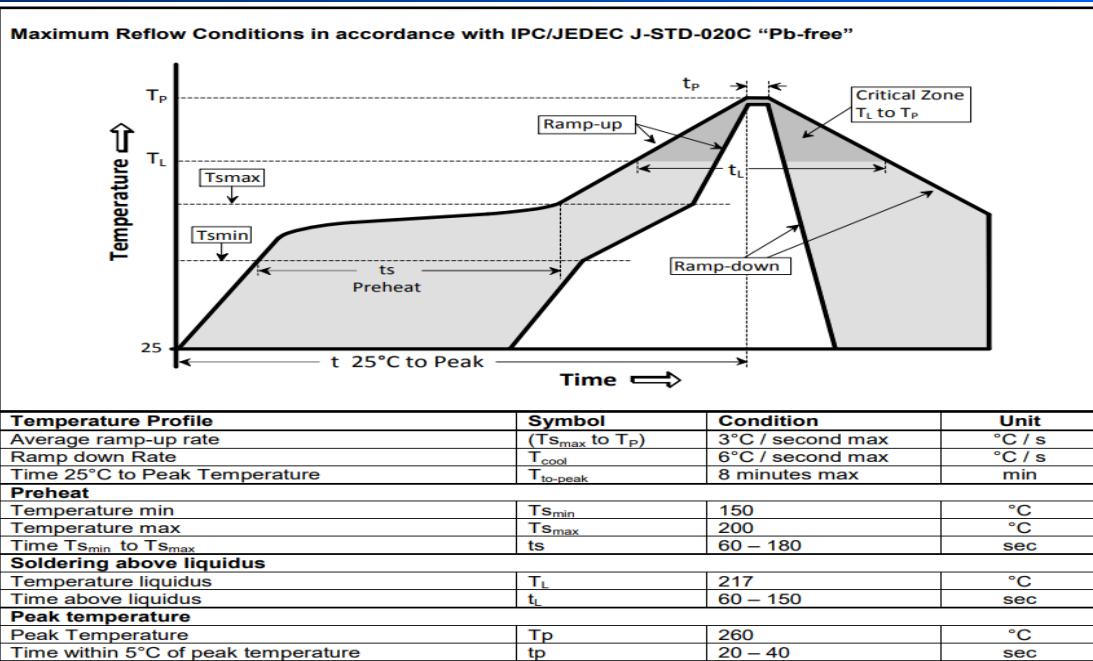
### Absolute Maximum Ratings

Parameter	Unit
$V_{cc}$ Supply Voltage	-0.3V to +4.0V
$V_i$ Input Voltage	-0.3V to $V_{cc} + 0.3V$
$V_o$ Output Voltage	-0.3V to $V_{cc} + 0.3V$

### Thermal Characteristics:

The maximum die or junction temperature is 150°C

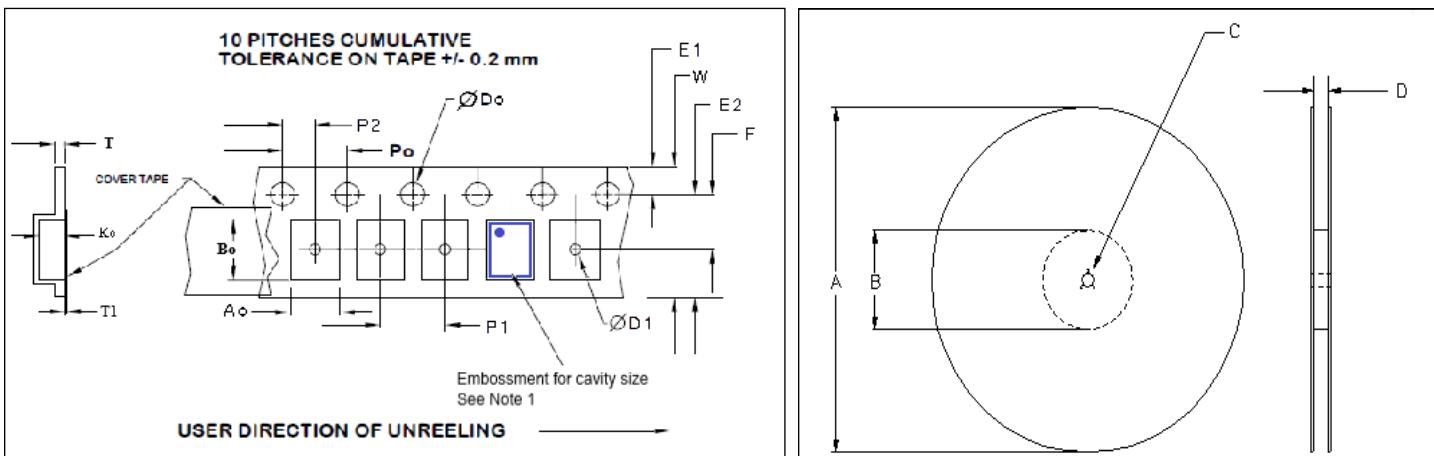
## Reflow Cycle



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. 12mm (or 16mm) tape, 8mm pitch.



Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ±0.05	8.0 ±0.1	12.2	3.6±0.1	5.4±0.1	1.4±0.1
16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	3.6±0.1	5.4±0.1	1.4±0.1

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	Tape size +0.4
13	13.0	330	3.75	100	+0.5 -0.2	+2.0 -0.0

Tape Constant Dimensions Table 1

Tape Size	Do	D1 min	E1	Po	P2	T max	T1 max
12mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3	0.1
16mm		1.5			2.0 ±0.1		

Product information is current as of publication date. The product conforms to specifications per the terms of the Pletronics standard warranty. Production processing does not necessarily include testing of all parameters.



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## Contacting Pletronics Inc.

Pletronics, Inc.  
19013 36th Ave. West  
Lynnwood, WA 98036-5761  
U.S.A.

Tel: 425.776.1880  
Fax: 425.776.2760  
email: [ple-sales@pletronics.com](mailto:ple-sales@pletronics.com)  
URL: [www.pletronics.com](http://www.pletronics.com)