Features

- Pletronics' SM55J 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
- 3.3V nominal Supply Voltage
- 1.25-170 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
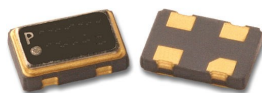
SM55JV
3.2 x 5.0 x 1.25 mm
LCC Ceramic Package

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range [2]	1.25	-	170	MHz	Consult factory for other options
Frequency Stability vs. T emperature [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	-	+70	°C	Standard range
	-20	-	+70		Extended range **C** option
	-40	-	+85		Extended range **E** option
Supply Voltage [1, 2] V_{CC}	2.97	3.30	3.63	Volts	3.3V ± 10%
Output Waveform		CMOS			
Duty Cycle	45	-	55	%	See Load Circuit
Output V_{HIGH}	V_{CC} -0.4	-	-	V	See Load Circuit
Output V_{LOW}	-	-	0.4	V	
Output T_{RISE} and T_{FALL}	-	1	5	ns	C_{LOAD} = 15 Pf 10% to 90% of V_{CC} See Load Circuit
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	-	-	100	ns	Time for output to reach a logic state
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	30	-	-	Kohm	To V_{CC}
Output Leakage V_{OUT} = V_{CC}	-10	-	+10	µA	Pad 1 low, device disabled
V_{OUT} = 0V	-10		+10		
Standby Current	-	-	10	µA	
Phase Noise 10 Hz	-	-78	-	dBc/Hz	25°C ± 2°C at 100 MHz
100 Hz		-107			
1 kHz		-132			
10 kHz		-144			
100 kHz		-151			
1 MHz		-155			
10 MHz		-158			
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Specified by part number

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition	
Supply Current I_{CC}		0.9	1.8	mA	3 MHz	no load
		1.4	2.8		5 MHz	
		1.5	3.0		10 MHz	
	-	1.7	3.4		20 MHz	
	-	3.5	7.0		50 MHz	
	-	4.0	8.0		65 MHz	
	-	4.5	9.0		85 MHz	
		5.5	10.5		100 MHz	
		7.0	13.5		133 MHz	
		10.5	21.0		170 MHz	

Specifications with Pad 1 E/D circuit open

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Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V$_{CC}$	Frequency in MHz	Optional T&R Packaging code
SM55	45	J	E	V	- 125.0M	-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%	1.25 - 170 MHz	**T250** = 250 per Reel **T500** = 500 per Reel **T1K** = 1000 per Reel (Std for 1K pcs)

Device Marking

P$ff.fff$ M • $YMDxx$	**P $ff.fff$ M** • $YYWWxx$	**P5xYWWx** • $ff.fff$ M	**PLE SM55** $ff.fff$ M • $YMDxx$	**5xYWWxxx** $ff.fff$ M • PLExx

P or PLE = Pletronics
ff.fff = Frequency in MHz
YMD or *YWW* or *YYWW* = 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	7	8	9	0	1	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2017	2018	2019	2020	2021	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

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

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

P/N: SM5545JEV-125.0M
Customer P/N: 12345678
Qty: 1000
D/C: 9DW
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 3 (2015/863) and WEEE 2 (2012/19/EU) 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-020D
Second Level Interconnect code: e4

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Mechanical Dimensions

	Inches	mm
A	0.197 ± 0.006	5.00 ± 0.15
B	0.126 ± 0.006	3.20 ± 0.15
C	0.049 Max	1.25 Max
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
J[1]	0.024	0.60
K[1]	0.004R	0.10R
L[1]	0.008R	0.20R

[1] Typical dimensions
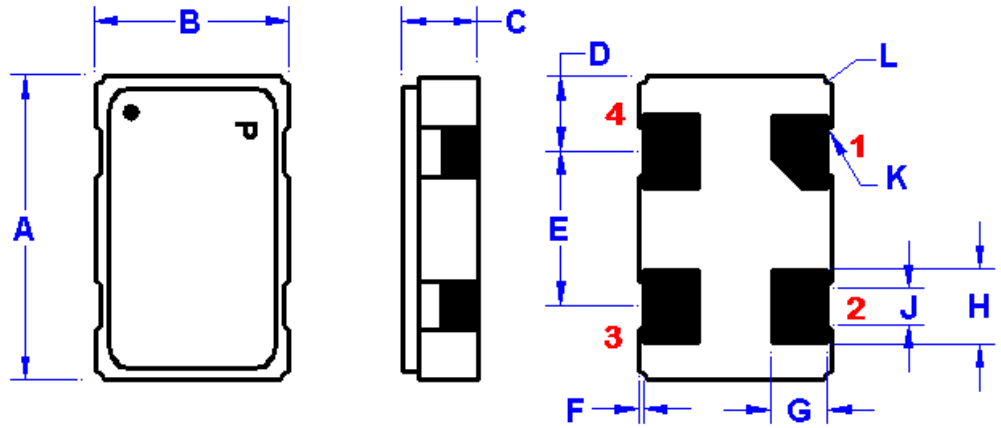
Pad Layout mm shown

Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.
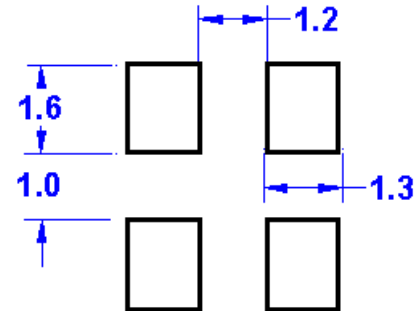
(Not to Scale)

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)
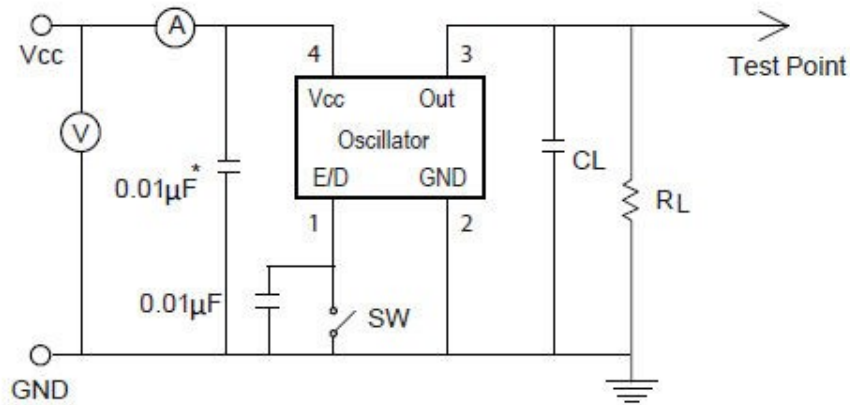
Layout

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

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

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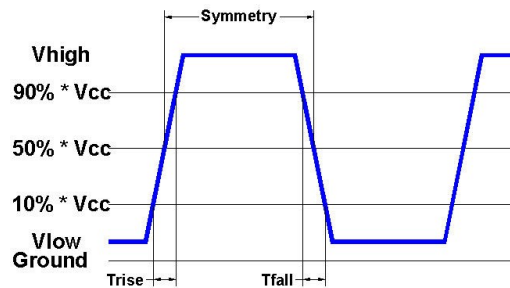
Electrical Test / Load Circuit

Notes:
RL: 5 Kohm minimum
CL: Includes the input capacitance of oscilloscope
* 0.01µF external by-pass filter is recommended

Environmental / ESD Ratings

Reliability: Environmental Compliance

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

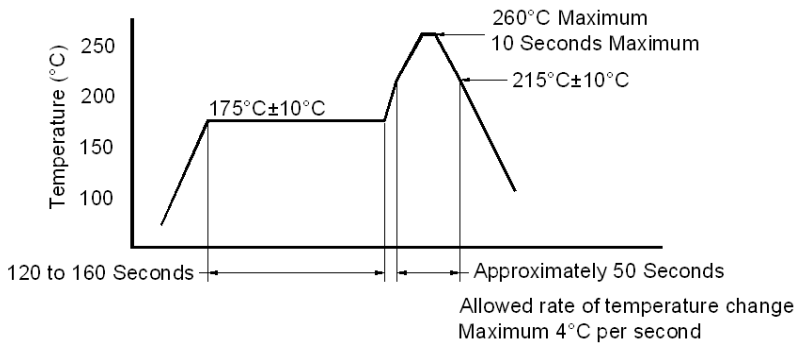| Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

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.

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.3V to +4.0V
Vi Input Voltage	-0.3V to V_{CC} + 0.3V
Vo Output Voltage	-0.3V to V_{CC} + 0.3V

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Reflow Cycle

260°C Maximum
10 Seconds Maximum

215°C±10°C

175°C±10°C

120 to 160 Seconds

Approximately 50 Seconds

Allowed rate of temperature change
Maximum 4°C per second

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

Tape and Reel

10 PITCHES CUMULATIVE
TOLERANCE ON TAPE +/- 0.2 mm

USER DIRECTION OF UNREELING
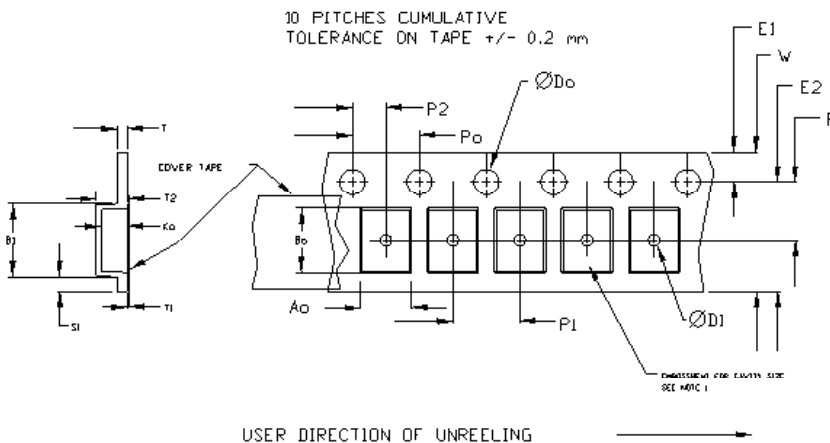
Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

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

Dimensions in mm   Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B
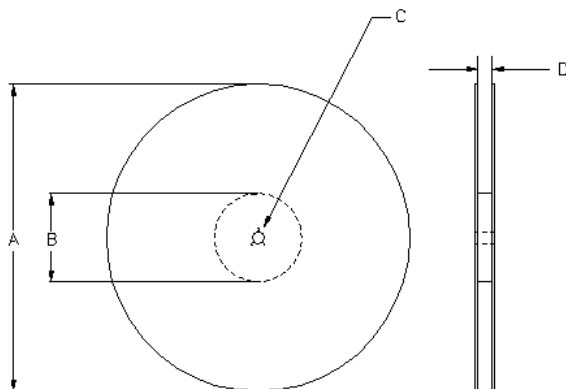
Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		

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