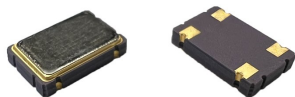




PLETRONICS SM77J Series 3.3V CMOS Clock Oscillator



SM77JV
7.0 x 5.0 x 1.3 mm
LCC Ceramic Package

Features

- Pletronics' SM77J 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

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range ²	1.25	-	170	MHz	Consult factory for other options
Frequency Stability ² $\pm 20 = 20^*$, $\pm 25 = 44$, $\pm 50 = 45$	± 20	-	± 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 ²	-10 -20 -40	- - -	+70 +70 +85	$^\circ\text{C}$	Standard range Extended range C option Extended range E option
Supply Voltage ^{1,2} (V_{CC})	2.97	3.30	3.63	V	$3.3\text{V} \pm 10\%$
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	At $50\%V_{\text{CC}}$
Output V_{HIGH} (V_{OH})	$V_{\text{CC}} - 0.4$	-	-	V	See Load Circuit
Output V_{LOW} (V_{OL})	-	-	0.4	V	
Output T_{RISE} and T_{FALL}	-	1	5	ns	$C_{\text{LOAD}} = 15\text{ pF}$ 10% to 90% of V_{CC} See Load Circuit
Startup Time	-	-	10	ms	Time for output to reach specified frequency
V_{DISABLE} (V_{IL})	-	-	30	%	Of V_{CC} applied to Pad 1
V_{ENABLE} (V_{IH})	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	70	150	Kohm	To V_{CC} , Pin 1 open or $\geq 0.7V_{\text{CC}}$
Output Leakage $V_{\text{OUT}} = V_{\text{CC}}$ $V_{\text{OUT}} = 0\text{V}$	- -10	-	+10 -	μA	Pad 1 low, device disabled
Standby Current	-	-	10	μA	
rms Phase Jitter	-	0.15	0.6	ps	$F_0 \geq 40\text{MHz}$, 12kHz ~ 20MHz offset
Phase Noise 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-78 -107 -132 -144 -151 -155 -158	-	dBc/Hz	$25^\circ\text{C} \pm 2^\circ\text{C}$ at 100 MHz
Storage Temperature Range	-55	-	+125	$^\circ\text{C}$	

Notes: Specifications with Pad 1 E/D open circuit

¹ Place an appropriate power supply bypass capacitor next to device for correct operation

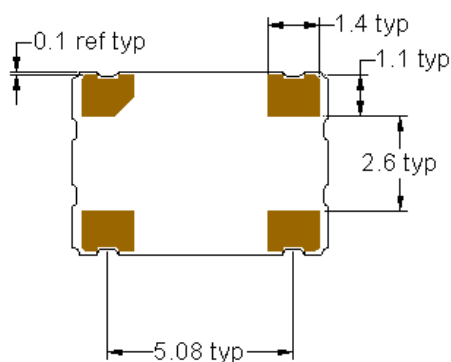
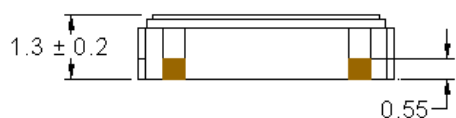
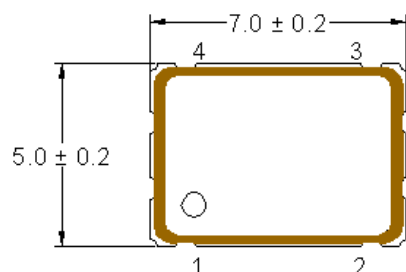
² Specified by part number

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Supply Current I_{CC}		0.9	1.8		3 MHz
		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

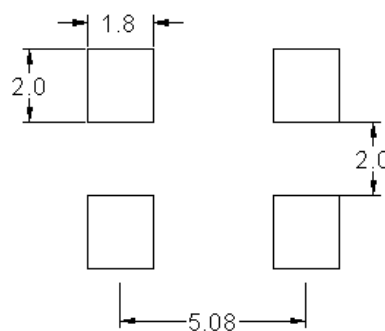
Mechanical Dimensions



Pad Connections

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

ENABLE/DISABLE	
Pad 1	Output
V_{IH} / Open	Active
V_{IL} / Gnd	Disabled / Tristate



Pad Layout

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

Dimensions in mm

Contacts (pads): Gold (0.3 to 1.0 μm) over Nickel (1.27 to 8.89 μm)

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 SM77J Series 3.3V CMOS Clock Oscillator

Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V_{CC}	Frequency	Optional T&R Packaging code
SM77	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 $\pm 10\%$	1.25 - 170 MHz	T250 = 250 per Reel T500 = 500 per Reel T1K = 1000 per Reel (Std for 1K pcs)

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

Device Marking

PLE SM77 FFF.FF M • YMDxx	PLE SM77 FFF.FF M • YYWWxx	7xYWWxx FFF.FF M • PLExxx
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PLE = Pletronics
FFF.FF = 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	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

P/N:  PLE Part Number
Customer P/N:  12345678
Qty:  1000
D/C  2A1
MSL: 1

RoHS Compliant

2nd Lvl Interconnect

Category=e4

Max Safe Temp=260C for 10s 2X Max

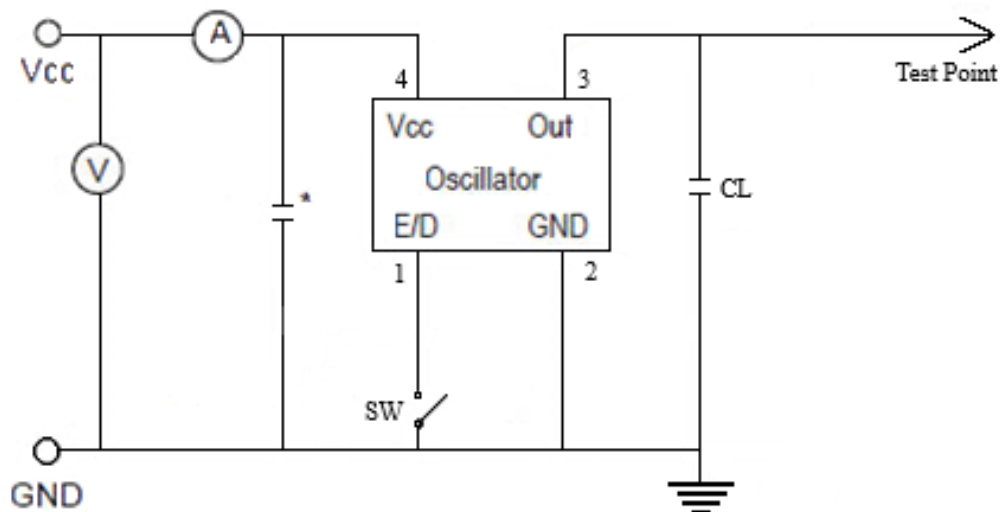
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.14 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4



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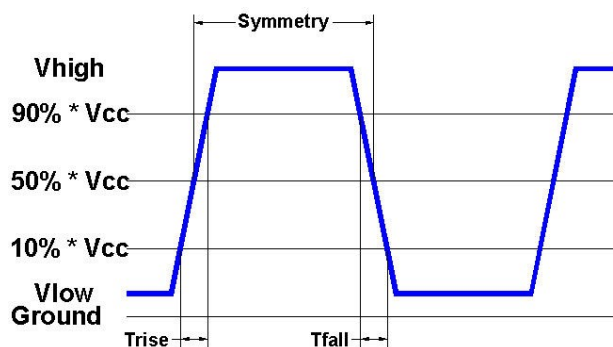
Electrical Test / Load Circuit



Notes:

CL: Includes the input capacitance of oscilloscope

* 0.01 μ F 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

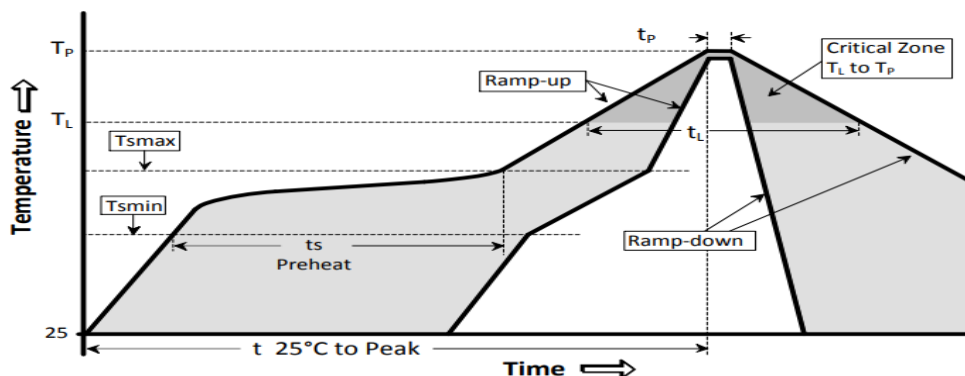
Parameter	Unit
V _{CC} Supply Voltage	-0.3V to +4.0V
V _i Input Voltage	-0.3V to V _{CC} + 0.3V
V _o Output Voltage	-0.3V to V _{CC} + 0.3V

Thermal Characteristics:

The maximum die or junction temperature is 150°C

Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

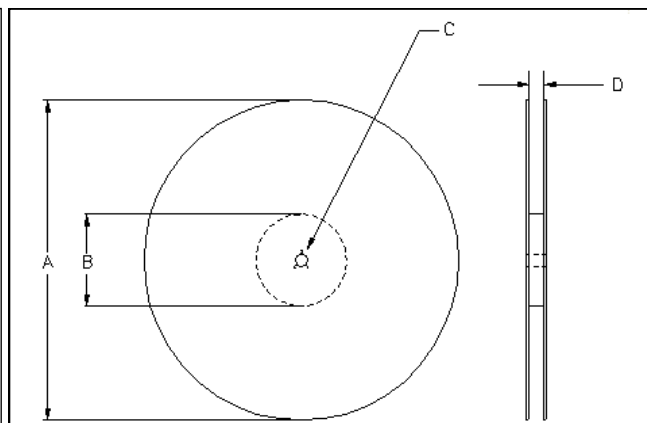
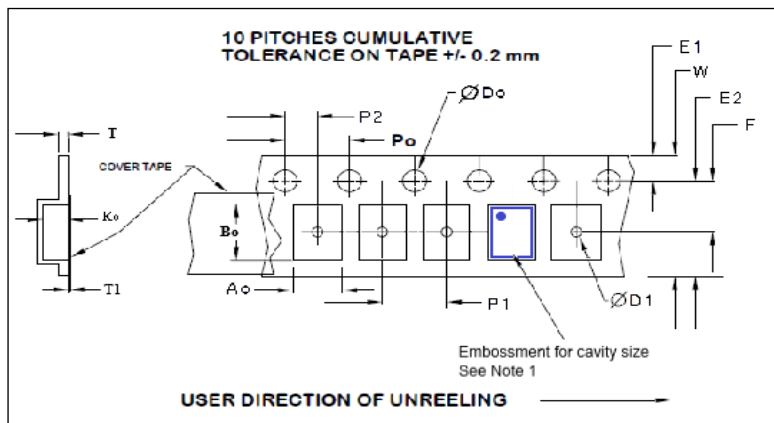


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(T _{smax} to T _P)	3°C / second max	°C / s
Ramp down Rate	T _{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	T _{to-peak}	8 minutes max	min
Preheat			
Temperature min	T _{smin}	150	°C
Temperature max	T _{smax}	200	°C
Time T _{smin} to T _{smax}	t _s	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T _L	217	°C
Time above liquidus	t _L	60 – 150	sec
Peak temperature			
Peak Temperature	T _P	260	°C
Time within 5°C of peak temperature	t _p	20 – 40	sec

Tape and Reel

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



Tape Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	A0	B0	K0
16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	5.56±0.1	7.85±0.1	2.0±0.1

Dimensions in mm Drawing Not to scale

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

Tape Constant Dimensions Table 1

Tape Size	D0	D1 typ	E1	P0	P2	T max	T1 max
16mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	0.3	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 +0.5 -0.2	Tape size +0.4
13	13.0	330	3.75	100		+2.0 -0.0



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