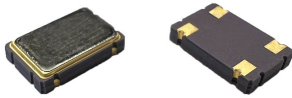




PLETRONICS SM77J Series 1.8V CMOS Clock Oscillator



SM77JX
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
- 1.8V nominal Supply Voltage
- 1.25-135 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	-	135	MHz	Consult factory for other options	
Frequency Stability ² ± 20 = 20* , ± 25 = 44 , ± 50 = 45	±20	-	±50	ppm	Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *limited frequencies, see page 3	
Operating Temperature Range ²	-10 -20 -40	- - -	+70 +70 +85	°C	Standard range Extended range C option Extended range E option	
Supply Voltage ^{1,2} (V _{CC})	1.62	1.8	1.98	V	1.8V ± 10%	
Output Waveform	CMOS					
Duty Cycle	45	-	55	%	At 50%V _{CC}	
Output V _{HIGH} (V _{OH})	V _{CC} - 0.4	-	-	V	See Load Circuit	
Output V _{LOW} (V _{OL})	-	-	0.4	V		
Output T _{RISE} and T _{FALL}	-	1.5	6	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} (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 ≥0.7V _{CC}	
Output Leakage	V _{OUT} = V _{CC} V _{OUT} = 0V	- -10	+10 -	µA	Pad 1 low, device disabled	
Standby Current	-	-	10	µA		
rms phase jitter	-	0.15	0.6	ps	≥40 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°C ± 2°C at 100 MHz
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

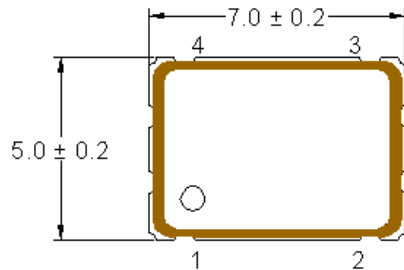
² Specified by part number

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Supply Current (I _{cc})		0.4	0.8		3 MHz
		0.7	1.4		5 MHz
		0.7	1.4		10 MHz
	-	0.8	1.6		20 MHz
	-	2.5	5.0	mA	50 MHz
	-	2.5	5.0		65 MHz
	-	3.5	7.0		85 MHz
	-	4.0	7.5		100 MHz
	-	4.5	8.5		133 MHz

Specifications with Pad 1 E/D circuit open

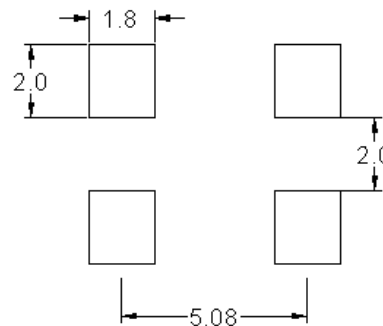
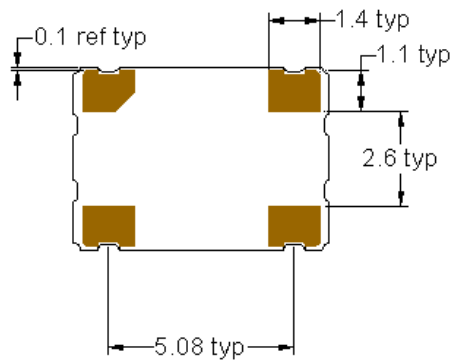
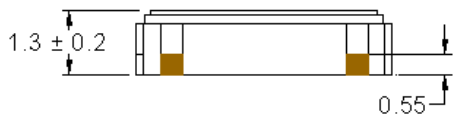
Mechanical Dimensions



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



Dimensions in mm

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

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



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Part Number						
Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V _{CC}	Frequency	Optional T&R Packaging code
SM77	45	J	E	X	- 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	X = 1.8V ±10%	1.25 - 135MHz	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

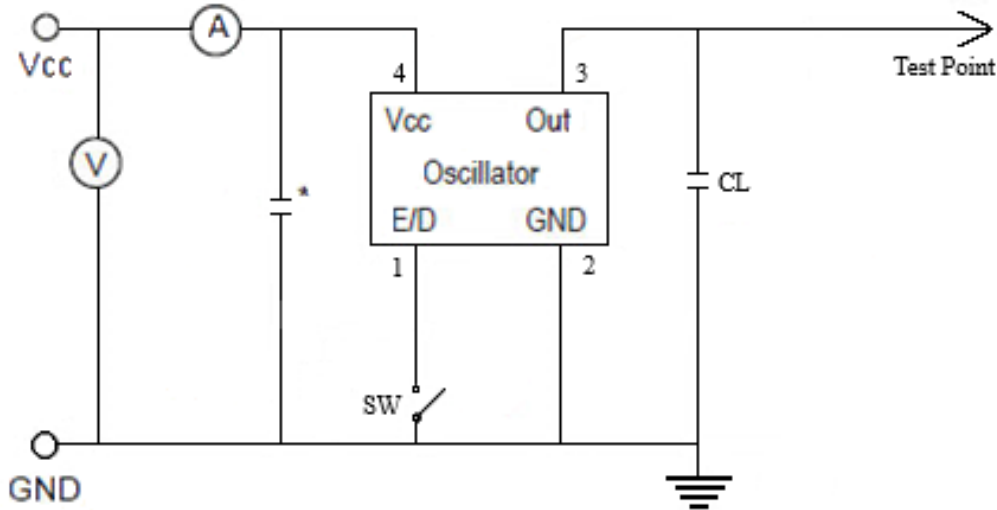
P/N: PLE Part Number Customer P/N: 12345678 Qty: 1000 D/C 2A1 MSL: 1
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RoHS Compliant 2nd Lvl Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max

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

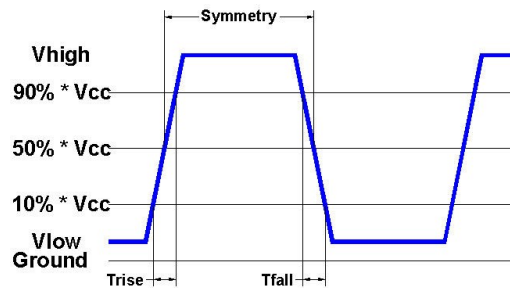
Electrical Test / Load Circuit



Notes:

CL: Includes the input capacitance of oscilloscope

* 0.01µF 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

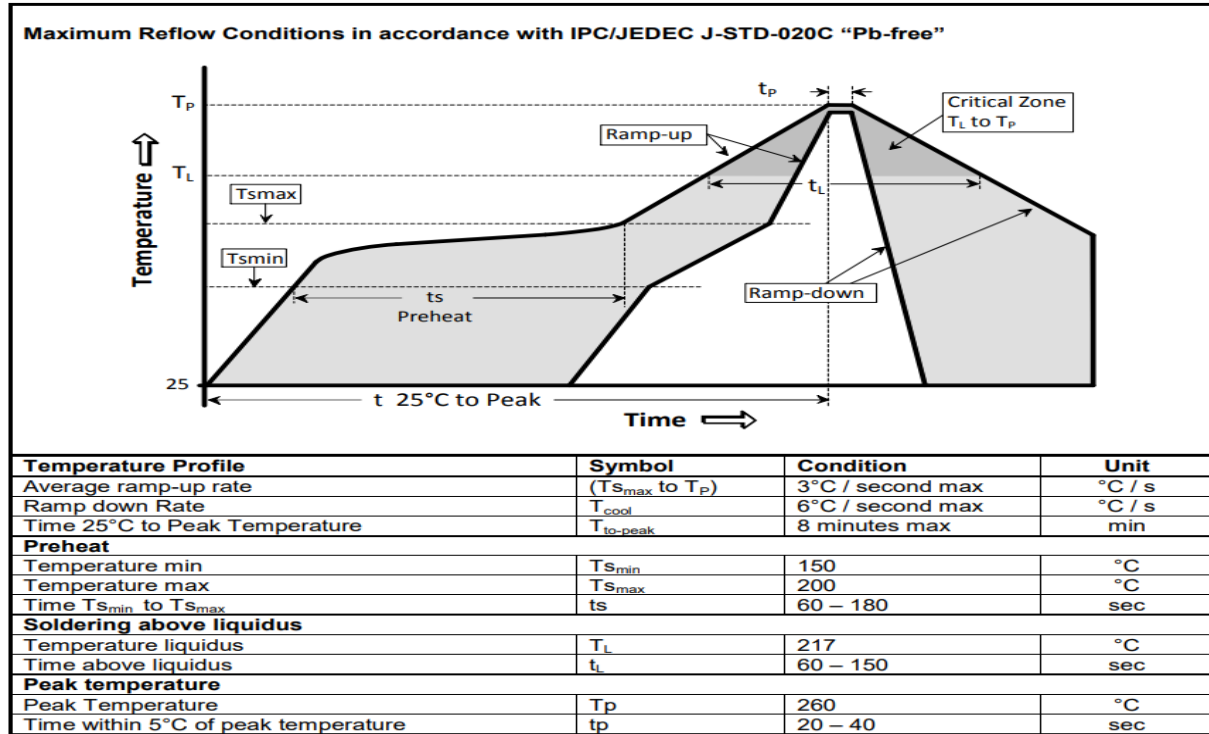
Absolute Maximum Ratings

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

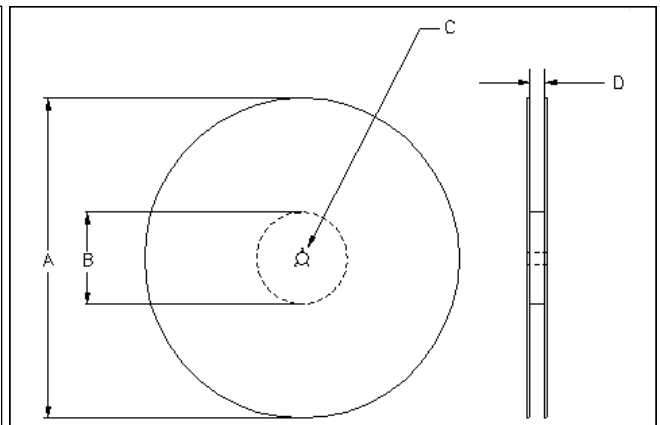
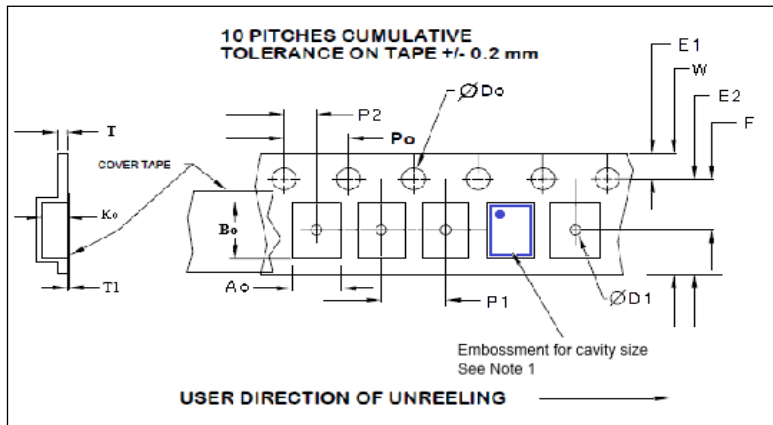
Reflow Cycle



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. 16mm tape, 8mm pitch.



Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
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 Size	Do	D1 typ	E1	Po	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 Size	A		B		C	D
	Inches	mm	Inches	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		



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