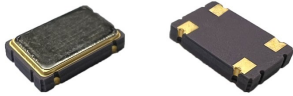




PLETRONICS SM77J Series 2.5V CMOS Clock Oscillator



SM77JW
7.0 x 5.0 x 1.7 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
- 2.5V 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 ± 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}	2.25	2.5	2.75	V	2.5V ± 10%
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	At 50%V _{CC} See Load Circuit
Output V _{HIGH}	V _{CC} - 0.4	-	-	V	
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	70	150	Kohm	To V _{CC}
Output Leakage V _{OUT} = V _{CC} V _{OUT} = 0V	-10 -10	-	+10 +10	µA	Pad 1 low, device disabled
Standby Current	-	-	10	µA	
rms phase jitter	-	0.15	0.6	Ps	≥40 MHz, 12kHz~20MHz
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



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Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition	
Supply Current I_{CC}		0.6	1.2		3 MHz	no load
		0.9	1.8		5 MHz	
		0.9	1.8		10 MHz	
	-	1.1	2.2		20 MHz	
	-	3.0	6.0	mA	50 MHz	
	-	3.0	6.0		65 MHz	
	-	4.0	8.0		85 MHz	
		4.5	8.5		100 MHz	
		5.5	10.5		133 MHz	
		9.0	18.0		170 MHz	

Specifications with Pad 1 E/D circuit open



PLETRONICS SM77J Series 2.5V 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	W	- 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	W = 2.5V ±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: SM7745JEW-125.0M Customer P/N: 12345678 Qty: 1000 D/C 0JX-MTG MSL: 1

RoHS Compliant

2nd Lvl Interconnect

Category=e4

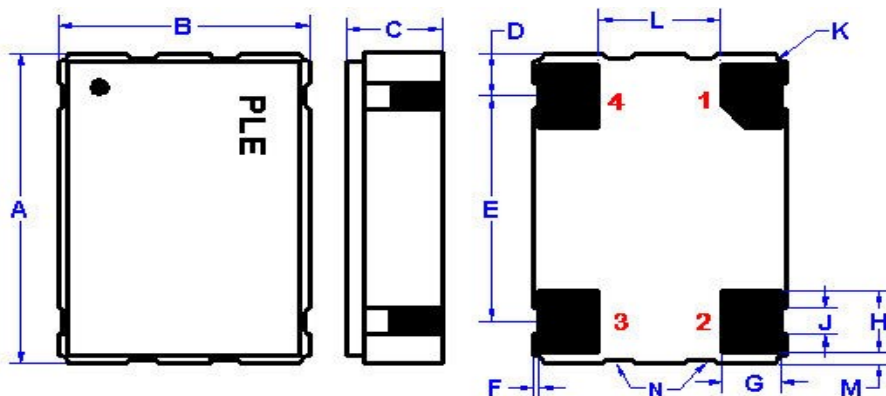
Max Safe Temp=260C for 10s 2X Max

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

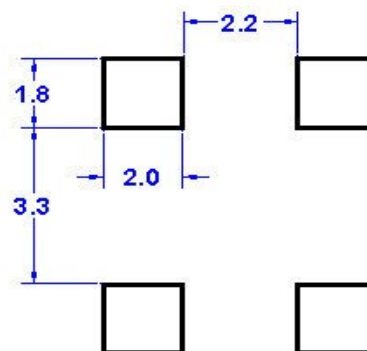
Mechanical Dimensions

	Inches	mm
A	0.276 ± 0.006	7.00 ± 0.15
B	0.197 ± 0.006	5.00 ± 0.15
C	0.067 Max	1.70 Max
D ¹	0.038	0.96
E ¹	0.200	5.08
F ¹	0.004	0.10
G ¹	0.043	1.10
H ¹	0.055	1.40
J ¹	0.024	0.60
K ¹	0.008R	0.20R
L ¹	0.102	2.60
M ¹	0.010	0.26
N	End Detents optional	



Pad Layout mm shown

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



¹ Typical dimensions

Contacts (pads): Gold 11.8 to 39.4 μmches (0.3 to 1.0 μm) over Nickel 50 to 350 μmches (1.27 to 8.89 μm)

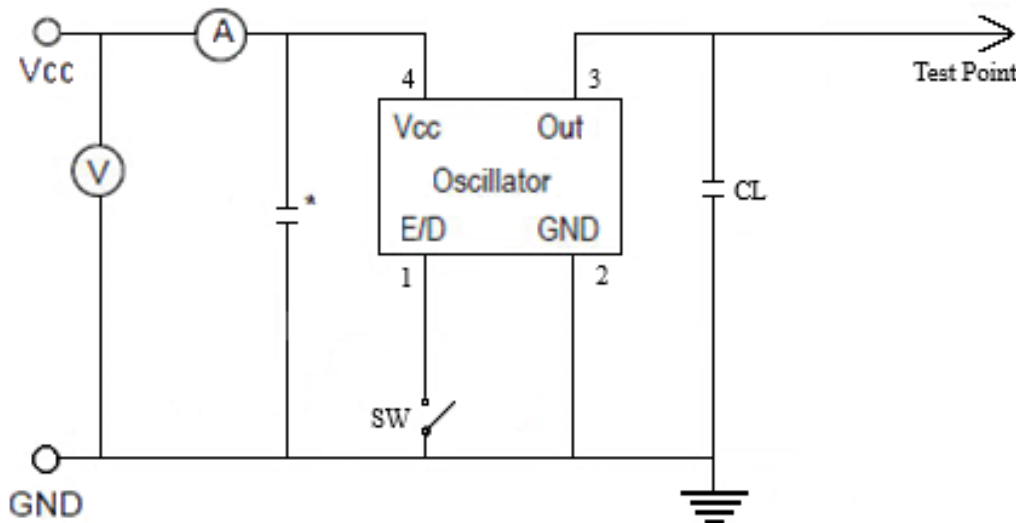
Layout

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

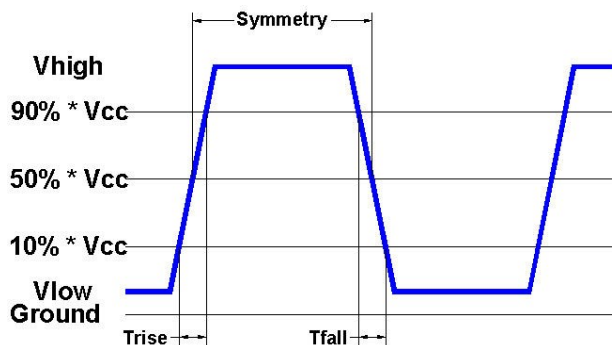
Electrical Test / Load Circuit



Notes:

CL: Includes the input capacitance of oscilloscope

* 0.01 μ F external by-pass filter is recommended



Environmental / ESD Ratings

Reliability: Environmental

ESD Rating

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

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

Absolute Maximum Ratings

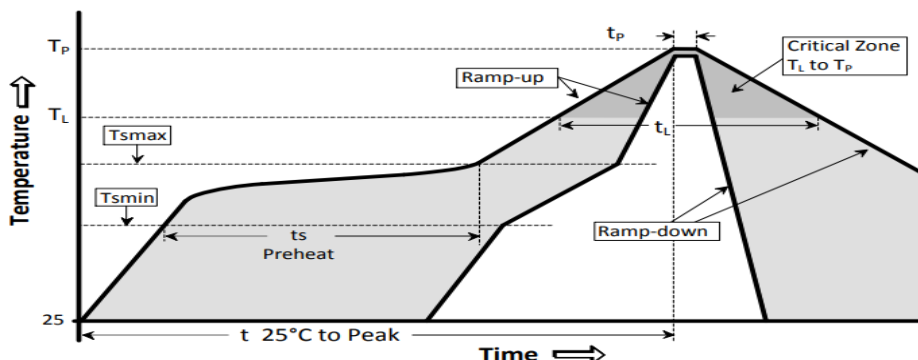
Parameter	Unit
V _{CC} Supply Voltage	-0.3V to +4.0V
V _i Input Voltage	-0.3V to V _{CC} + 0.3V
V _o Output Voltage	-0.3V to V _{CC} + 0.3V

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"

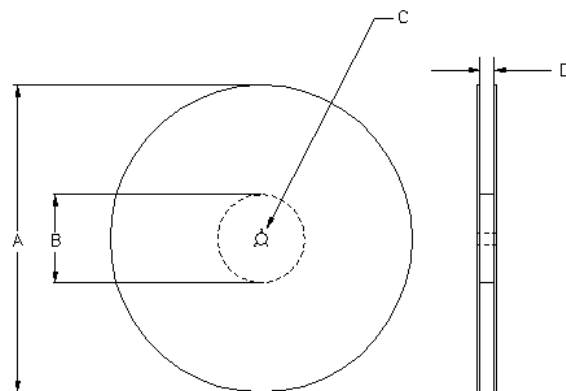
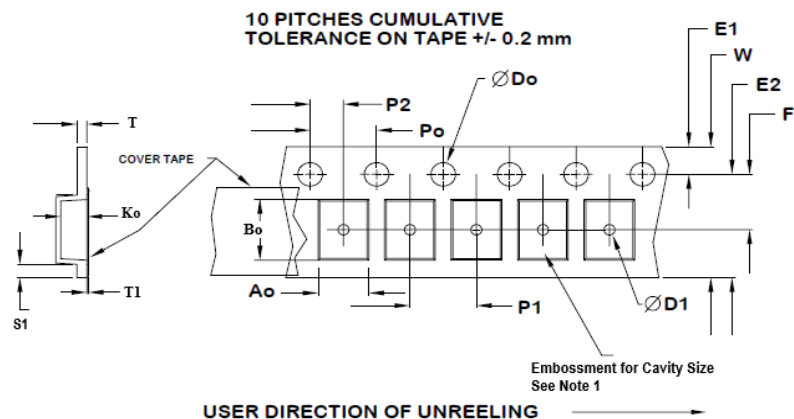


The part may be reflowed 2 times without degradation (typical for lead free processing).

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}	ts	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	tp	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	A ₀	B ₀	K ₀
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	Do	D1 min	E1	Po	P2	S1 min	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	0.6	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	177.8	2.50	63.5	13.0	Tape size +0.4
10	10.0	254.0	4.00	101.6	+0.5 -0.2	+2.0 -0.0
13	13.0	330.2	3.75	95.3		



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