



SM44T006-40.0M 2.8 V CMOS Clock Oscillators

December 2012



- Pletronics' SM44 Series is a quartz crystal controlled precision square wave generator with a CMOS output.
- The package is designed for high density surface mount designs.
- This is a low cost mass produced oscillator.
- Tape and Reel or cut tape packaging is available.
- 2.5 x 3.2 mm LCC Ceramic Package
- Enable/Disable Function
- Disable function includes low standby power mode
- Low Jitter

**Pletronics Inc. certifies this device is in accordance with the
RoHS 6/6 (2002/95/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:
Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.041 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D.1
Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +7.0V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V
I _o Output Current	+25 mA to -25 mA

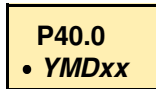
Thermal Characteristics

The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 40 to 60°C/Watt depending on the solder pads, ground plane and construction of the PCB.

ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Marking Legend:



YMD = Date of Manufacture (year and week, or year-month-day)
All other marking is internal factory codes

Codes for Date Code YMD

Code	10	1	2	3	4	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2010	2011	2012	2013	2014	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

Label is 1" x 2.6" (25.4mm x 66.7mm)

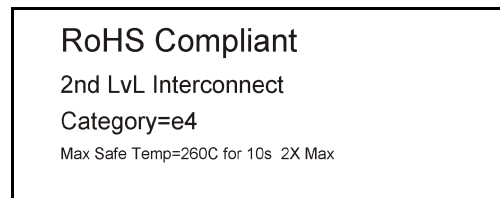
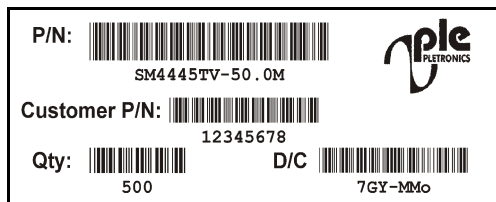
Font is Courier New

Bar code is 39-Full ASCII

The P/N will be shown as SM44T004-40.0M

Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Arial



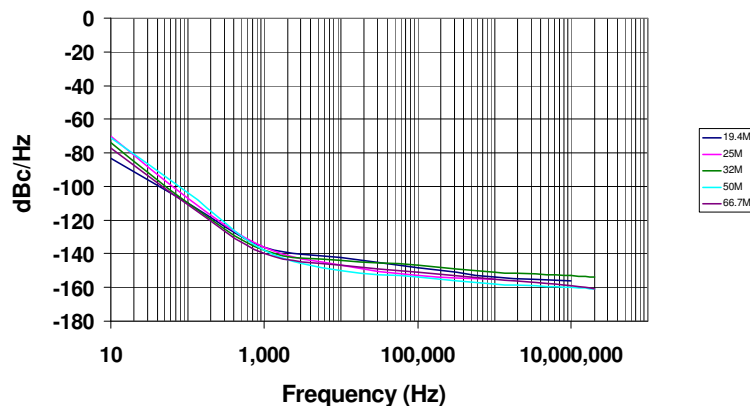
Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

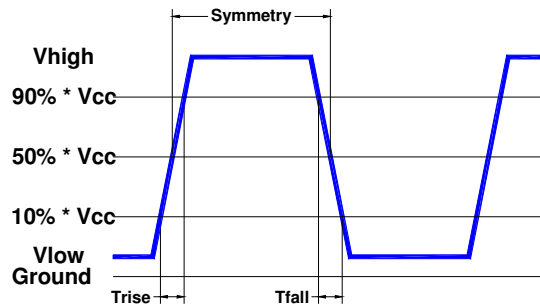
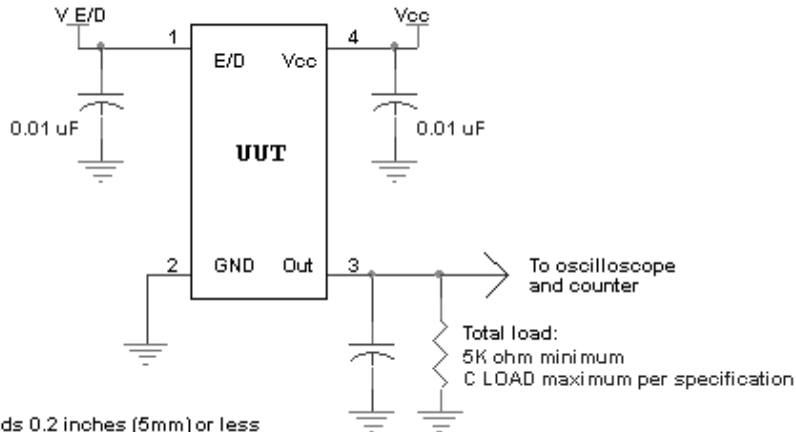
Electrical Specification for 2.80V $\pm 10\%$ over the specified temperature range

Item	Min	Max	Unit	Condition
Frequency Range	40	110	MHZ	
Frequency Accuracy	-20	+20	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
Output Waveform	CMOS			
Output High Level	90	-	%	of V_{CC} (See load circuit)
Output Low Level	-	10	%	
Output T_{RISE} and T_{FALL}	-	3	nS	$C_{LOAD} = 15$ pF
	-	5	nS	$C_{LOAD} = 30$ pF
Output Symmetry	45	55	%	10% to 90% of V_{CC} See Load Circuit at 50% point of V_{CC}
Jitter	-	0.6	pS RMS	12 KHz to 20 MHz from the output frequency
	-	2.5	pS RMS	10 Hz to 1 MHz from the output frequency
V_{CC} Supply Current (I_{CC})	-	9	mA	$C_{LOAD} = 15$ pF
	-	15	mA	$C_{LOAD} = 30$ pF
Enable/Disable Internal Pull-up	50	-	Kohm	to V_{CC}
V disable	-	30	%	of V_{CC} applied to pad 1
V enable	70	-	%	
Output leakage $V_{OUT} = V_{CC}$	-10	+10	uA	Pad 1 low, device disabled
	$V_{OUT} = 0V$	-10	+10	
Standby Current I_{CC}	-	3	uA	
Enable time	-	100	nS	Time for output to reach a logic state
Disable time	-	100	nS	Time for output to reach a high Z state
Start up time	-	3	mS	Time for output to reach specified frequency
Operating Temperature Range	-40	+85	°C	
Storage Temperature Range	-55	+125	°C	

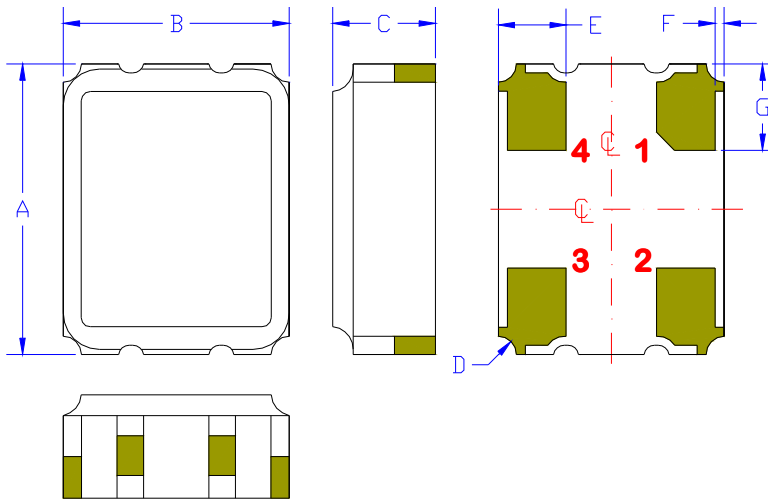
Typical phase noise plot for 5 oscillators at different output frequencies.



Load Circuit and Test Waveform



Mechanical:



	Inches	mm
A	0.125 ±0.006	3.20 ±0.15
B	0.098 ±0.006	2.50 ±0.15
C	0.041 ±0.004	1.05 ±0.10
D ¹	0.008	0.20R
E ¹	0.030	0.75
F ¹	0.004	0.10
G ¹	0.037	0.95

Not to Scale

¹ Typical dimensions

Contacts :

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)

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

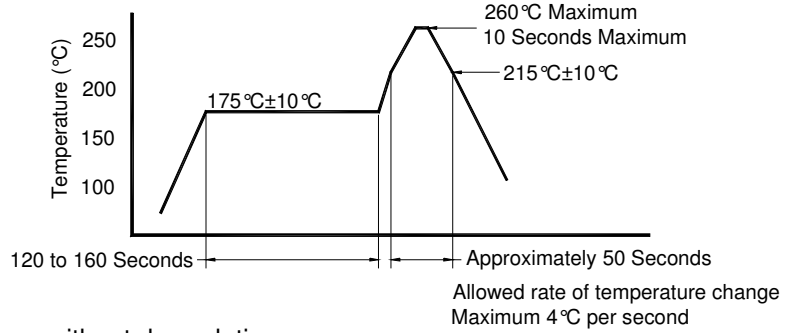
Layout and application information



For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.

Reflow Cycle (typical for lead free processing)



The part may be reflowed 3 times without degradation.

Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

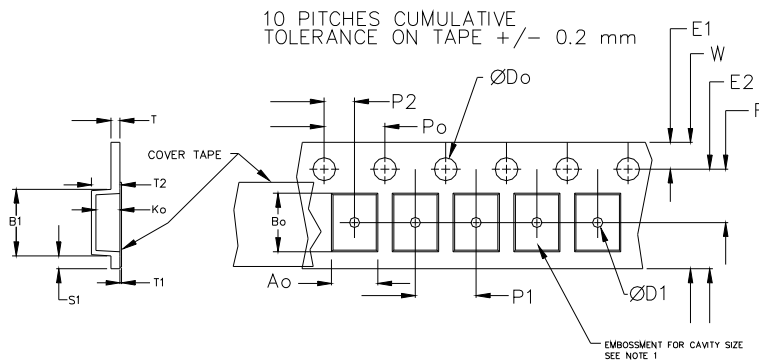
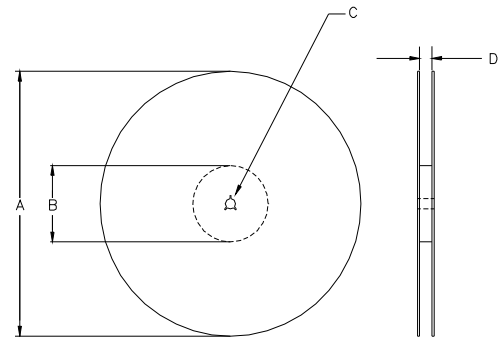
Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm		1.5			± 0.1			
24mm		1.5			± 0.1			

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

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

Dimensions in mm

Not to scale



USER DIRECTION OF UNREELING →

REEL DIMENSIONS					
A	inches	7.0	10.0	13.0	Tape Width
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	

Reel dimensions may vary from the above

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Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

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