



# PLETRONICS BM44T002-25.0M CMOS Clock Oscillator



BM44T002-25.0M  
3.2 x 2.5 x 1.05 mm  
LCC Ceramic Package

## Features

- Pletronics' BM44T 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
- 25.000MHz

## 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 <sup>2</sup>	-	25		MHz	
Frequency Stability <sup>2</sup>	-	-	±50	ppm	Includes supply voltage change, load change, 1 year aging at 25°C ± 2°C, shock, vibration and operating temperature
Operating Temperature Range <sup>2</sup>	-40		+85	°C	
Supply Voltage <sup>1,2</sup> V <sub>CC</sub>	2.62	3.30	3.63	V	
Input Current I <sub>CC</sub>	-	2.5	-	mA	CL=15pF
Output	CMOS				CL=15pF
Duty Cycle	45	-	55	%	See Load Circuit
Output V <sub>HIGH</sub>	V <sub>CC</sub> - 0.4	-	-	V	
Output V <sub>LOW</sub>	-	-	0.4	V	
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	1	5	ns	C <sub>LOAD</sub> = 15 pF; 10% to 90% of V <sub>CC</sub> See Load Circuit
Startup Time	-	-	7	ms	After V <sub>DD</sub> ≥ 1.62V; Time for output to reach specified frequency
V <sub>DISABLE</sub>	-	-	30	%	Of V <sub>CC</sub> applied to Pad 1
V <sub>ENABLE</sub>	70	-	-		
Enable Time	-	-	7	ms	
Disable Time	-	-	100	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	-	70	-	Kohm	To V <sub>CC</sub>
Standby Current I <sub>ST</sub>	-	-	10	µA	Pad 1 low, device disabled, Output Tri-stated
Phase Noise					25°C ± 2°C
	10 Hz	-85		dBc/Hz	
	100 Hz	-111			
	1 kHz	-128			
	10 kHz	-150	-		
	100 kHz	-162			
	1 MHz	-164			
	5 MHz	-164			
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit

<sup>1</sup> Place an appropriate power supply bypass capacitor next to device for correct operation

<sup>2</sup> Specified by part number



# PLETRONICS BM44T002-25.0M CMOS Clock Oscillator

## Device Marking

**PFF.FFM**  
• YMxxx

**PFF.FFM** = Pletronics/Frequency in MHz  
**YMxxx** = Date Code (YearMonth), All other marking is internal code

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.

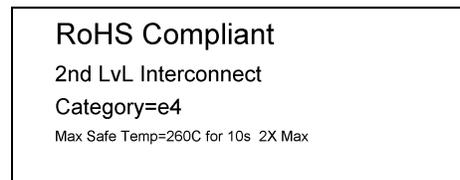
Codes for Date Code YM (Year Month)

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

## 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

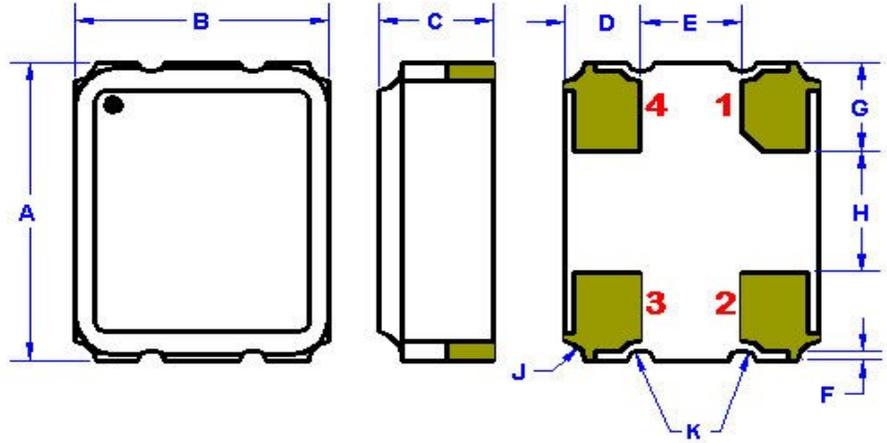


**Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.**

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.024 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4

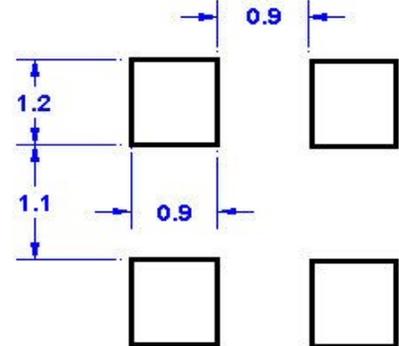
### Mechanical Dimensions

	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 <sup>1</sup>	0.030	0.75
E <sup>1</sup>	0.039	1.00
F <sup>1</sup>	0.004	0.10
G <sup>1</sup>	0.043	1.10
H <sup>1</sup>	0.039	1.00
J <sup>1</sup>	0.008	0.20R
K	End Detents optional	



**Pad Layout** mm shown

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



<sup>1</sup> Typical dimensions

(Not to Scale)

**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)

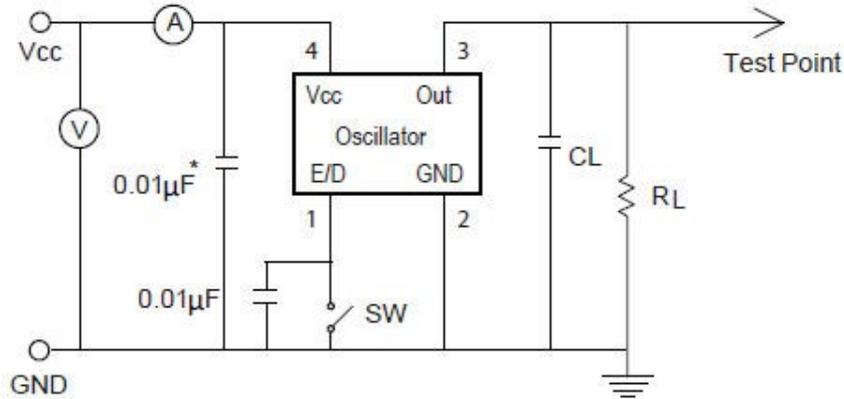
### Layout

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 <sub>CC</sub> if the oscillator is to be always on.
2	Ground (GND)	
3	Output	CMOS
4	V <sub>CC</sub> Supply Voltage	Connect an appropriate power supply bypass capacitor as close as possible

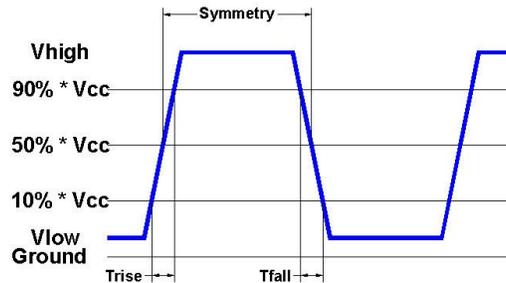
For Optimum Jitter Performance, Pletronics recommends:

- 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:  
 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

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	MIL-STD-883 3015.7
Machine Model	200V	EIAJ ED-4701/304

Absolute Maximum Ratings

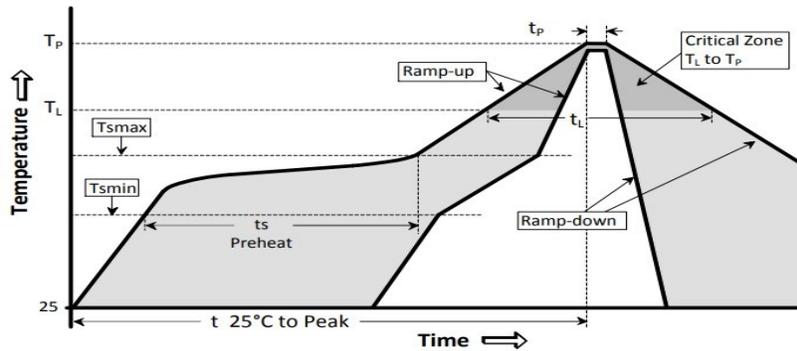
Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.3V to +4.0V
V <sub>i</sub> Input Voltage	-0.3V to V <sub>CC</sub> + 0.3V
V <sub>o</sub> Output Voltage	-0.3V to V <sub>CC</sub> + 0.3V

### Thermal Characteristics:

The maximum die or junction temperature is 125°C

### Reflow Cycle

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

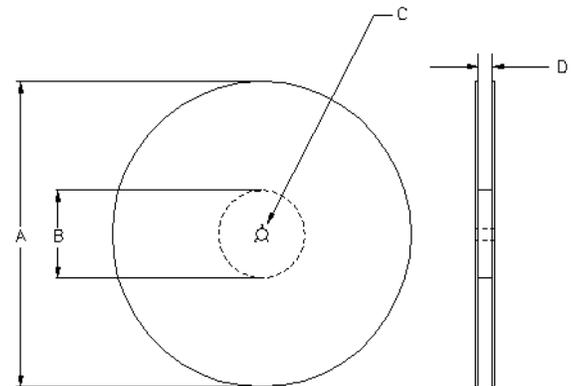
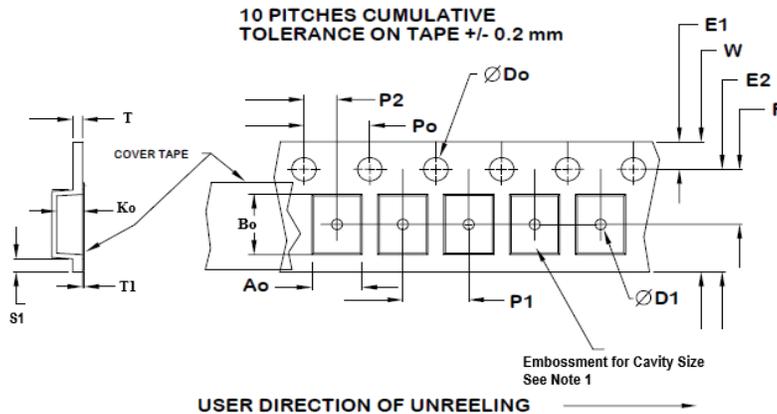


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	( $T_{S_{max}}$ 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
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
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 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.



Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
8mm	6.25	3.5 ±0.05	4.0 ±0.1	8.2	2.7±0.1	3.4±0.1	1.4±0.1

Reel Size	A		B		C	D
	Inches	mm	Inches	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		
13	13.0	330.2	3.75	95.3	+0.5 -0.2	+2.0 -0.0

Dimensions in mm Drawing Not to scale

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

Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5	1.0	±0.1	±0.1	2.0	0.6	0.3	0.1
12mm		1.5			±0.05			
16mm	+0.1 -0.0	1.5			2.0			
24mm		1.5			±0.1			



## Important Notice

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's limited warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

PLE assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using PLE components. To minimize the risks associated with the customer products and applications, customers should provide adequate design and operating safeguards.

PLE products are not designed, intended, authorized or warranted to be suitable for use in life support applications, weapons, weapon systems or space applications, devices or systems or other critical applications that may involve potential risks of death, personal injury or severe property or environmental damage. Inclusion of PLE products in such applications is understood to be fully at the risk of the customer. Use of PLE products in such applications requires the written approval of an appropriate PLE officer. Questions concerning potential risk applications should be directed to PLE.

PLE does not warrant or represent that any license, either express or implied, is granted under any PLE patent right, copyright, artwork or other intellectual property right relating to any combination, machine or process which PLE product or services are used. Information published by PLE regarding third-party products or services does not constitute a license from PLE to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from PLE under the patents or other intellectual property of PLE.

Reproduction of information in PLE data sheets or web site is permissible only if the reproduction is without alteration and is accompanied by associated warranties, conditions, limitations and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. PLE is not responsible or liable for such altered documents.

Resale of PLE products or services with statements different from or beyond the parameters stated by PLE for that product or service voids all express and implied warranties for the associated PLE product or service and is an unfair or deceptive business practice. PLE is not responsible for any such statements.

### Contacting Pletronics Inc.

Pletronics, Inc.  
19013 36th Ave. West  
Lynnwood, WA 98036-5761  
U.S.A.

Tel: 425.776.1880  
Fax: 425.776.2760  
email: [ple-sales@pletronics.com](mailto:ple-sales@pletronics.com)

URL: [www.pletronics.com](http://www.pletronics.com)