PLETRONICS BM44T001-24.0M
CMOS Clock Oscillator

BM44T001-24.0M
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
- 24.000MHz

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 [2]	-	24		MHz	
Frequency Stability [2]	-	-	±50	ppm	Includes supply voltage change, load change, 1 year aging at 25°C ± 2°C, shock, vibration and operating temperature
Operating Temperature Range [2]	-40		+85	°C	
Supply Voltage [1, 2] V_{CC}	2.62	3.30	3.63	V	
Input Current I_{CC}	-	2.5	-	mA	CL=15pF
Output	CMOS				CL=15pF
Duty Cycle	45	-	55	%	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	-	-	7	ms	After Vdd ≥ 1.62V; Time for output to reach specified frequency
$V_{DISABLE}$	-	-	30	%	Of V_{CC} applied to Pad 1
V_{ENABLE}	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_{CC}
Standby Current I_{ST}	-	-	10	µA	Pad 1 low, device disabled, Output Tri-stated
Phase Noise 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 5 MHz	-	-85 -111 -128 -150 -162 -164 -164	-	dBc/Hz	25°C ± 2°C
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

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

RoHS Compliant
2nd LvL Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

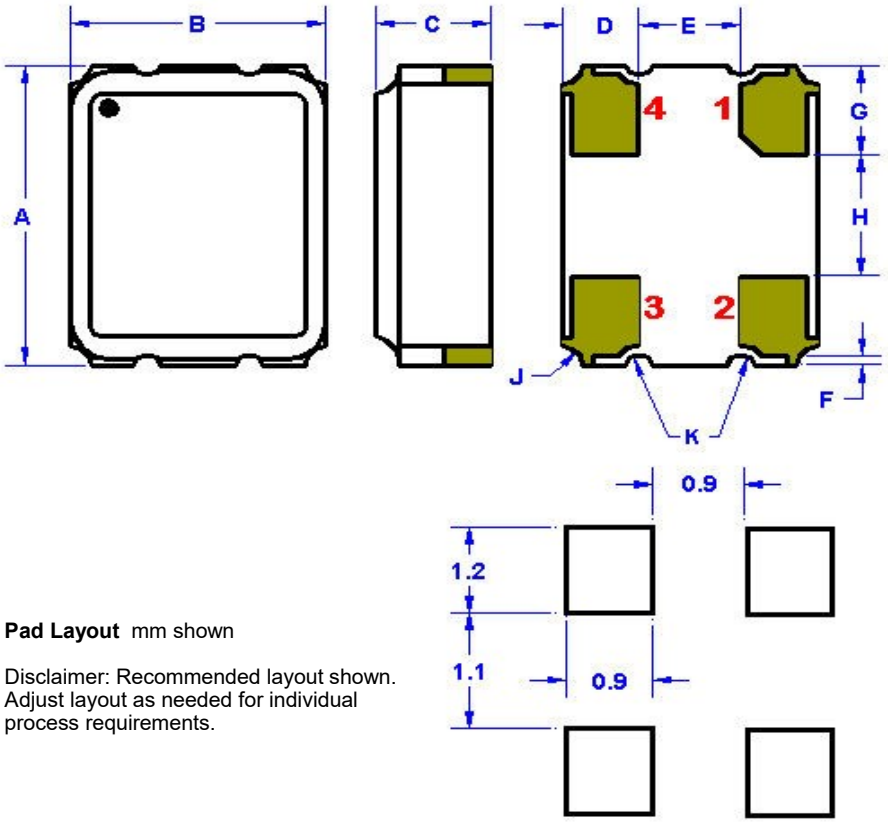
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.024 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[1]	0.030	0.75
E[1]	0.039	1.00
F[1]	0.004	0.10
G[1]	0.043	1.10
H[1]	0.039	1.00
J[1]	0.008	0.20R
K	End Detents optional	

[1] Typical dimensions



Pad Layout mm shown

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

(Not to Scale)

Contacts (pads): 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)

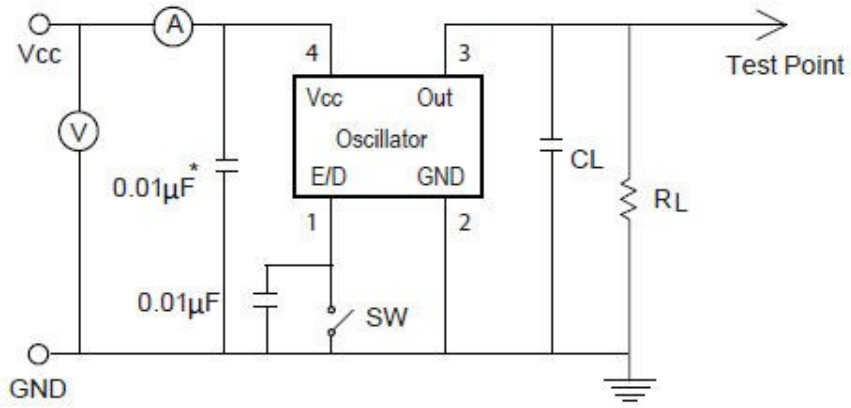
Layout

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

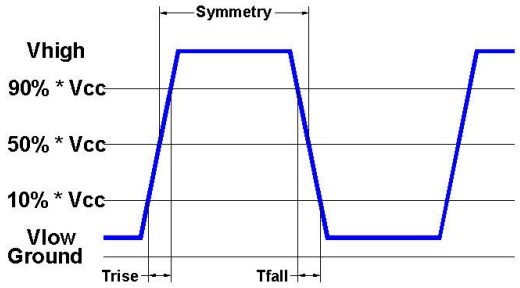
For Optimum Jitter Performance, Pletronics recommends:

- 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:
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

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

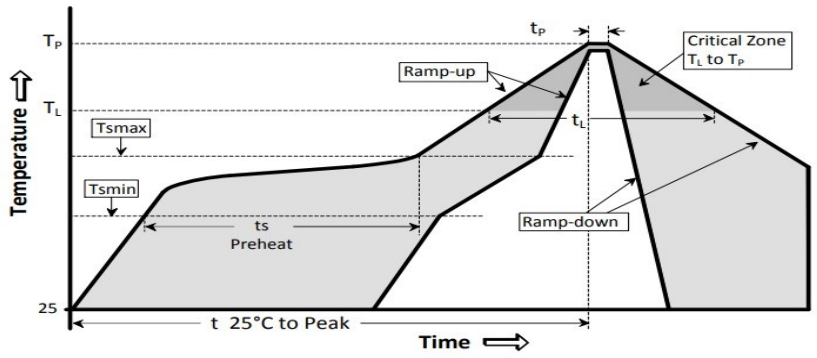
Thermal Characteristics:
The maximum die or junction temperature is 125°C

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.3V to +4.0V
Vi Input Voltage	-0.3V to V_{CC} + 0.3V
Vo Output Voltage	-0.3V to V_{CC} + 0.3V

Reflow Cycle

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

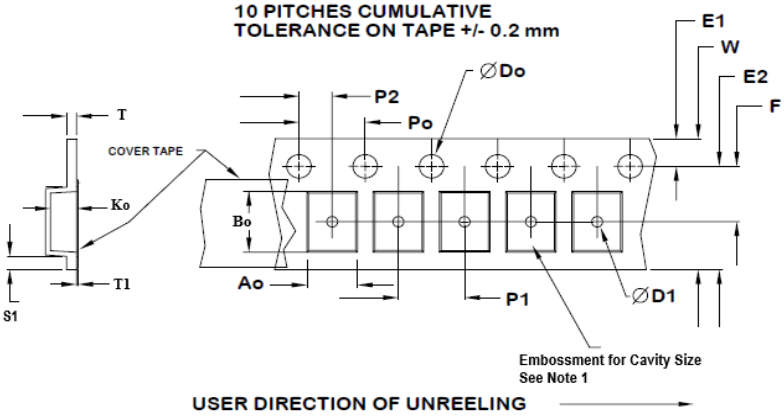


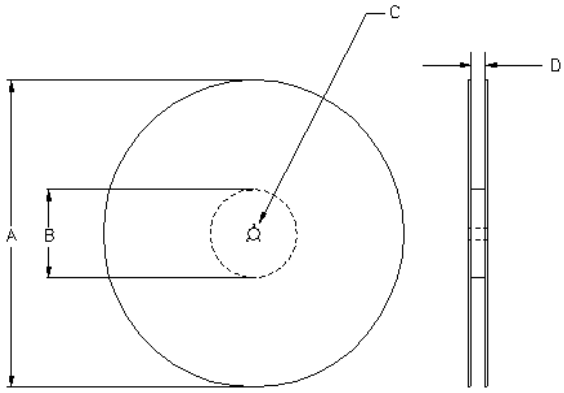
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time Ts_{min} to Ts_{max}	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	Tp	260	°C
Time within 5°C of peak temperature	tp	20 – 40	sec

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 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.





Tape Variable Dimensions Table 2							
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

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
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.3	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inch-es	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		

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