

## OeD4204-10.00M TCVCXO Oscillator

March 2014

- Pletronics' OeD4204-10.00M is from the OeXO™ Series of temperature compensated voltage controlled crystal oscillator with a CMOS output.
- Cut Tape -or- Tape and Reel packaging
- 3.2 x 5 mm LCC Ceramic Package
- Supply Voltage: 3.3V

**Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2011/65/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: 0.10 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4



### Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +6.5V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

### Thermal Characteristics

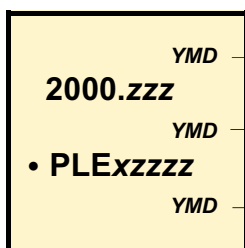
The maximum die or junction temperature is 155°C

The thermal resistance junction to board is 30 to 50°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

## Part Marking:



2000	=	20.00 frequency in MHz
PLE	=	Pletronics
x	=	Model number, normally a "B"
z	=	Internal factory code
YMD	=	Manufacturing date code (may appear on any line on part)

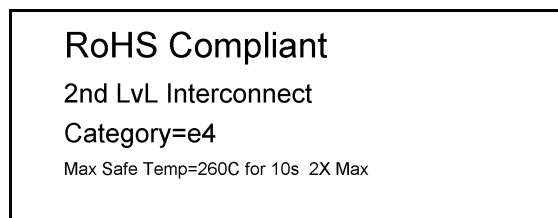
The actual part number is OED4204-10.00M where the model number "204" is the specification number the part is made to. This is not included in the part marking. This is included on the label on the Tape and Reel.

Note that the crystal frequency is 2 times the specified frequency of 10.00MHz. The TCXO IC used divides the crystal frequency by 2 resulting in a 10.00MHz output.

## Package Labeling

Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

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



## Reliability: Environmental Compliance

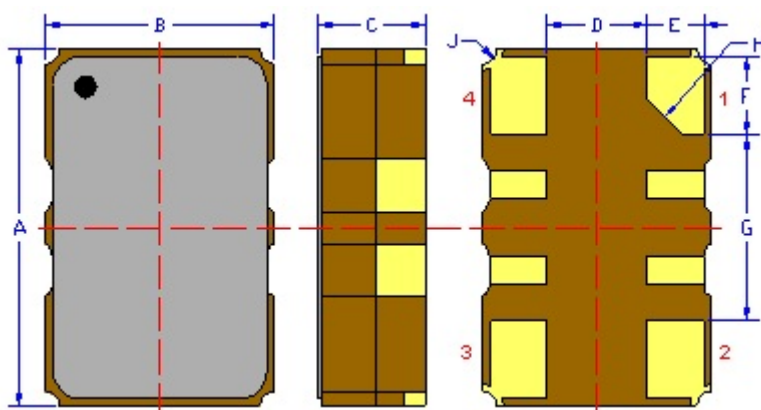
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

**Electrical Specification for specified Vcc= 3.3V  $\pm$ 5% over the specified temperature range.**

Item	Min	TYP	Max	Unit	Condition
Frequency Stability over temperature	-50	-	50	ppb	Over 0°C to 70°C at fixed supply voltage + load (reference to midpoint min/max frequency)
Holdover	-50 -40	0 0	50 40	ppb ppb	Over 0°C to 70°C for 24 hours Over $\pm$ 5°C change for 24 hours
Frequency Calibration	-2.0	-	2.0	ppm	Frequency offset at 25°C, 60 minutes after reflow.
Supply voltage stability	-10	0	10	ppb	$\pm$ 2% variation in supply voltage
Load sensitivity	-5	-	5	ppb	10K ohm $\pm$ 5%    10 pF $\pm$ 10%
Warm Up	-	0.4	3.0	S	Time to reach specified frequency
Aging rate following reflow	- - -	$\pm$ 10 $\pm$ 3 $\pm$ 1	- - -	ppb/day	1 day after reflow 7 days after reflow 30 days after reflow
Long term stability (Aging)	-1000 -1500 -4600	- - -	1000 1500 4600	ppb	after 1 year after 5 years after 15 years
Output Waveform	CMOS				
Output V <sub>HIGH</sub>	90	-	-	%Vs	Load: 10K ohm $\pm$ 5%    10 pF $\pm$ 10% Vth: T <sub>R</sub> and T <sub>F</sub> 10% and 90% of amplitude Vth: D.C. 50% of amplitude
Output V <sub>LOW</sub>	-	-	10	%Vs	
T <sub>RISE</sub> and T <sub>FALL</sub>	-	-	6.5	nS	
Duty Cycle	40	50	60	%	
Phase Noise 1 Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz	- - - - - -	-71 -93 -117 -138 -152 -155	- - - - - -	dBc/Hz	at 25°C
Jitter	-	-	0.6	pS	Frequency offset from carrier 12kHz to 20MHz
V Supply Range <sup>1</sup> V <sub>CC</sub>	3.13	3.30	3.47	Volts	
Supply Current I <sub>CC</sub>	-	-	3.0	mA	
Vcontrol Range	0.5	-	2.50	Volts	1.50 volts nominal
Frequency Pullability	5	-	10	$\pm$ ppm	Slope positive
Linearity	-	0.05	2.0	%	In accordance with MIL-PRF-55310
Operating Temperature	0	-	+70	°C	Widest range allowed
Storage Temperature	-55	-	+95	°C	

Note: <sup>1</sup> For correct operation a 10nF supply de-coupling capacitor should be placed next to the device.

## Mechanical:



Not to Scale

<sup>1</sup> Typical dimensions

	Inches	mm
A	0.197 $\pm$ 0.008	5.00 $\pm$ 0.20
B	0.126 $\pm$ 0.008	3.20 $\pm$ 0.20
C	0.059 max	1.50 max
D <sup>1</sup>	0.055	1.40
E <sup>1</sup>	0.031	0.80
F <sup>1</sup>	0.043	1.10
G <sup>1</sup>	0.102	2.60
H <sup>1</sup>	0.013C	0.50C
J <sup>1</sup>	0.008	0.20R

### Contacts:

Gold 11.8 to 39.4  $\mu$ inches (0.3 to 1.0  $\mu$ m)  
over  
Nickel 50 to 350  $\mu$ inches (1.27 to 8.89  $\mu$ m)

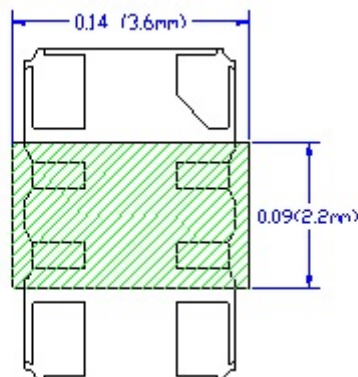
Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground.
2	Ground (GND)	
3	Output	CMOS
4	Supply Voltage (V <sub>cc</sub> )	Connect an appropriate power supply bypass capacitors as close as possible.
-	N. C.	All other pads on the bottom shall not be connected. These are internally connected and were for the TCXO compensation process

## Layout and application information

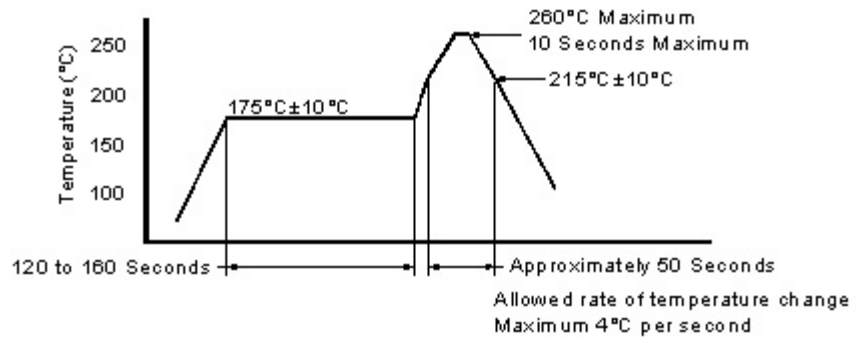
All connection points in the designated region have solder mask cover to avoid any electrical connections

For Optimum Stability and 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.
- minimize air flow across the device



## Reflow Cycle (typical for lead free processing)



The part may be reflowed 2 times without degradation.

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

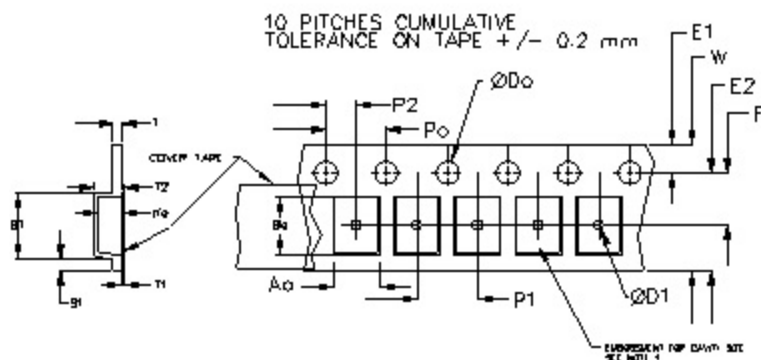
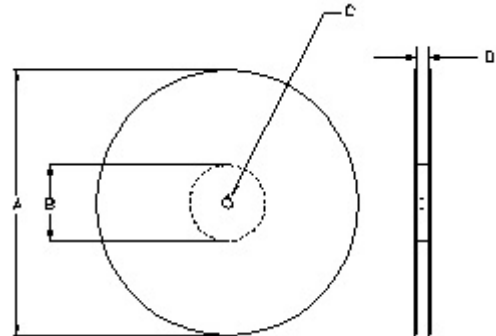
Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5  +0.1 -0.0	1.0	1.75  ±0.1	4.0  ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5			2.0 ±0.1			
16mm		1.5						
24mm		1.5						

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



from the above

USER DIRECTION OF UNREELING →

REEL DIMENSIONS					Tape Width
A	inches	7.0	10.0	13.0	
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			16.0
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	

Reel dimensions may vary

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