



# OeM4213-19.20M TCVCXO Oscillator

November 2010

- Pletronics' OeM4 is from the OeXO™ Series of temperature compensated voltage controlled crystal oscillator with a CMOS output.
- Tube packaging is available
- Hermetically sealed Metal Package to replace DIP/DIL OCXOs
- Supply Voltage range: 3.10 to 12.0V

**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: 4.00 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D.1  
Second Level Interconnect code: e1



## Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +12.0V
V <sub>CONTROL</sub> Voltage	-0.5V to +3.0V or limited to ±5mA
V <sub>o</sub> Output Voltage	-0.5V to +6.0V

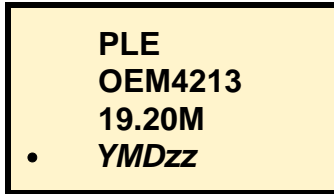
## Thermal Characteristics

The maximum die or junction temperature is 155°C  
The thermal resistance junction to board is 120°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:



PLE = Pletronics  
 OEM4 = Model number of the series  
 19.20 = frequency in MHZ  
 4213 = Model number  
 YMD = Year, Month and Date of manufacture  
 zz = internal factory code

### Codes for Date Code YMD

Code	0	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	

### 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

### Package Labeling

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





Font is Courier New

Bar code is 39-Full ASCII

The bar code will show the actual Part Number OEM4213-19.20M

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

Font is Arial

<b>P/N:</b>  <small>OEM4xxx-ff.fFM</small> <b>Customer P/N:</b>  <small>123456</small> <b>Qty:</b>  <small>1000</small>	<b>D/C</b>  <small>0GD</small>
MSL: 1	

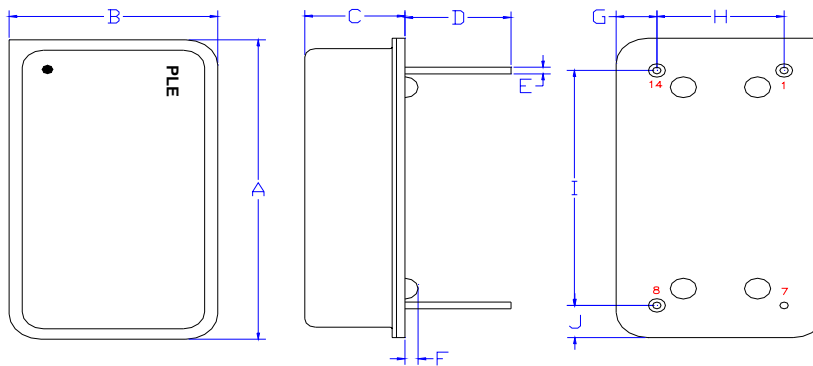
<b>RoHS Compliant</b> 2nd Lvl Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max
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## Electrical Specification over the specified temperature range.

Item	Min	TYP	Max	Unit	Condition
Frequency Stability over temperature	-250	-	250	ppb	Over -40°C to 85°C at fixed supply voltage + load (reference to midpoint min/max frequency)
Holdover	-250 -125	0 0	250 125	ppb ppb	Over -40°C to 85°C for 24 hours Over $\pm 5^\circ\text{C}$ 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 $\pm 10\%$    15 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 $V_{\text{HIGH}}$	2.80	-	-	V	Load: 10K ohm $\pm 10\%$    15 pF $\pm 10\%$ Vth: $T_{\text{R}}$ and $T_{\text{F}}$ 10% and 90% of amplitude Vth: D.C. 50% of amplitude
Output $V_{\text{LOW}}$	-	-	0.20	V	
$T_{\text{RISE}}$ and $T_{\text{FALL}}$	-	-	4.0	nS	
Duty Cycle	40	50	60	%	
Phase Noise 1 Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz	- - - - - -	-71 -92 -115 -135 -148 -149	- - - - - -	dBc/Hz	at 25°C
Jitter	-	-	0.6	pS	Frequency offset from carrier 12kHz to 20MHz
V Supply Range <sup>1</sup> $V_{\text{CC}}$	3.10	-	12.0	Volts	
Supply Current $I_{\text{CC}}$	-	-	5.0	mA	
$V_{\text{CONTROL}}$ Range	0.5	-	2.50	Volts	1.50 volts nominal
$V_{\text{CONTROL}}$ Input Current	-50	-	50	uA	
Frequency Pullability	5	-	10	$\pm$ ppm	Slope positive
Linearity	-	0.05	2.0	%	In accordance with MIL-PRF-55310
Operating Temperature	-40	-	+85	°C	
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:



Cover:  
Kovar  
Electroless Nickel Plated  
1 μinch (25 μm) typical  
Resistance welded to base

Base:  
Kovar  
Glass to metal sealed leads

Label:  
Laser marked

Pin 7 Connected to case

	Inches	mm
A	0.787 ±0.005	20.00 ±0.13
B	0.487 ±0.005	12.37 ±0.13
C	0.225 ±0.011	5.72 ±0.28
D <sup>1</sup>	0.250	6.35
E <sup>1</sup>	0.020	0.51
F <sup>1</sup>	0.031	0.79
G <sup>1</sup>	0.094	2.37
H <sup>1</sup>	0.300	7.62
I <sup>1</sup>	0.600	15.24
J <sup>1</sup>	0.094	2.37

<sup>1</sup> Nominal dimension

**Not to scale**

Pin	Name	Function
1	V <sub>CONTROL</sub>	EFC, electronics frequency control. 1.5V is nominal input
7	Ground (case)	
8	Output	CMOS output
14	V <sub>CC</sub>	Power supply. Be sure to bypass near the pin with 10nF low noise capacitor.

## Layout and application information

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

## PCB Mounting (typical for lead free processing)

Hand soldering is recommended.

Wave solder at 255°C to 280°C with maximum wave exposure of 15 seconds

Reflow solder maximum exposure of 245°C for 15 seconds

Soldering done in a nitrogen atmosphere enhances the solder joint quality.

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