



OeM4
12.37 x 20.0 x 5.72 mm
DIP/DIL Metal Package

Features

- Pletronics' OeXO® Series Ovenized equivalent Temperature Compensated Crystal Oscillator
- Optional Voltage Control Function
- Low Power / Fast Warm Up
- CMOS or Clipped Sine Wave Output
- 2.8V to 3.3V nominal Supply Voltage
- See tables for available Frequencies

Applications

SONET / SDH / DWDM
Test & Measurement
Telecom Transmission & Switching Equipment
Base Stations / Picocell
Wireless Communication Equipment

Electrical Characteristics for CMOS

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)
Frequency Range ²	8.192	-	40.0	MHz	See table below for developed frequencies
Frequency Stability vs. Temperature ²	-200 -100 -50	-	+200 +100 +50	ppb	Over -40°C to +85°C Over -10°C to +70°C Over 0°C to +70°C at fixed V _{CC} + load (reference to midpoint min/max frequency) See factory for other options
Frequency Initial Calibration		-	±2.0	ppm	V _{control} 1.50 volts at 25°C ± 2°C when V _{CC} ≥ 2.8 volts If V _{control} used
Operating Temperature Range ²	-40	-	+85	°C	Widest range available
Supply Voltage ^{1,2} V _{CC}	2.8	-	3.3	Volts	± 5%
Supply Current ² I _{CC}	-	2.0 3.0 4.0	-	mA	13 MHz 26 MHz 40 MHz Load: 15 pF, V _{CC} ± 5%
Frequency Stability vs. Supply	-	-	±0.2	ppm	Load: 15 pF, V _{CC} ± 5%
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: 15 pF ± 10%
V _{control} Range	0.5	-	2.5	Volts	1.50 volts nominal for V _{CC}
Frequency Pullability ²	0	±8.0	±12.0	ppm	Positive Slope
Linearity	-	-	2.0	%	
Output Waveform	CMOS				
Duty Cycle	40	50	60	%	Load: 15 pF
Output V _{HIGH}	90	-	-	%V _{DD}	V _{th} : T _R and T _F 10% and 90% of amplitude V _{th} : D.C. 50% of amplitude
Output V _{LOW}	-	-	10	%V _{DD}	
Output T _{RISE} and T _{FALL}	-	-	6.5	nS	
Startup Time	-	-	10.0	mS	Within ± 2.0 ppm of final frequency
Long Term Stability (Aging)	-	-	±1.0	ppm	Per year at 25°C ± 2°C
Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz	-	-120 -134 -144 -145	-	dBc/Hz 25°C ± 2°C at 20.0 MHz
Jitter	-	0.6	-	pS	Frequency offset from carrier 12 kHz to 20 MHz, Typical performance at 20.0 MHz
Storage Temperature Range	-55	-	+95	°C	

Note: ¹ Place a 10nF power supply bypass capacitor next to device for correct operation

² Typical capabilities shown. A unique OeXO® datasheet is created for each specific device. See Factory for other options.

Electrical Characteristics for Clipped Sine Wave

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)
Frequency Range ²	8.192	-	40.0	MHz	See table below for developed frequencies
Frequency Stability vs. Temperature ²	-200 -100 -50	-	+200 +100 +50	ppb	Over -40°C to +85°C Over -10°C to +70°C Over 0°C to +70°C at fixed V _{CC} + load (reference to midpoint min/max frequency) See factory for other options
Frequency Initial Calibration		-	±2.0	ppm	V _{control} 1.50 volts at 25°C ± 2°C when V _{CC} ≥ 2.8 volts If V _{control} used
Operating Temperature Range ²	-40	-	+85	°C	Widest range available
Supply Voltage ^{1,2} V _{CC}	2.8	-	3.3	Volts	± 5%
Supply Current ² I _{CC}	-	2.0 3.0 4.0	-	mA	13 MHz 26 MHz 40 MHz Load: 10 Kohm 10 pF, V _{CC} ± 5%
Frequency Stability vs. Supply	-	-	±0.2	ppm	Load: 10 Kohm 10 pF, V _{CC} ± 5%
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: 10 Kohm 10 pF ± 10%
V _{control} Range	0.5	-	2.5	Volts	1.50 volts nominal for V _{CC}
Frequency Pullability ²	0	±8.0	±12.0	ppm	Positive Slope
Linearity	-	-	2.0	%	
Output Waveform	Clipped Sine Wave				Dc Coupled
Output Level	0.8	-	-	V p-p	Load: 10 Kohm 10 pF ± 10%
Startup Time	-	-	10.0	mS	Within ± 2.0 ppm of final frequency
Long Term Stability (Aging)	-	-	±1.0	ppm	Per year at 25°C ± 2°C
Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz	-	-120 -134 -144 -145	-	dBc/Hz 25°C ± 2°C at 20.0 MHz
Jitter	-	0.6	-	pS	Frequency offset from carrier 12 kHz to 20 MHz, Typical performance at 20.0 MHz
Storage Temperature Range	-55	-	+95	°C	

Note: ¹ Place a 10nF power supply bypass capacitor next to device for correct operation
² Typical capabilities shown. A unique OeXO® datasheet is created for each specific device. See Factory for other options.

The following is a list of developed frequencies. Consult factory for other options.

8.192M, 9.60M, 9.72M, 10.00M, 12.80M, 13.00M, 16.384M,
19.20M, 19.44M, 20.00M, 25.60M, 26.00M, 40.00M only

Part Number (Possible Options shown)

Series Model	V _{cc} Supply Voltage ¹	Operating Temperature		Stability ^{1,2}	Pullability ¹	Frequency
		Lowest	Highest	(ppm)	(ppm)	(MHz)
OEM4	A unique number will be assigned for your exact specification					-19.44M
	3.3 volts nominal 3.0 volts nominal 2.8 volts nominal	+10°C +5°C +0°C -5°C -10°C -15°C -20°C -25°C -30°C -35°C -40°C	+40°C +45°C +50°C +55°C +60°C +65°C +70°C +75°C +80°C +85°C	± 0.05 ± 0.1 ± 0.2 ± 0.5 ± 1.0	0 ± 5 ± 8	10 - 40 MHz Developed: 8.192M, 9.60M, 9.72M, 10.00M, 12.80M, 13.00M, 16.384M, 19.20M, 19.44M, 20.00M, 25.60M, 26.00M, 40.00M

¹ Contact Factory for non-standard specifications

² Not all stabilities are available with all operating temperature ranges. Contact Factory for exact combinations available.

Device Marking

PLE OEM4* FFFFM • YMDzzz	PLE = Pletronics FFFF = Frequency in MHz YMD = Date code zzz = Internal factory codes
-----------------------------------	--

* A unique number is assigned for your exact specifications.

Specifications such as part number, 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 YMD (Year Month Day)

Code	4	5	6	7	8	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2014	2015	2016	2017	2018	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	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Package Labeling

Tube or pad packaging is available.

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

P/N:  OEM4211-26.00M Customer P/N:  12345678 Qty:  1000 D/C  103-M8ZU4 MSL: 1 OeXO®

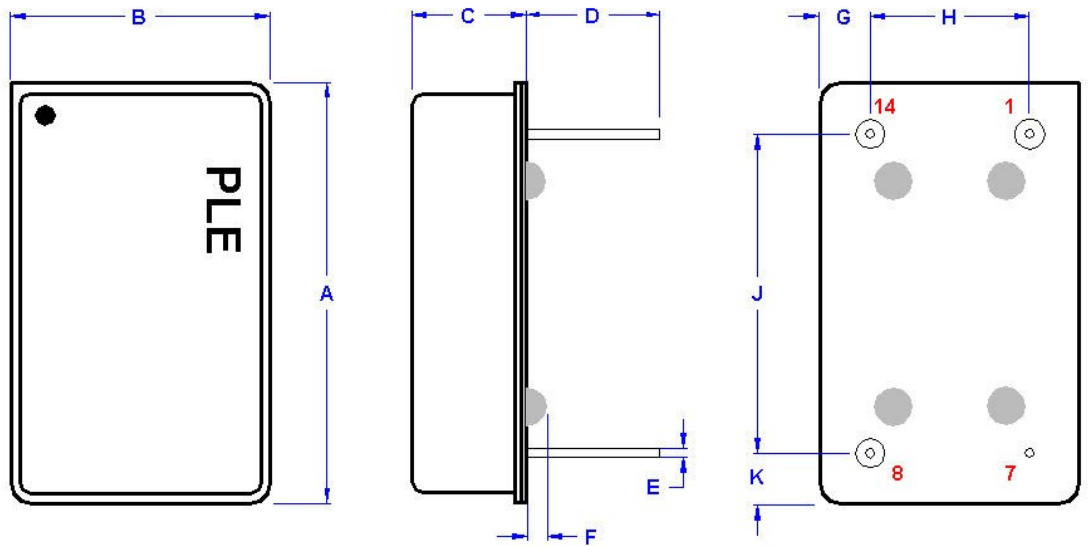
RoHS Compliant 2nd Lvl Interconnect Category=e1 Max Safe Temp=245C for 10s (Reflow only) 2X Max Max Safe Temp=280C for 15s (Wave solder only)
--

Pletronics Inc. certifies this device is in accordance with the RoHS 2 (2011/65/EU) 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: 4.0 grams
 Moisture Sensitivity Level: 1 As defined in J-STD-020D
 Second Level Interconnect code: e1

Mechanical Dimensions

	Inches	mm
A	0.792 ± 0.004	20.12 ± 0.1
B	0.492 ± 0.004	12.50 ± 0.1
C	0.225 max	5.72 max
D¹	0.287	7.30
E¹	0.018	0.45
F¹	0.031	0.80
G¹	0.096	2.44
H¹	0.300	7.62
J¹	0.600	15.24
K¹	0.096	2.43



¹ Typical dimensions

(Not to Scale)

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

Layout

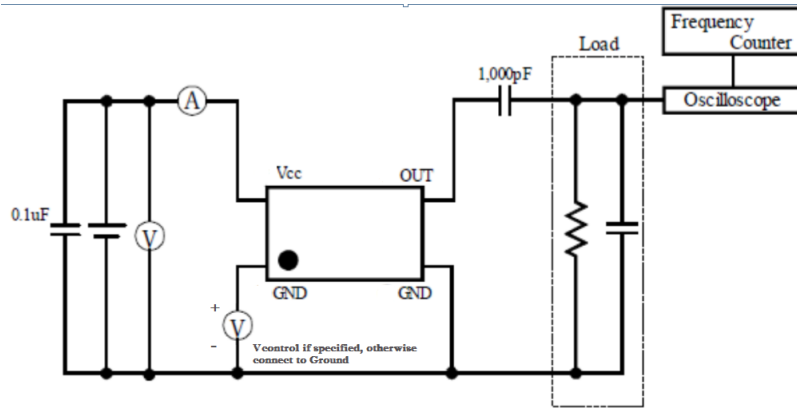
Pin	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pin to ground. EFC (Electronic Frequency Control).
7	Ground (GND)	
8	Output	CMOS or Clipped Sine Wave (output is DC coupled. Most commonly used with external coupling capacitor. 0.001 to 0.01µF recommended)
14	V _{cc} Supply Voltage	Connect an appropriate 10nF power supply bypass capacitor as close as possible

For Optimum Jitter Performance, Pletronics recommends:

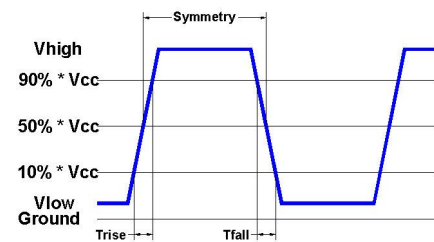
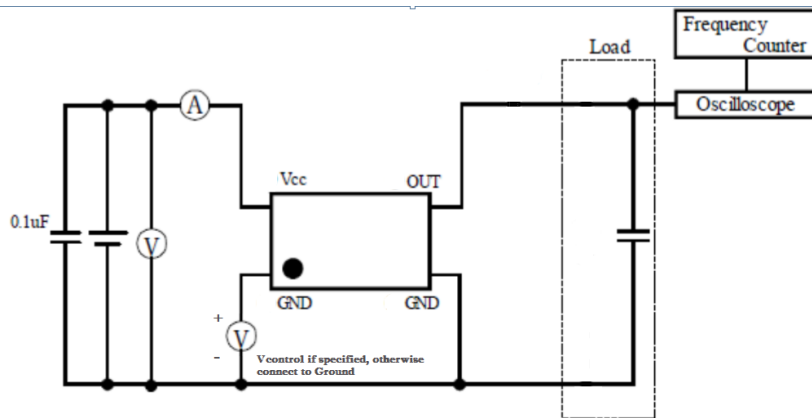
- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans
- Minimize air flow across the device

Electrical Test /Load Circuit

Clipped Sine Wave



CMOS



Environmental / ESD Ratings

Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

Absolute Maximum Ratings

Parameter	Unit
V _{CC} Supply Voltage	-0.6V to +6.0V
V _i Input Voltage	-0.6V to V _{CC} + 0.6V
I _o Output Current	-10mA to +10mA

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.

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, 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

URL: www.pletronics.com