



VPU7 Series 3.3V PECL VCXO Oscillators

November 2018



- Pletronics' VPU7 Series is a voltage - quartz crystal controlled precision square wave generator with a PECL output
- See VLU7 for LVDS output
- Tape and Reel or cut tape packaging
- 10.9 MHz to 1,175MHz
- Enable/Disable Function on pad 2
- Output frequency is synthesized
- Low Jitter

Pletronics Inc. certifies this device is in accordance with the RoHS (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: 0.28 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D.1
Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +4.6V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V
I _o Output Current	-50mA

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.

Part Number:

VPU7029036	EG	000	050	-312.5M	-XX	
						Packaging code or blank T250 = 250 per Tape and Reel T500 = 500 per Tape and Reel T1K = 1000 per Tape and Reel
						Frequency in MHZ
						Pullability in ppm (Vcontrol) APR 050 = ± 50 ppm minimum is standard 075 = ± 75 ppm minimum 100 = ± 100 ppm minimum
						Stability in ppm (Stability in ppm * 10) 000 = APR 500 = ± 50 ppm 250 = ± 25 ppm (typical values shown)
						Temperature Range EG = -10 to +70°C LK = -40 to +85°C
						Series Model

Part Marking:

PLE VPU7
FF.FFF M
• YMDXX

Marking Legend:

PLE = Pletronics
 FF.FFF M = Frequency in MHZ
 YMD = Date of Manufacture (year-month-day)
 All other marking is internal factory codes

Codes for Date Code YMD

Code	6	7	8	9	0	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2016	2017	2018	2019	2020	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	

Electrical Specification for 3.30V $\pm 10\%$ over the specified temperature range and the frequency range of 10.9 MHz to 766 MHz and 876 MHz to 1,175MHz

Item	Min	Max	Unit	Condition	
Pullability, Absolute Pull Range	-50 -75 -100	+50 +75 +100	ppm	APR includes the effect of temperature stability, aging, supply voltage and load. Defined by part number.	
Output Waveform	PECL / ECL				
Output High Level	2.12	2.49	volts	Referenced to Ground, $V_{CC} = 3.3\text{ V}$	
	0.82	1.19	volts	Referenced to termination voltage, $V_{CC} = 3.3\text{ V}$	
	-1.18	-0.81	volts	Referenced to V_{CC} , $V_{CC} = 3.3\text{ V}$	
Output Low Level	1.83	1.99	volts	Referenced to Ground, $V_{CC} = 3.3\text{ V}$	
	0.53	0.69	volts	Referenced to termination voltage, $V_{CC} = 3.3\text{ V}$	
	-1.47	-1.31	volts	Referenced to V_{CC} , $V_{CC} = 3.3\text{ V}$	
Output Peak to Peak Level	0.405	1.076	volts		
Output Symmetry	47	53	%	at 50% point of V_{CC} (See load circuit)	
Modulation Bandwidth	10	-	KHz	$V_{control} = 1.65\text{V} \pm 1.50\text{ V}$, -3dB	
Vcontrol Resistance (Pad 1)	20	-	Kohm		
Voltage vs Frequency Linearity	-10	+10	%	$V_{control} = 1.65\text{V} \pm 1.50\text{ V}$	
Jitter	-	0.8	pS RMS	12 KHz to 20 MHz from the output frequency	
	-	3.2	pS RMS	10 Hz to 20 MHz from the output frequency	
Output T_{RISE} and T_{FALL}	100	300	pS	V_{th} is 20% and 80% of waveform	
V_{CC} Supply Current (I_{CC})	-	110	mA		
Enable/Disable Internal Pull-up	50	-	Kohm	to V_{CC}	
V disable	-	0.8	volts	Referenced to pad 3	
V enable	2.00	-	volts	Referenced to pad 3	
Output leakage	$V_{OUT} = V_{CC}$	-50	+50	μA	Pad 1 low, device disabled
	$V_{OUT} = 0\text{V}$	-50	+50	μA	
Enable time	-	10	nS	Time for output to reach a logic state	
Disable time	-	10	nS	Time for output to reach a high Z state	
Start up time	-	5	mS	Time for output to reach specified frequency	
Operating Temperature Range	-10	+70	$^{\circ}\text{C}$	Standard Temperature Range	
	-40	+85	$^{\circ}\text{C}$	Extended Temperature Range	
Storage Temperature Range	-55	+125	$^{\circ}\text{C}$		

Specifications with Pad 2 E/D open circuit or connected to V_{CC}

Typical Phase-Noise Response



Load Circuit



Test Waveform



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

ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	2000	MIL-STD-883 Method 3115
Charged Device Model	1500	JESD 22-C101

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

P/N:  VPU7029036EG100050-100.0M	
Customer P/N:  12345678	D/C  4AN3LGC2-SF2
Qty:  1000	MSL: 1

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

Mechanical:



Contacts (pads):

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

Center metallized pad on the base is internally
connected, may be open or connected to V_{cc} or
to Ground.

¹ Typical dimensions

Not to Scale

	Inches	mm
A	0.276 \pm 0.006	7.00 \pm 0.15
B	0.197 \pm 0.006	5.00 \pm 0.15
C	0.117 max	2.97 max
D ¹	0.038	0.96
E ¹	0.200	5.08
F ¹	0.004	0.10
G ¹	0.050	1.27
H ¹	0.055	1.40
I ¹	0.024	0.60
J ¹	0.004r	0.10r
K ¹	0.008r	0.20r
L ¹	0.089	2.25
M ¹	0.010r	0.25r

Do not permit solder to bridge the upper gold contacts on the side

Pad	Function	Note
1	Vcontrol	Modulates the output frequency
2	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is <0.80 volts, the output will be inhibited (high impedance state.) Recommend connecting this pad to V_{cc} if the oscillator is to be always on..
3	Ground (GND)	
4	Output	Both outputs must be terminated and biased for proper operation. The ideal termination is 50 ohms connected to 2.0V below the Supply Voltage. The outputs become a High Z when disabled and the voltage level is determined by the termination circuitry.
5	Output*	
6	Supply Voltage (V_{cc})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

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	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm		1.5			2.0 ± 0.1			
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



		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			
D	mm	16.4 +2.0 / -0.0	16.4 +2.0 / -0.0	16.4 +2.0 / -0.0	16.0
	mm	---	---	24.4 +2.0 / -0.0	24.0
	mm	---	---	32.4 +2.0 / -0.0	32.0

Reel dimensions may vary from the above

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Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.