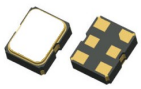
PLETRONICS PE33G Series 3.3V PECL Clock Oscillator



PE33GV
2.5 x 2.0 x 0.9 mm
LCC Ceramic Package

Features

- Quartz crystal controlled Precision Square Wave Oscillator
- PECL Differential Output
- Enable/Disable Function on pad 1
- Low Jitter
- 3.3V nominal Supply Voltage
- 13.5 - 220 MHz Frequency Range

Applications

Driving A/Ds, D/As, FPGAs
Fibre Channel
Ethernet, GbE, SynchE
Medical
Storage Area Networking
COTS
Telecom
PON

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range [2] Fo	13.5	-	220	MHz	Not all frequencies available, check with PLE sales
Frequency Stability [2] ± 20 = **20***, ± 25 = **44**, ± 50 = **45**	±20		±50	ppm	Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *limited frequencies, see page 2
Operating Temperature Range [2]	-10 -20 -40 -40 -40	-	+70 +70 +85 +105 +125	°C	Standard range Extended range **C** option Extended range **E** option Extended range **G** option Extended range **H** option
Supply Voltage [1, 2] V_{CC}	2.97	3.3	3.63	V	
Supply Current I_{CC}	-	-	68	mA	
Output Waveform		PECL			
Output High Level V_{OH}	Vcc - 1.025V	Vcc - 0.95V	Vcc - 0.88V	V	Referenced to Ground
Output Low Level V_{OL}	Vcc - 1.81V	Vcc - 1.7V	Vcc - 1.62V	V	Referenced to Ground
Output Voltage Amplitude V_{OPP}	0.4	-	-	V	Single ended measurement
Output T_{RISE} and T_{FALL}	-	-	0.4	ns	Vth is 20% and 80% of output V_{OPP}
Start Up Time	-	-	10	ms	Time for output to reach specified frequency
Duty Cycle (50% of output V_{OPP})	45 40	-	55 60	%	>85°C ~ +125°C, Fo ≥ 160MHz
$V_{DISABLE}$ VIL	-	-	0.3Vcc	V	Referenced to ground
V_{ENABLE} VIH	0.7Vcc	-			
Enable Time	-	-	10	ms	
Disable Time	-	-	200	ns	
Enable/Disable Internal Pull-up	-	39	-	KΩ	To V_{CC}, measured with pad 1 = 0.0 volts
Output Leakage $V_{OUT} = V_{CC}$ $V_{OUT} = 0V$	-10 -10	-	+10 +10	µA	Pad 1 low, device disabled
Standby Current	-	-	10	µA	
rms Phase Jitter	-	-	0.6	ps	Fo ≥ 40MHz; 12 kHz to 20 MHz offset
Phase Noise 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz 20 MHz	-	-141 -155 -160 -162 -163 -163	-	dBc/Hz	25°C ± 2°C at 125 MHz
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

Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V_{CC}	Frequency in MHz	Optional T&R code (Std 3K no designator)
PE33	**45**	**G**	**E**	**V**	**- 100.0M**	**-XX**
	45 = ± 50 ppm (STD) **44** = ± 25 ppm **20*** = ± 20 ppm		**Blank** = -10 to +70°C (STD) **C** = -20 to +70°C **E*** = -40 to +85°C **G** = -40 to +105°C **H** = -40 to +125°C	**V** = 3.3V ± 10%	13.5 - 220 MHz	**T250** = 250 per Reel **T500** = 500 per Reel **T1K** = 1000 per Reel

* Contact PLE sales for limited frequencies. Full frequency range available which excludes aging.
Temperature Options G and H apply to ±50ppm stability

Device Marking

***FF.FF* P**
- ***YMxxx***

FF.FF = Frequency in MHz (max 5 digits includes decimal); Examples: 156.25M is 156.2; 50MHz is 50.0
P = PECL
YM = Date Code, 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	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	**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

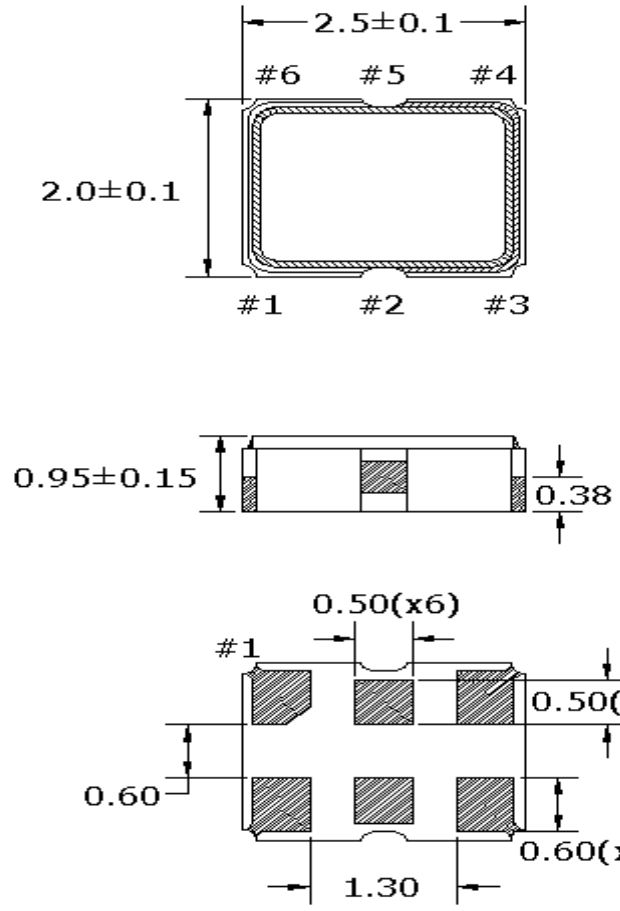
RoHs Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial

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: 0.015 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions / Solder Pad Layout



Dimensions in mm

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

Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

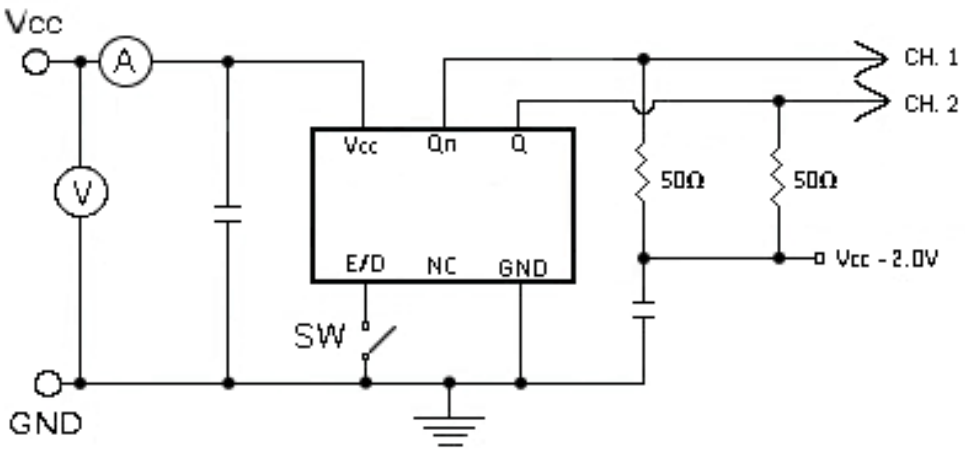
Pinout

Pad	Function	Note
1	Output Enable/Disable	The oscillator shall operate when this pad is not connected or ≥VIH The output will be inhibited (high impedance state) when this pad is ≤ VIL or ground. Recommend connecting this pad to V_{CC} if the oscillator is to be always on.
2	No connect	There is no internal connection to this pad. Recommend connecting to pad 1 to permit E/D input on either pad for layout.
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 supply voltage
5	OutputN	
6	V_{CC} Supply Voltage	Connect an appropriate power supply bypass capacitor as close as possible to pad 6

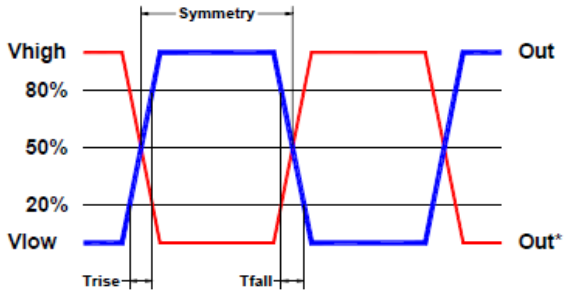
For Optimum Jitter Performance, Pletronics recommends:

- 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



Test Waveform



Showing Out Measurement only

Environmental / ESD Ratings

Reliability: Environmental

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	JESD22-A114
Machine Model	200V	JESD22-A115

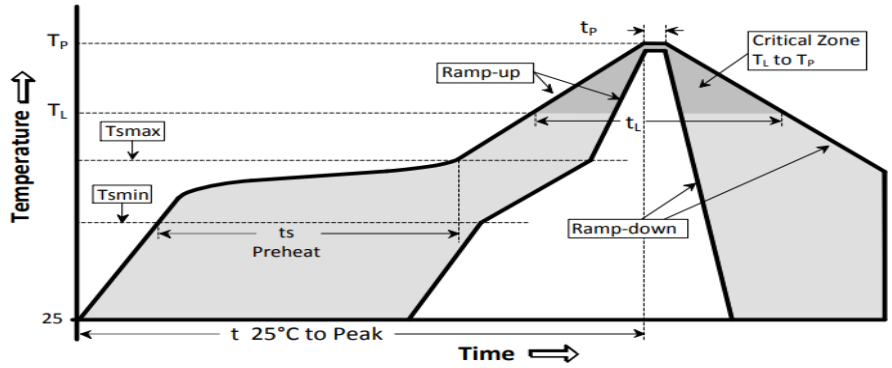
Thermal Characteristics:
The maximum die or junction temperature is 150°C

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +5.0V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V

Reflow Cycle

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

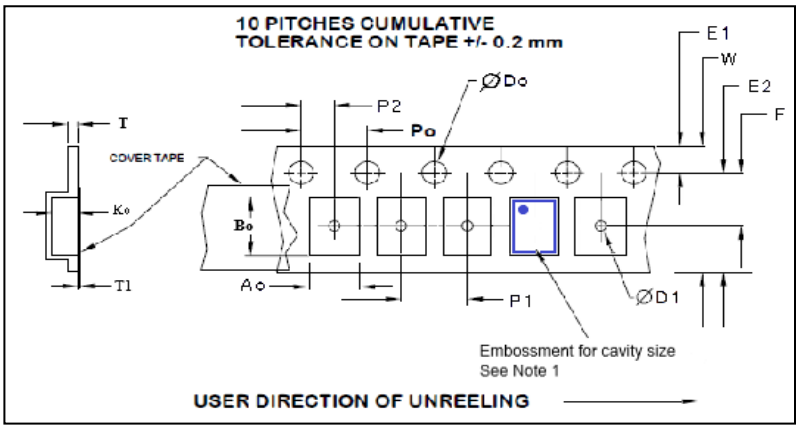


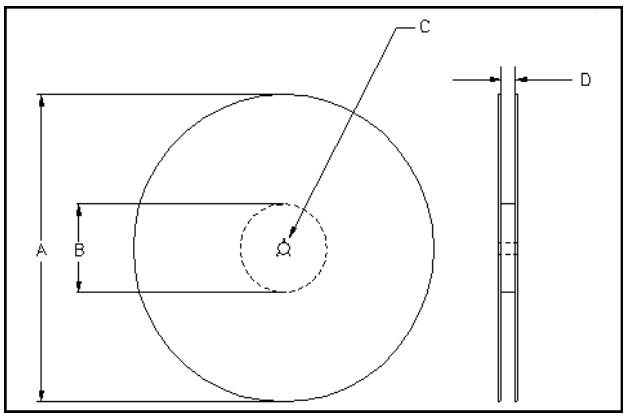
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time 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	2.25±0.1	2.75±0.1	1.15±0.1

Dimensions in mm Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inch-es	mm	Inches	mm	mm	mm
7	7.0	178	2.50	63.5	13.0 +0.5 -0.2	8.4 +2.0 -0.0

Tape Constant Dimensions Table 1							
Tape Size	Do	D1 typ	E1	Po	P2	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	0.3	0.1

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