



# PLETRONICS PE44J Series 3.3V PECL Clock Oscillator



PE44JV  
3.2 x 2.5 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
- 25 - 320 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 <sup>2</sup> (Fo)   | 25                              | -                                  | 320                               | MHz    |  |
| Frequency Stability <sup>2</sup><br>± 20 = <b>20*</b> , ± 25 = <b>44</b> , ± 50 = <b>45</b> | ±20                             | -                                  | ±50                               | ppm    | Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures.<br>*limited frequencies, see page 2    |
| Operating Temperature Range <sup>2</sup>  | -10<br>-20<br>-40<br>-40<br>-40 | -                                  | +70<br>+70<br>+85<br>+105<br>+125 | °C     | Standard range<br>Extended range <b>C</b> option<br>Extended range <b>E</b> option<br>Extended range <b>G</b> option<br>Extended range <b>H</b> option |
| Supply Voltage <sup>1,2</sup> (V <sub>CC</sub> )  | 2.97                            | 3.3                                | 3.63                              | V      |  |
| Supply Current (I <sub>CC</sub> )   | -                               | -                                  | 58<br>66<br>70                    | mA     | 25 MHz ≤ Fo ≤ 125 MHz<br>125 MHz < Fo ≤ 200 MHz<br>Fo > 200 MHz  |
| Output Type   | LVPECL                          |                                    |                                   |        |  |
| Output High Level (V <sub>OH</sub> )  | V <sub>CC</sub> -1.085V         | V <sub>CC</sub> -0.95V             | V <sub>CC</sub> -0.88V            | V      | See test circuit   |
| Output Low Level (V <sub>OL</sub> )   | V <sub>CC</sub> -1.81V          | V <sub>CC</sub> -1.7V              | V <sub>CC</sub> -1.62V            | V      | See test circuit   |
| Output Voltage Amplitude (V <sub>OPP</sub> )  | 0.4                             | -                                  | -                                 | V      | Single ended measurement, see test circuit   |
| Output T <sub>RISE</sub> and T <sub>FALL</sub>  | -                               | -                                  | 0.5                               | ns     | V <sub>th</sub> is 20% and 80% levels of V <sub>OPP</sub> , see test circuit   |
| Start Up Time   | -                               | -                                  | 10                                | ms     | Time for output to reach specified frequency   |
| Duty Cycle  | 45                              | -                                  | 55                                | %      | 50% level of V <sub>OPP</sub> , see test circuit   |
| V <sub>DISABLE</sub> (V <sub>IL</sub> )   | -                               | -                                  | 0.3V <sub>CC</sub>                | V      | Referenced to ground   |
| V <sub>ENABLE</sub> (V <sub>IH</sub> )  | 0.7V <sub>CC</sub>              | -                                  |                                   |        |  |
| Enable Time   | -                               | -                                  | 10                                | ms     | Time for output to reach specified frequency   |
| Disable Time  | -                               | -                                  | 200                               | ns     | Time for output to reach a high Z state  |
| Enable/Disable Internal Pull-up   | 30                              | 70                                 | 150                               | KΩ     | To V <sub>CC</sub> , Pin 1 open or ≥0.7V <sub>CC</sub>   |
| Output Leakage<br>V <sub>OUT</sub> = V <sub>CC</sub><br>V <sub>OUT</sub> = 0V               | -<br>-10                        | -                                  | +10<br>-                          | μA     | Pad 1 low, device disabled   |
| Standby Current   | -                               | -                                  | 30                                | μA     |  |
| rms Phase Jitter  | -                               | 0.1                                | -                                 | ps     | 12 kHz to 20 MHz offset at 156.25 MHz  |
| Phase Noise<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz<br>1 MHz                                | -                               | -64<br>-98<br>-127<br>-142<br>-152 | -                                 | dBc/Hz | 25°C ± 2°C at 156.25 MHz   |
| Storage Temperature Range   | -55                             | -                                  | +125                              | °C     |  |

Notes: Specifications with Pad 1 E/D open circuit

<sup>1</sup> Place an appropriate power supply bypass capacitor as close as possible to V<sub>CC</sub> for best performance

<sup>2</sup> Specified by part number



# PLETRONICS PE44J Series 3.3V PECL Clock Oscillator

## Part Number

| Series Model | Frequency Stability                                    |   | Operating Temperature Range  | Supply Voltage V <sub>CC</sub> | Frequency in MHz | Optional T&R Packaging code   |
|--------------|--|---|--|--------------------------------|------------------|---|
| PE44         | 45   | J | E  | V                              | - 100.0M         | -XX   |
|              | 45 = ± 50 ppm (STD)<br>44 = ± 25 ppm<br>20* = ± 20 ppm |   | Blank = -10 to +70°C (STD)<br>C = -20 to +70°C<br>E = -40 to +85°C<br>G = -40 to +105°C (50ppm)<br>H = -40 to +125°C (check sales) | V = 3.3V ± 10%                 | 25 - 320 MHz     | T250 = 250 per Reel<br>T500 = 500 per Reel<br>T3K = 3000 per Reel (Std) |

\* Contact PLE sales for limited frequencies. Full frequency range available which excludes aging.

## Device Marking

PFF.FFP  
• YMDxxx

P = Pletronics  
FFF.FFP = Frequency in MHz, P for PECL  
YMD = 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 YMD (Year Month Day)

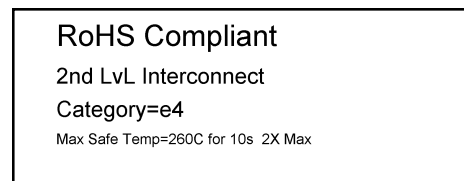
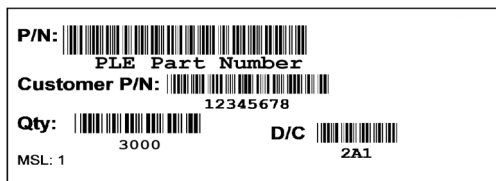
| Code | 4    | 5    | 6    | 7    | 8    | Code  | A   | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   |
|------|------|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Year | 2024 | 2025 | 2026 | 2027 | 2028 | Month | JAN | 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 |    |

## 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

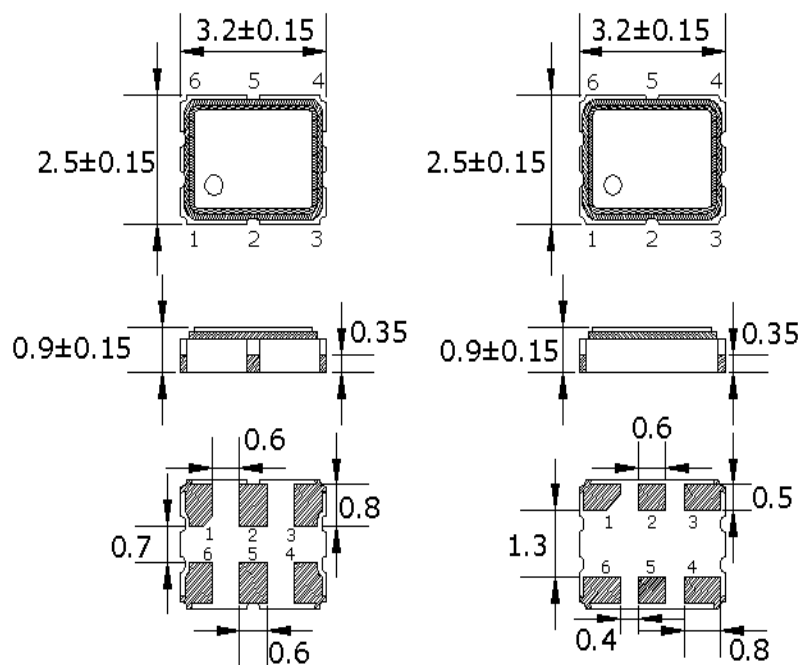
RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial



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

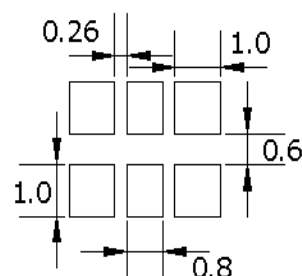
## Mechanical Dimensions / Pinout



Dimensions in mm

| Pin Connections |                |
|-----------------|----------------|
| PIN#            | Function       |
| 1               | Enable/Disable |
| 2               | No connect     |
| 3               | Ground/Lid     |
| 4               | Output         |
| 5               | Output N       |
| 6               | Vcc            |

| ENABLE/DISABLE        |                   |
|-----------------------|-------------------|
| PIN1                  | Output            |
| V <sub>IH</sub> /Open | Active            |
| V <sub>IL</sub> /Gnd  | Disabled/Tristate |



### Pad Layout

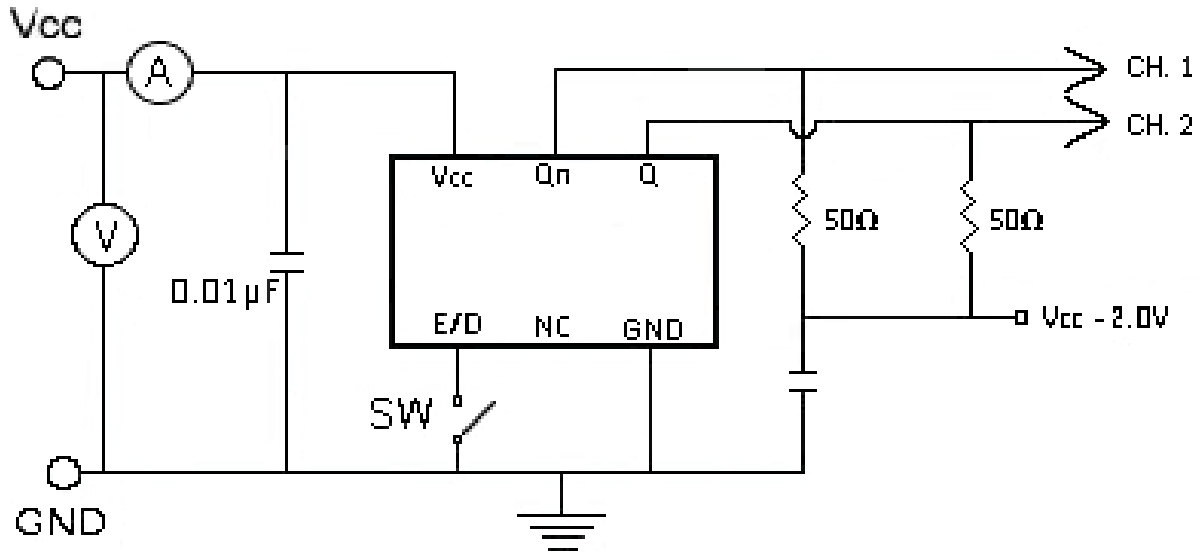
Disclaimer: Recommended layout shown.  
Adjust layout as needed for individual  
process requirements.

**Contacts (pads): Gold (0.3 to 1.0  $\mu$ m) over Nickel (1.27 to 8.89  $\mu$ m)**

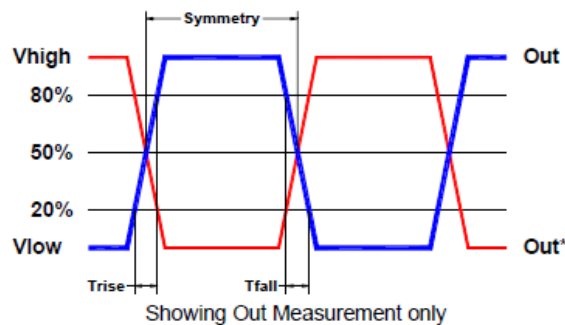
For Optimum Jitter Performance, Pletronics recommends:

- 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



## 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 |

Absolute Maximum Ratings

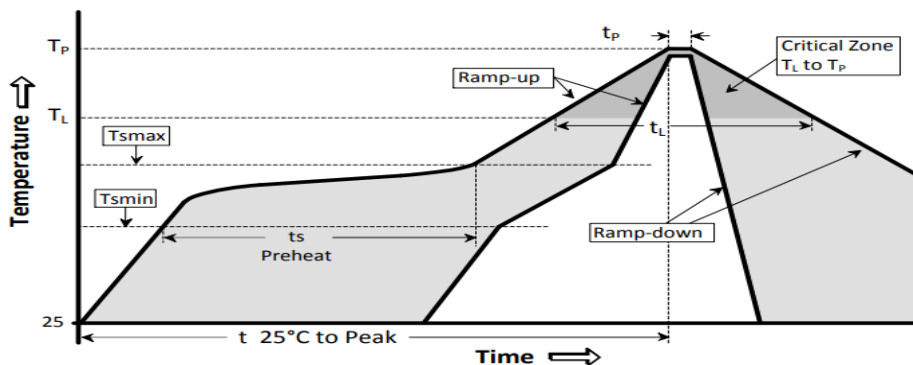
| Parameter                      | Unit                            |
|--------------------------------|---------------------------------|
| V <sub>CC</sub> Supply Voltage | -0.3V to +4.0V                  |
| V <sub>i</sub> Input Voltage   | -0.3V to V <sub>CC</sub> + 0.3V |
| V <sub>o</sub> Output Voltage  | -0.3 to V <sub>CC</sub> + 0.3V  |

### Thermal Characteristics:

The maximum die or junction temperature is 150°C

## Reflow Cycle

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

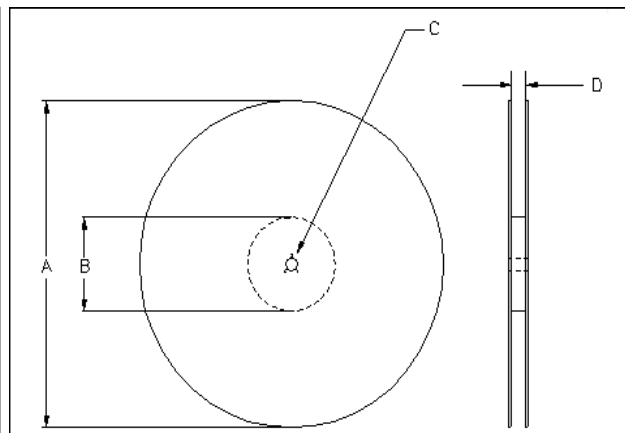
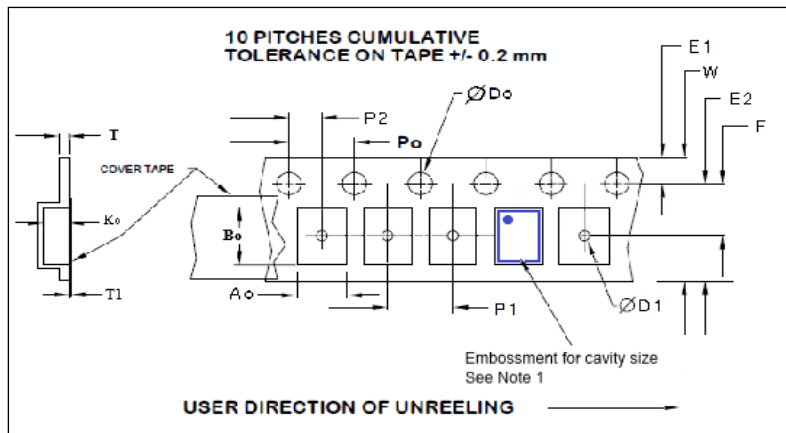


The part may be reflowed 2 times without degradation (typical for lead free processing).

| Temperature Profile                 | Symbol                  | Condition        | Unit   |
|-------------------------------------|-------------------------|------------------|--------|
| Average ramp-up rate                | ( $T_{smax}$ 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       | $T_{to-peak}$           | 8 minutes max    | min    |
| <b>Preheat</b>                      |                         |                  |        |
| Temperature min                     | $T_{smin}$              | 150              | °C     |
| Temperature max                     | $T_{smax}$              | 200              | °C     |
| Time $T_{smin}$ to $T_{smax}$       | $t_s$                   | 60 – 180         | sec    |
| <b>Soldering above liquidus</b>     |                         |                  |        |
| Temperature liquidus                | $T_L$                   | 217              | °C     |
| Time above liquidus                 | $t_L$                   | 60 – 150         | sec    |
| <b>Peak temperature</b>             |                         |                  |        |
| Peak Temperature                    | $T_p$                   | 260              | °C     |
| Time within 5°C of peak temperature | $t_p$                   | 20 – 40          | sec    |

## 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 | A <sub>0</sub> | B <sub>0</sub> | K <sub>0</sub> |
|-----------|--------|-----------|----------|-------|----------------|----------------|----------------|
| 8mm       | 6.25   | 3.5 ±0.05 | 4.0 ±0.1 | 8.2   | 2.7±0.1        | 3.4±0.1        | 1.4±0.1        |

Dimensions in mm Drawing Not to scale

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

Tape Constant Dimensions Table 1

| Tape Size | D <sub>0</sub> | D1 typ | E1        | P <sub>0</sub> | P <sub>2</sub> | 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    |

Reel Dimensions (may vary) Table 3

| Reel Size | Inches | mm  | Inches | mm | mm             | mm                       |
|-----------|--------|-----|--------|----|----------------|--------------------------|
| 7         | 7.0    | 180 | 2.50   | 60 | 13.0 +0.5 -0.2 | Tape size +0.4 +2.0 -0.0 |



# **PLETRONICS PE44J Series 3.3V PECL Clock Oscillator**

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