

## PE55K Series 3.3 V PECL Clock Oscillators

November 2018



- Pletronics' PE55K Series is a quartz crystal controlled precision square wave generator with a PECL output.
- Improved phase noise performance.
- Low cost mass produced oscillator.
- Tape and Reel or cut tape packaging is available.
- 3.2 x 5 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- 3<sup>rd</sup> Overtone Crystals used
- Improved circuit to minimize oscillator issues such as multi-mode output signal.
- Lowest Jitter Product

**\* BEST OPTION FOR LOW JITTER REQUIREMENTS  
50 pS Jitter 12.0 KHz to 20.0 MHz @ 156.25 MHz**

**Pletronics Inc. certifies this device is in accordance with the  
RoHS 6/6 (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: 0.09 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4

### Absolute Maximum Ratings:

| Parameter                      | Unit                            |
|--------------------------------|---------------------------------|
| V <sub>CC</sub> Supply Voltage | -0.5V to +4.6V                  |
| V <sub>i</sub> Input Voltage   | -0.5V to V <sub>CC</sub> + 0.5V |
| V <sub>o</sub> Output Voltage  | -0.5V to V <sub>CC</sub> + 0.5V |

### Thermal Characteristics

The maximum die or junction temperature is 125°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.



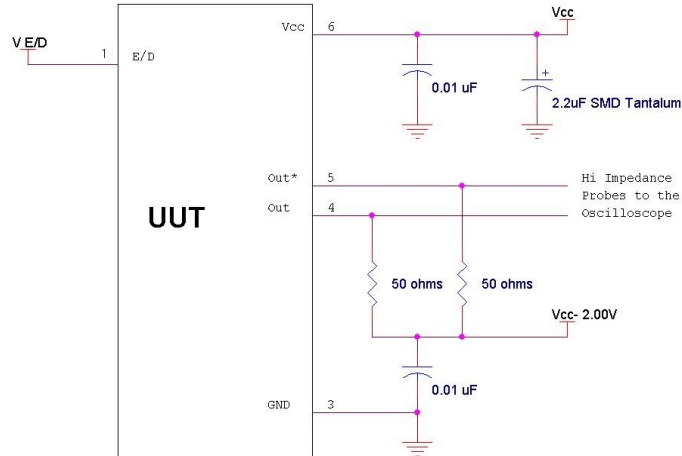
## Electrical Specification for 3.30V $\pm 5\%$ over the specified temperature range and the frequency range of 156.25 to 212.50 MHz

| Item                                 | Min       | Typ   | Max   | Unit        | Condition  |
|--------------------------------------|-----------|-------|-------|-------------|--|
| Frequency Accuracy "45"              | -50       | -     | +50   | ppm         | For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures           |
| "44"                                 | -25       | -     | +25   |             |  |
| "20"                                 | -20       | -     | +25   |             |  |
| Output Waveform                      | PECL /ECL |       |       |             |  |
| Output High Level                    | 2.215     | 2.350 | 2.420 | V           | $V_{CC} = 3.3 V$   |
| Output Low Level                     | 1.490     | 1.600 | 1.745 | V           | $V_{CC} = 3.3 V$   |
| Output Symmetry                      | 45        | -     | 55    | %           | at 50% point of $V_{CC}$ (See load circuit)  |
| Jitter <sup>1</sup>                  | -         | 50    | -     | fs RMS      | 12 KHz to 20 MHz from the output frequency @156.25 MHz   |
| Output $T_{RISE}$ and $T_{FALL}$     | -         | 0.3   | 1.1   | ns          | $V_{th}$ is 20% and 80% of waveform  |
| $V_{CC}$ Supply Current ( $I_{CC}$ ) | -         | 45    | 70    | mA          |  |
| Enable/Disable Internal Pull-up      | 50        | -     | -     | Kohm        | to $V_{CC}$ , measured with Pad 1 = 0.0 volts  |
| V disable                            | -         | -     | 20    | % $V_{CC}$  |  |
| V enable                             | 80        | -     | -     | % $V_{CC}$  |  |
| Output leakage                       | -10       | -     | +10   | $\mu A$     |  |
| Enable time                          | -         | -     | 2     | ms          | Time for output to reach a logic state, the output frequency is correct at the specified Start Time. |
| Disable time                         | -         | -     | 200   | ns          | Time for output to reach a high Z state  |
| Start up time                        | -         | -     | 3     | ms          | Time for output to reach specified frequency   |
| Operating Temperature Range          | -10       | -     | +70   | $^{\circ}C$ | Standard Temperature Range   |
|                                      | -20       | -     | +70   | $^{\circ}C$ | Extended Temperature Range "C" Option  |
|                                      | -40       | -     | +85   | $^{\circ}C$ | Extended Temperature Range "E" Option  |
| Storage Temperature Range            | -55       | -     | +125  | $^{\circ}C$ |  |
| Standby Current $I_{CC}$             | -         | -     | 30    | $\mu A$     | Pad 1 low, device disabled   |

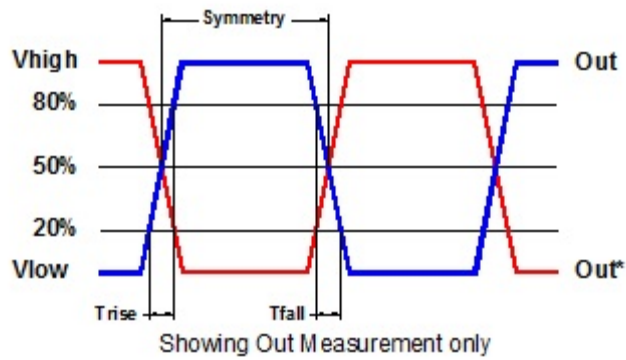
<sup>1</sup> Jitter computed from phase noise data at 156.25MHz

Specifications with Pad 1 E/D open circuit unless stated otherwise

**Load Circuit**

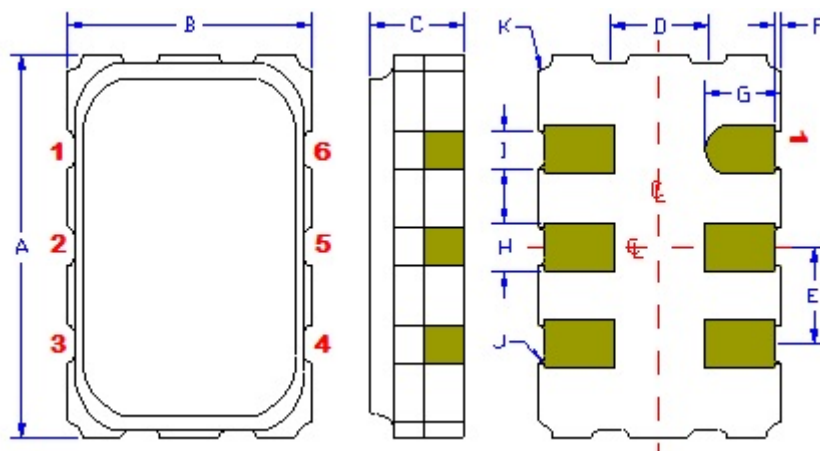


**Test Waveform**





## Mechanical:



### Contacts:

Gold 11.8 to 39.4 μinches (0.3 to 1.0 μm)  
over  
Nickel 50 to 350 μinches (1.27 to 8.89 μm)

<sup>1</sup> Typical dimensions

Not to Scale

|                | Inches            | mm              |
|----------------|-------------------|-----------------|
| A              | 0.197 $\pm$ 0.006 | 5.00 $\pm$ 0.15 |
| B              | 0.125 $\pm$ 0.006 | 3.20 $\pm$ 0.15 |
| C              | 0.053 max         | 1.35 max        |
| D <sup>1</sup> | 0.050             | 1.27            |
| E <sup>1</sup> | 0.050             | 1.27            |
| F <sup>1</sup> | 0.004             | 0.10            |
| G <sup>1</sup> | 0.039             | 1.00            |
| H <sup>1</sup> | 0.025             | 0.63            |
| I <sup>1</sup> | 0.020             | 0.50            |
| J <sup>1</sup> | 0.004R            | 0.10R           |
| K <sup>1</sup> | 0.008R            | 0.20R           |

| Pad | Function                          | Note   |
|-----|-----------------------------------|--|
| 1   | Output Enable/Disable             | When this pad is not connected the oscillator shall operate.<br>When this pad is <0.30 volts, the output will be inhibited (high impedance state.)<br>Recommend connecting this pad to V <sub>CC</sub> if the oscillator is to be always on. |
| 2   | No connect                        | There is no internal connection to this pad  |
| 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.  |
| 5   | Output*                           |  |
| 6   | Supply Voltage (V <sub>CC</sub> ) | Recommend connecting appropriate power supply bypass capacitors as close as possible.  |

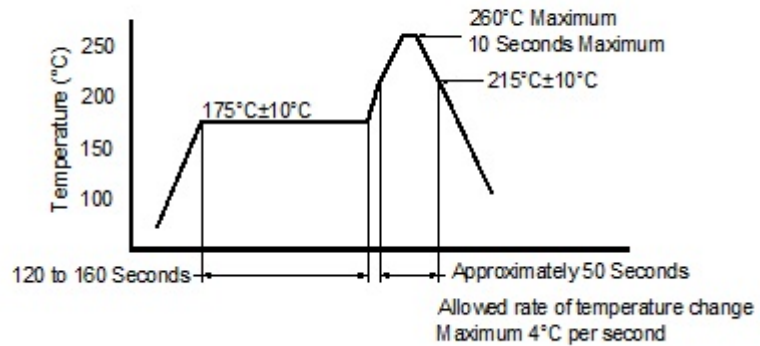
## Layout and application information

Recommend connecting Pad 1 and Pad 2 together to permit the design to accept Enable/Disable input on either pad

For Optimum 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.

## Reflow Cycle (typical for lead free processing)



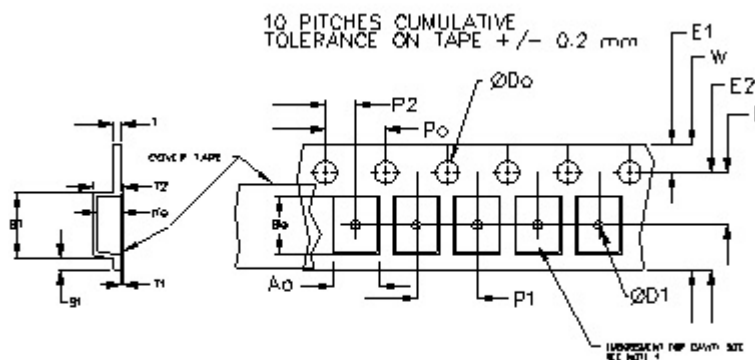
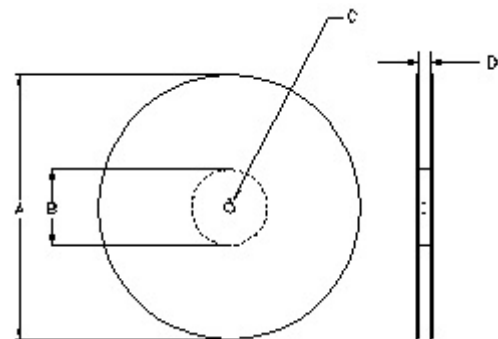
The part may be reflowed 3 times without degradation.

## 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<br>+0.1<br>-0.0 | 1.0    | 1.75<br>±0.1 | 4.0<br>±0.1 | 2.0<br>±0.05 | 0.6    | 0.6   | 0.1    |
| 12mm                        |                     | 1.5    |              |             | 2.0<br>±0.1  |        |       |        |
| 16mm                        |                     | 1.5    |              |             |              |        |       |        |
| 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



USER DIRECTION OF UNREELING →

| REEL DIMENSIONS |        |                      |                      |                      |            |
|-----------------|--------|----------------------|----------------------|----------------------|------------|
| A               | inches | 7.0                  | 10.0                 | 13.0                 | Tape Width |
|                 | mm     | 177.8                | 254.0                | 330.2                |            |
| B               | inches | 2.50                 | 4.00                 | 3.75                 | Tape Width |
|                 | mm     | 63.5                 | 101.6                | 95.3                 |            |
| C               | mm     | 13.0 +0.5 / -0.2     |                      |                      | Tape Width |
| D               | mm     | 16.4<br>+2.0<br>-0.0 | 16.4<br>+2.0<br>-0.0 | 16.4<br>+2.0<br>-0.0 |            |

Reel dimensions may vary from the above

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