



LV77K Series 3.3 V LVDS Clock Oscillators

November 2018



- Pletronics' LV77K Series is a quartz crystal controlled precision square wave generator with LVDS output.
- Improved phase noise performance.
- Tape and Reel or cut tape packaging is available.
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- 3rd 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 fS Jitter 12 KHz - 20 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: 0.16 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 |

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.

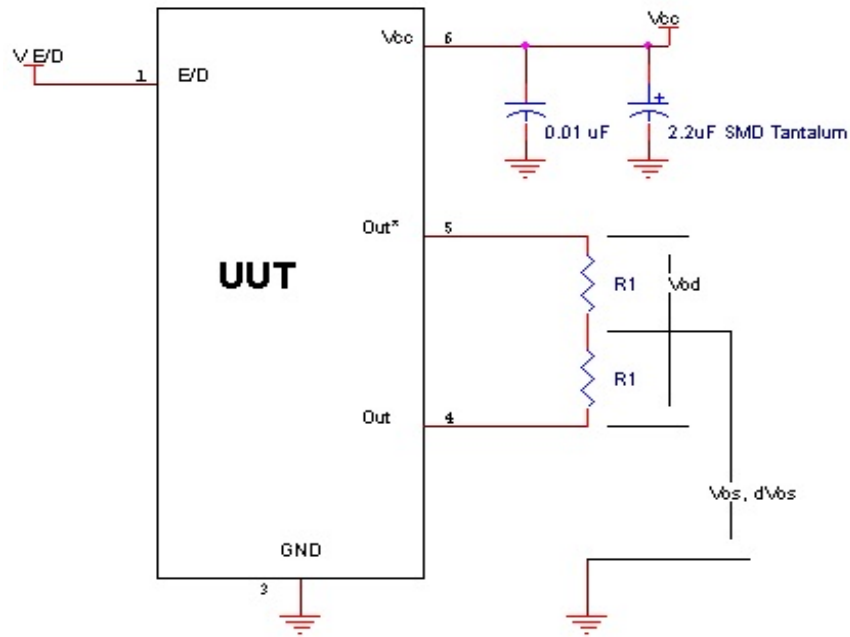
Electrical Specification for 3.30V $\pm 5\%$ over the specified temperature range and the frequency range of 100.0 to 212.50 MHz

| 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 | - | +20 | | |
| Output Waveform | LVDS | | | | |
| Output High Level | - | 1.43 | 1.60 | V | |
| Output Low Level | 0.90 | 1.10 | - | V | |
| Output Symmetry | 45 | - | 55 | % | at 50% point of V_{CC} (See load circuit) |
| Jitter ¹ | - | 50 | - | fs RMS | 12 KHz to 20 MHz from the output frequency @ 156.25 MHz |
| Output T_{RISE} and T_{FALL} | - | 0.3 | 1.0 | ns | V_{th} is 20% and 80% of waveform |
| V_{CC} Supply Current (I_{CC}) | - | 28 | 45 | mA | |
| Enable/Disable Internal Pull-up | 30 | - | 150 | Kohm | to V_{CC} , measured with Pad 1 = 0.0 volts |
| V disable | - | - | 20 | % V_{CC} | |
| V enable | 80 | - | - | % V_{CC} | |
| Output leakage Current | -10 | - | +10 | μA | |
| 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} | - | - | 15 | μA | Pad 1 low, device disabled |

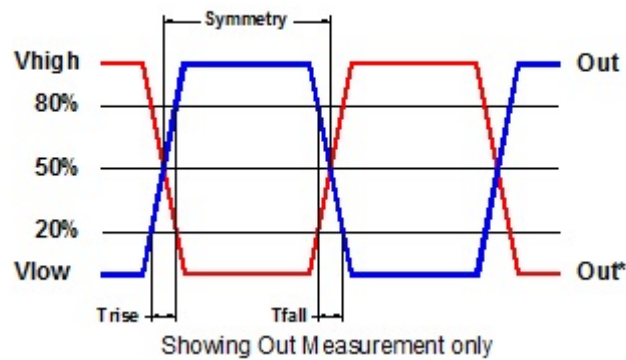
¹ Jitter computed from phase noise data at 156.25MHz

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

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 | 1500 | MIL-STD-883 Method 3115 |
| Charged Device Model | 1000 | JESD 22-C101 |

Package Labeling

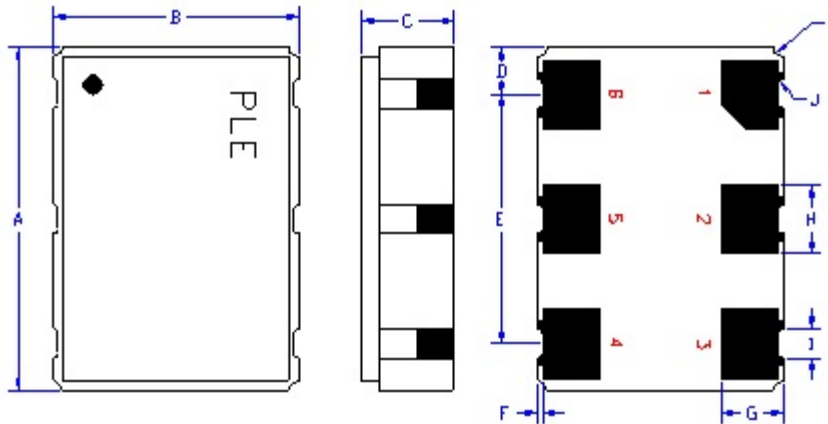
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

| | |
|----------------------|---|
| P/N: |  |
| | LV7745KV-156.25M |
| Customer P/N: |  |
| | 12345678 |
| Qty: |  |
| | 1000 |
| D/C |  |
| | 6KX-SG |
| MSL: 1 | |

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

Mechanical:



Not to Scale

¹ Typical dimensions

| | 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 | 0.067 max | 1.80 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 |

Contacts (pads) :

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

| Pad | Function | Note |
|-----|-----------------------------|---|
| 1 | Output Enable/Disable | When this pad is not connected the oscillator shall operate. When this pad is <0.30 volts, the output will be inhibited (high impedance state.) 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 |
| 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_{CC}) | Recommend connecting appropriate power supply bypass capacitors as close as possible. |



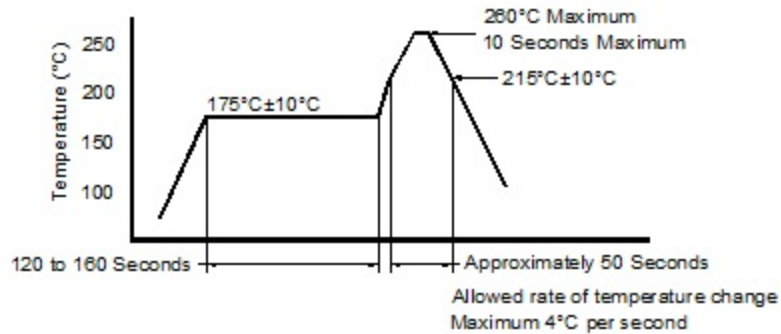
Layout and application information

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)



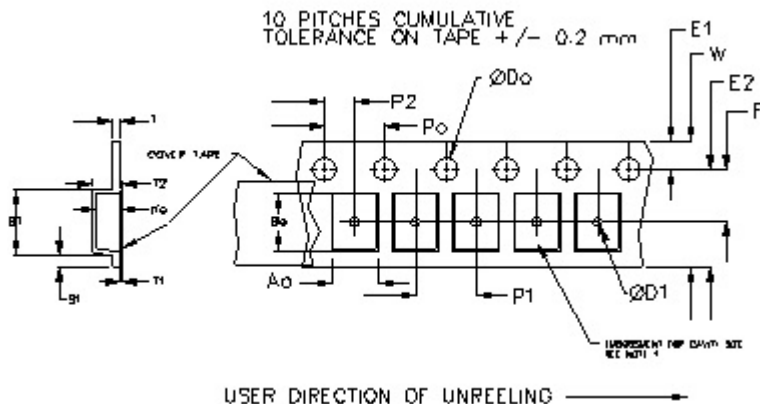
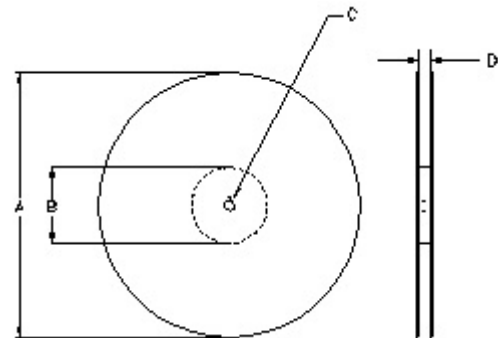
The part may be reflowed 3 times without degradation.

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 | 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 | +0.1 -0.0 | 1.5 | ±0.1 | ±0.1 | 2.0 ±0.1 | | | |

| 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 | | | |
|---|--------|------------------|-------|-------|------------|
| A | inches | 7.0 | 10.0 | 13.0 | |
| | 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 | | | |
| D | mm | 16.4 | 16.4 | 16.4 | 16.0 |
| | | +2.0 | +2.0 | +2.0 | |
| | | -0.0 | -0.0 | -0.0 | |

Reel dimensions may vary from the above

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