CARDINAL COMPONENTS

## Field Programmable Crystal Oscillator

**Series CPPL**

- Programmed in the field with the PG-3200 oscillator programming instrument within seconds.
- Factory Programmable
- Can be programmed twice
- Standard Package Options
- Ultra low jitter @ 1 million samples

**Instrument Part Number:** **CPPLCL1LZ-A5B6-XX.XXXX TS**

| CPPL | C | 1 | L | Z | A5 | B6 | XX.XXXX | TS |
|---|---|---|---|---|---|---|---|---|
| SERIES | OUTPUT | PACKAGE STYLE | VOLTAGE | ADDED FEATURE | OPERATING TEMP | STABILITY | FREQUENCY | TRI-STATE |
| CPPL | C = CMOS<br>T = TTL | 1 = Full Size<br>4 = Half Size<br>5 = 3.2x5 Ceramic<br>7 = 5x7 Ceramic<br>8 = PLASTIC SMD | Blank = 5V<br>L = 3.3V<br>R = 2.7V | Blank = Cut Tape<br>B = Bulk<br>T = Tube<br>Z = Tape and Reel | Blank = 0°C~+70°C<br>A3 = -55~+125°C<br>A5 = -20°C~+70°C<br>A7 = -40°C~+85°C | B6 = ±100PPM<br>BP = ±50PPM<br>BR = ±25PPM | 0.500 ~ 133.000MHz | TS = Tri-State<br>PD = Power Down |

## Specifications:

| Description | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Frequency Range:**<br>Programmable to any discrete frequency | | 0.500 | | 133 | MHz |
| **Available Stability Options:** | | -100<br>-50<br>-25 | | +100<br>+50<br>+25 | PPM |
| **Programmable Supply Voltage:** | (1-133 MHz)<br>(1-100 MHz)<br>(1-66.0 MHz) | 4.5<br>3.0<br>2.5 | 5.0<br>3.3<br>2.7 | 5.5<br>3.6<br>3.0 | V<br>V<br>V |
| **Operating Temperature Range Options:** | | -55<br>-20<br>-40 | | +125<br>+70<br>+85 | °C<br>°C<br>°C |
| **Storage Temperature:** | | -55 | | +125 | °C |
| **Aging:**<br>Ta=°25C,Vdd=5V/3.3V | | | | ±5 | PPM/Year |

**Programmable Output Level:** CMOS/TTL

## Operating Conditions:

| Description | | Min | Max | Unit |
|---|---|---|---|---|
| $V_{DD}$ | Supply Voltage | 2.7 | 5.5 | V |
| $C_{TTL}$ | Max capacitive load on outputs for TTL levels | | | |
| | 4.5V-5.5V $V_{DD}$, ≤ 40 MHz | | 50 | pF |
| | 4.5V-5.5V $V_{DD}$, 40 - 133 MHz | | 25 | pF |
| $C_{CMOS}$ | Max capacitive load on outputs for CMOS levels | | | |
| | 4.5V-5.5V $V_{DD}$, ≤ 66 MHz | | 50 | pF |
| | 4.5V-5.5V $V_{DD}$, 66 - 133 MHz | | 25 | pF |
| | 3.0V-3.6V $V_{DD}$, ≤ 40 MHz | | 30 | pF |
| | 3.0V-3.6V $V_{DD}$, 40 - 100 MHz | | 15 | pF |
| | 2.5-3.0V $V_{DD}$, ≤ 66 MHz | | 25 | pF |

**Cardinal Components**
1801 Broadway Street
Charlottesville, VA 22902

Telephone: (973)785-1333
Email: sales@cardinalxtal.com
Website: www.cardinalxtal.com

## Output Clock Switching Characteristics:

| Description | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Duty Cycle:** | ≤ 50 MHz, $C_L$ = 50 pF | 45 | - | 55 | % |
| TTL @ 1.4V | 50 - 66 MHz, $C_L$ = 15 pF | 45 | - | 55 | % |
| 4.5-5.5 $V_{DD}$ | 66 - 125 MHz, $C_L$ = 25 pF | 40 | - | 60 | % |
| | 125 - 133 MHz, $C_L$ = 15 pF | 40 | - | 60 | % |
| **Duty Cycle:** | ≤ 66 MHz, $C_L$ ≤ 25 pF | 45 | - | 55 | % |
| CMOS @ $V_{DD}$/2 | 66 - 125 MHz, $C_L$ ≤ 25 pF | 40 | - | 60 | % |
| 4.5-5.5 $V_{DD}$ | 125 - 133 MHz, $C_L$ ≤ 15 pF | 60 | - | 60 | % |
| 3.0-3.6 $V_{DD}$ | ≤ 40 MHz, $C_L$ ≤ 30 pF | 45 | - | 55 | % |
| | 40 - 100 MHz, $C_L$ ≤ 15 pF | 40 | - | 60 | % |
| **Rise/Fall:** | 0.8V - 2.0V, 4.5 - 5.5 $V_{DD}$, $C_L$ = 50 pF | | | 1.8 | ns |
| | 0.8V - 2.0V, 4.5 - 5.5 $V_{DD}$, $C_L$ = 25 pF | | | 1.2 | ns |
| | 0.8V - 2.0V, 4.5 - 5.5 $V_{DD}$, $C_L$ = 15 pF | | | 0.9 | ns |
| | 0.2V - 0.8 * $V_{DD}$, 4.5 - 5.5 $V_{DD}$, $C_L$ = 50 pF | | | 3.4 | ns |
| | 0.2V - 0.8 * $V_{DD}$, 3.0 - 3.6 $V_{DD}$, $C_L$ = 30 pF | | | 4.0 | ns |
| | 0.2V - 0.8 * $V_{DD}$, 3.0 - 3.6 $V_{DD}$, $C_L$ = 15 pF | | | 2.4 | ns |
| **Start Up Time** | From Power On | - | - | 2 | ms |
| **Power Down Delay Time** | PWR_DOWN pin LOW to output Hi-Z, | | | | |
| Synchronous | T = Frequency Oscillator Period | | T/2 | T+10 | ns |
| Asynchronous | | | 10 | 15 | ns |
| **Output Disable Time** | OE pin LOW to output Hi-Z, | | | | |
| Synchronous | T = Frequency Oscillator Period | | T/2 | T+10 | ns |
| Asynchronous | | | 10 | 15 | ns |
| **Output Enable Time** | T = Frequency Oscillator Period | | T | 1.5 * T + 25 | ns |
| **RMS Period Jitter** | 1 - 133.00 MHz | | 8 | 11 | ps |
| **Peak to Peak*** | ≤ 33.000 MHz | | 65 | 99 | ps |
| | > 33.000 MHz | | 65 | 80 | ps |

*** Jitter Tested at > 1,000,000 samples, exceeding JEDEC std JESD65**



**Cardinal Components**
1801 Broadway Street
Charlottesville, VA 22902

Telephone: (973)785-1333
Email: sales@cardinalxtal.com
Website: www.cardinalxtal.com

## Electrical Characteristics:

| Description | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Input Characteristics (Pin 1):** | | | | | |
| $V_{IL}$, Low-Level Input Voltage | $V_{DD}$ = 5.0 V | - | - | 0.8 | V |
| (To Tri-State or Power Down) | $V_{DD}$ = 3.3 V | - | - | 0.2 * $V_{DD}$ | V |
| | VDD = 2.7 V | - | - | 0.2 * $V_{DD}$ | V |
| $V_{IH}$, High-Level Input Voltage | $V_{DD}$ = 5.0 V | 2.0 | - | - | V |
| (To Enable Output or Open) | $V_{DD}$ = 3.3 V | 0.7 * $V_{DD}$ | - | - | V |
| $I_{IL}$, Input Low Current | $V_{IN}$ = 0 V | - | - | 10 | µA |
| $I_{IH}$, Input High Current | $V_{IN}$ = $V_{DD}$ | - | - | 5 | µA |
| **Output Characteristics:** | | | | | |
| $V_{OL}$, Low-Level Output Voltage | $V_{DD}$ = 5.0 V, $I_{OL}$ = 16mA | - | - | 0.4 | V |
| | $V_{DD}$ = 3.3 V, $I_{OL}$ = 8mA | - | - | 0.4 | V |
| $V_{IHTTL}$, High-Level Output Voltage | $V_{DD}$ = 5.0 V, $I_{OL}$ = -16mA | 2.4 | - | - | V |
| $V_{IHCMOS}$, High-Level Output Voltage | $V_{DD}$ = 5.0 V, $I_{OL}$ = -16mA | $V_{DD}$-0.4 | - | - | V |
| | $V_{DD}$ = 3.3 V, $I_{OL}$ = -8mA | $V_{DD}$-0.4 | - | - | V |
| **Power Supply Current:** | $V_{DD}$ = 5.0 V , $F_O$ ≤ 133 MHz | - | - | 45 | mA |
| (Unloaded) | $V_{DD}$ = 3.3 V , $F_O$ ≤ 100 MHz | - | - | 25 | mA |
| | $V_{DD}$ = 2.7 V , $F_O$ ≤ 66.0 MHz | - | - | 20 | mA |
| **Standby Current:** | | - | 10 | 50 | µA |
| **Tri-State Leakage Current** | $V_{DD}$ = 5.0 V | - | 20 | - | µA |
| **Output Enable Mode:** | Output is Tri-Stated | | | | |
| **Power Down Mode:** | Output is Tri-Stated | | | | |



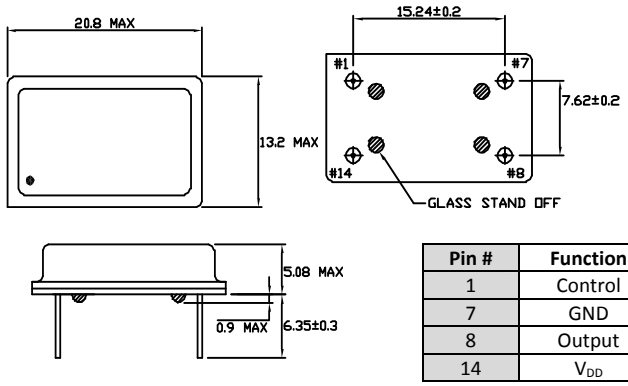
**Cardinal Components**
1801 Broadway Street
Charlottesville, VA 22902

Telephone: (973)785-1333
Email: sales@cardinalxtal.com
Website: www.cardinalxtal.com

**Field Programmable Crystal Oscillator** **Series CPPL**

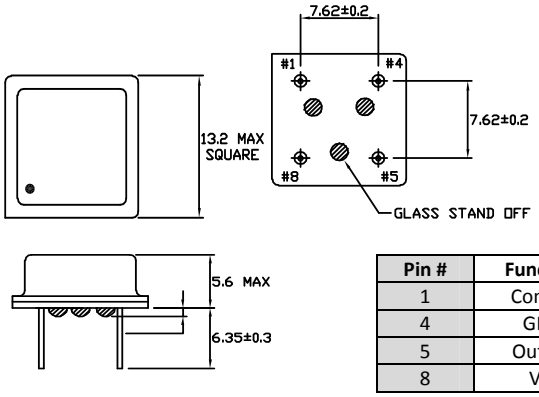
***Note: Bypass $V_{DD}$ to GND with a 0.01µF capacitor**

## Style 1 Full Size 14 Pin Dip



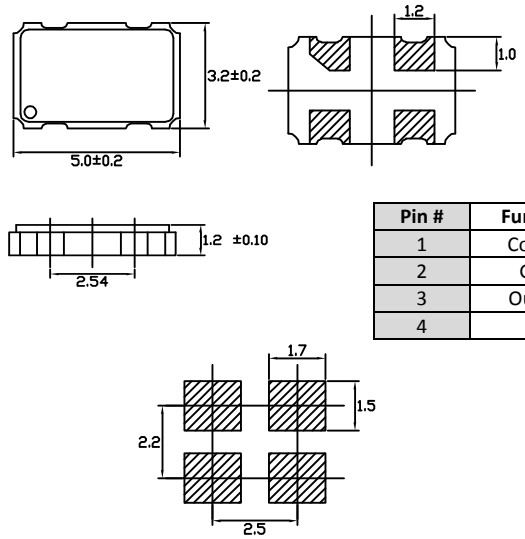

| Pin # | Function |
|---|---|
| 1 | Control |
| 7 | GND |
| 8 | Output |
| 14 | $V_{DD}$ |

## Style 4 Half Size 8 Pin Dip




| Pin # | Function |
|---|---|
| 1 | Control |
| 4 | GND |
| 5 | Output |
| 8 | $V_{DD}$ |

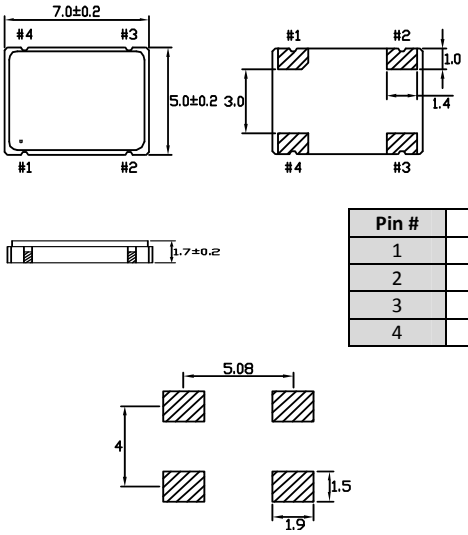
## Style 5 3.2x5 Ceramic SMD




| Pin # | Function |
|---|---|
| 1 | Control |
| 2 | GND |
| 3 | Output |
| 4 | $V_{DD}$ |

Recommended Solder Pad Layout

## Style 7 5x7 Ceramic SMD




| Pin # | Function |
|---|---|
| 1 | Control |
| 2 | GND |
| 3 | Output |
| 4 | $V_{DD}$ |

Recommended Solder Pad Layout

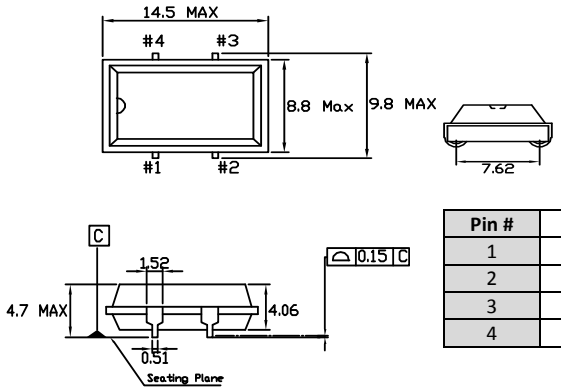


**Cardinal Components**
1801 Broadway Street
Charlottesville, VA 22902

Telephone: (973)785-1333
Email: sales@cardinalxtal.com
Website: www.cardinalxtal.com

***Note: Bypass $V_{DD}$ to GND with a 0.01µF capacitor**

Style 8 Plastic SMD




| Pin # | Function |
|---|---|
| 1 | Control |
| 2 | GND |
| 3 | Output |
| 4 | $V_{DD}$ |

Recommended Solder Pad Layout



**Cardinal Components**
1801 Broadway Street
Charlottesville, VA 22902

Telephone: (973)785-1333
Email: sales@cardinalxtal.com
Website: www.cardinalxtal.com