# CARDINAL COMPONENTS

# CPPYX25 Series Configurable Blank

2.5 x 2.0 x 0.81mm
LCC Ceramic Package

## Features

- Field Programmable with the PG-3200 oscillator programming instrument within seconds.
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function (low standby power option)
- 1.8V, 2.5V, or 3.3V nominal Supply Voltage
- 1-200 MHz Frequency Range (1-125MHz at 1.8V)
- Size: 2.5 x 2.0mm

## Applications

Driving A/Ds, D/As, FPGAs
Digital Video
Ethernet, GbE
Medical
Storage Area Networking
COTS
Broadband Access
SONET/ SDH/ DWDM
Test & Measurement

## Electrical Characteristics

| Parameter | Min | Typ | Max | Unit | Condition |
|---|---|---|---|---|---|
| Configurable Frequency Range [2] | 1 | - | 200 | MHz | (1.8V frequency range 1-125MHz) |
| Frequency Stability [2] | ±20 | - | ±50 | ppm | For all supply voltages, load changes, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. |
| Operating Temperature Range options [2] | 0<br>-20<br>-40<br>-40 | -<br>-<br>-<br>- | +70<br>+70<br>+85<br>105 | °C | |
| Supply Voltage [1, 2] $V_{CC}$ | 1.8 | - | 3.3 | V | ± 5%, See Part Number options on page 2 |
| Supply Current $I_{CC}$ | - | - | - | mA | See page 2 |
| Output Waveform | CMOS | | | | Cload = 15 pF |
| Duty Cycle | 45 | - | 55 | % | At 50%Vcc level |
| Output $V_{OH}$ | 90 | - | - | $\%V_{CC}$ | |
| Output $V_{OL}$ | - | - | 10 | $\%V_{CC}$ | See Load Circuit and waveform page |
| Output $T_{RISE}$ and $T_{FALL}$ | - | - | 2 | ns | |
| Startup Time | - | - | 8 | ms | Time for output to reach specified frequency |
| $V_{DISABLE}$ | - | - | 30 | % | Of $V_{CC}$ applied to Pad 1 |
| $V_{ENABLE}$ | 70 | - | | | |
| Enable Time | - | - | 100 | ns | Time for output to reach a logic state |
| Disable Time | - | - | 100 | ns | Time for output to reach a high Z state |
| Disable Current | -<br>- | -<br>0.4 | -<br>- | mA | Enable/Disable: Pad 1 low, output disabled; See page 2<br>Standby option: Pad 1 low, output disabled, oscillator shutdown |
| Jitter | - | 1.0 | - | ps | 12 kHz to 20 MHz @ 110 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

## Input Current

| Parameter | Min | Typ | Max | Unit | Condition Vcc = 3.3V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 27<br>30<br>35<br>40 | mA | 1MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo < 170MHz<br>170MHz ≤ Fo ≤ 200MHz | 15pF load |

| Parameter | Min | Typ | Max | Unit | Condition Vcc = 2.5V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 27<br>30<br>35 | mA | 1MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo ≤ 200MHz | 15pF load |

| Parameter | Min | Typ | Max | Unit | Condition Vcc = 1.8V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 25 | mA | 1MHz ≤ Fo ≤ 125MHz | 15pF load |

## Part Number Example: CPPYX25-A7BP-XX.XXXNP

| Series Model | Package Size (mm) | | Operating Temperature Range | Frequency Stability | | | |
|---|---|---|---|---|---|---|---|
| **CPPYX** | **25** | **-** | **A7** | **BP** | **-** | **XX.XXX** | **NP** |
| | **25 = 2.5 x 2.0** | | Blank = 0 to +70°C<br>A5 = -20 to +70°C<br>**A7 = -40 to +85°C**<br>AJ = -40 to +105°C | BD = ±20 ppm<br>BR = ±25 ppm<br>**BP = ±50 ppm**<br>B6 = ±100 ppm | | | |

## Frequency Stability selection chart

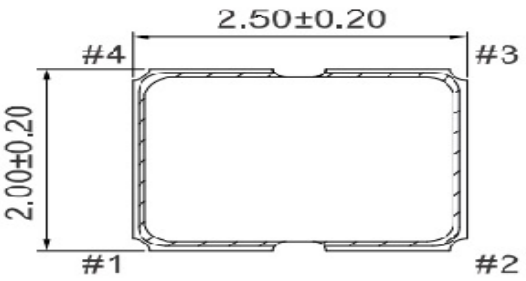
| | ±20 | ±25 | ±50 |
|---|---|---|---|
| 0 - +70°C | • | • | • |
| -20 - +70°C | • | • | • |
| -40 - +85°C | △ | • | • |
| -40 - +105°C | | △ | • |

• - Available △ - Check with Cardinal

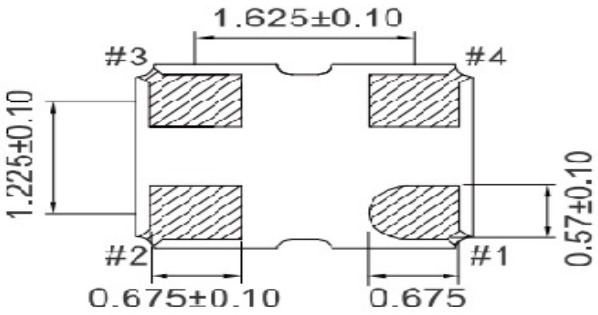

 

## Mechanical Dimensions (mm)

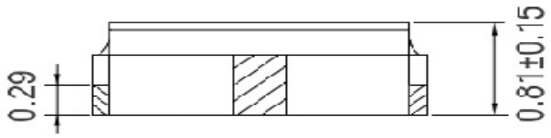
[ TOP VIEW ]




[ BOTTOM VIEW ]




[ SIDE VIEW ]

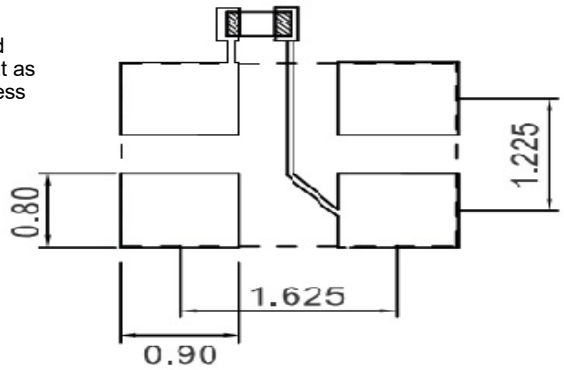



| Pin# | Function |
|---|---|
| 1 | Enable/Disable |
| 2 | GND |
| 3 | Output |
| 4 | VDD |

**Enable/Disable**

| Pin 1 | Output |
|---|---|
| Open | Active |
| Logic '1' | Active |
| Gnd / Logic '0' | Tri-state |

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




To ensure optimal performance, place a bypass capacitor of 0.01~0.1µF as close as possible to the part between Vcc and Gnd pads.

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

**Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.**

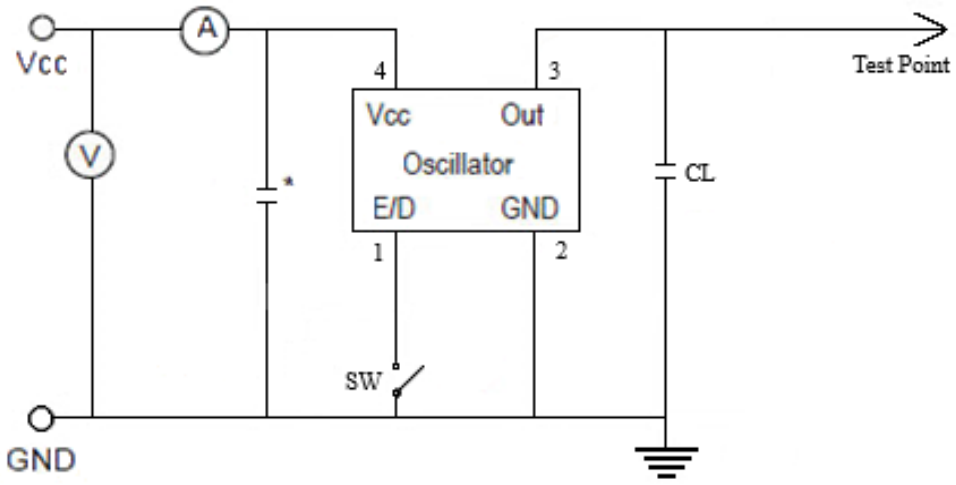
Cardinal Components guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.02 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

For Optimum Jitter Performance, Cardinal recommends:

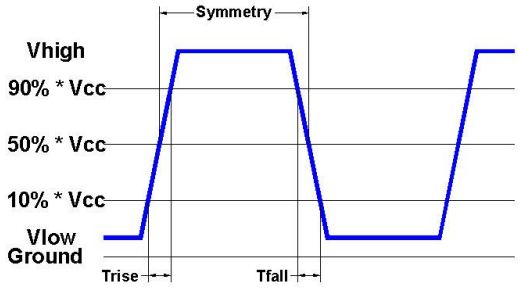
- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans

## Electrical Test / Load Circuit




Notes:
CL: 15pF Includes the input capacitance of oscilloscope
* 0.01~0.1µF external by-pass filter is recommended




## 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 |

**Thermal Characteristics:**
The maximum die or junction temperature is 125°C

ESD Rating

| Model | Min. Voltage | Condition |
|---|---|---|
| Human Body Model | 2000V | MIL-STD-883 3015.7 |
| Machine Model | 200V | EIAJ ED-4701/304 |

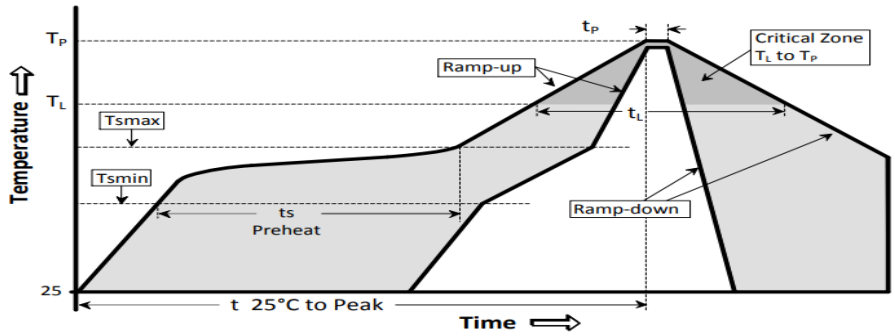
Absolute Maximum Ratings

| Parameter | Unit |
|---|---|
| $V_{CC}$ Supply Voltage | -0.5V to +7.0V |
| Vi Input Voltage | -0.5V to $V_{CC}$ + 0.5V |
| Vo Output Voltage | -0.5V to $V_{CC}$ + 0.5V |

## Reflow Cycle

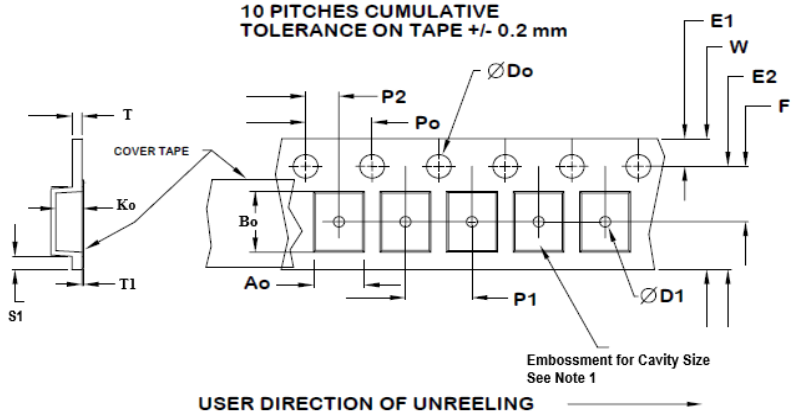
**Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"**

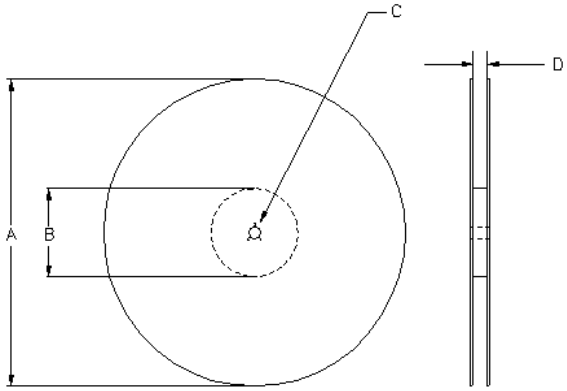



| Temperature Profile | Symbol | Condition | Unit |
|---|---|---|---|
| Average ramp-up rate | ($Ts_{max}$ to $T_P$) | 3°C / second max | °C / s |
| Ramp down Rate | $T_{cool}$ | 6°C / second max | °C / s |
| Time 25°C to Peak Temperature | $T_{to\text{-}peak}$ | 8 minutes max | min |
| **Preheat** | | | |
| 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 Variable Dimensions Table 2 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Part Size | Tape Size | E2 typ | F | P1 | W max | Ao | Bo | Ko | Qty/reel standard |
| 2520 | 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 | 3K |

Dimensions in mm  Drawings 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 | Inches | mm | Inches | mm | mm | mm |
| 7 | 7.0 | 177.8 | 2.50 | 63.5 | 13.0 | Tape size +0.4 |
| 10 | 10.0 | 254.0 | 4.00 | 101.6 | +0.5 -0.2 | +2.0 -0.0 |

| Tape Constant Dimensions Table 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tape Size | Do | D1 typ | E1 | Po | P2 | S1 min | T typ | T1 max |
| 8mm | 1.5 +0.1 -0.0 | 1.0 | 1.75 ±0.1 | 4.0 ±0.1 | 2.0 ±0.05 | 0.6 | 0.3 | 0.1 |

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