

7.0 x 5.0 x 1.3mm  
LCC Ceramic Package

### Features

- Field Programmable with the [PG-3200](#) oscillator programming instrument within seconds.
- Can be programmed twice (single Frequency) or one time as Dual frequency
- CMOS Output (will interface with TTL devices)
- 3.3V or 5.0V nominal Supply Voltage
- Size: 7 x 5mm
- Enable/Disable Function (optional Standby function) for single frequency program only

### Applications

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

### Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Programmable Frequency Range	1	-	133	MHz	(3.3V: 1 - 100MHz)
Frequency Stability <sup>2</sup>	±25	-	±100	ppm	Includes supply voltage change, load changes, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures.
Operating Temperature Range options <sup>2</sup>	-20 -40	- -	+70 +85	°C	
Supply Voltage <sup>1,2</sup> V <sub>DD</sub>	2.97	-	5.5	V	
Supply Current I <sub>DD</sub> (No Load)	-	-	45 25	mA	V <sub>DD</sub> = 5.0V V <sub>DD</sub> = 3.3V
Output Type	CMOS				Cload = 50pF max, V <sub>DD</sub> = 4.5~5.5V, ≤66MHz Cload = 25pF max, V <sub>DD</sub> = 4.5~5.5V, >66MHz Cload = 30pF max, V <sub>DD</sub> = 3.0~3.6V, ≤40MHz Cload = 15pF max, V <sub>DD</sub> = 3.0~3.6V, >40MHz
	TTL				Cload = 50pF max; V <sub>DD</sub> = 4.5~5.5V, ≤40MHz
Duty Cycle	-	-	-	%	See Page 2
Output V <sub>OH</sub> (TTL Level) (CMOS Level)	2.4	-	-	V	V <sub>DD</sub> = 4.5~5.5V
	V <sub>DD</sub> - 0.4			V	All voltages
Output V <sub>OL</sub>	-	-	0.4	V	See Load Circuit and waveform page
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	-	-	ns	See page 2
Startup Time	-	-	2	ms	Time for output to reach specified frequency
V <sub>DISABLE</sub>	-	-	0.8 0.2V <sub>DD</sub>	V	V <sub>DD</sub> = 4.5~5.5V V <sub>DD</sub> = 3.0~3.6V
V <sub>ENABLE</sub>	2.0 0.7V <sub>DD</sub>	-			V <sub>DD</sub> = 4.5~5.5V V <sub>DD</sub> = 3.0~3.6V
Enable Time	-	-	2	ms	
Disable Time - Pin 1 low to Output Hi-Z	-	T/2	T+10	ns	T = Frequency Period
Disable Current	-	-	-	mA	Enable/Disable: Pad 1 low, output disabled; See above Supply Current
	-	0.4	-		Standby option: Pad 1 low, output disabled, oscillator shutdown
RMS Period Jitter	-	40 30	50 40	ps	≤33MHz >33MHz
Period Jitter, Pk-Pk		100 75	250 175	ps	>1,000,000 samples ≤33MHz >33MHz
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 next to device for correct operation

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

**Duty Cycle**

Parameter	Min	Typ	Max	Unit	
TTL @ 1.4V level; V <sub>DD</sub> = 4.5~5.5V	45 45 40 40		55 55 60 60	%	Fo ≤ 50 MHz, CL ≤ 50pF 50 MHz < Fo ≤ 66MHz; CL ≤ 15pF 66 MHz < Fo ≤ 125MHz, CL ≤ 25pF 125 MHz < Fo ≤ 133MHz, CL ≤ 15pF

Parameter	Min	Typ	Max	Unit	
CMOS @ 0.5V <sub>DD</sub> level; V <sub>DD</sub> = 4.5~5.5V	45 40 40		55 60 60	%	Fo ≤ 66 MHz, CL ≤ 25pF 66 MHz < Fo ≤ 125MHz; CL ≤ 25pF 125 MHz < Fo ≤ 133MHz, CL ≤ 15pF

Parameter	Min	Typ	Max	Unit	
CMOS @ 0.5V <sub>DD</sub> level; V <sub>DD</sub> = 3.0~3.6V	45 40		55 60	%	Fo ≤ 40 MHz, CL ≤ 30pF 40 MHz < Fo ≤ 100MHz; CL ≤ 15pF

**Rise/Fall Time**

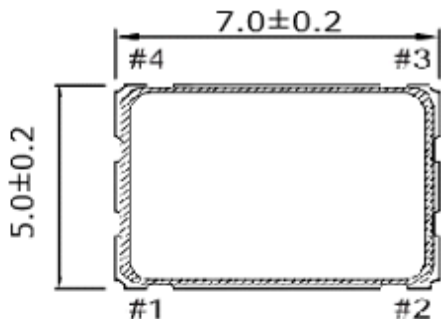
Parameter	Min	Typ	Max	Unit	
Rise/Fall Time			1.8 1.2 0.9  3.4 4.0 2.4	ns	0.8V~2.0V, V <sub>DD</sub> = 4.5~5.5V, CL=50pF 0.8V~2.0V, V <sub>DD</sub> = 4.5~5.5V, CL=25pF 0.8V~2.0V, V <sub>DD</sub> = 4.5~5.5V, CL=15pF  0.2V <sub>DD</sub> ~0.8V <sub>DD</sub> , V <sub>DD</sub> = 4.5~5.5V, CL=50pF 0.2V <sub>DD</sub> ~0.8V <sub>DD</sub> , V <sub>DD</sub> = 3.0~3.6V, CL=30pF 0.2V <sub>DD</sub> ~0.8V <sub>DD</sub> , V <sub>DD</sub> = 3.0~3.6V, CL=15pF

**Part Number Example: CPPX7-A7BR-XX.XXXNP**

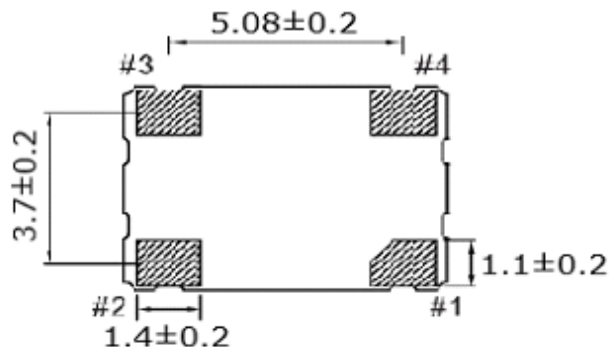
Series Model	Package Size (mm)		Operating Temperature Range	Frequency Stability (ppm)			
CPPX	7	-	A7	BR	-	XX.XXX	NP or NC
	7 = 7 x 5		A5 = -20 to +70°C A7 = -40 to +85°C	BC = ±20 BR = ±25 BP = ±50 B6 = ±100			

### Mechanical Dimensions (mm)

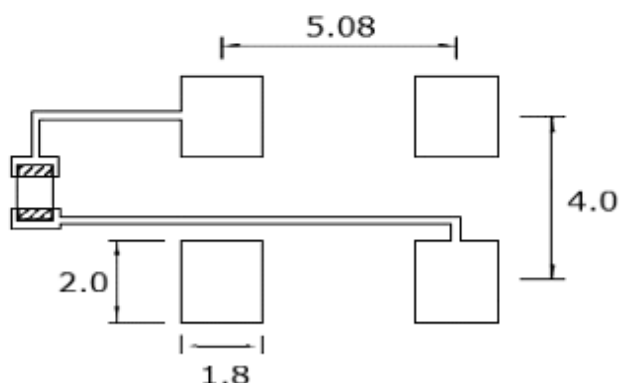
[ TOP VIEW ]



[ BOTTOM VIEW ]



[ SIDE VIEW ]



Pin 1 Operation for  
Single Frequency

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

Pin 1 Operation for  
Dual Frequency

Pin 1 (Fsel)	Output
Logic '1'	Freq 2
Logic '0'/GND	Freq 1

#### Pad Layout

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

To ensure optimal oscillator performance, place a by-pass capacitor of 0.01~0.1 $\mu$ F as close to the part as possible between V<sub>CC</sub> and GND pads.

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

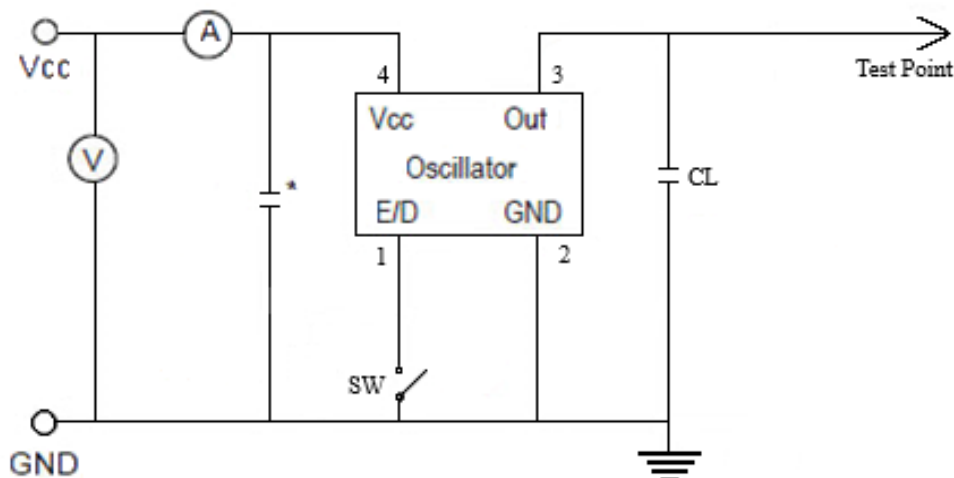
Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.

Cardinal Components guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.16 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

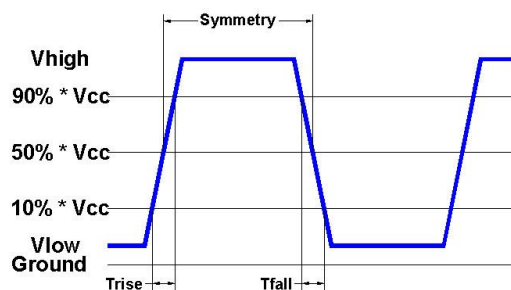
### Electrical Test / Load Circuit



Notes:

CL: 15pF Includes the input capacitance of oscilloscope

\* 0.01~0.1 $\mu$ F 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

ESD Rating

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

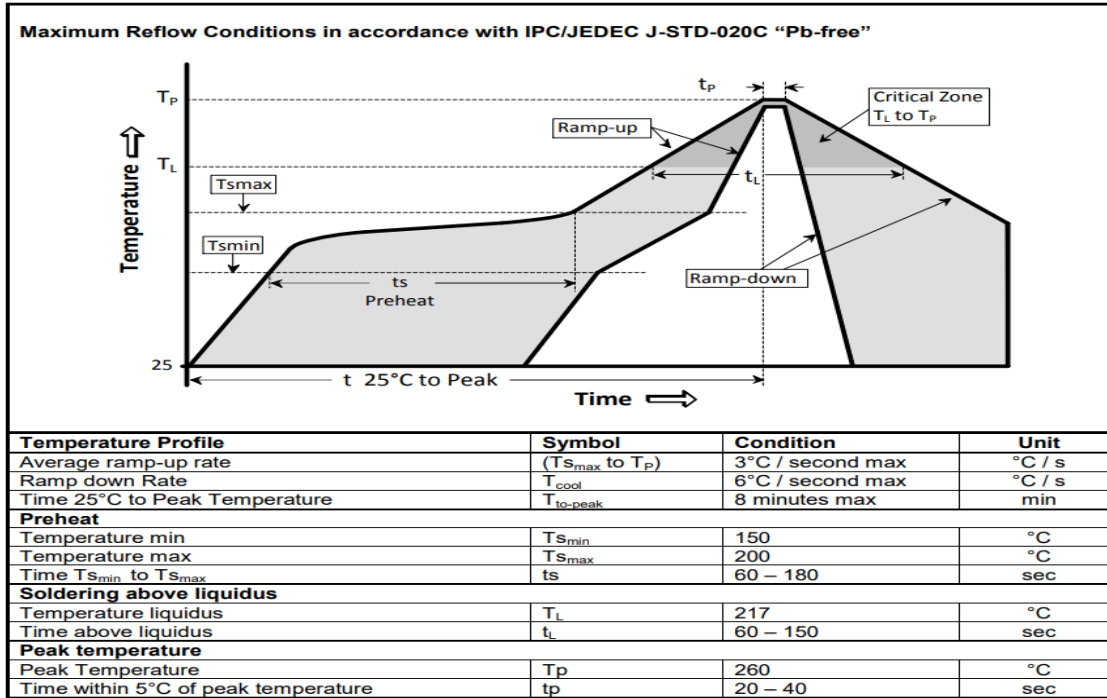
Absolute Maximum Ratings

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +7.0V
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 100°C

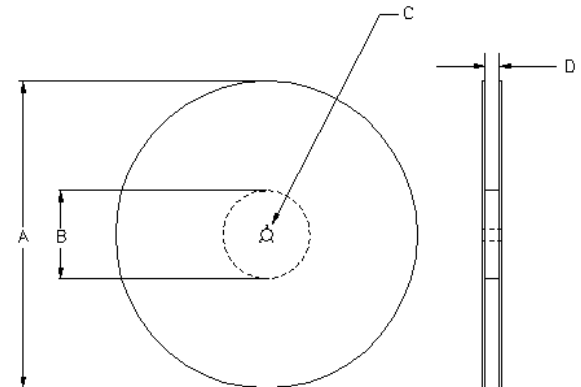
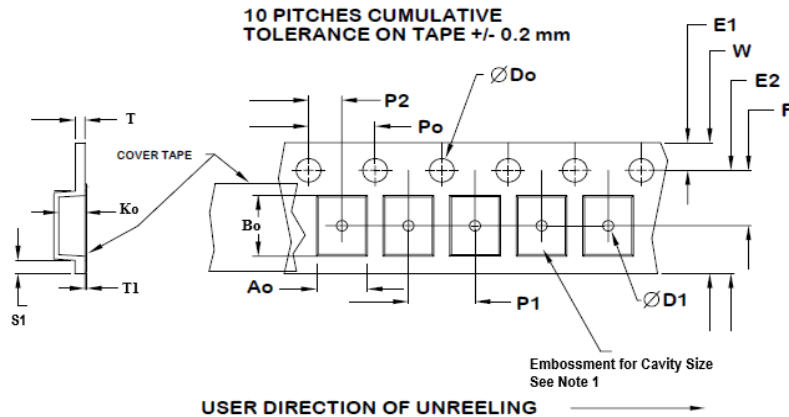
### Reflow Cycle



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

### Tape and Reel

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.



Tape Variable Dimensions Table 2									
Part Size	Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko	Qty/reel standard
7050	16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	5.56±0.1	7.85±0.1	2±0.1	1K

Dimensions in mm Drawings Not to scale  
Note 1: Embossed cavity to conform to EIA-481-B

Tape Constant Dimensions Table 1								
Tape Size	Do	D1 typ	E1	Po	P2	S1 min	T typ	T1 max
16mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	0.6	0.3	0.1

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 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		

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