



CC25L  
2.5 x 2.0 x 0.81 mm  
LCC Ceramic Package

### Features

- Quartz crystal controlled precision square wave oscillator
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function includes low standby power
- Low Jitter
- 3.3V nominal Supply Voltage
- 1.25 - 125 MHz Frequency Range

### Applications

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

### Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition	
Frequency Range <sup>2</sup>	1.25	-	125	MHz		
Frequency Stability <sup>2</sup>	±20*	-	±50	ppm	Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *limited frequencies, see page 2	
Operating Temperature Range options <sup>2</sup>	-10 -20 -40	-	+70 +70 +85	°C		
Supply Voltage <sup>1,2</sup> (V <sub>CC</sub> )	2.97	3.30	3.63	V		
Output Waveform	CMOS					
Duty Cycle	45	-	55	%	At 50% V <sub>CC</sub>	
Output V <sub>HIGH</sub> (VOH)	V <sub>CC</sub> - 0.4	-	-	V	See Load Circuit	
Output V <sub>LOW</sub> (VOL)	-	-	0.4	V		
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	1	5	ns	C <sub>LOAD</sub> = 15 pF 10% to 90% of V <sub>CC</sub> See Load Circuit	
Startup Time	-	-	10	ms	Time for output to reach specified frequency	
V <sub>DISABLE</sub> (VIL)	-	-	30	%	Of V <sub>CC</sub> applied to Pad 1	
V <sub>ENABLE</sub> (VIH)	70	-				
Enable Time	-	-	100	ns	Time for output to reach a logic state	
Disable Time	-	-	200	ns	Time for output to reach a high Z state	
Enable/Disable Internal Pull-up	30	70	150	KΩ	To V <sub>CC</sub>	
Output Leakage	V <sub>OUT</sub> = V <sub>CC</sub> V <sub>OUT</sub> = 0V	- -10	+10 -	μA	Pad 1 low, device disabled	
Standby Current	-	-	10	μA		
rms Phase Jitter	-	0.1	1.0	ps	Fo ≥ 40MHz; 12kHz ~ 20MHz	
Phase Noise	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-78 -107 -132 -144 -151 -155 -158	-	dBc/Hz	25°C ± 2°C at 100 MHz
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

Electrical Characteristics						
Parameter	Min	Typ	Max	Unit	Condition	
Supply Current $I_{CC}$		0.9	1.8		3 MHz	3.3V, no load
		1.4	2.8		5 MHz	
		1.5	3.0		10 MHz	
	-	1.7	3.4		20 MHz	
	-	3.5	7.0	mA	50 MHz	
	-	4.0	8.0		65 MHz	
	-	4.5	9.0		85 MHz	
		5.5	10.5		100 MHz	
		7.0	13.5		133 MHz	

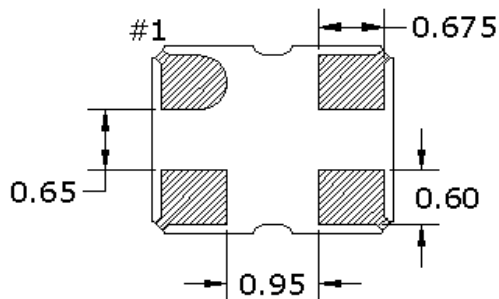
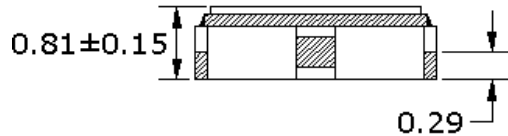
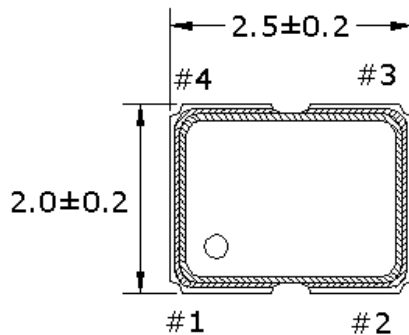
Specifications with Pad 1 E/D circuit open

Part Number							
Series Model	Supply Voltage	Packaging		Operating Temperature Range	Frequency Stability	Symmetry	Frequency
CC25	L	Z	-	A2	BR	45	-50.0
	L = 3.3V ± 10%	Z = Tape/Reel Blank = Tape only		A1 = -10 to +70°C A5 = -20 to +70°C A2 = -40 to +85°C*	B9 = ±20 ppm* BR = ±25 ppm B2 = ±50 ppm Blank = ±100 ppm	45 = 45/55%	

\* Contact Cardinal sales for limited frequencies. Full frequency range available which excludes aging.

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

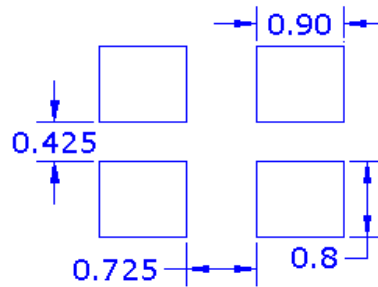
Cardinal guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
 Weight of the Device: 0.015 grams  
 Moisture Sensitivity Level: 1 As defined in J-STD-020D  
 Second Level Interconnect code: e4

**Mechanical Dimensions**

**Pad Connections**

Pad	Function
1	Enable/Disable
2	Ground
3	Output
4	Vcc

**ENABLE/DISABLE**

Pad 1	Output
V <sub>IH</sub> /Open	Active
V <sub>IL</sub> /Gnd	Disabled/Tristate


**Pad Layout**

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

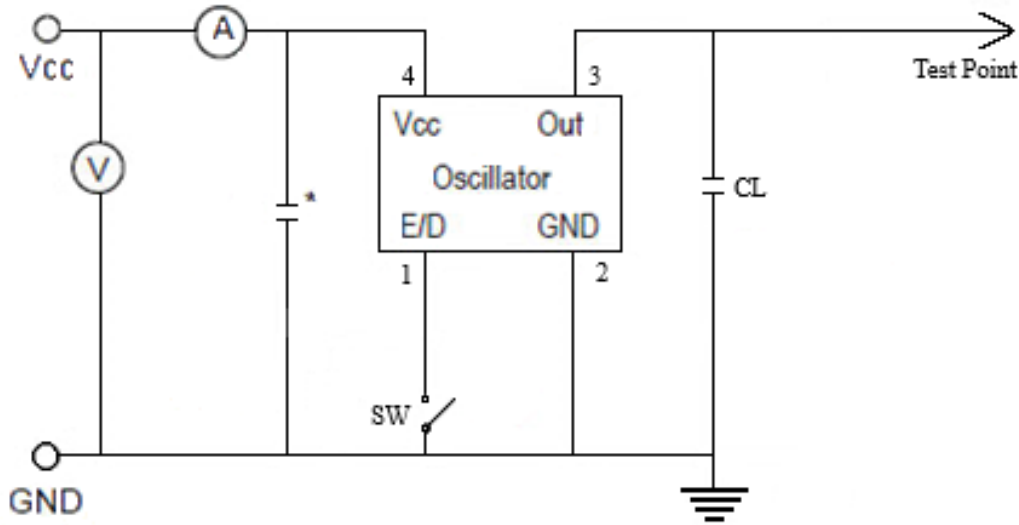
**Dimensions in mm**

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

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

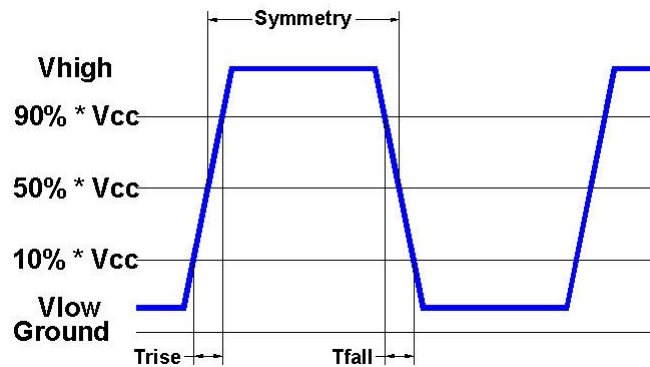
### Electrical Test / Load Circuit



Notes:

CL: Includes the input capacitance of oscilloscope

\* 0.01 $\mu$ 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	JESD22-A114
Machine Model	200V	JESD22-A115

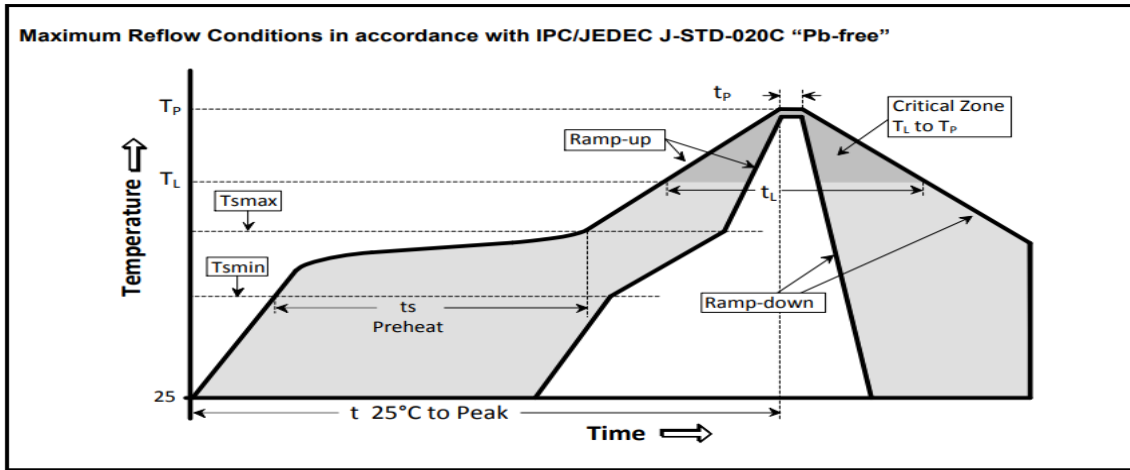
Absolute Maximum Ratings

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.3V to +4.0V
V <sub>i</sub> Input Voltage	-0.3V to V <sub>CC</sub> + 0.3V
V <sub>o</sub> Output Voltage	-0.3V to V <sub>CC</sub> + 0.3V

### Thermal Characteristics:

The maximum die or junction temperature is 150°C

## Reflow Cycle

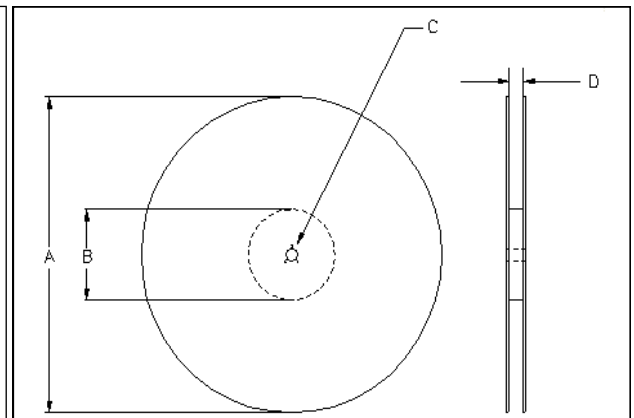
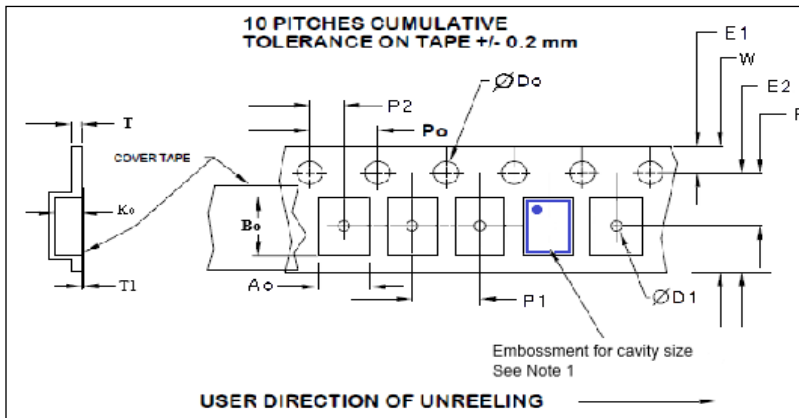


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	( $T_{S_{max}}$ 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	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$ min	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
Peak Temperature	$T_P$	260	°C
Time within 5°C of peak temperature	$t_p$	20 – 40	sec

## Tape and Reel

Tape and Reel available for quantities of 250 to 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.



Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
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

Reel Size	A		B		C	D
	Inches	mm	Inches	mm	mm	mm
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

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

Tape Size	Do	D1 min	E1	Po	P2	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3	0.1

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