CARDINAL COMPONENTS

CC25 Series 1.8V CMOS Clock Oscillator

CC25K
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
- 1.8V 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 [2]	1.25	-	125	MHz	
Frequency Stability [2]	±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[2]	-10 -20 -40	- - -	+70 +70 +85	°C	
Supply Voltage [1, 2] (V_{CC})	1.62	1.8	1.98	V	
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	At 50% Vcc
Output V_{HIGH} (VOH)	V_{CC} - 0.4	-	-	V	
Output V_{LOW} (VOL)	-	-	0.4	V	See Load Circuit
Output T_{RISE} and T_{FALL}	-	1.5	6	ns	C_{LOAD} = 15 pF 10% to 90% of V_{CC} See Load Circuit
Startup Time	-	-	10	ms	Time for output to reach specified frequency
$V_{DISABLE}$ (VIL)	-	-	30	%	Of V_{CC} applied to Pad 1
V_{ENABLE} (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_{CC}
Output Leakage $V_{OUT} = V_{CC}$ V_{OUT} = 0V	- -10	-	+10 -	µA	
Standby Current	-	-	10	µA	Pad 1 low, device disabled
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
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Specified by part number

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition	
Supply Current I_{CC}	-	0.4	0.8	mA	3 MHz	no load
	-	0.7	1.4		5 MHz	
	-	0.7	1.4		10 MHz	
	-	0.8	1.6		20 MHz	
	-	2.5	5.0		50 MHz	
	-	2.5	5.0		65 MHz	
	-	3.5	7.0		85 MHz	
	-	4.0	7.5		100 MHz	
	-	4.5	8.5		125 MHz	

Specifications with Pad 1 E/D circuit open

Part Number

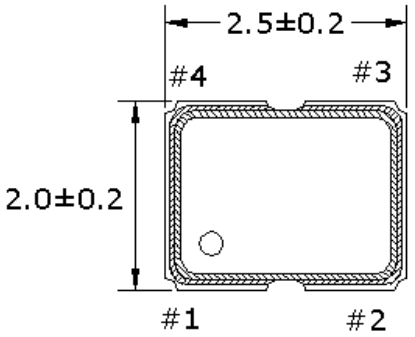
Series Model	Supply Voltage	Packaging		Operating Temperature Range	Frequency Stability	Symmetry	Frequency
CC25	**K**	**Z**	**-**	**A2**	**BR**	**45**	**-50.0**
	K = 1.8V ± 10%	**Z** = Tape/Reel Blank = Tape only		A1 = -10 to +70°C A5 = -20 to +70°C **A2** = -40 to +85°C*	B9 = ±20 ppm* **BR** = ±25 ppm B2 = ±50 ppm Blank = ±100 ppm	**45** = 45/55%	

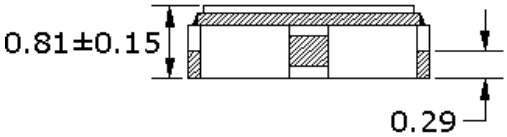
* Contact Cardinal sales for limited frequencies. Full frequency range available which excludes aging.

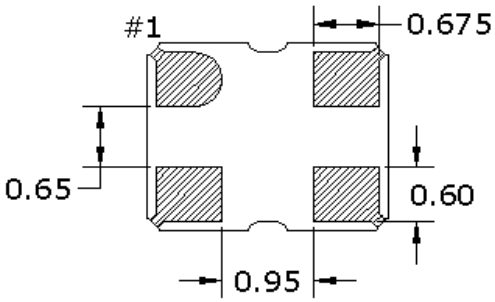
Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.

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





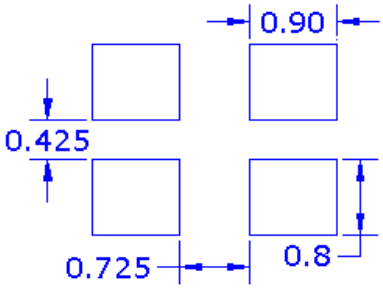


Dimensions in mm

Pad Connections

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

ENABLE/DISABLE	
Pad 1	Output
VIH/Open	Active
VIL/Gnd	Disabled/Tristate



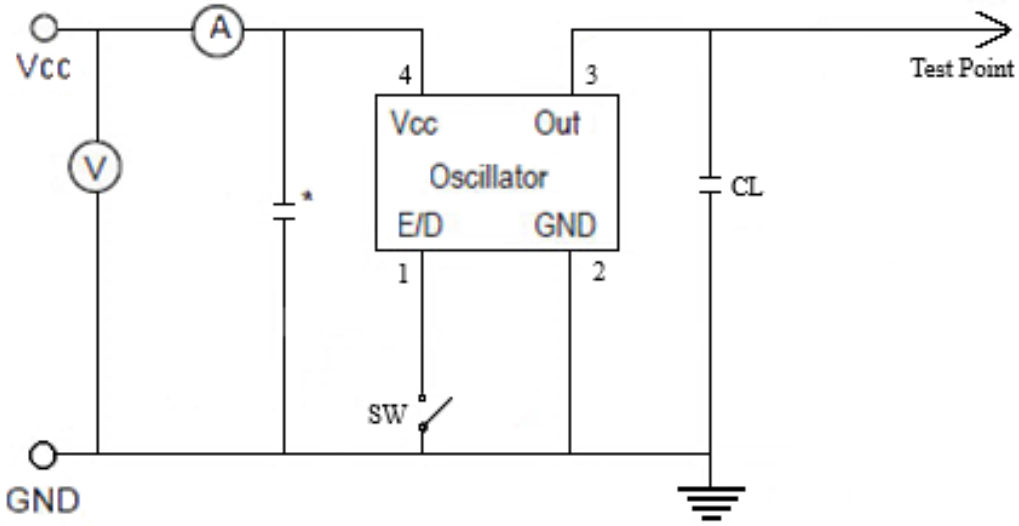
Pad Layout
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

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

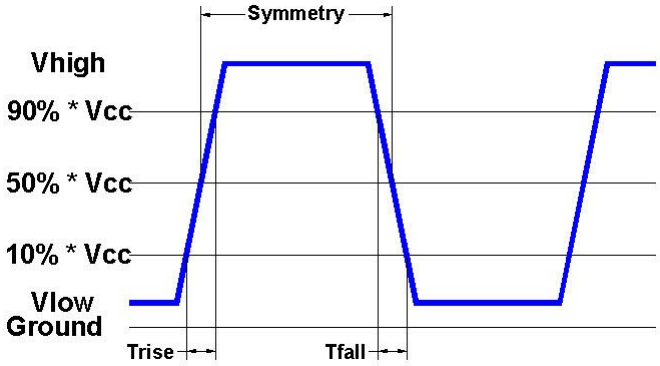
For Optimum Jitter Performance, Cardinal recommends:

- 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
* 0.01µF 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

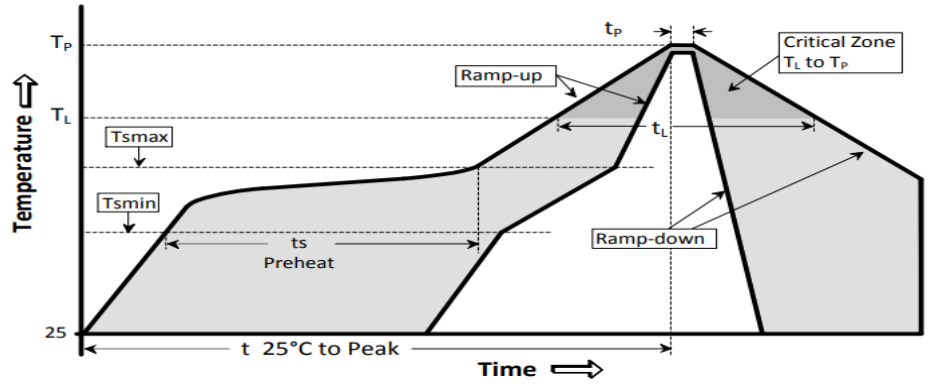
Thermal Characteristics:
The maximum die or junction temperature is150°C

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.3V to +4.0V
Vi Input Voltage	-0.3V to V_{CC} + 0.3V
Vo Output Voltage	-0.3V to V_{CC} + 0.3V

Reflow Cycle

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

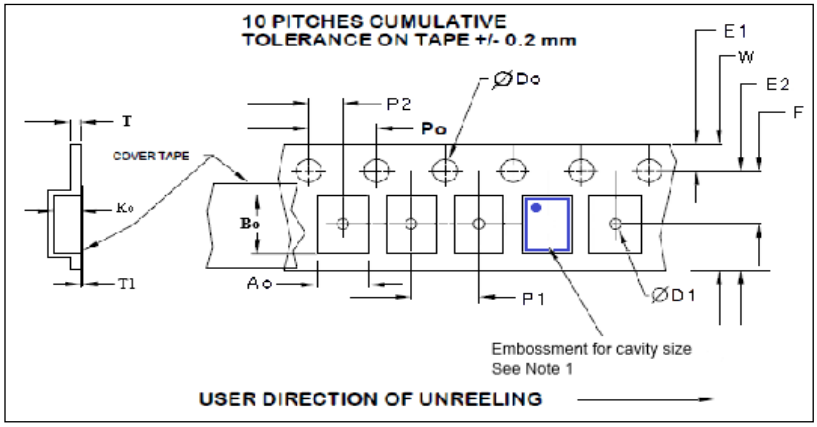


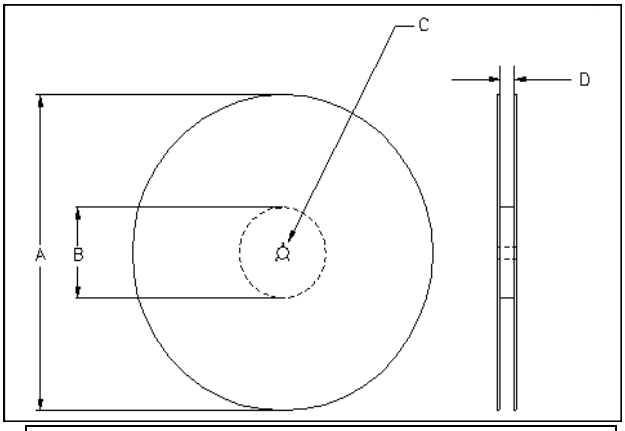
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time 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 and Reel available for quantities of 250 to 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.





Tape Variable Dimensions Table 2							
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

Dimensions in mm Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B

Tape Constant Dimensions Table 1							
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

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inch-es	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

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Contacting Cardinal Components

Cardinal Components
19013 36th Ave. West
Lynnwood, WA 98036-5761
U.S.A.

Tel: 973-785-1333
Fax: 425.776.2760
email: sales@cardinalxtal.com
URL: www.cardinalxtal.com