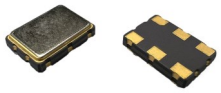
CARDINAL COMPONENTS

CJAL7 LVDS Oscillator



CJAL7
7.0 x 5.0 x 1.5 mm
Leadless Ceramic Package

Features

- Quartz crystal controlled PLL Based Square Wave Oscillator
- LVDS Output
- Enable/Disable Function on pad 1 (Pad 2 option)
- Low Jitter
- 2.5V and 3.3V Supply Voltage

Applications

Driving A/Ds, D/As, FPGAs
Fibre Channel
Ethernet, GbE, SynchE
Medical
Storage Area Networking
COTS
Telecom
PON

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range	10		1500	MHz	
Frequency Stability	±25	-	±50	ppm	Includes Vcc change, load change, 1 year aging at 25°C ± 2°C, shock, vibration, 25°C tolerance and operating temperature
Operating Temperature Range	-20 -40	-	+70 +85	°C	
Storage Temperature Range	-55		+125	°C	
Supply Voltage [1] V_{CC}	2.375 2.97	2.5 3.3	2.625 3.63	V	TVcc ramp = 100µs min
Supply Current I_{CC}	-		40 50	mA	2.5V 3.3V
Output Waveform	LVDS				Load = 100Ω. Recommended termination is DC-Coupled (Point to Point)
Differential Output Voltage (V_{OD})	175	350		mV	
Offset Voltage (V_{OS})		1.25		V	
Output T_{RISE} and T_{FALL}			0.5	ns	Vth is 10% and 90% of V_{OD}
Disable Current		16		mA	When output disabled (pin 1 low)
Startup Time	-	-	10	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	At output crossing point
$V_{DISABLE}$	-	-	0.3*V_{CC}	V	Referenced to Ground
V_{ENABLE}	0.7*V_{CC}	-	-		
Phase Noise 100Hz 1kHz 10kHz 100kHz 1MHz 5MHz 20MHz	-	-95 -111 -116 -117 -137 -140 -150	-	dBc/Hz	25°C ± 2°C, 3.3V, 156.25MHz
Phase Jitter	-	1	-	ps rms	12 kHz to 20 MHz from the output frequency

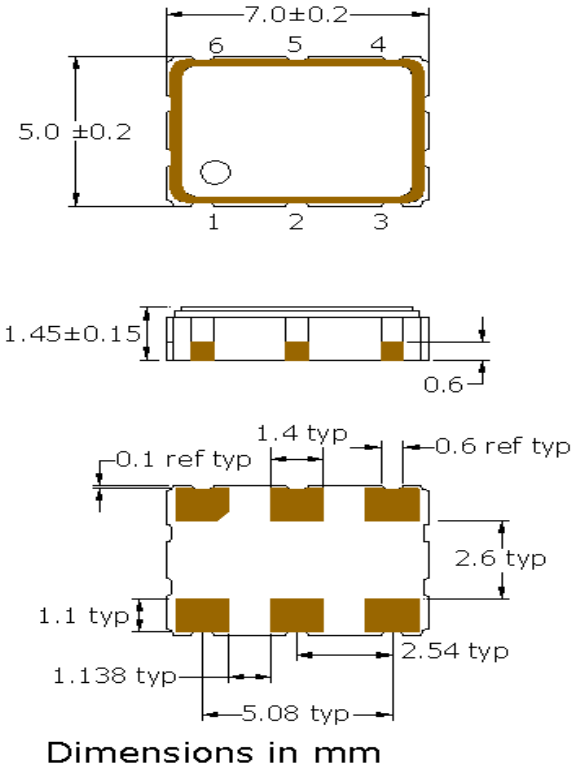
Part Number

Example: CJAL7LZ-A7BP-100.0TS

Series Model	Output	Package Size	Supply Voltage	Packaging	Operating Temperature Range	Frequency Stability	Frequency (MHz)	Output Control
CJA	**L**	**7**	**L**	**Z**	**A7**	**BP**	**100.0**	**TS**
	L = LVDS	**7 = 7.0x5.0mm**	S = 2.5V **L = 3.3V**	Blank=Tape only **Z = Tape/Reel**	A5 = -20 to +70°C **A7 = -40 to +85°C**	BR = ±25ppm **BP = ±50ppm**		**TS=TRISTATE**

Notes: Specifications with Pad 1 E/D open circuit
[1] Place an appropriate power supply bypass capacitor next to device for correct operation

Mechanical Dimensions



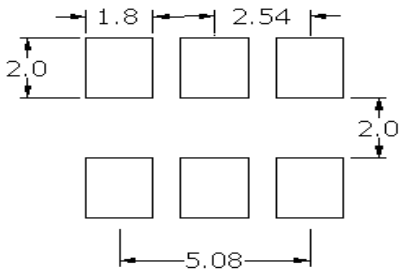
Dimensions in mm

Pad Connections

Pad	Function
1	Enable/Disable*
2	No Connect*
3	Ground
4	Output
5	Output N
6	Vcc

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

*= Optional Pad 2 for E/D

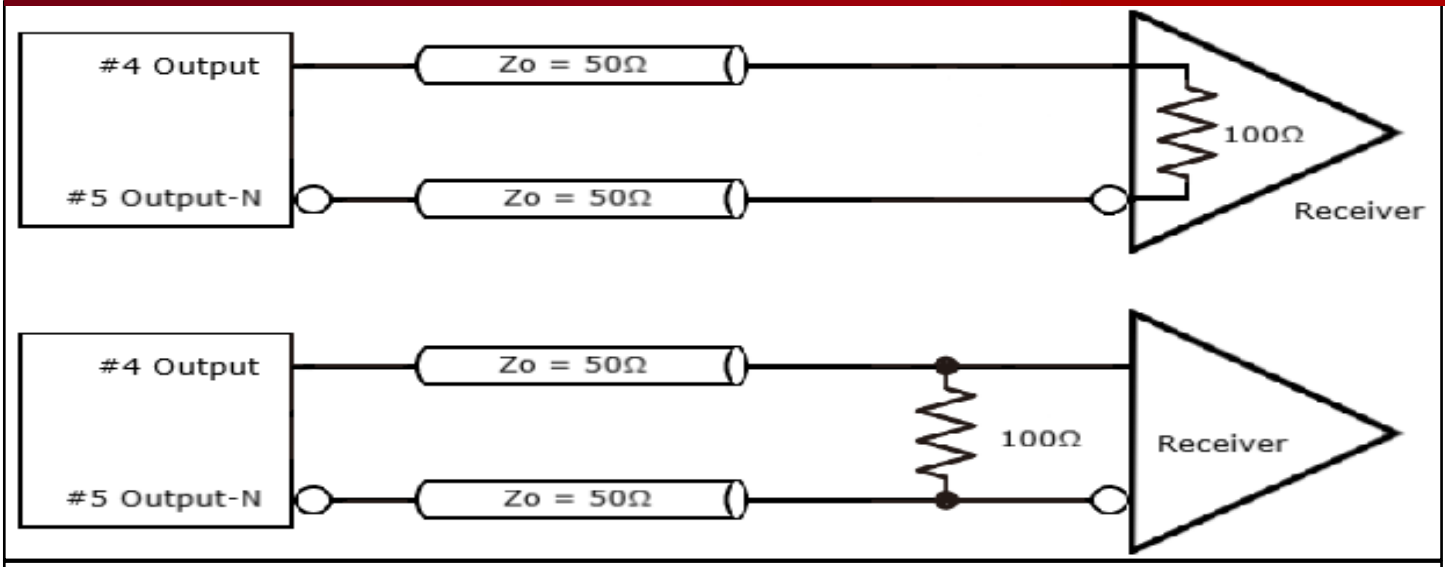


Solder pad layout

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)

Recommended Termination

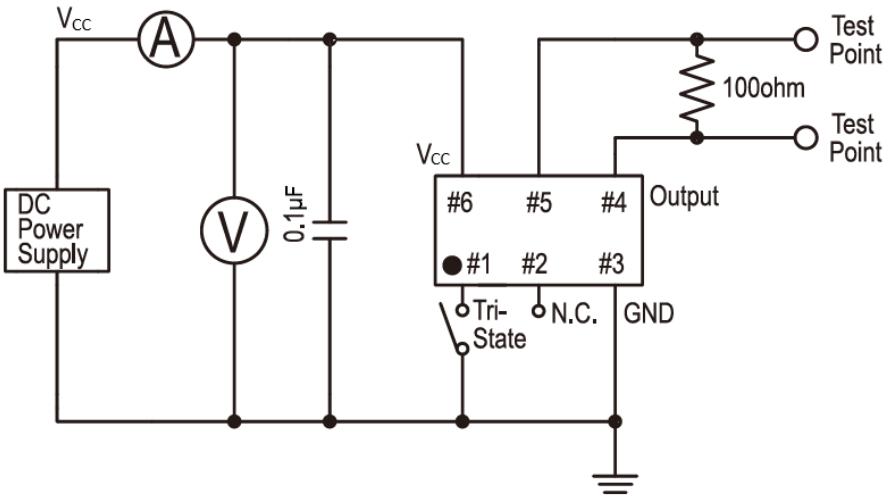


For any other terminations, the oscillator should be sampled and tested in the application. Both outputs shall be terminated and biased for proper operation.

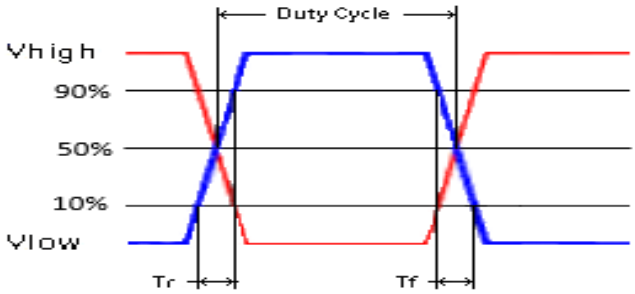
For Optimum Jitter Performance, Cardinal recommends:

- 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



Test Waveform



Environmental / ESD

Reliability: Environmental Test

Parameter	Reference Standard	Test Condition
Vibration	MIL-STD-883 2007 Condition A	10-2000Hz, 1.52mm, 20g, each axis for 4hrs
Thermal Shock	MIL-STD-883 1010 Condition B	-55°C, 125°C, soak time is 10 mins, with total 200 cycles
Mechanical Shock	MIL-STD-883 2002 Condition B	1500g, half-sine, 0.5ms, each axis for 3 times

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +4.2V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V
Max Junction Temperature	125°C

ESD Rating

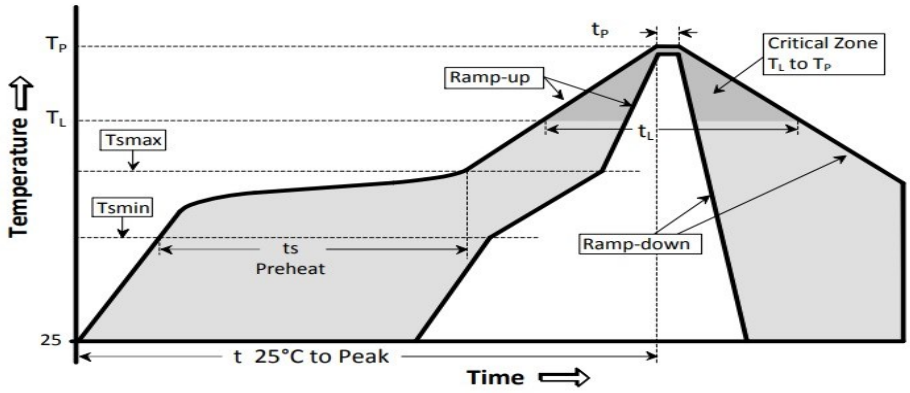
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	1000V	JESD22-C101
Machine Model	120V	JESD22-A115

Cardinal Components 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

Reflow Cycle

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

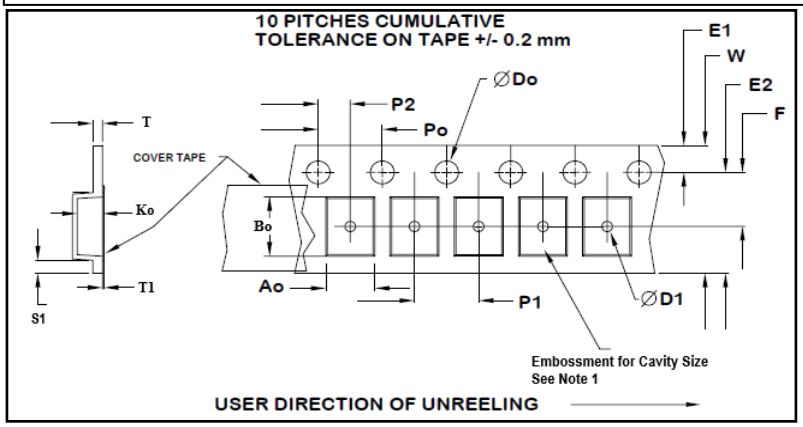


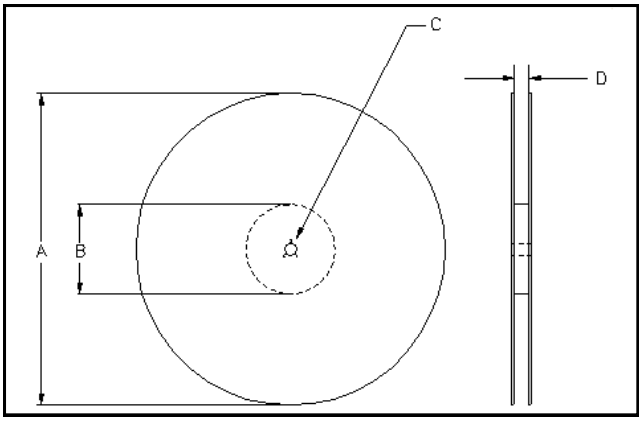
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time 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 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.





Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
16mm	14.25	7.5 ±0.05	8.0 ± 0.1	16.3	5.56±0.1	7.85±0.1	2.0±0.1

Dimensions in mm Drawing 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	180	2.50	60	13.0	Tape size +0.4
13	13.0	330	4.0	100	+0.5 -0.2	+2.0 -0.0

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

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