



LC55DX
3.20 x 5.0 x 1.35 mm
LCC Ceramic Package

Features

- Pletronics' LC55D Series is a Quartz crystal controlled Precision Square Wave Oscillator
- LVDS Output
- Enable/Disable Function on pad 1
- Low Jitter
- 1.8V nominal Supply Voltage
- 15-1000 MHz Frequency Range

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 ²	15	-	1000	MHz	Consult factory for other options
Frequency Stability vs. Temperature ² $\pm 20 = 20$, $\pm 25 = 44$, $\pm 50 = 45$	-20 -25 -50	-	-20 -25 -50	ppm	For all supply voltages, load changes, aging for 1 year at 25°C $\pm$ 2°C, shock, vibration and temperatures
Operating Temperature Range ²	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range C option Extended range E option
Supply Voltage ^{1,2} V _{CC}	1.71	1.80	1.89	V	
Supply Current I _{CC}	-	69	81	mA	
Output Waveform	LVDS				
Change in V _{OCM} between complementary output states ΔV_{OCM}	-	-	50	mV	
Output leakage current V _{OZ}	-20	-	+20	μA	Output off, V _{out} = 0.75V to 1.75V
Output differential peak V _P	247 150	-	454 454	mV	15 MHz to 700 MHz 700 MHz to 1000 MHz
Change in V _P between complementary output states ΔV_P	-	-	50	mV	
Output T _{RISE} and T _{FALL}	-	-	350	ps	V _{th} is 20% and 80% of waveform
Duty Cycle t _{ODC}	45	50	55	%	Referenced to 50% of amplitude or crossing point
V _{DISABLE}	-	-	30	%V _{DD}	Referenced to Ground
V _{ENABLE}	70	-	-		
Enable/Disable Internal Pull-up	-	200	-	kΩ	To V _{CC} , measured with pad 1 = 0.0 volts
RMS Jitter	-	150	250	fs	12 kHz to 20 MHz from the output frequency at 156.25 MHz
Phase Noise 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-113 -127 -135 -144 -152	-	dBc/Hz	25°C $\pm$ 2°C at 156.25 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

*Requires external AC coupling for V_{CC} = 1.8-V range as indicated. The common-mode voltage has to be generated and applied externally

Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V _{CC}	Frequency in MHz	Optional T&R Packaging code
LC55	45	D	E	X	- 100.0M	-XX
	45 = ± 50 ppm (STD) 44 = ± 25 ppm 20 = ± 20 ppm		Blank = -10 to +70°C (STD) C = -20 to +70°C E = -40 to +85°C	X = 1.8V±5%	15 - 1000 MHz	T250 = 250 per Reel T500 = 500 per Reel T1K = 1000 per Reel (Std for 1K pcs)

Device Marking

PFFF.F L

• YMDxxx

P = Pletronics
FFF.FF L = Frequency in MHz, L for LVDS
YMD = Date Code, All other marking is internal codes

Note: Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Codes for Date Code YMD (Year Month Day)

Code	4	5	6	7	8	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2014	2015	2016	2017	2018	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Package Labeling

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

P/N Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial

P/N:	
Customer P/N:	
Qty:	
D/C	
MSL: 1	

RoHS Compliant
2nd Lvl Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

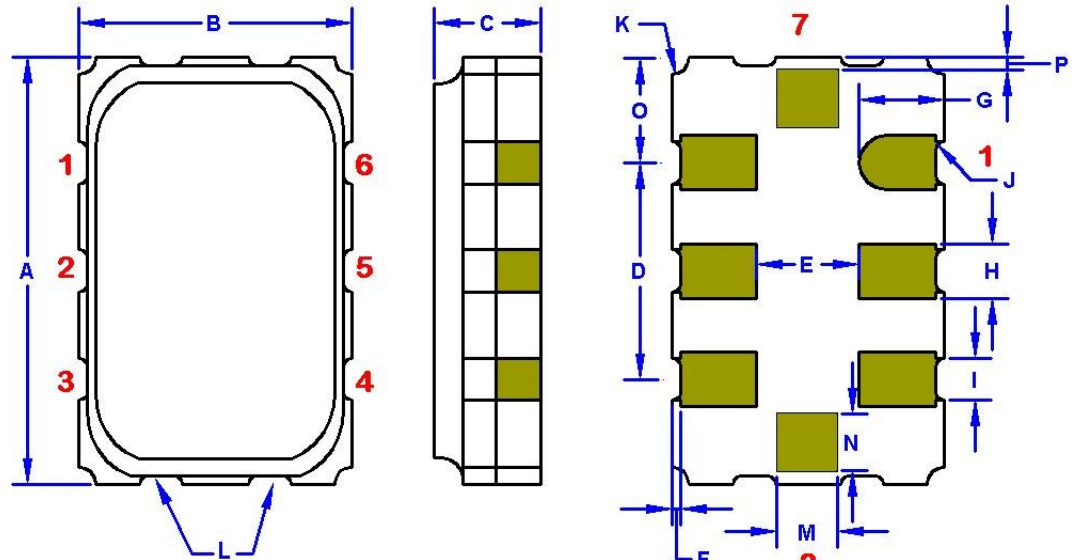
Pletronics Inc. certifies this device is in accordance with the RoHS 2 (2011/65/EU) and WEEE (2002/96/EC) directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.09 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions

	Inches	mm
A	0.197 ± 0.006	5.00 ± 0.15
B	0.126 ± 0.006	3.20 ± 0.15
C	0.053 max	1.35 max
D ¹	0.100	2.54
E ¹	0.047	1.20
F ¹	0.004	0.10
G ¹	0.039	1.00
H ¹	0.026	0.64
I ¹	0.018	0.45
J ¹	0.004R	0.10R
K ¹	0.008R	0.20R
L ¹	End Detents	
M ¹	0.026	0.64
N ¹	0.028	0.70
O ¹	0.049	1.23
P ¹	0.004	0.10

¹ Typical dimensions



Pad Layout mm shown

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

(Not to Scale)

Contacts (pads): Gold 11.8 to 39.4 μmches (0.3 to 1.0 μm) over Nickel 50 to 350 μmches (1.27 to 8.89 μm)

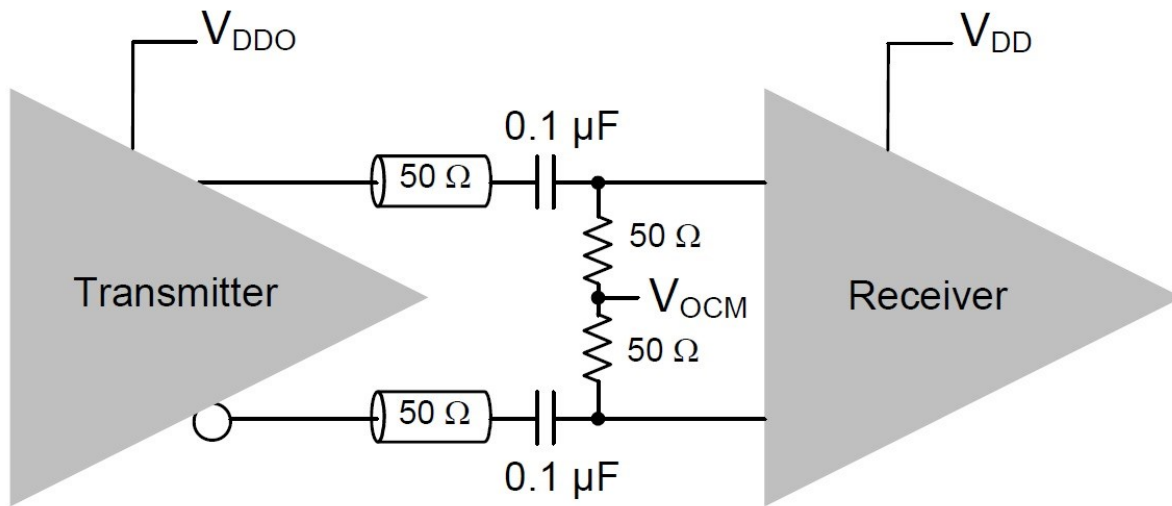
Layout

Pad	Function	Note
1	Output Enable/Disable	The oscillator shall operate when this pad is not connected. The output will be inhibited (high impedance state) when this pad is logic low. Recommend connecting this pad to V _{CC} if the oscillator is to be always on.
2	No connect	There is no internal connection to this pad. Recommend connecting to pad 1 to permit E/D input on either pad for layout.
3	Ground (GND)	
4	Output	Both outputs must be terminated and biased for proper operation. The ideal termination is 100 ohms between the outputs
5	Output*	
6	V _{CC} Supply Voltage	Connect an appropriate power supply bypass capacitor as close as possible to pad 4
7	SDA	
8	SCL	

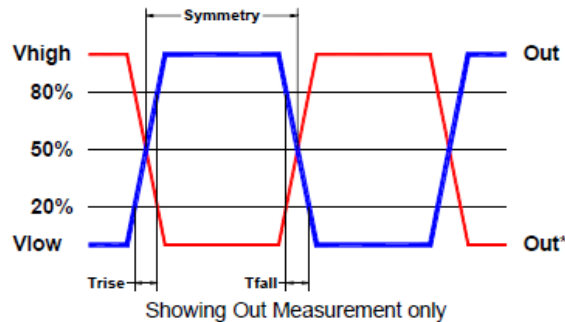
For Optimum Jitter Performance, Pletronics recommends:

- 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 Ratings

Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

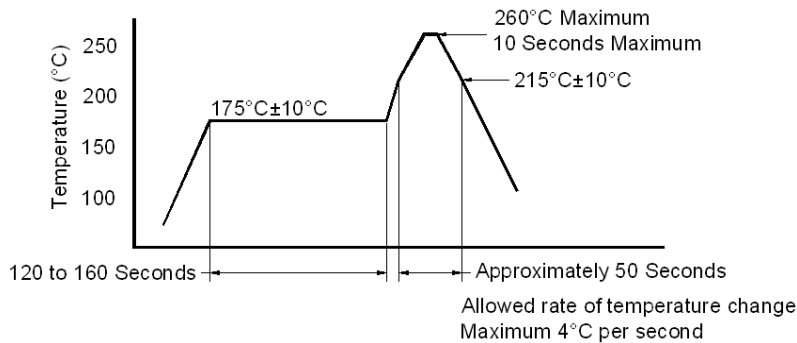
Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +5.0V
V_i Input Voltage	-0.5V to $V_{CC} + 0.5V$
V_o Output Voltage	-0.5V to $V_{CC} + 0.5V$

Thermal Characteristics:

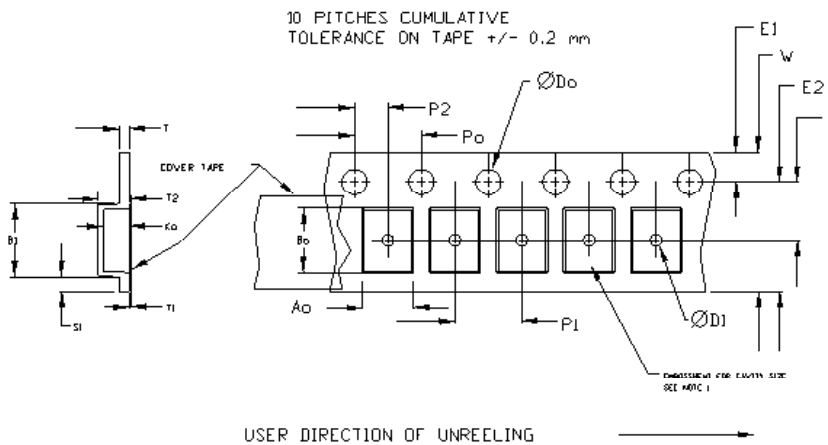
The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 45 to 65°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Reflow Cycle



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

Tape and Reel



Tape Constant Dimensions Table 1

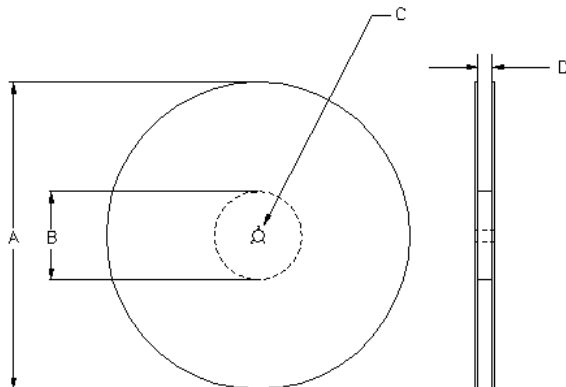
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5	1.0	1.75	4.0	2.0	0.6	0.6	0.1
12mm		1.5			±0.05			
16mm	+0.1 -0.0	1.5	±0.1	±0.1	2.0	0.6	0.6	0.1
24mm		1.5			±0.1			

Tape Variable Dimensions Table 2

Tape Size	B1 max	E2 min	F	P1	T2 max	W max	Ao, Bo & Ko
16mm	12.1	14.25	7.5 ±0.1	8.0 ±0.1	8.0	16.3	Note 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	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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