

Low Phase Noise VCXO (for 100-200MHz Fund Xtal)

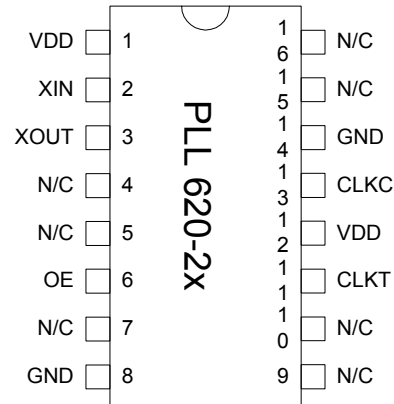
FEATURES

- 100MHz to 200MHz Fundamental Mode Crystal.
- Output range: 100 – 200MHz (no PLL).
- Low Injection Power for crystal 50uW.
- Sub 0.5pS RMS phase jitter (12kHz to 20MHz).
- PECL (PLL620-28) or LVDS output (PLL620-29).
- Supports 2.5V or 3.3V-Power Supply.
- Available in 16-Pin TSSOP.

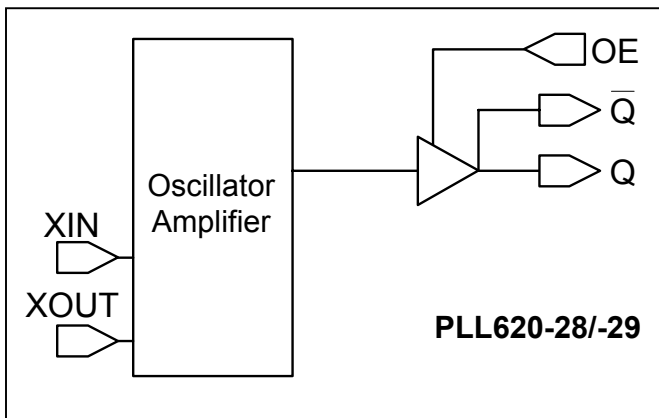
DESCRIPTION

The PLL620-28/-29 are a family of XO IC's specifically designed to pull high frequency fundamental crystals. They achieve very low current into the crystal resulting in better overall stability. Their very low jitter makes them ideal for the most demanding timing requirements.

**PIN CONFIGURATION
(Top View)**



BLOCK DIAGRAM



OUTPUT ENABLE LOGICAL LEVELS

Part #	OE	State
PLL620-28	0 (Default)	Output enabled
	1	Tri-state
PLL620-29	0	Tri-state
	1 (Default)	Output enabled

OE input: Logical states defined by PECL levels for PLL620-28
Logical states defined by CMOS levels for PLL620-29

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PIN DESCRIPTIONS

Name	Pin number	Type	Description
XIN	2	I	Crystal input. See Crystal Specifications on page 2.
XOUT	3	I	Crystal output. See Crystal Specifications on page 2.
OE	6	I	Output enable pin. See Output Enable Logic Levels on page 1.
GND	8, 14	P	Ground.
CLKT	11	O	True output PECL (PLL620-28) or LVDS (PLL620-29)
CLKC	13	O	Complementary output PECL (PLL620-28) or LVDS (PLL620-29).
N/C	4,5,7,9,10,15,16	-	Not connected.
VDD	1, 12	P	Power supply.

ELECTRICAL SPECIFICATIONS

1. Absolute Maximum Ratings

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage	V _{DD}		4.6	V
Input Voltage, dc	V _I	-0.5	V _{DD} +0.5	V
Output Voltage, dc	V _O	-0.5	V _{DD} +0.5	V
Storage Temperature	T _S	-65	150	°C
Ambient Operating Temperature*	T _A	-40	85	°C
Junction Temperature	T _J		125	°C
Lead Temperature (soldering, 10s)			260	°C
ESD Protection, Human Body Model			2	kV

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

* **Note:** Operating Temperature is guaranteed by design for all parts (COMMERCIAL and INDUSTRIAL), but tested for COMMERCIAL grade only.

2. Crystal Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	MAX.	UNITS
Built-in Capacitance	CX+	120MHz to 200MHz (VDD=3.3V)		2	pF
	CX-			2	
Inter-electrode capacitance	C ₀			2	
C0/C1 ratio (gamma)	γ			300	-
Oscillation Frequency	OF	Fund.	120	200	MHz

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3. General Electrical Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current (Loaded Outputs)	I _{DD}	PECL/LVDS			100/80	mA
Operating Voltage	V _{DD}		2.97		3.63	V
Output Clock Duty Cycle		@ 1.25V (LVDS) @ V _{DD} - 1.3V (PECL)	45 45	50 50	55 55	%
Short Circuit Current				±50		mA

4. Jitter Specifications

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Period jitter RMS	At 155.52MHz, with capacitive decoupling between VDD and GND.		2.5		ps
Period jitter peak-to-peak			18.5		
Accumulated jitter RMS	At 155.52MHz, with capacitive decoupling between VDD and GND. Over 10,000 cycles.		2.5		ps
Accumulated jitter peak-to-peak			24		
Integrated jitter RMS at 155MHz	Integrated 12 kHz to 20 MHz		0.3		ps

5. Phase Noise Specifications

PARAMETERS	FREQUENCY	@10Hz	@100Hz	@1kHz	@10kHz	@100kHz	UNITS
Phase Noise relative to carrier	155.52MHz	-75	-95	-125	-140	-145	dBc/Hz

Note: Phase Noise measured at VCON = 0V

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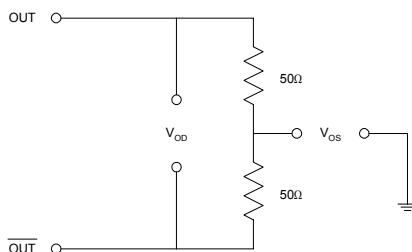
6. LVDS Electrical Characteristics

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Differential Voltage	V_{OD}	$R_L = 100 \Omega$ (see figure)	247	355	454	mV
V_{DD} Magnitude Change	ΔV_{OD}		-50		50	mV
Output High Voltage	V_{OH}			1.4	1.6	V
Output Low Voltage	V_{OL}		0.9	1.1		V
Offset Voltage	V_{OS}		1.125	1.2	1.375	V
Offset Magnitude Change	ΔV_{OS}		0	3	25	mV
Power-off Leakage	I_{OXD}	$V_{out} = V_{DD}$ or GND $V_{DD} = 0V$		± 1	± 10	μA
Output Short Circuit Current	I_{OSD}			-5.7	-8	mA

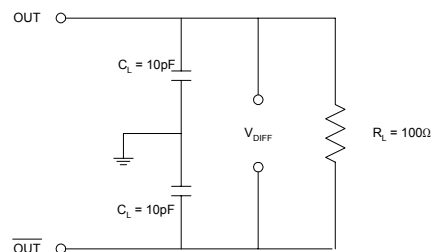
7. LVDS Switching Characteristics

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Differential Clock Rise Time	t_r	$R_L = 100 \Omega$ $C_L = 10 \text{ pF}$ (see figure)	0.2	0.7	1.0	ns
Differential Clock Fall Time	t_f		0.2	0.7	1.0	ns

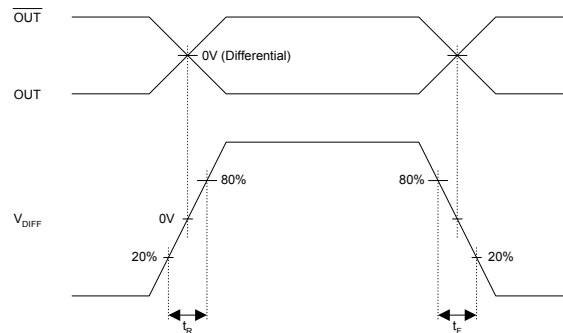
LVDS Levels Test Circuit



LVDS Switching Test Circuit



LVDS Transition Time Waveform



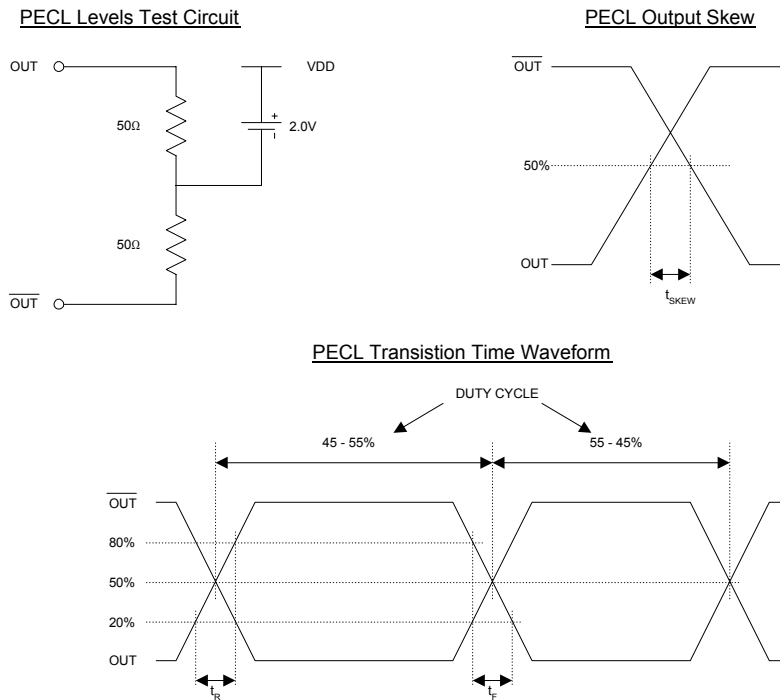
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8. PECL Electrical Characteristics

PARAMETERS	SYMBOL	CONDITIONS	MIN.	MAX.	UNITS
Output High Voltage	V_{OH}	$R_L = 50 \Omega$ to $(V_{DD} - 2V)$ (see figure)	$V_{DD} - 1.025$		V
Output Low Voltage	V_{OL}			$V_{DD} - 1.620$	V

9. PECL Switching Characteristics

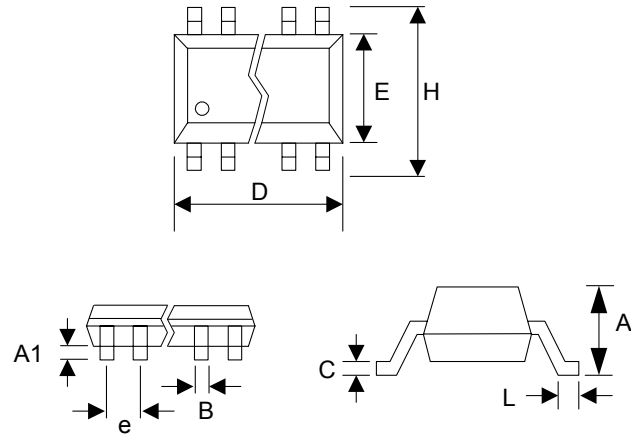
PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Clock Rise Time	t_r	@20/80% - PECL		0.6	1.5	ns
Clock Fall Time	t_f	@80/20% - PECL		0.5	1.5	ns



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PACKAGE INFORMATION

16 PIN TSSOP (mm)		
Symbol	Min.	Max.
A	-	1.20
A1	0.05	0.15
B	0.19	0.30
C	0.09	0.20
D	4.90	5.10
E	4.30	4.50
H	6.40 BSC	
L	0.45	0.75
e	0.65 BSC	

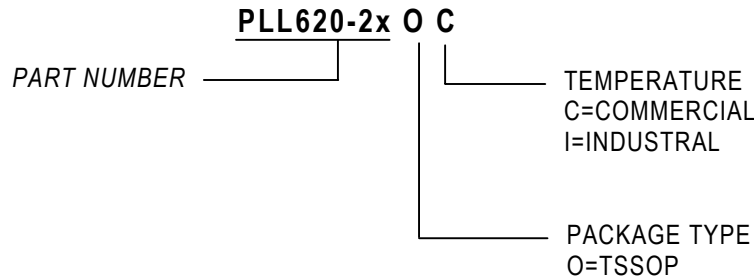


ORDERING INFORMATION

For part ordering, please contact our Sales Department:
47745 Fremont Blvd., Fremont, CA 94538, USA
Tel: (510) 492-0990 Fax: (510) 492-0991

PART NUMBER

The order number for this device is a combination of the following:
Device number, Package type and Operating temperature range



<u>Order Number</u>	<u>Marking</u>	<u>Package Option</u>
PLL620-28OC	P620-28OC	TSSOP - Tube
PLL620-28OC-R	P620-28OC	TSSOP - Tape & Reel
PLL620-29OC	P620-29OC	TSSOP - Tube
PLL620-29OC-R	P620-29OC	TSSOP - Tape & Reel

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