

1.8V to 3.3V, 32.768KHz XO IC – With 512 Divider

FEATURES

- Very fast start up time (<2ms)
- Wide operating voltage: 1.8V to 3.3V (+/-10%)
- Input frequency: 16.777216MHz fundamental crystal
- Built-in 512 divider to generate 32.768KHz output clock.
- Low power consumption: 130µA @ 1.8V, 15pF load
- Output enable/disable function provide stand by mode to turn off oscillator and output buffer.
- Very low standby power consumption: 0.2uA @ 1.8V
- 2mA output drive
- Operating temperature range from -40°C to 85°C

DESCRIPTION

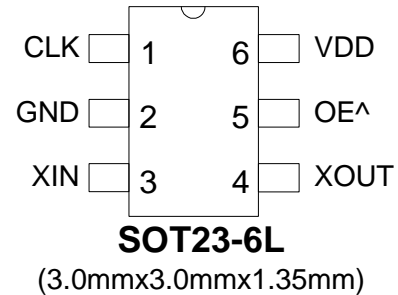
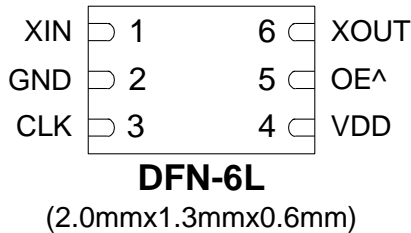
The PL610-32 is a member of PicoXO family and is designed to fit in a small 2 x 1.3mm DFN or 3x 3mm SOT23 package. It can operate from a single power supply ranging from 1.62V to 3.63V and consumes ultra low-power.

PL610-32 is a crystal oscillator IC with built-in 512 divider which can accept a 16.777216MHz fundamental mode crystal source and produce 32.768KHz output with excellent temperature characteristics.

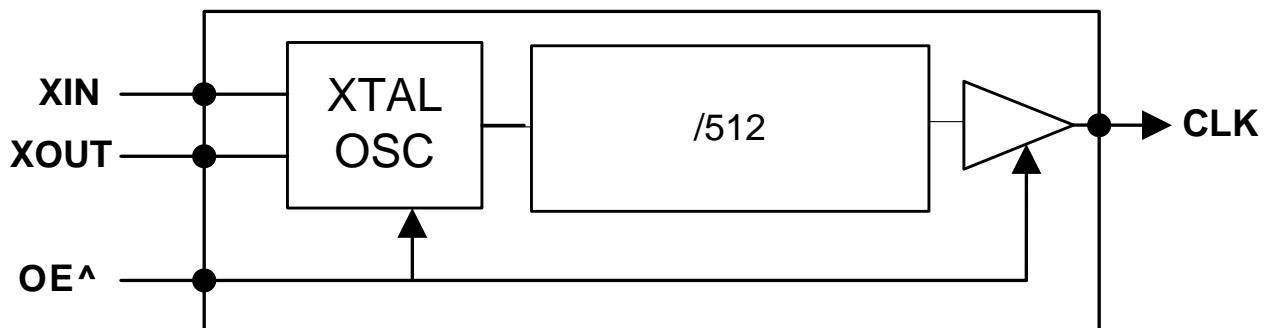
APPLICATION

Fast start up 32.768KHz crystal oscillator.

PACKAGE PIN CONFIGURATION



BLOCK DIAGRAM



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PACKAGE PIN AND DIE PAD ASSIGNMENT

Name	Pin Assignment		Description						
	DFN-6L	SOT23-6L							
XIN	1	3	Crystal Oscillator Input pin						
GND	2	2	GND connection						
CLK	3	1	Clock Output pin						
VDD	4	6	VDD connection						
OE [^]	5	5	Output Enable pin with on-chip pull-up.						
			<table border="1"> <thead> <tr> <th>State</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Power Down Mode with Output Disabled</td> </tr> <tr> <td>1 (default)</td> <td>Normal mode</td> </tr> </tbody> </table>	State	Function	0	Power Down Mode with Output Disabled	1 (default)	Normal mode
			State	Function					
0	Power Down Mode with Output Disabled								
1 (default)	Normal mode								
XOUT	6	4	Crystal Oscillator Output pin						

ABSOLUTE MAXIMUM RATINGS

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage Range	V _{DD}	-0.5	4.6	V
Input Voltage Range	V _I	-0.5	V _{DD} +0.5	V
Output Voltage Range	V _O	-0.5	V _{DD} +0.5	V
Storage Temperature	T _S	-65	150	°C
Ambient Operating Temperature*		-40	85	°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. ***Operating temperature is guaranteed by design. Parts are tested to commercial grade only.**

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CRYSTAL SPECIFICATIONS

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Fundamental Crystal Resonator Frequency (1.8V)		15	16.777216	40	MHz
Crystal Loading Rating	$C_{L(xtal)}$		3		pF
Maximum Sustainable Drive Level		100			μ W
Operating Drive Level			25		μ W
Crystal Shunt Capacitance	C0			3	pF
Effective Series Resistance, Fundamental	ESR			50	Ω

ELECTRICAL SPECIFICATIONS
AC SPECIFICATIONS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Duty Cycle	Duty	15pF load	48	50	52	%
Output rise time	t_r	3.3V, 15pF, 10/90% Vdd			4	ns
		2.5V, 15pF, 10/90% Vdd			4	ns
		1.8V, 15pF, 10/90% Vdd			5	ns
Output fall time	t_f	3.3V, 15pF, 10/90% Vdd			4	ns
		2.5V, 15pF, 10/90% Vdd			4	ns
		1.8V, 15pF, 10/90% Vdd			5	ns
Output enable delay time	t_{OE}	Temp=25°C, Vdd=1.8V, 2.5V, 3.3V, (See MTC-2)			2	μ s
Output disable delay time	t_{OD}	Temp=25°C, Vdd=1.8V, 2.5V, 3.3V, (See MTC-1 and MTC-2)			2	μ s

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DC SPECIFICATIONS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating current consumption	I_{DD} (PL610-32/32A)	@V _{DD} =3.3V, 32.768KHz output, C _L = 15pF		0.26		mA
		@V _{DD} =2.5V, 32.768KHz output, C _L = 15pF		0.18		
		@V _{DD} =1.8V, 32.768KHz output, C _L = 15pF		0.13		
	I_{DD} (PL610-33)	@V _{DD} =3.3V, 32.768KHz output, C _L = 15pF		0.42		
		@V _{DD} =2.5V, 32.768KHz output, C _L = 15pF		0.28		
		@V _{DD} =1.8V, 32.768KHz output, C _L = 15pF		0.21		
Standby Supply Current	I_{DD_SB}	PDB [^] = "0", V _{DD} =1.8V, 2.5V, 3.3V		0.2	1	μA
Operating Voltage	V _{DD}		1.62		3.63	V
HIGH level output voltage	V _{OH}	1.62V ~ 3.63V, I _{OH} =2mA	V _{DD} -0.4			V
LOW level output voltage	V _{OL}	1.62V ~ 3.63V, I _{OH} =2mA			0.4	V
Output leakage current	I_z	PDB [^] =LOW, V _{OH} = V _{DD}			1	μA
		PDB [^] =LOW, V _{OH} = V _{SS}			1	μA
HIGH level input voltage	V _{IH}		0.7V _{DD}			V
LOW level input voltage	V _{IL}				0.3V _{DD}	V
Built-in capacitance	C _{xin}			4		pF
	C _{xout}			12		pF

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MEASUREMENT TEST CIRCUITS (MTC)

MTC-1 Measurement: I_{DD} , I_{PD} , T_r , T_f , Duty	MTC-2 Measurement: T_{OE} , T_{OD} ,

WAVEFORM SWITCHING CHARACTERISTICS

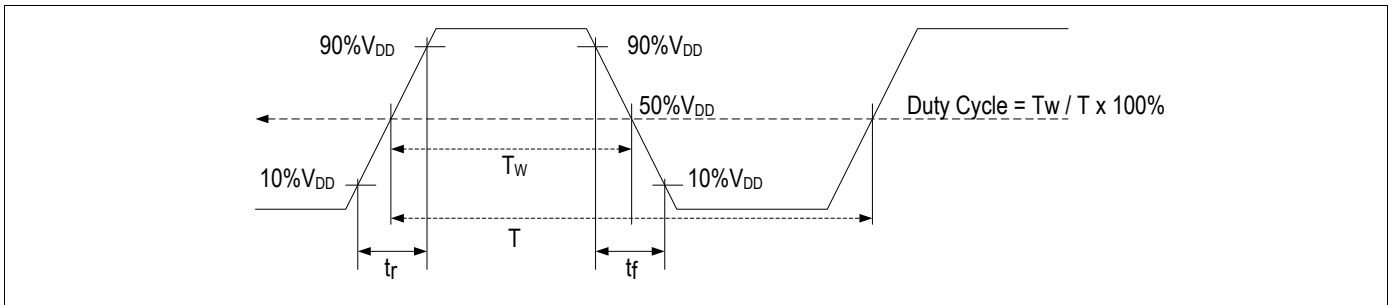


Figure 1. Rise Time, Fall Time, Duty Cycle

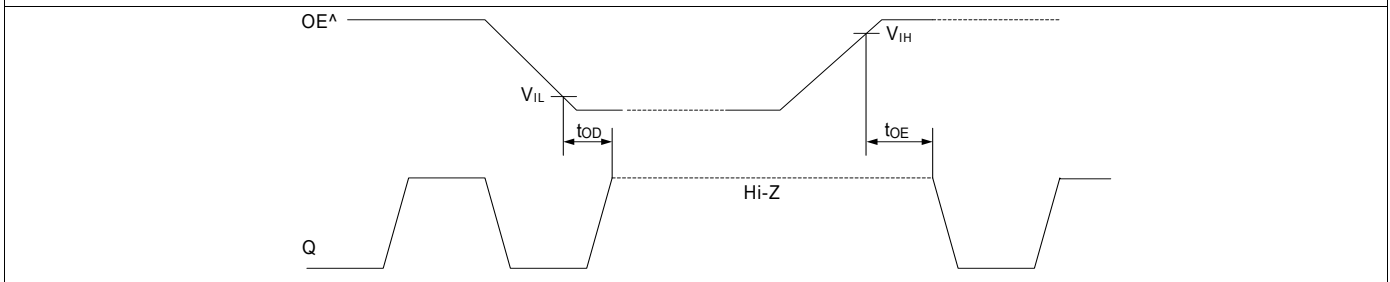


Figure 2. Output Enable/Disable Timing Chart

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ORDERING INFORMATION

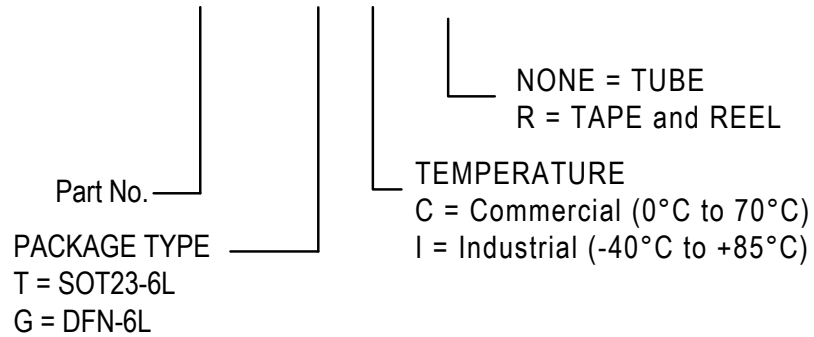
For part ordering, please contact our Sales Department:

2180 Fortune Drive, San Jose, CA 95131, USA
Tel: (408) 944-0800 Fax: (408) 474-1000

PART NUMBER

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

PL610-32 T C - R



Part/Order Number	Marking†	Option
PL610-32GC-R	t.b.d.	6-Pin DFN (Tape and Reel)
PL610-32TC-R	t.b.d.	6-Pin SOT-23 (Tape and Reel)

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