

# HIGH PERFORMANCE GENERAL PURPOSE OSCILLATOR IC

ABX1027

1.8V-3.3V, 5MHz to 60MHz XO IC

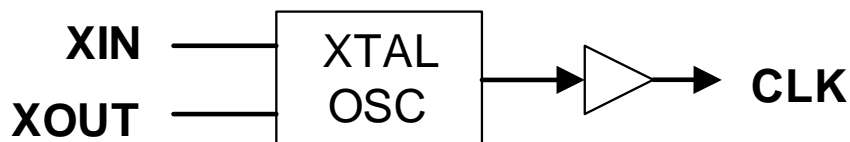
## FEATURES

- Wide frequency oscillator design.
- Single IC to cover up to 60MHz output frequency.
- Input Frequency:
  - Fundamental Crystal: 5MHz to 60MHz
  - Reference Clock: 5MHz to 60MHz
- Output Frequency: 5MHz to 60MHz
- Very low Jitter and Phase Noise
- Low current consumption
- Single 1.8V, 2.5V, or 3.3V  $\pm$  10% power supply
- Operating temperature range from -40°C to 85°C

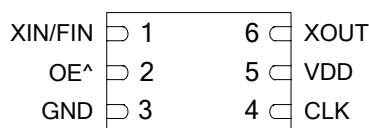
## DESCRIPTION

The ABX1027 is a high performance general purpose oscillator IC for outputs up to 60MHz. Designed to fit in a small 2 x 1.3mm DFN or 3 x 3mm SOT23 package, the PL610 offers the best phase noise and jitter performance and lowest power consumption of any comparable IC.

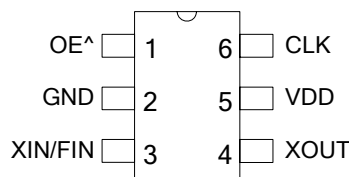
## BLOCK DIAGRAM



## PACKAGE PIN CONFIGURATION



**DFN-6L**  
(2.0mmx1.3mmx0.6mm)



**SOT23-6L**  
(3.0mmx3.0mmx1.35mm)

## PACKAGE PIN ASSIGNMENT

Name	Pin Assignment		Type	Description
	DFN Pin#	SOT Pin#		
XIN/FIN	1	3	I	Crystal or Reference Clock input pin
OE	2	1	I	Output Enable (OE) input
GND	3	2	P	GND connection
CLK	4	6	O	Clock Output
VDD	5	5	P	VDD connection
XOUT	6	4	O	Crystal Output pin
				Do Not Connect (DNC ) when FIN is present

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## LAYOUT RECOMMENDATIONS

The following guidelines are to assist you with a performance optimized PCB design:

### Signal Integrity and Termination Considerations

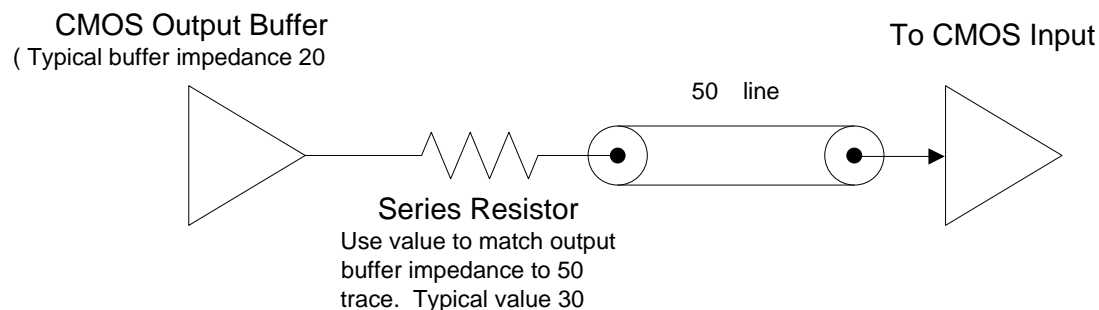
- Keep traces short!
- Trace = Inductor. With a capacitive load this equals ringing!
- Long trace = Transmission Line. Without proper termination this will cause reflections ( looks like ringing ).
- Design long traces as "striplines" or "microstrips" with defined impedance.
- Match trace at one side to avoid reflections bouncing back and forth.

### Decoupling and Power Supply Considerations

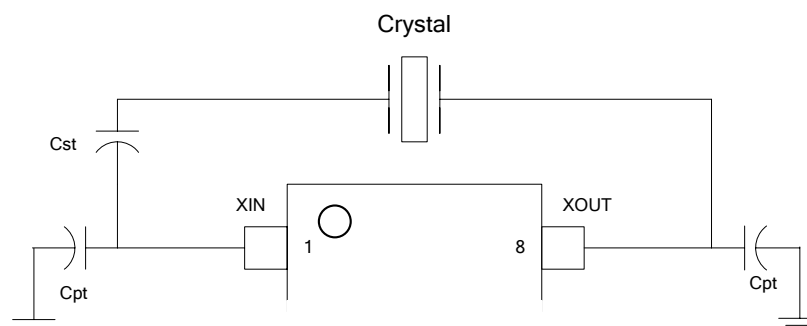
- Place decoupling capacitors as close as possible to the VDD pin(s) to limit noise from the power supply
- Multiple VDD pins should be decoupled separately for best performance.
- Addition of a ferrite bead in series with VDD can help prevent noise from other board sources
- Value of decoupling capacitor is frequency dependant. Typical values to use are 0.1 $\mu$ F for designs using crystals < 50MHz and 0.01 $\mu$ F for designs using crystals > 50MHz.

### Typical CMOS termination

Place Series Resistor as close as possible to CMOS output



Series and parallel capacitors used to fine tune the crystal load to the circuit load.



- Series Capacitor, used to lower circuit load to match crystal load. Raises frequency offset. This can be eliminated by using a crystal with a Load of equal or greater value than the oscillator.
- Parallel Capacitors, Used to raise the circuit load to match the crystal load. Lowers frequency offset.

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## ELECTRICAL SPECIFICATIONS

### 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

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.

### AC SPECIFICATIONS

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Crystal Input Frequency (XIN)	Fundamental Crystal	5		60	MHz
Output Frequency	@ Vdd=1.8V-3.3V	5		60	MHz
VDD Sensitivity	Frequency vs. VDD+/-10%	-2		2	ppm
Output Rise Time	15pF Load, 10/90%VDD, High Drive, 3.3V		1	1.2	ns
Output Fall Time	15pF Load, 90/10%VDD, High Drive, 3.3V		1	1.2	ns
Duty Cycle		45	50	55	%

### DC SPECIFICATIONS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded CMOS Output	$I_{DD}$	@Vdd=3.3V,25MHz, load=15pF		3.4		mA
		@Vdd=2.5V,25MHz, load=10pF		2.1		mA
		@Vdd=1.8V,25MHz, load=5pF		0.9		mA
		@Vdd=1.8V,2.0MHz, load=5pF		0.65		mA
Operating Voltage	$V_{DD}$		1.62	2.5	3.63	V
Output Low Voltage	$V_{OL}$	$I_{OL} = +4mA$ Standard Drive			0.4	V
Output High Voltage	$V_{OH}$	$I_{OH} = -4mA$ Standard Drive	$V_{DD} - 0.4$			V
Output Current, Low Drive	$I_{OLD}$	$V_{OL} = 0.4V, V_{OH} = 2.4V$	4			mA
Output Current, Standard	$I_{OSD}$	$V_{OL} = 0.4V, V_{OH} = 2.4V$	8			mA
Output Current, High Drive	$I_{OHD}$	$V_{OL} = 0.4V, V_{OH} = 2.4V$	16			mA

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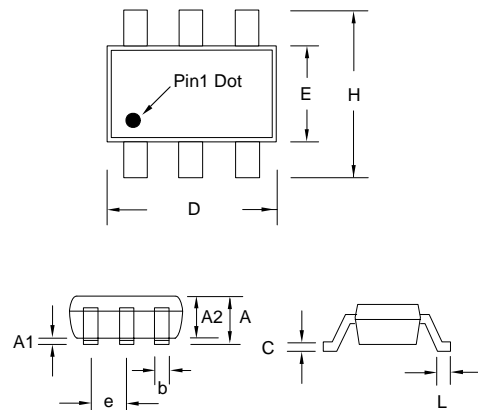
## CRYSTAL SPECIFICATIONS

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Fundamental Crystal Resonator Frequency	$F_{XIN}$	5		60	MHz
Crystal Loading Rating	$C_L (xtal)$		12		pF
Maximum Sustainable Drive Level				100	µW
Operating Drive Level			25		µW
Crystal Shunt Capacitance	$C_0$			3	pF
Effective Series Resistance	ESR			50	?

## PACKAGE DRAWINGS (GREEN PACKAGE COMPLIANT)

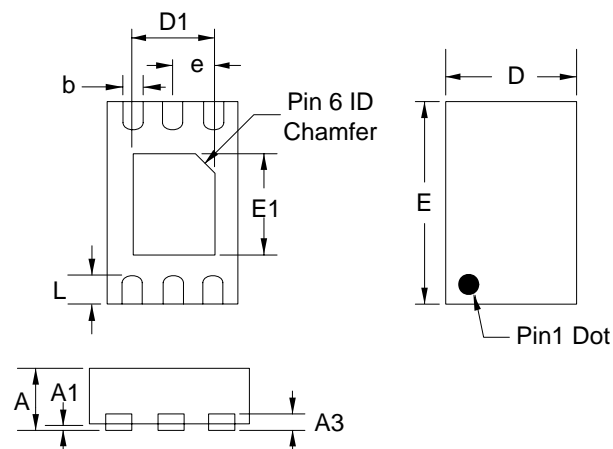
### SOT23-6 L

Symbol	Dimension in MM	
	Min.	Max.
A	1.05	1.35
A1	0.05	0.15
A2	1.00	1.20
b	0.30	0.50
c	0.08	0.20
D	2.80	3.00
E	1.50	1.70
H	2.60	3.0
L	0.35	0.55
e	0.95 BSC	



### DFN-6L

Symbol	Dimension in MM	
	Min.	Max.
A	0.50	0.60
A1	0.00	0.05
A3	0.152	0.152
b	0.15	0.25
e	0.40BSC	
D	1.25	1.35
E	1.95	2.05
D1	0.75	0.85
E1	0.95	1.05
L	0.20	0.30



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## ORDERING INFORMATION (GREEN PACKAGE COMPLIANT)

**For part ordering, please contact our Sales Department:**

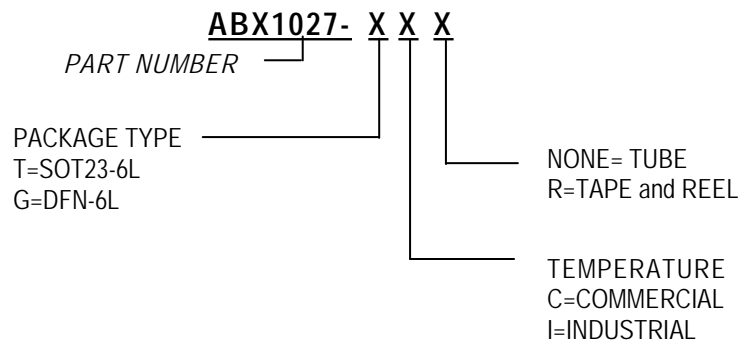
30332 Esperanza., Rancho Santa Margarita, Ca 92688

Ph: 949-546-8000 Fax: 949-546-8001

### PART NUMBER

The order number for this device is a combination of the following:

Part number, Package type and Operating temperature range



Part/Order Number	Marking†	Package Option
ABX1027GC-R	E27	6-Pin DFN (Tape and Reel)
ABX1027TC-R	61027	6-Pin SOT-23 (Tape and Reel)

† Note: 'XXX' designates marking identifier that could be independent of the part number.

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