Ultra Low Current XO 10 MHz to 52 MHz

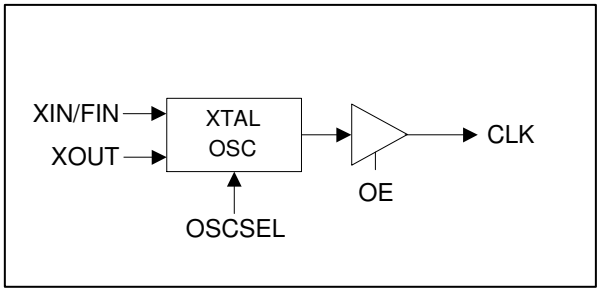
FEATURES

- Low phase noise (-130 dBc @ 10kHz offset).
- CMOS output with OE tri-state control.
- Selectable oscillator “on” or “off” (Sleep Mode) feature in output disable mode
- Ultra Low current consumption (<2mA, <1.5mA at 27MHz, 3.3V respectively for PLL600-27 and PLL600-37)
- Ultra Low disable mode current (<2uA when disabled with osc. off)
- 10 to 52MHz fundamental or 3rd OT crystal input.
- 12mA drive capability at TTL output.
- Low jitter (RMS): 2.5ps period jitter.
- 1.8V, 2.5V and 3.3V DC operation.
- Available in 8 pin SOIC, 6 pin SOT or DIE.

DESCRIPTION

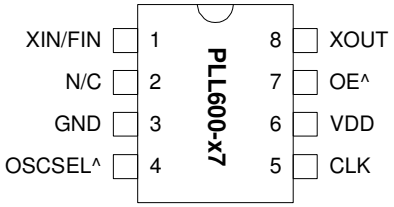
The PLL600-27/-37 form a low cost family of XO IC’s, designed to consume the lowest current on the market for the 10MHz to 52MHz range. It accepts fundamental resonant mode crystal input from 10 to 52MHz. Providing less than -130dBc at 10kHz offset at 30MHz and with a very low jitter (2.5 ps RMS period jitter) makes this chip ideal for applications requiring low current frequency sources.

BLOCK DIAGRAM



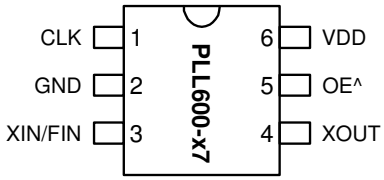
PIN ASSIGNMENT (PACKAGE)

8 pin SOIC



^ : denotes internal pull-up

6 pin SOT



^: denotes internal Pull-up

SELECTION TABLE

OE^	OSCSEL^*	OUTPUT
0	0	Disabled - osc. off
0	1	Disabled - osc. on
1	0	Enabled
1	1	Enabled

^ Internal Pull-up, default value is ‘1’ when not connected.
* Not available in 6 pin SOT package.

PIN/PAD DESCRIPTION

Name	Pin #		Type	Description
	8 pin SOIC	6 pin SOT		
XIN	1	4	I	Crystal input or reference clock input pin.
N/C	2	n/a	I	No connect.
GND	3	2	P	Ground.
OSCSEL	4	n/a	I	Disable mode select. See Table on page 1.
CLK	5	1	O	Output clock.
VDD	6	6	P	Power supply.
OE	7	5	I	Output Enable input. See Table on page 1.
XOUT	8	3	I	Crystal output.

OE and OSCSEL have internal pull-ups, so the default value is '1' when not connected (OSCSEL not available on 6 pin package).

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. AC Electrical Specifications

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Crystal Frequency		10		52	MHz
Settling time	At power-up (Vdd reaches 1.62V)			10	ms
	Disable to enable, osc. Off			10	ms
	Disable to enable, osc. On			500	µs
Output Clock Rise/Fall Time	0.8V ~ 2.0V with 10 pF load		1.15		ns
	0.3V ~ 3.0V with 15 pF load		2.4		
VDD sensitivity	Frequency vs. VDD +/- 10%	0.8		0.8	ppm
Output Clock Duty Cycle	Measured @ 50% V_{DD}	45	50	55	%

3. Jitter and Phase Noise Specifications

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
RMS Period Jitter (1 sigma – 1000 samples)	With capacitive decoupling between VDD and GND.		2.1	2.5	ps
Phase Noise relative to carrier	30MHz @100Hz offset		-80		dBc/Hz
Phase Noise relative to carrier	30MHz @1kHz offset		-110		dBc/Hz
Phase Noise relative to carrier	30MHz @10kHz offset		-130		dBc/Hz
Phase Noise relative to carrier	30MHz @100kHz offset		-138		dBc/Hz
Phase Noise relative to carrier	30MHz @1MHz offset		-145		dBc/Hz

4. DC Specification

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs (at VDD = 3.3V) Respectively for PLL600 -27/-37	I_{DD}	At 10MHz, Cload=15pF		1.0 / 0.75	1.1 / 0.9	mA
		At 13.5MHz, Cload=15pF		1.2 / 0.8	1.3 / 1.0	
		At 17.7MHz, Cload=15pF		1.5 / 1.0	1.6 / 1.1	
		At 27MHz, Cload=15pF		2.0 / 1.2	2.1 / 1.3	
		At 48MHz, Cload=15pF		3.5 / 2.1	3.6 / 2.2	
Supply Current in tri-state	I_{DD}	Output disabled, Osc. off		2	4	µA
		Output disabled, Osc. On			520	µA
Operating Voltage	V_{DD}		1.62		3.63	V
Output High Voltage	V_{OH}	I_{OH} = -12mA* (3.3V)	2.4			V
		-37*, I_{OH} = -12mA* (3.3V)	2.4	2.9		V
Output Low Voltage	V_{OL}	I_{OL} = 12mA* (3.3V)			0.4	V
		-37*, I_{OL} = 12mA* (3.3V)		0.32	0.4	V
Output High Voltage at CMOS level (PLL600-27)	V_{OHC}	I_{OH} = -4mA	V_{DD} – 0.4			V
Output drive current (PLL600-27)		At TTL level (3.3V)	12	17		mA
Short Circuit Current		(3.3V)		±50		mA

*** Note:** PLL600-37 has non-standard CMOS VOH and VOL levels for lower current consumption, but meets CMOS input stage needs. PLL600-37 should be used to drive pure capacitive loads only.

5. Crystal Specifications

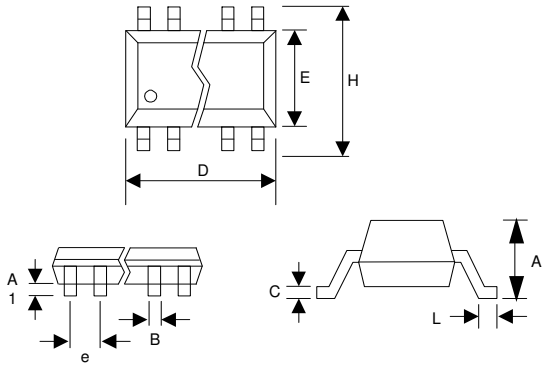
PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	F_{XIN}	10		52	MHz
Crystal Loading Rating	$C_{L\ (xtal)}$		8.5		pF
Maximum Sustainable Drive Level				200	µW
Operating Drive Level			50		µW
C0 (for frequencies below 30MHz)				5	pF
C0 (for frequencies above 30MHz)				4	pF
ESR	R_S			30	Ω

Note: A detailed crystal specification document is also available for this part

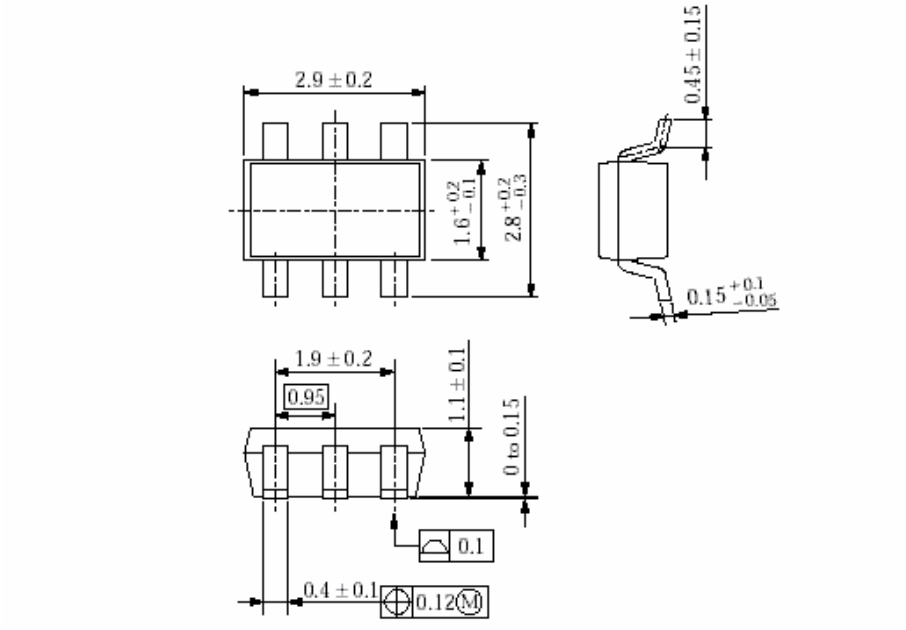
PACKAGE INFORMATION

8-PIN SOIC (dimensions in mm)

	Narrow SOIC	
Symbol	Min.	Max.
A	1.47	1.73
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	4.95
E	3.80	4.00
H	5.80	6.20
L	0.38	1.27
e	1.27 BSC	



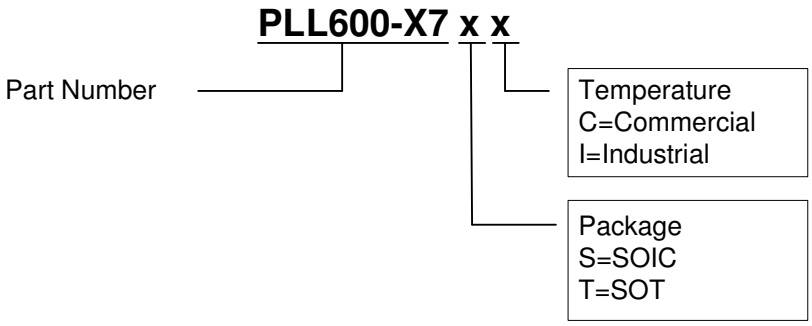
6-PIN SOIC (dimensions in mm)



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



Order Number	Marking	Package Option
PLL600-27SC	P600-27 SC	8-Pin SOIC (Tube)
PLL600-27SC-R	P600-27 SC	8-Pin SOIC (Tape and Reel)
PLL600-27TC	A27A1	6-Pin SOT (Bulk)
PLL600-37SC	P600-37 SC	8-Pin SOIC (Tube)
PLL600-37SC-R	P600-37 SC	8-Pin SOIC (Tape and Reel)
PLL600-37TC	A37A2	6-Pin SOT (Bulk)

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