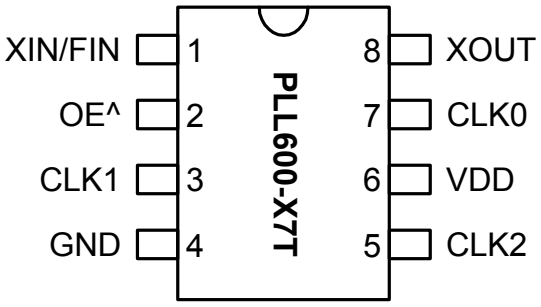
Low Power 3 Outputs XO 10MHz to 52MHz

FEATURES

- 3 CMOS outputs with OE tri-state control
- Low current consumption:
  PLL600-27T: <4.5mA @ 27MHz with standard CMOS buffer (3.3V)
  PLL600-37T: <3.0mA @ 27MHz with CMOS compatible Clipped buffer, offering the lowest current consumption (3.3V)
- 10 to 52MHz fundamental crystal input.
- Low phase noise (-130 dBc @ 10kHz offset).
- Low jitter (RMS): 2.5ps period jitter.
- 12mA drive capability at TTL output.
- 1.62V to 3.63V DC operation.
- Available in 8 pin SOIC.

PIN ASSIGNMENT

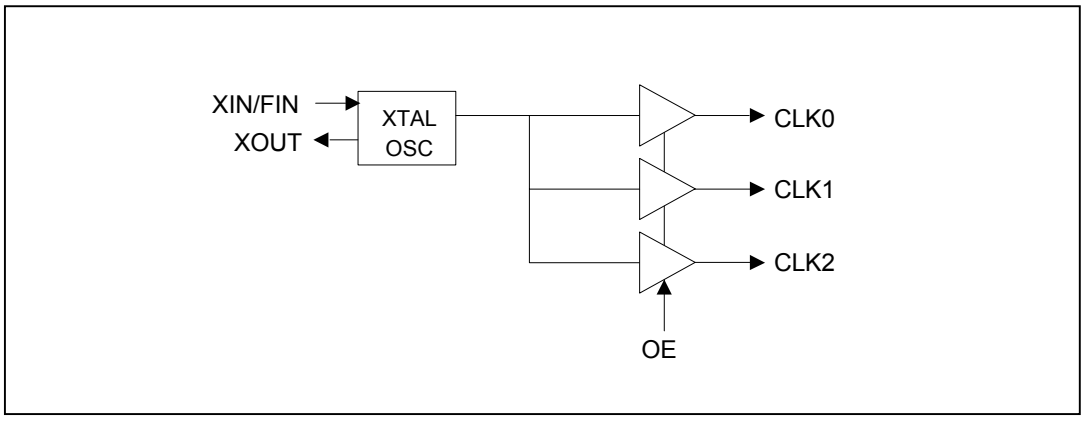


^: Denotes internal Pull-up

DESCRIPTION

The PLL600-27T/-37T form a low cost family of XO IC's, designed to replace multiple XO solutions saving the cost and board space of clock distribution buffers. In addition, they provide among the lowest current on the market for the 10MHz to 52MHz range. They accept input crystals from 10 to 52MHz (fundamental resonant mode) and provide low phase noise (<-130dBc at 10kHz offset at 30MHz), and very low jitter (2.5 ps RMS period jitter) outputs.

BLOCK DIAGRAM



PIN DESCRIPTION

Name	Pin #	Type	Description
XIN/FIN	1	I	Crystal input (10MHz to 52MHz) or Ref Clock input.
OE	2	I	Output Enable input. This pin has internal pull-up resistor. All outputs will be tri-stated when low.
CLK1	3	O	Output clock.
GND	4	P	Ground.
CLK2	5	O	Output clock.
VDD	6	P	Power supply.
CLK0	7	O	Output clock.
XOUT	8	I	Crystal output.

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
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	%
Short Circuit Current			±50		mA

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 Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs (at VDD = 3.3V) Respectively for PLL600 -27T/-37T	I_{DD}	At 10MHz, Cload=15pF		2.0 / 1.5	2.5 / 2.0	mA
		At 13.5MHz, Cload=15pF		2.4 / 1.6	3.0 / 2.0	
		At 17.7MHz, Cload=15pF		3.0 / 2.0	3.5 / 2.5	
		At 27MHz, Cload=15pF		4.0 / 2.5	4.5 / 3.0	
		At 48MHz, Cload=15pF		7.0 / 4.0	7.5 / 4.5	
Supply Current in tri-state	I_{DD}	Output disabled			520	µA
Operating Voltage	V_{DD}		1.62		3.63	V
Output High Voltage	V_{OH}	-27T I_{OH} = -12mA(1) (3.3V)	2.4			V
		-37T(1), I_{OH} = -12mA(1) (3.3V)	2.4	2.9		V
Output Low Voltage	V_{OL}	-27T I_{OL} = 12mA(1) (3.3V)			0.4	V
		-37T(1), I_{OL} = 12mA(1) (3.3V)		0.32	0.4	V
Output High Voltage at CMOS level (PLL600-27T)	V_{OHC}	I_{OH} = -4mA	V_{DD} – 0.4			V
Output drive current (PLL600-27T)		At TTL level (3.3V)	12	17		mA

(1): P600-37T has non-standard CMOS VOH and VOL levels for lower current consumption, but meets CMOS input stage needs. P600-37T should be used to drive pure capacitive loads only.

5. Crystal Specifications

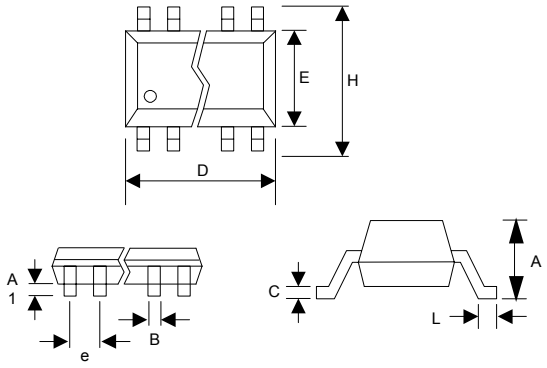
PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	F_{XIN}	10		52	MHz
Crystal Loading Rating	$C_{L\ (xtal)}$		8.5		pF
Maximum Sustainable Drive Level				200	µW
Operating Drive Level			50		µW
C0 (for frequencies below 30MHz)				5	pF
C0 (for frequencies above 30MHz)				4	pF
ESR	R_S			30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

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

PACKAGE INFORMATION

8 PIN (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	



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

PLL600-X7T S C

PART NUMBER

TEMPERATURE
C=COMMERCIAL
I=INDUSTRIAL

PACKAGE TYPE
S=SOIC

Order Number	Marking	Package Option
PLL600-27T SC	P600-27T SC	8 pin SOIC - Tubes
PLL600-27T SC-R	P600-27T SC	8 pin SOIC - Tape and Reel
PLL600-37T SC	P600-37T SC	8 pin SOIC - Tubes
PLL600-37T SC-R	P600-37T SC	8 pin SOIC - Tape and Reel