PLL502-04

Low Phase Noise VCXO (96MHz to 200MHz)

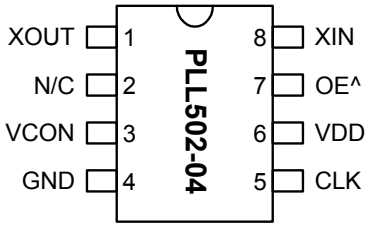
FEATURES

- VCXO output for the 96MHz to 200MHz range
- Low phase noise.
- CMOS output.
- 12 to 25MHz crystal input.
- Integrated variable capacitors.
- Selectable High Drive (30mA) or Standard Drive (10mA) output.
- Wide pull range (+/- 250 ppm).
- Low jitter (RMS): 4ps period.
- 3.3V operation.
- Available in 8-Pin SOIC.

DESCRIPTION

The PLL502-04 is a low cost, high performance and low phase noise VCXO for the 96 to 200MHz range. The very low jitter (4ps RMS period jitter at 155.52MHz) makes this chip ideal for applications requiring voltage controlled frequency sources in CMOS. Input crystal can range from 12 to 25MHz (fundamental resonant mode).

PIN CONFIGURATION

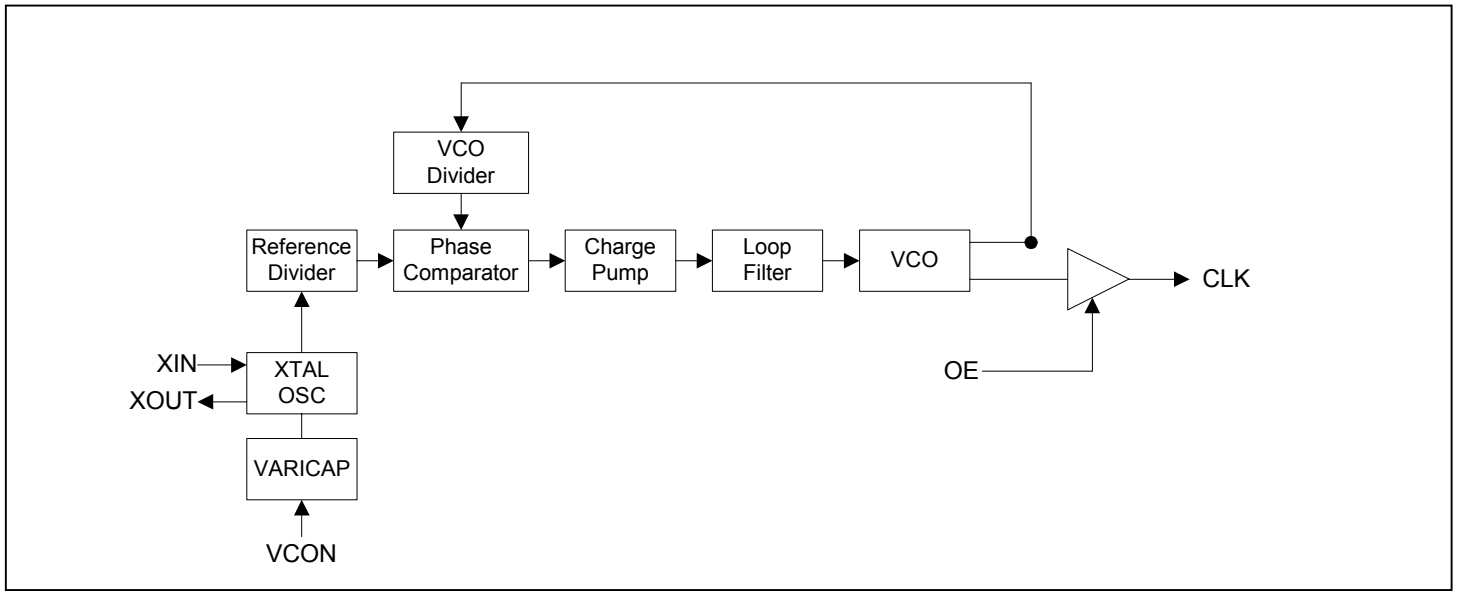


Note: ^ denotes internal pull up

OUTPUT RANGE

MULTIPLIER	FREQUENCY RANGE	OUTPUT BUFFER
X8	96 - 200MHz	CMOS

BLOCK DIAGRAM



PIN DESCRIPTIONS

Name	Number	Type	Description
XOUT	1	I	Crystal output. See Crystal Specifications on page 3.
N/C	2	-	Not connected.
VCON	3	I	Voltage Control input.
GND	4	P	Ground.
CLK	5	O	Output clock.
VDD	6	P	+3.3V power supply.
OE	7	I	Output enable input. Disables (tri-state) output when low. Internal pull-up enables output by default if pin is not connected to low.
XIN	8	I	Crystal input. See Crystal Specifications on page 3.

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. DC Electrical Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs	I_{DD}	F_{XIN} = 12 - 25MHz Output load of 10pF		20	25	mA
Operating Voltage	V_{DD}		2.97		3.63	V
Output drive current (High Drive)	I_{OH}	V_{OH}= V_{DD}-0.4V, V_{DD}=3.3V	30			mA
	I_{OL}	V_{OL} = 0.4V, V_{DD} = 3.3V	30			mA
Output drive current (Standard Drive)	I_{OH}	V_{OH}= V_{DD}-0.4V, V_{DD}=3.3V	10			mA
	I_{OL}	V_{OL} = 0.4V, V_{DD} = 3.3V	10			mA
Short Circuit Current				±50		mA
VCXO Control Voltage	VCON		0		3.3	V

3. AC Electrical Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Crystal Frequency			12		25	MHz
Output Clock Rise/Fall Time (Standard Drive)		0.3V ~ 3.0V with 15 pF load		2.4		ns
Output Clock Rise/Fall Time (High Drive)		0.3V ~ 3.0V with 15 pF load		1.2		
Output Clock Duty Cycle		Measured @ 50% V_{DD}	45	50	55	%

4. Voltage Control Crystal Oscillator

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
VCXO Stabilization Time *	$T_{VCXOSTB}$	From power valid			10	ms
VCXO Tuning Range		F_{XIN} = 12 – 25MHz; XTAL C_0/C_1 < 250 0V ≤ VCON ≤ 3.3V		500		ppm
CLK output pullability		VCON=1.65V, ±1.65V	±200			ppm
VCXO Tuning Characteristic				150		ppm/V
Pull range linearity					10	%
VCON pin input impedance			2000			kΩ
VCON modulation BW		0V ≤ VCON ≤ 3.3V, -3dB	25			kHz

Note: Parameters denoted with an asterisk (*) represent nominal characterization data and are not production tested to any specific limits.

5. Jitter and Phase Noise Specification

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
RMS Period Jitter (1 sigma – 1000 samples)	At 155MHz with capacitive decoupling between VDD and GND.		4		ps
Phase Noise relative to carrier	155.52MHz @100Hz offset		-95		dBc/Hz
Phase Noise relative to carrier	155.52MHz @1kHz offset		-120		dBc/Hz
Phase Noise relative to carrier	155.52MHz @10kHz offset		-128		dBc/Hz
Phase Noise relative to carrier	155.52MHz @100kHz offset		-122		dBc/Hz
Phase Noise relative to carrier	155.52MHz @1MHz offset		-120		dBc/Hz

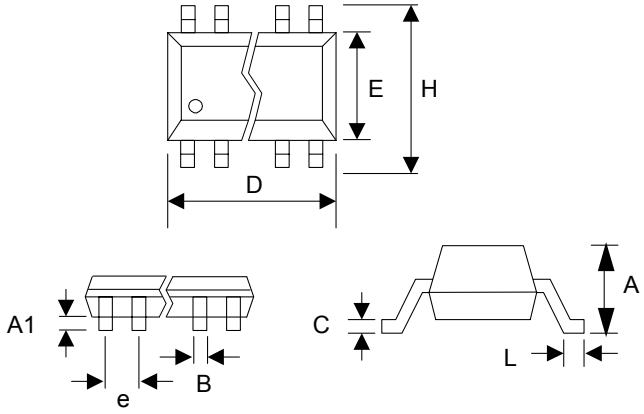
6. Crystal Specifications

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	F_{XIN}	12		25	MHz
Crystal Loading Capacitance Rating	$C_{L\ (xtal)}$		9.5		pF
C0/C1				250	-
ESR	R_S			30	Ω

Note: Crystal Loading rating: 9.5pF is the loading the crystal sees from the VCXO chip at VCON = 1.65V. It is assumed that the crystal will be at nominal frequency at this load. If the crystal requires more load to be at nominal frequency, the additional load must be added externally. This however may reduce the pull range.

PACKAGE INFORMATION

8 PIN SOIC (in mm)		
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

PLL502-04 (H) X C

PART NUMBER

Optional High Drive

TEMPERATURE
C=COMMERCIAL
I=INDUSTRAL

PACKAGE TYPE
S=SOIC

Order Number	Marking	Package Option
PLL502-04SC	P502-04SC	8-Pin SOIC (Tube)
PLL502-04SC -R	P502-04SC	8-Pin SOIC (Tape and Reel)
PLL502-04HSC	P502-04HSC	8-Pin SOIC (Tube)
PLL502-04HSC -R	P502-04HSC	8-Pin SOIC (Tape and Reel)

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