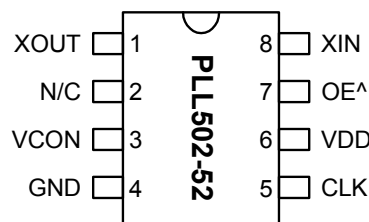


**Low Phase Noise Divider by 2 VCXO (10MHz to 20MHz)**

**FEATURES**

- Integrated voltage-controlled crystal oscillator circuitry (VCXO) (pull range 380ppm minimum).
- VCXO tuning range: 0V - V<sub>DD</sub>V.
- Uses inexpensive fundamental-mode parallel resonant crystals (from 20 to 40MHz).
- Integrated divider by 2: output range of 10MHz to 20MHz.
- 2.5V or 3.3V supply voltage.
- Selectable High Drive (30mA) or Standard Drive (10mA) output.
- Available in 8-Pin TSSOP or SOIC.

**PIN CONFIGURATION**



Note: ^ denotes internal pull up

**DESCRIPTION**

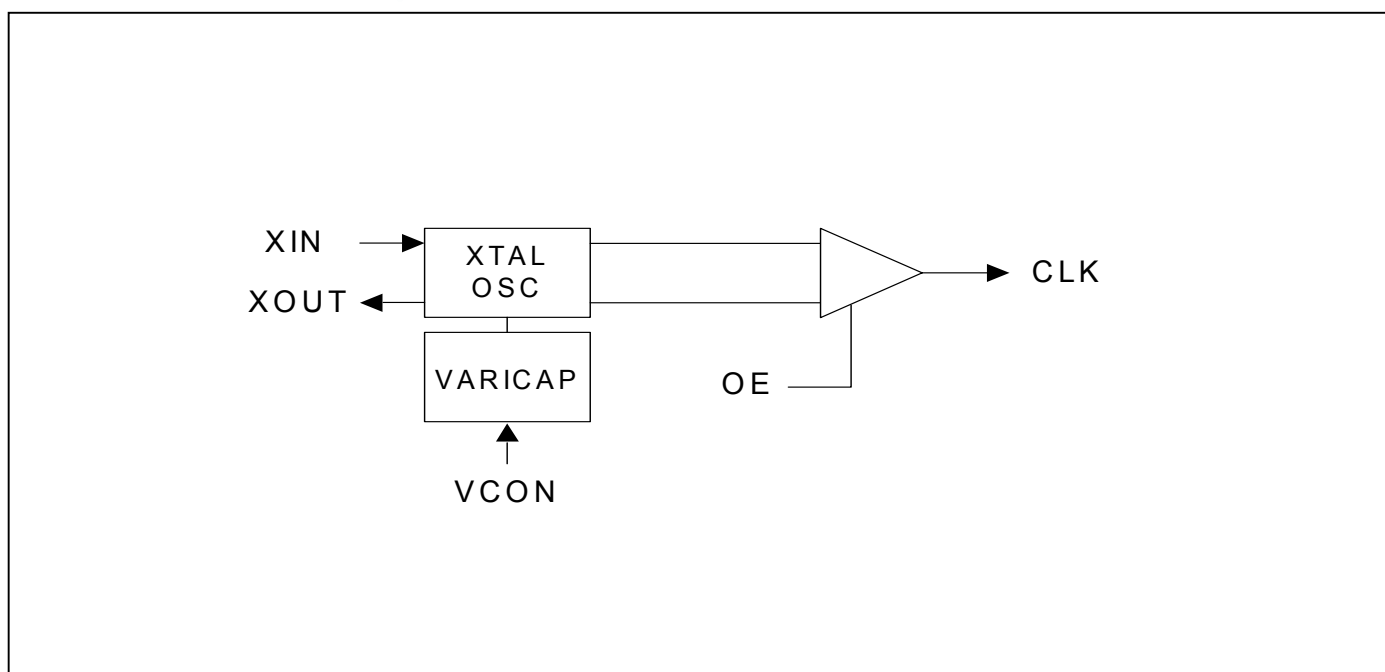
The PLL502-52 is a monolithic low jitter, high performance CMOS VCXO IC Die. It allows the control of the output frequency with an input voltage (VCON), using a low cost crystal.

This makes the PLL502-52 ideal for a wide range of applications requiring a VCXO output in the 10MHz to 20MHz range, using a fundamental crystal ranging from 20 to 40 MHz.

**OUTPUT RANGE**

DIVIDER	FREQUENCY RANGE	OUTPUT BUFFER
÷ 2	10 - 20MHz	CMOS

**BLOCK DIAGRAM**



**Low Phase Noise Divider by 2 VCXO (10MHz to 20MHz)**
**PIN DESCRIPTIONS**

Name	Number	Type	Description
XOUT	1	I	Crystal output. See Crystal Specifications on page 4.
N/C	2	-	Not connected.
VCON	3	I	Voltage Control input.
GND	4	P	Ground.
CLK	5	O	Output clock.
VDD	6	P	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 4.

**ELECTRICAL SPECIFICATIONS**
**1. Absolute Maximum Ratings**

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage	V <sub>DD</sub>		4.6	V
Input Voltage, dc	V <sub>I</sub>	-0.5	V <sub>DD</sub> +0.5	V
Output Voltage, dc	V <sub>O</sub>	-0.5	V <sub>DD</sub> +0.5	V
Storage Temperature	T <sub>S</sub>	-65	150	°C
Ambient Operating Temperature*	T <sub>A</sub>	-40	85	°C
Junction Temperature	T <sub>J</sub>		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 <sub>DD</sub>	F <sub>XIN</sub> = 20 - 52MHz Output load of 10pF		10		mA
Operating Voltage	V <sub>DD</sub>		2.25		3.63	V
Output drive current (High Drive)	I <sub>OH</sub>	V <sub>OH</sub> = V <sub>DD</sub> -0.4V, V <sub>DD</sub> =3.3V	30			mA
	I <sub>OL</sub>	V <sub>OL</sub> = 0.4V, V <sub>DD</sub> = 3.3V	30			mA
Output drive current (Standard Drive)	I <sub>OH</sub>	V <sub>OH</sub> = V <sub>DD</sub> -0.4V, V <sub>DD</sub> =3.3V	10			mA
	I <sub>OL</sub>	V <sub>OL</sub> = 0.4V, V <sub>DD</sub> = 3.3V	10			mA
Short Circuit Current				±50		mA
VCXO Control Voltage	VCON		0		V <sub>DD</sub>	V

## Low Phase Noise Divider by 2 VCXO (10MHz to 20MHz)

### 3. AC Electrical Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Crystal Frequency			20		52	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 <sub>DD</sub>	45	50	55	%

### 4. Voltage Control Crystal Oscillator

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
VCXO Stabilization Time *	T <sub>VCXOSTB</sub>	From power valid			10	ms
VCXO Tuning Range		F <sub>XIN</sub> = 20 - 40MHz; XTAL C <sub>0</sub> /C <sub>1</sub> < 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 input impedance				80		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 Specifications

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Period jitter RMS	20MHz		2.5		ps
Period jitter peak-to-peak	20MHz		20		ps
Integrated jitter RMS	Integrated 12 kHz to 20 MHz at 20MHz		1		ps

### 6. Phase Noise Specifications

PARAMETERS	FREQUENCY	@10Hz	@100Hz	@1kHz	@10kHz	@100kHz	UNITS
Phase Noise relative to carrier	20MHz	-65	-90	-120	-140	-147	dBc/Hz

Note: Phase Noise at VCON = 0V – to be measured

**Low Phase Noise Divider by 2 VCXO (10MHz to 20MHz)**

**7. Crystal Specifications**

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	$F_{XIN}$	Parallel Fundamental Mode	20		40	MHz
Crystal Loading Rating	$C_L (xtal)$	At $V_{con} = 1.65V$		9.5		pF
Crystal Pullability	$C_0/C_1 (xtal)$	AT cut			250	-
Recommended ESR	$R_E$	AT cut			30	$\Omega$

**Note:** Crystal Loading rating: 9.5pF is the loading the crystal sees from the VCXO chip at  $V_{CON} = 1.65V$ . 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 ( dimensions in mm )

Symbol	Narrow SOIC		TSSOP	
	Min.	Max.	Min.	Max.
A	1.47	1.73	-	1.20
A1	0.10	0.25	0.05	0.15
B	0.33	0.51	0.19	0.30
C	0.19	0.25	0.09	0.20
D	4.80	4.95	2.90	3.10
E	3.80	4.00	4.30	4.50
H	5.80	6.20	6.20	6.60
L	0.38	1.27	0.45	0.75
e	1.27 BSC		0.65 BSC	

**Low Phase Noise Divider by 2 VCXO (10MHz to 20MHz)**

**ORDERING INFORMATION**

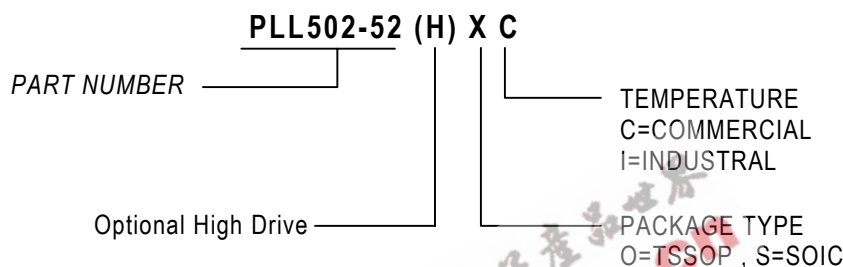
**For part ordering, please contact our Sales Department:**

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



<u>Order Number</u>	<u>Marking</u>	<u>Package Option</u>
PLL502-52OC-R	P502-52OC	TSSOP - Tape and Reel
PLL502-52OC	P502-52OC	TSSOP - Tube
PLL502-52HOC-R	P502-52HOC	TSSOP - Tape and Reel
PLL502-52HOC	P502-52HOC	TSSOP - Tube
PLL502-52SC-R	P502-52SC	SOIC - Tape and Reel
PLL502-52SC	P502-52SC	SOIC - Tube
PLL502-52HSC-R	P502-52HSC	SOIC - Tape and Reel
PLL502-52HSC	P502-52HSC	SOIC - Tube

PhaseLink Corporation, reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Phaselink is believed to be accurate and reliable. However, PhaseLink makes no guarantee or warranty concerning the accuracy of said information and shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon this product.

**LIFE SUPPORT POLICY:** PhaseLink's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of PhaseLink Corporation.