



**THE DATASHEET OF
PL502-03SC-R**

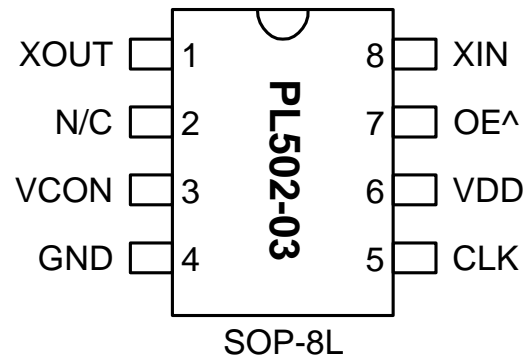


Low Phase Noise VCXO (48MHz to 100MHz)

FEATURES

- VCXO output for the 48MHz to 100MHz range
- Low phase noise (-130 dBc @ 10kHz offset at 48MHz)
- LVCMOS output
- 12 to 25MHz crystal input
- Integrated variable capacitors
- Selectable High Drive (30mA) or Standard Drive (10mA) output
- Wide pull range (± 250 ppm typ)
- Low period jitter: 3.5ps RMS
- 3.3V operation
- Available in 8-Pin SOP

PIN CONFIGURATION



Note: ^ denotes internal pull up

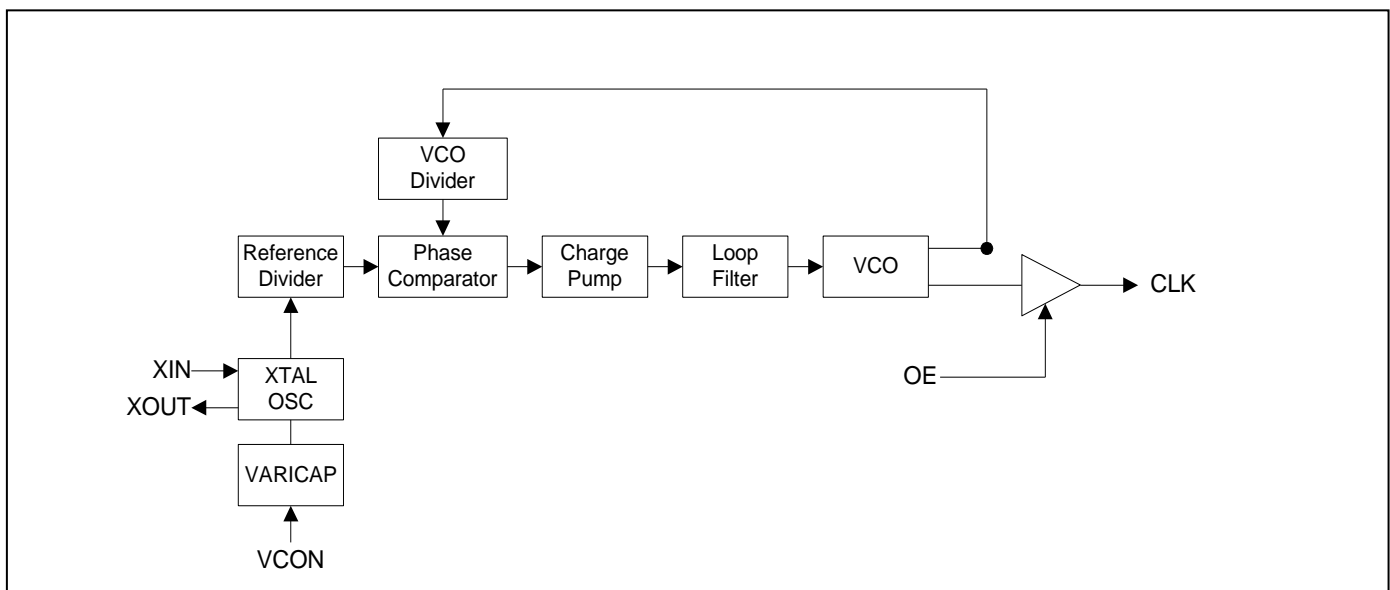
DESCRIPTION

The PL502-03 is a low cost, high performance and low phase noise VCXO for the 48 to 100MHz range, providing less than -130dBc at 10kHz offset at 48MHz. The very low jitter (3.5ps RMS period jitter) makes this chip ideal for applications requiring voltage controlled frequency sources. Input crystal can range from 12 to 25MHz (fundamental resonant mode).

OUTPUT RANGE

MULTIPLIER	FREQUENCY RANGE	OUTPUT BUFFER
X4	48 - 100MHz	LVCMOS

BLOCK DIAGRAM



Low Phase Noise VCXO (48MHz to 100MHz)
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	+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 4.

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

Low Phase Noise VCXO (48MHz to 100MHz)
3. DC Electrical Specifications

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs	I_{DD}	$F_{XIN} = 25\text{MHz}$ Output load 10pF		16	20	mA
Operating Voltage	V_{DD}		2.97		3.63	V
Output Drive Current (High Drive)	I_{OH}	$V_{OH} = V_{DD} - 0.4\text{V}$, $V_{DD} = 3.3\text{V}$	30			mA
	I_{OL}	$V_{OL} = 0.4\text{V}$, $V_{DD} = 3.3\text{V}$	30			mA
Output Drive Current (Standard Drive)	I_{OH}	$V_{OH} = V_{DD} - 0.4\text{V}$, $V_{DD} = 3.3\text{V}$	10			mA
	I_{OL}	$V_{OL} = 0.4\text{V}$, $V_{DD} = 3.3\text{V}$	10			mA
Short Circuit Current				±50		mA
VCXO Control Voltage	VCON		0		3.3	V

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		$F_{XIN} = 12 - 25\text{MHz}$; XTAL $C_0/C_1 < 250$ $0\text{V} \leq \text{VCON} \leq 3.3\text{V}$		500		ppm
CLK output pullability		$\text{VCON} = 1.65\text{V}$, ±1.65V	±200			ppm
VCXO Tuning Characteristic				150		ppm/V
Pull range linearity					10	%
VCON pin input impedance			2000			kΩ
VCON modulation BW		$0\text{V} \leq \text{VCON} \leq 3.3\text{V}$, -3dB	10			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)	with capacitive decoupling between VDD and GND.		3.5		ps
Phase Noise relative to carrier	48MHz @100Hz offset		-100		dBc/Hz
Phase Noise relative to carrier	48MHz @1kHz offset		-123		dBc/Hz
Phase Noise relative to carrier	48MHz @10kHz offset		-130		dBc/Hz
Phase Noise relative to carrier	48MHz @100kHz offset		-125		dBc/Hz
Phase Noise relative to carrier	48MHz @1MHz offset		-125		dBc/Hz

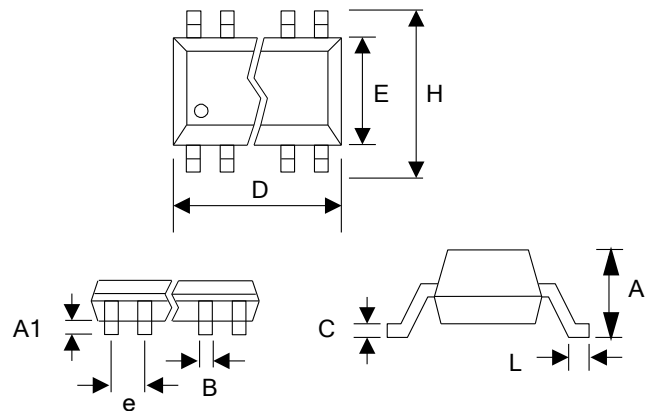
Low Phase Noise VCXO (48MHz to 100MHz)
6. Crystal Specifications

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 $V_{CON} = 1.65V$. 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 (GREEN PACKAGE COMPLIANT)

8 PIN SOP (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	



Low Phase Noise VCXO (48MHz to 100MHz)

ORDERING INFORMATION (GREEN PACKAGE COMPLIANT)

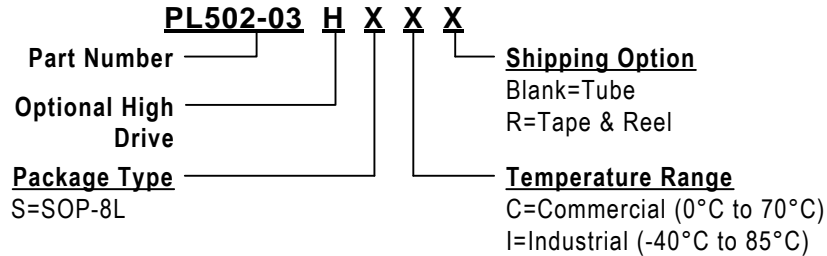
For part ordering, please contact our Sales Department:

2180 Fortune Drive, San Jose, CA 95131, USA

Tel: (408) 944-0800 Fax: (408) 474-1000

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
PL502-03SC	P502-03 SC	SOP - Tube
PL502-03SC-R	LLLLL	SOP - Tape and Reel
PL502-03HSC	P502-03H SC	SOP - Tube
PL502-03HSC-R	LLLLL	SOP - Tape and Reel



*Note: "LLL" or "LLLLL" are designates lot number

Micrel Inc., reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Micrel is believed to be accurate and reliable. However, Micrel 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: Micrel'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 Micrel Inc.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View PL502-03SC-R on WIN SOURCE](#)
-  [Microchip Technology](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management