PLL502-52

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

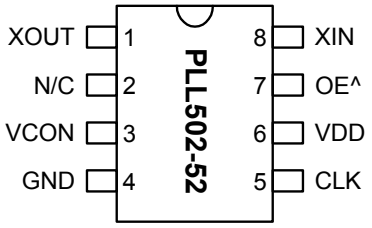
FEATURES

- Integrated voltage-controlled crystal oscillator circuitry (VCXO) (pull range 380ppm minimum).
- VCXO tuning range: 0V - V_{DD}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.

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.

PIN CONFIGURATION

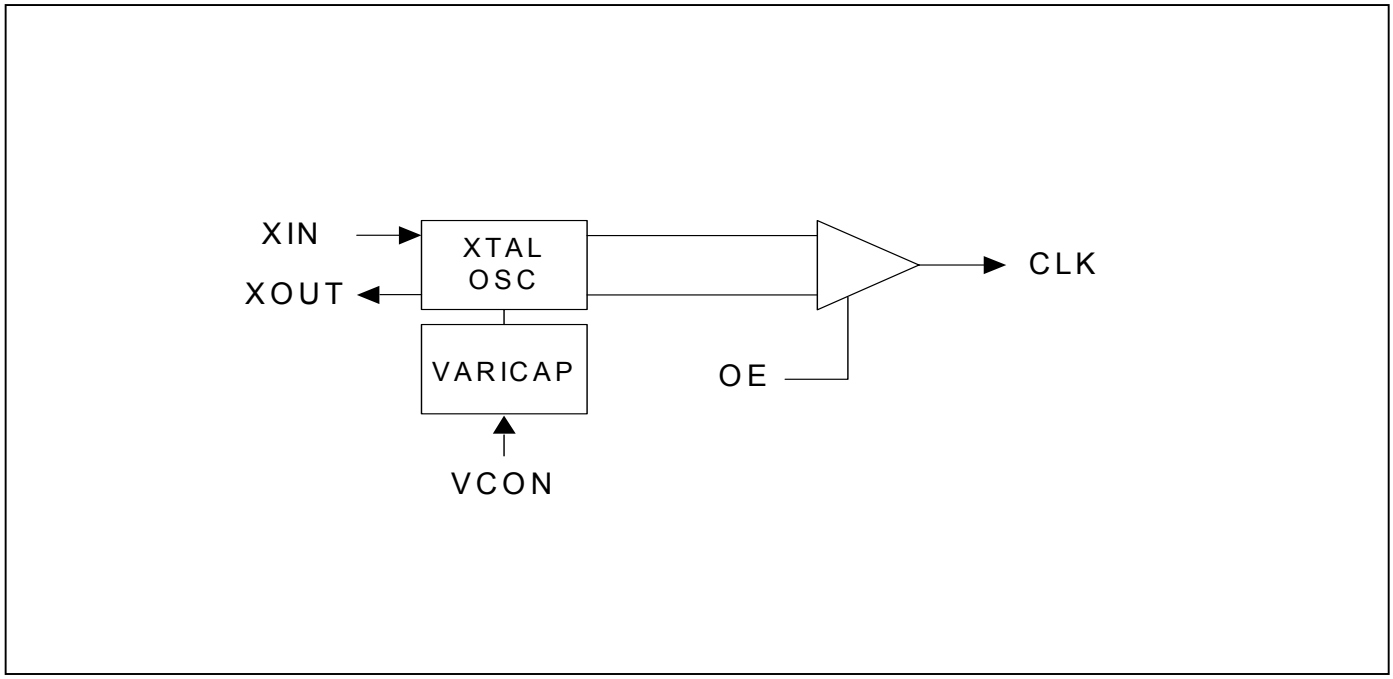


Note: ^ denotes internal pull up

OUTPUT RANGE

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

BLOCK DIAGRAM



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_{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} = 20 - 52MHz Output load of 10pF		10		mA
Operating Voltage	V_{DD}		2.25		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		V_{DD}	V

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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_{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} = 20 - 40MHz; 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 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

7. Crystal Specifications

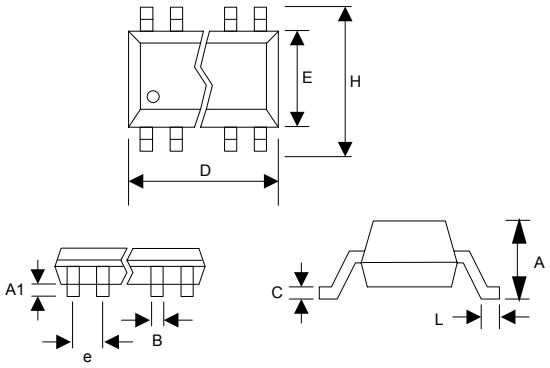
PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	F_{XIN}	Parallel Fundamental Mode	20		40	MHz
Crystal Loading Rating	$C_{L\ (xtal)}$	At Vcon = 1.65V		9.5		pF
Crystal Pullability	$C_0/C_{1\ (xtal)}$	AT cut			250	-
Recommended ESR	R_E	AT cut			30	Ω

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 (dimensions in mm)

	Narrow SOIC		TSSOP	
Symbol	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	



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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

PLL502-52 (H) X C

PART NUMBER

TEMPERATURE
C=COMMERCIAL
I=INDUSTRAL

Optional High Drive

PACKAGE TYPE
O=TSSOP , S=SOIC

Order Number	Marking	Package Option
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

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