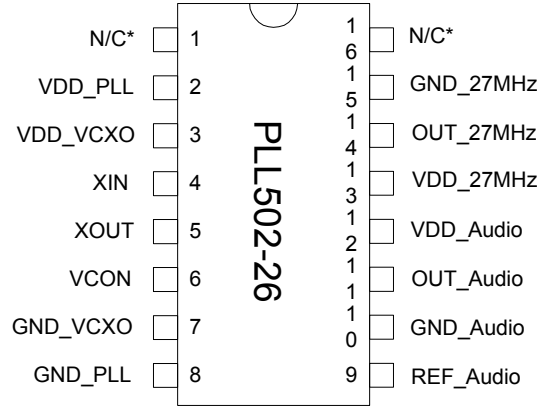


**High Pull-Range VCXO (27MHz) with integrated Audio PLL**

**FEATURES**

- Low phase noise 27MHz VCXO (-135 dBc at 10kHz offset).
- Integrated variable capacitors.
- Wide pull range (+/- 250 ppm).
- Low jitter (RMS): 10ps period.
- Integrated audio Phase Locked Loop.
- Audio clock output (ideal for 8.192MHz, 11.2896MHz, 12.288MHz).
- 27MHz crystal input.
- Audio Reference clock input.
- 3.3V operation.
- Available in 16-Pin SOIC.

**PIN CONFIGURATION**



Note: \* Pins reserved for future DAC integration

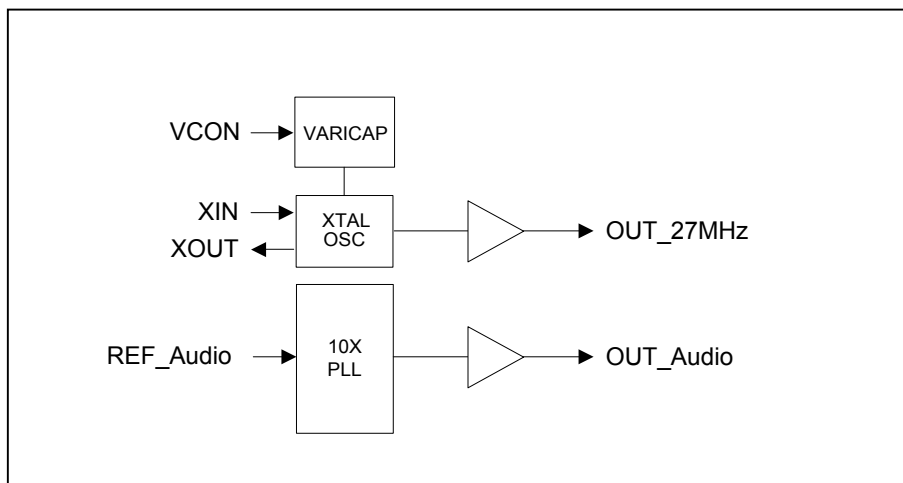
**DESCRIPTION**

The PLL502-26 is a low cost, high pull-range and low phase noise VCXO, providing less than -135dBc at 10kHz offset at 27MHz. It also integrates an Audio clock phase locked loop ideal for the 8.192MHz, 11.2896MHz and 12.288MHz audio outputs, starting from an audio reference clock. Its very high pull range makes it ideal for Digital Video applications, allowing users to save board space and cost.

**OUTPUT RANGE**

OUTPUT	FREQUENCY RANGE	OUTPUT TYPE
VCXO	27MHz	CMOS
Audio	8.192MHz – 12.288MHz	CMOS

**BLOCK DIAGRAM**



**High Pull-Range VCXO (27MHz) with integrated Audio PLL**
**PIN DESCRIPTIONS**

Name	Number	Type	Description
N/C	1,16		No connection.
VDD_PLL	2	P	VDD power supply pin for PLL circuitry. This pin should be decoupled separately from other VDD.
VDD_VCXO	3	P	VDD power supply pin for VCXO circuitry. This pin should be decoupled separately from other VDD.
XIN	4	I	Crystal input. See Crystal Specifications on page 4.
XOUT	5	O	Crystal output. See Crystal Specifications on page 4.
VCON	6	I	Voltage Control input.
GND_VCXO	7	P	GND connection for VCXO circuitry.
GND_PLL	8	P	GND connection for VCXO circuitry.
REF_Audio	9	I	Audio Reference Clock input.
GND_Audio	10	P	GND connection for Audio clock output buffer circuitry.
OUT_Audio	11	O	Audio clock output.
VDD_Audio	12	P	VDD power supply pin for Audio clock output buffer. This pin should be decoupled separately from other VDD.
VDD_27MHz	13	P	VDD power supply pin for 27MHz output clock. This pin should be decoupled separately from other VDD.
OUT_27MHz	14	O	27MHz VCXO output clock.
GND_27MHz	15	P	GND connection for 27MHz output buffer circuitry.

**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.

**High Pull-Range VCXO (27MHz) with integrated Audio PLL**
**2. AC Electrical Specifications**

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Crystal Frequency				27		MHz
Audio Reference Clock	REF_Audio		0.65	-	1.5	MHz
Output Clock Rise/Fall Time		0.3V ~ 3.0V with 15 pF load		2		ns
Output Clock Duty Cycle		Measured @ 50% V <sub>DD</sub>	45	50	55	%

**3. 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> = 12 – 27MHz; XTAL C <sub>0</sub> /C <sub>1</sub> < 250 0V ≤ V <sub>IN</sub> ≤ 3.3V		500		ppm
CLK output pullability		VCON=1.65V ±1.65V	±250			ppm
VCXO Tuning Characteristic				150		ppm/V
Pull range linearity					10	%
VCON pin input impedance			2000			kΩ
VCON modulation BW		0V ≤ V <sub>IN</sub> ≤ 3.3V, -3dB	25			kHz

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

**4. Jitter and Phase Noise Specification**

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
RMS Period Jitter (1 sigma – 10,000 samples)	with capacitive decoupling between VDD and GND.		3		ps
Phase Noise relative to carrier	27MHz @100Hz offset		-85		dBc/Hz
Phase Noise relative to carrier	27MHz @1kHz offset		-115		dBc/Hz
Phase Noise relative to carrier	27MHz @10kHz offset		-135		dBc/Hz
Phase Noise relative to carrier	27MHz @100kHz offset		-140		dBc/Hz
Phase Noise relative to carrier	27MHz @1MHz offset		-150		dBc/Hz

**High Pull-Range VCXO (27MHz) with integrated Audio PLL**
**5. DC Specification**

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs	$I_{DD}$	$F_{XIN} = 12 - 27\text{MHz}$ Output load of 10pF		30	35	mA
Operating Voltage	$V_{DD}$		2.97		3.63	V
Output drive current	$I_{OH}$	$V_{OH} = V_{DD} - 0.4\text{V}$ , $V_{DD} = 3.3\text{V}$	10			mA
	$I_{OL}$	$V_{OL} = 0.4\text{V}$ , $V_{DD} = 3.3\text{V}$	10			mA
Short Circuit Current				$\pm 50$		mA
VCXO Control Voltage	VCON		0		3.3	V

**6. Crystal Specifications**

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Crystal Resonator Frequency	$F_{XIN}$		27		MHz
Crystal Loading Capacitance Rating	$C_L$ (xtal)		9.5		pF
C0/C1				250	-
ESR	$R_s$			30	$\Omega$

**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.

**High Pull-Range VCXO (27MHz) with integrated Audio PLL**

**PACKAGE INFORMATION**

16 PIN Narrow SOIC ( mm )		
	SOIC	
Symbol	Min.	Max.
A	1.35	1.75
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	9.80	10.00
E	3.80	4.00
H	5.80	6.20
L	0.40	1.27
e	1.27 BSC	

**ORDERING INFORMATION**

**PART NUMBER**

The order number for this device is a combination of the following:  
Device number, Package type and Operating temperature range

**PLL502-26 S C**

PART NUMBER ————

————— TEMPERATURE  
C=COMMERCIAL

————— PACKAGE TYPE  
S=SOIC

<u>Order Number</u>	<u>Marking</u>	<u>Package</u>
PLL502-26SC	P502-26SC	SOIC - Tube
PLL502-26SC-R	P502-26SC	SOIC (Tape & Reel)

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