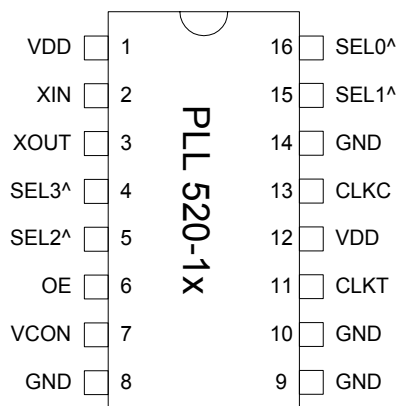


## Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

### FEATURES

- 65MHz to 130MHz Fundamental Mode Crystal.
- Output range: 65MHz – 800MHz (selectable 1x, 2x, 4x and 8x multipliers).
- Low Injection Power for crystal 50uW.
- Available outputs: PECL, LVDS, or CMOS.
- Integrated variable capacitors.
- Supports 3.3V-Power Supply.
- Available in 16 pin (TSSOP or SOIC)

### PIN CONFIGURATION



### DESCRIPTION

The PLL520-17/-18/-19 family of VCXO IC's is specifically designed to pull high frequency fundamental crystals. They achieve very low current into the crystal resulting in better overall stability. Their internal varicaps allow an on chip frequency pulling, controlled by the VCON input.

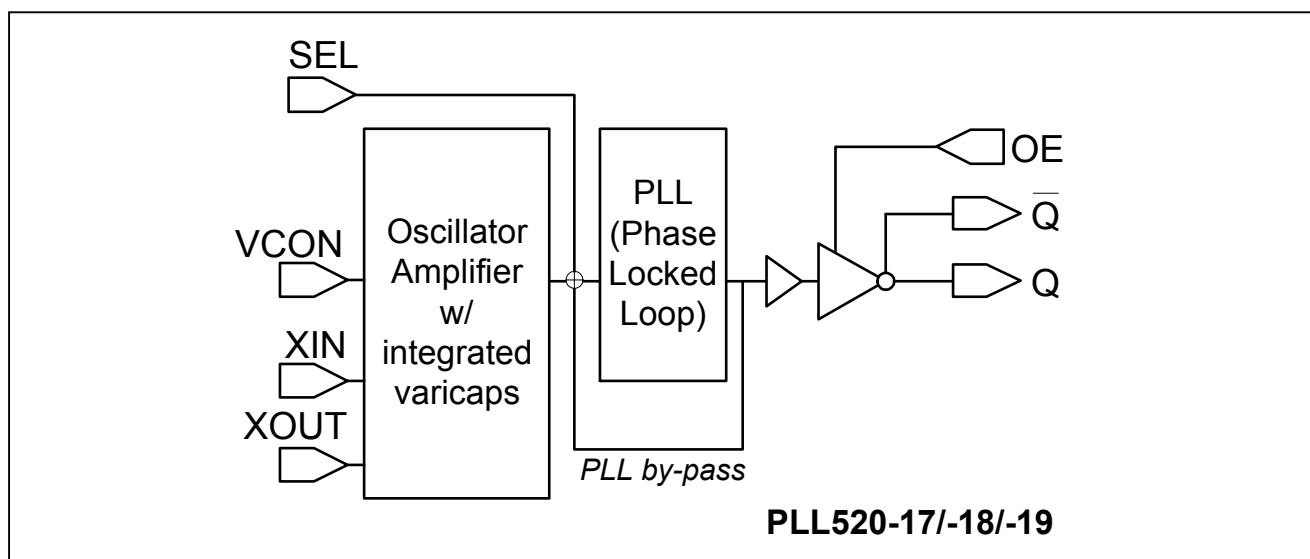
^: Internal pull-up

### OUTPUT ENABLE LOGICAL LEVELS

| Part #                 | OE          | State          |
|------------------------|-------------|----------------|
| PLL520-18              | 0 (Default) | Output enabled |
|                        | 1           | Tri-state      |
| PLL520-17<br>PLL520-19 | 0           | Tri-state      |
|                        | 1 (Default) | Output enabled |

OE input: Logical states defined by PECL levels for PLL520-18  
Logical states defined by CMOS levels for PLL520-17/-19

### BLOCK DIAGRAM



## Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

### PIN DESCRIPTIONS

| Name | Number      | Type | Description                                                                                                           |
|------|-------------|------|-----------------------------------------------------------------------------------------------------------------------|
| XIN  | 2           | I    | Crystal input. See Crystal Specification on page 3.                                                                   |
| XOUT | 3           | I    | Crystal output. See Crystal Specification on page 3.                                                                  |
| OE   | 6           | I    | Output enable. See Output Enable Logic Levels on page 1.                                                              |
| VCON | 7           | I    | Voltage control input.                                                                                                |
| GND  | 8,9, 10, 14 | P    | Ground.                                                                                                               |
| CLKT | 11          | O    | True output PECL (PLL520-18) or LVDS (PLL520-19).<br>No Connect for CMOS (PLL520-17).                                 |
| CLKC | 13          | O    | Complementary output PECL (PLL520-18) or LVDS (PLL520-19).<br>CMOS output for (PLL520-17).                            |
| SEL  | 4,5,15,16   | I    | Multiplier selector pins. These pins have an internal pull-up that will default SEL to '1' when not connected to GND. |
| VDD  | 1, 12       | P    | +3.3V power supply.                                                                                                   |

### FREQUENCY SELECTION TABLE

| Pin #4<br>SEL3 | Pin #5<br>SEL2 | Pin #15<br>SEL1 | Pin #16<br>SEL0 | Selected Multiplier |
|----------------|----------------|-----------------|-----------------|---------------------|
| 0              | 0              | 1               | 1               | Fin x 8             |
| 1              | 0              | 1               | 1               | Fin x 4             |
| 1              | 1              | 1               | 0               | Fin x 2             |
| 1              | 1              | 1               | 1               | No multiplication   |

All pins have internal pull-ups (default value is 1). Connect to GND to set to 0.

### 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.

## Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

### 2. Crystal Specifications

| PARAMETERS                  | SYMBOL         | CONDITIONS                    | MIN. | MAX. | UNITS |
|-----------------------------|----------------|-------------------------------|------|------|-------|
| Built-in Capacitance        | CX+            | 65MHz to 130MHz<br>(VDD=3.3V) |      | 2    | pF    |
|                             | CX-            |                               |      | 2    |       |
| Inter-electrode capacitance | C <sub>0</sub> |                               |      | 2    |       |
| C0/C1 ratio (gamma)         | $\gamma$       |                               |      | 300  | -     |
| Oscillation Frequency       | OF             | Fund.                         | 120  | 200  | MHz   |

### 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> = 100 – 200MHz;<br>XTAL C <sub>0</sub> /C <sub>1</sub> < 250<br>0V ≤ VCON ≤ 3.3V |       | 200*    |      | ppm   |
| CLK output pullability         |                      | VCON=1.65V, ±1.65V                                                                                | ±100* |         |      | ppm   |
| On-chip Varicaps control range |                      | VCON = 0 to 3.3V                                                                                  |       | 4 – 18* |      | pF    |
| Linearity                      |                      |                                                                                                   |       |         | 10*  | %     |
| VCXO Tuning Characteristic     |                      |                                                                                                   |       | 65      |      | ppm/V |
| VCON input impedance           |                      |                                                                                                   |       | 60      |      | 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.

### 4. General Electrical Specifications

| PARAMETERS                      | SYMBOL          | CONDITIONS                      | MIN. | TYP. | MAX.      | UNITS |
|---------------------------------|-----------------|---------------------------------|------|------|-----------|-------|
| Supply Current (Loaded Outputs) | I <sub>DD</sub> | PECL/LVDS/CMOS                  |      |      | 100/80/40 | mA    |
| Operating Voltage               | V <sub>DD</sub> |                                 | 2.97 |      | 3.63      | V     |
| Output Clock Duty Cycle         |                 | @ 1.4V (CMOS)                   | 45   | 50   | 55        | %     |
|                                 |                 | @ 1.25V (LVDS)                  | 45   | 50   | 55        |       |
|                                 |                 | @ V <sub>dd</sub> – 1.3V (PECL) | 45   | 50   | 55        |       |
| Short Circuit Current           |                 |                                 |      | ±50  |           | mA    |

## Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

### 5. Jitter Specifications

| PARAMETERS                 | CONDITIONS                               | MIN. | TYP. | MAX. | UNITS |
|----------------------------|------------------------------------------|------|------|------|-------|
| Period jitter RMS          | 77.76MHz                                 |      | 2.5  |      | ps    |
|                            | 155.52MHz                                |      | 4    |      |       |
|                            | 622.08MHz                                |      | 5    |      |       |
| Period jitter peak-to-peak | 77.76MHz                                 |      | 24   |      | ps    |
|                            | 155.52MHz                                |      | 29   |      |       |
|                            | 622.08MHz                                |      | 32   |      |       |
| Integrated jitter RMS      | Integrated 12 kHz to 20 MHz at 77.76MHz  |      | 0.5  |      | ps    |
|                            | Integrated 12 kHz to 20 MHz at 155.52MHz |      | 1.5  |      |       |
|                            | Integrated 12 kHz to 20 MHz at 622.08MHz |      | 1.5  |      |       |

### 6. Phase Noise Specifications

| PARAMETERS                      | FREQUENCY | @10Hz | @100Hz | @1kHz | @10kHz | @100kHz | UNITS  |
|---------------------------------|-----------|-------|--------|-------|--------|---------|--------|
| Phase Noise relative to carrier | 77.76MHz  | -75   | -95    | -125  | -145   | -155    | dBc/Hz |
|                                 | 155.52MHz | -75   | -95    | -120  | -125   | -123    |        |
|                                 | 622.08MHz | -75   | -95    | -115  | -118   | -115    |        |

Note: Phase Noise measured at VCON = 0V

### 7. CMOS Output Electrical Specifications

| PARAMETERS                                   | SYMBOL          | CONDITIONS                                                     | MIN. | TYP. | MAX. | UNITS |
|----------------------------------------------|-----------------|----------------------------------------------------------------|------|------|------|-------|
| 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    |
| 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  |      |       |

**Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)**

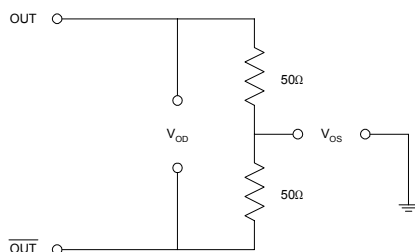
**8. LVDS Electrical Characteristics**

| PARAMETERS                   | SYMBOL          | CONDITIONS                                 | MIN.  | TYP.    | MAX.     | UNITS   |
|------------------------------|-----------------|--------------------------------------------|-------|---------|----------|---------|
| Output Differential Voltage  | $V_{OD}$        | $R_L = 100\ \Omega$<br>(see figure)        | 247   | 355     | 454      | mV      |
| $V_{DD}$ Magnitude Change    | $\Delta V_{OD}$ |                                            | -50   |         | 50       | mV      |
| Output High Voltage          | $V_{OH}$        |                                            |       | 1.4     | 1.6      | V       |
| Output Low Voltage           | $V_{OL}$        |                                            | 0.9   | 1.1     |          | V       |
| Offset Voltage               | $V_{OS}$        |                                            | 1.125 | 1.2     | 1.375    | V       |
| Offset Magnitude Change      | $\Delta V_{OS}$ |                                            | 0     | 3       | 25       | mV      |
| Power-off Leakage            | $I_{OXD}$       | $V_{out} = V_{DD}$ or GND<br>$V_{DD} = 0V$ |       | $\pm 1$ | $\pm 10$ | $\mu A$ |
| Output Short Circuit Current | $I_{OSD}$       |                                            |       | -5.7    | -8       | mA      |

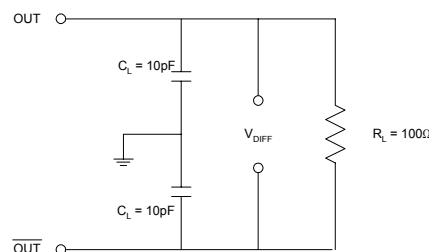
**9. LVDS Switching Characteristics**

| PARAMETERS                   | SYMBOL | CONDITIONS                                            | MIN. | TYP. | MAX. | UNITS |
|------------------------------|--------|-------------------------------------------------------|------|------|------|-------|
| Differential Clock Rise Time | $t_r$  | $R_L = 100\ \Omega$<br>$C_L = 10\ pF$<br>(see figure) | 0.2  | 0.7  | 1.0  | ns    |
| Differential Clock Fall Time | $t_f$  |                                                       | 0.2  | 0.7  | 1.0  | ns    |

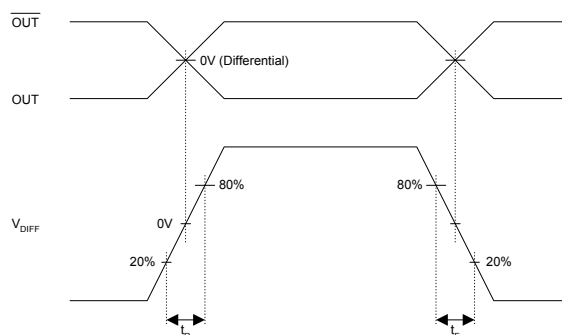
LVDS Levels Test Circuit



LVDS Switching Test Circuit



LVDS Transition Time Waveform



**Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)**

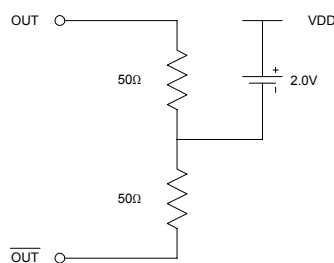
**10. PECL Electrical Characteristics**

| PARAMETERS          | SYMBOL   | CONDITIONS                                           | MIN.             | MAX.             | UNITS |
|---------------------|----------|------------------------------------------------------|------------------|------------------|-------|
| Output High Voltage | $V_{OH}$ | $R_L = 50 \Omega$ to $(V_{DD} - 2V)$<br>(see figure) | $V_{DD} - 1.025$ |                  | V     |
| Output Low Voltage  | $V_{OL}$ |                                                      |                  | $V_{DD} - 1.620$ | V     |

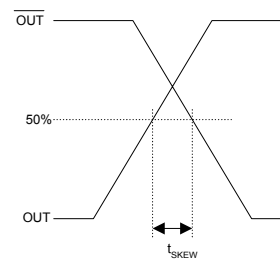
**11. PECL Switching Characteristics**

| PARAMETERS      | SYMBOL | CONDITIONS     | MIN. | TYP. | MAX. | UNITS |
|-----------------|--------|----------------|------|------|------|-------|
| Clock Rise Time | $t_r$  | @20/80% - PECL |      | 0.6  | 1.5  | ns    |
| Clock Fall Time | $t_f$  | @80/20% - PECL |      | 0.5  | 1.5  | ns    |

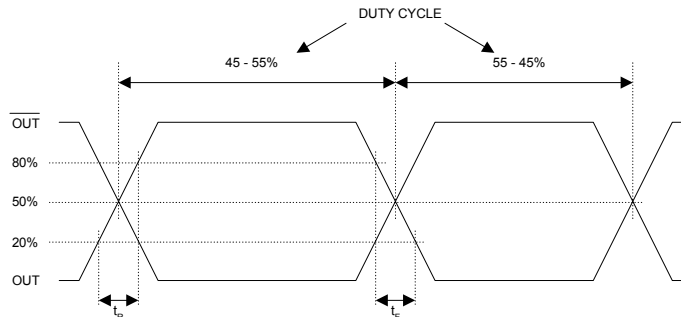
PECL Levels Test Circuit



PECL Output Skew



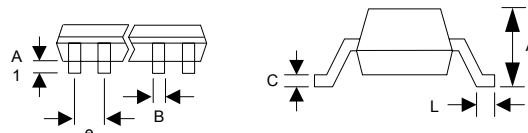
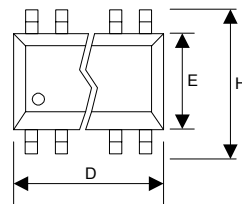
PECL Transition Time Waveform



**PACKAGE INFORMATION**

16 PIN Narrow SOIC, TSSOP ( mm )

|        | SOIC     |       | TSSOP    |      |
|--------|----------|-------|----------|------|
| Symbol | Min.     | Max.  | Min.     | Max. |
| A      | 1.35     | 1.75  | -        | 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      | 9.80     | 10.00 | 4.90     | 5.10 |
| E      | 3.80     | 4.00  | 4.30     | 4.50 |
| H      | 5.80     | 6.20  | 6.40 BSC |      |
| L      | 0.40     | 1.27  | 0.45     | 0.75 |
| e      | 1.27 BSC |       | 0.65 BSC |      |



**Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)**

**ORDERING INFORMATION**

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

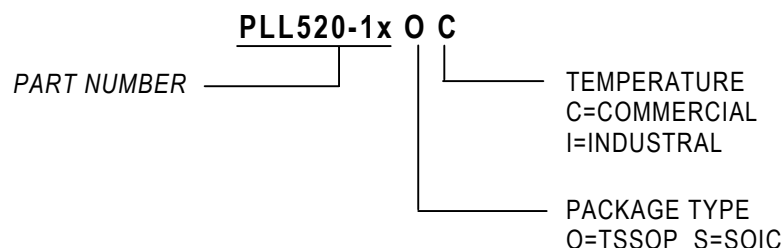
47745 Fremont Blvd., Fremont, CA 94538, USA

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> |
|---------------------|----------------|-----------------------|
| PLL520-17OC         | P520-17OC      | TSSOP – Tube          |
| PLL520-17OC-R       | P520-17OC      | TSSOP – Tape & Reel   |
| PLL520-17SC         | P520-17SC      | SOIC – Tube           |
| PLL520-17SC-R       | P520-17SC      | SOIC – Tape & Reel    |
| PLL520-18OC         | P520-18OC      | TSSOP – Tube          |
| PLL520-18OC-R       | P520-18OC      | TSSOP – Tape & Reel   |
| PLL520-18SC         | P520-18SC      | SOIC – Tube           |
| PLL520-18SC-R       | P520-18SC      | SOIC – Tape & Reel    |
| PLL520-19OC         | P520-19OC      | TSSOP – Tube          |
| PLL520-19OC-R       | P520-19OC      | TSSOP – Tape & Reel   |
| PLL520-19SC         | P520-19SC      | SOIC – Tube           |
| PLL520-19SC-R       | P520-19SC      | SOIC – Tape & Reel    |

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.

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9