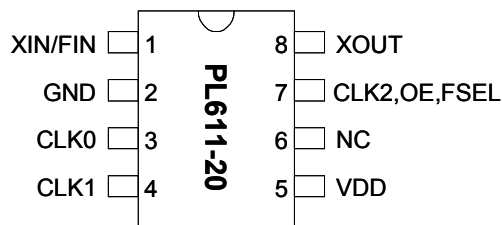


**Programmable Quick Turn Clock™**

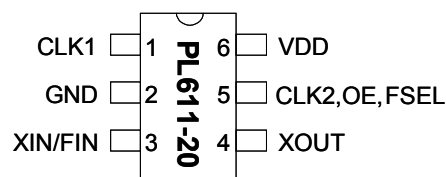
**FEATURES**

- Advanced programmable PLL design
- Very low Jitter and Phase Noise (< 40ps Pk-Pk typical)
- Up to 3 outputs
- Output frequency up to 200MHz CMOS.
- Crystal inputs:
  - Fundamental crystal: 10MHz-30MHz
  - 3<sup>RD</sup> overtone crystal: Up to 75MHz
- Accepts <1.0V reference signal input voltage
- One programmable I/O pin can be configured as Output Enable (OE), or Frequency Selection input (FSEL), or Reference clock.
- Single 2.5V or 3.3V ± 10% power supply
- Operating temperature range from -40°C to 85°C
- Available in 8-pin MSOP/SOIC, 6-pin SOT Green/RoHS compliant packages, or Die

**PIN CONFIGURATION**



**SOP-8  
MSOP-8**

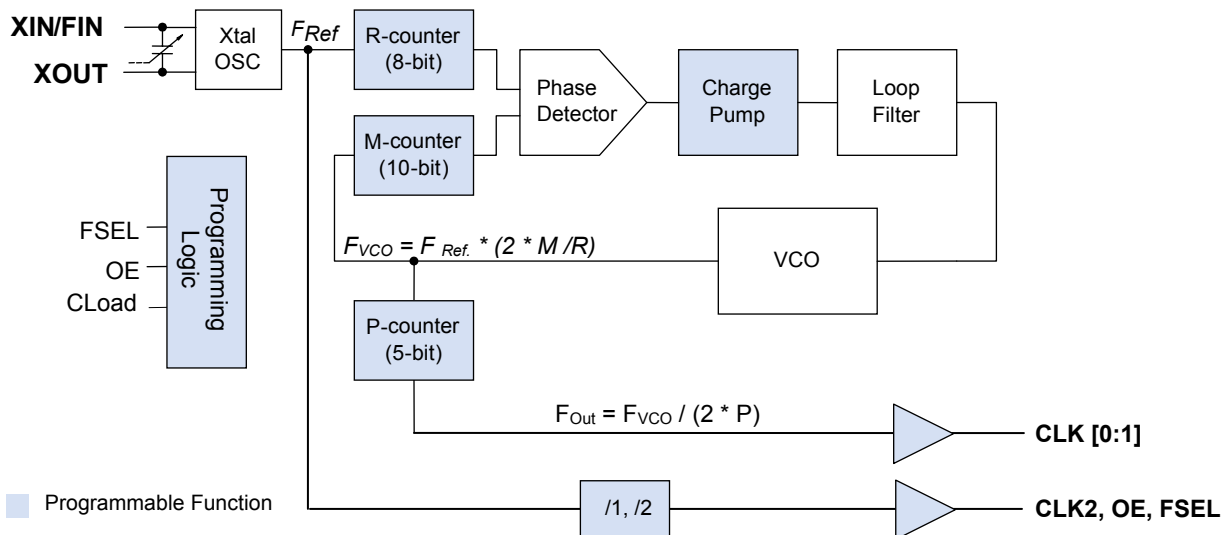


**SOT-23**

**DESCRIPTION**

The PL611-20 is a low-cost general purpose frequency synthesizer and a member of PhaseLink's Factory Programmable 'Quick Turn Clock (QTC)' family. PhaseLink's PL611-20 product family can generate any output frequency up to 200 MHz from fundamental crystal input between 10 MHz - 30 MHz, or a 3rd overtone crystal of up to 75Mhz.

**BLOCK DIAGRAM**



## Programmable Quick Turn Clock™

### KEY PROGRAMMING PARAMETERS

CLK[ 0:2 ] Output Frequency	Output Drive Strength	Crystal Load	Programmable Input/Output (pin #7)	Charge-Pump Current
$F_{out} = F_{IN} * M / (R * P)$ where M=10 bit R = 8 bit P = 5 bit 1. CLK[0:1] = VCO / 2 * P 2. CLK0 = ~ CLK1 2. CLK[2]= FIN or FIN/2	Std: 10mA (default)  High: 24mA	+/- 200ppm tuning.	One output pin can be configured as 1. CLK2 = FIN or FIN/2 2. FSEL - input 3. OE - input	4 levels of pump current setting

### PIN DESCRIPTION

Name	Pin #		Type	Description									
	(M)SOP-8	SOT-23											
XIN/FIN	1	3	I	Crystal or Reference input pin									
GND	2	2	P	GND connection									
CLK[0:1]	3,4	1	O	Programmable Clock Output [note:CLK0=CLK1]									
VDD	5	6	P	VDD connection (2.25~3.63V)									
DNC	6	-	-	Do No Connect									
CLK2, OE, FSEL	7	5	B	This programmable I/O pin can be configured as CLK2 (FIN or FIN/2) output, or OE input, or Frequency Selection (FSEL) input pin. This pin has an internal 60KΩ pull up resistor. <table border="1" data-bbox="873 1255 1458 1474"> <thead> <tr> <th>State</th> <th>OE</th> <th>FSEL</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Tristate CLK[0:1]</td> <td>Select Freq. '1'</td> </tr> <tr> <td>1 (default)</td> <td>Normal mode</td> <td>Select Freq. '2'</td> </tr> </tbody> </table>	State	OE	FSEL	0	Tristate CLK[0:1]	Select Freq. '1'	1 (default)	Normal mode	Select Freq. '2'
State	OE	FSEL											
0	Tristate CLK[0:1]	Select Freq. '1'											
1 (default)	Normal mode	Select Freq. '2'											
XOUT	8	4	O	Crystal output pin									

## Programmable Quick Turn Clock™

### DIE SPECIFICATION

Name	Value
Size	31.5x55.1 mil
Reverse side	GND
Pad Opening	80 micron x 80 micron
Die Thickness	10 mil

### PAD LAYOUT AND DIE ID

XIN	1	9	XOUT
GND	2	8	CLK2, OE, FSEL
GND	3	7	VDD
CLK0	4	6	VDD
CLK1	5		

Note: CLK0=CLK1

### PAD ASSIGNMENT and DESCRIPTION

Name	Die Pads			Type	Description									
	Pad #	X (μm)	Y(μm)											
XIN	1	101.5	1274.0	I	Crystal input.									
GND	2	101.5	1075.0	P	GND connection.									
	3	101.5	878.4											
CLK0	4	101.5	671.8	O	Optional same frequency clock output (CLK0=CLK1). If the clock output is not used, the pad should remain as 'Do Not Connect (DNC)'.									
CLK1	5	101.5	425.0	O	Programmable Clock Output.									
VDD	6	697	483.0	P	VDD connection.									
VDD	7	697	790.0											
CLK2, OE, FSEL	8	697	1024.0	O	<p>This programmable I/O pin can be configured as CLK2 (FIN or FIN/2) output, or OE input, or Frequency Selection (FSEL) input pin. This pin has an internal 60KΩ pull up resistor.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>State</th> <th>OE</th> <th>FSEL</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Tristate CLK[0:1]</td> <td>Select Freq. '1'</td> </tr> <tr> <td>1 (default)</td> <td>Normal mode</td> <td>Select Freq. '2'</td> </tr> </tbody> </table>	State	OE	FSEL	0	Tristate CLK[0:1]	Select Freq. '1'	1 (default)	Normal mode	Select Freq. '2'
State	OE	FSEL												
0	Tristate CLK[0:1]	Select Freq. '1'												
1 (default)	Normal mode	Select Freq. '2'												
XOUT	9	697	1274.0	O	Crystal output.									

**Programmable Quick Turn Clock™**
**ELECTRICAL SPECIFICATIONS**
**ABSOLUTE MAXIMUM RATINGS**

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage Range	V <sub>DD</sub>	-0.5	4.6	V
Input Voltage Range	V <sub>I</sub>	-0.5	V <sub>DD</sub> +0.5	V
Output Voltage Range	V <sub>O</sub>	-0.5	V <sub>DD</sub> +0.5	V
Data Retention @ 85° C		10		Years
Soldering Temperature (Green Package)			260	°C
Storage Temperature	T <sub>S</sub>	-65	150	°C
Ambient Operating Temperature*		-40	+85	°C

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.

**AC SPECIFICATIONS**

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Crystal Input Frequency	Fundamental Crystal	10		30	MHz
	3 <sup>rd</sup> Overtone Crystal			75	MHz
Settling Time	At power-up (after V <sub>DD</sub> increases over 1.62V)			10	ms
VDD Sensitivity	Frequency vs. V <sub>DD</sub> +/-10%	-2		2	ppm
Output Rise Time	15pF Load, 10/90%V <sub>DD</sub> , Standard drive		2.5	3.5	ns
	15pF Load, 10/90%V <sub>DD</sub> , High drive		1.0	1.5	ns
Output Fall Time	15pF Load, 90/10%V <sub>DD</sub> , Standard drive		2.5	3.5	ns
	15pF Load, 90/10%V <sub>DD</sub> , High drive		1.0	1.5	ns
Duty Cycle	At V <sub>DD</sub> /2	45	50	55	%
Max. output skew between same frequency clocks	Equal loading (15 pF). Equal frequency & drive strength			200	ps
Period Jitter, peak-to-peak* (measured from 10,000 samples)	With capacitive decoupling between V <sub>DD</sub> and GND. Operating only one output.		40		ps

\* Note: Jitter performance depends on the programming parameters.

**DC SPECIFICATIONS**

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs	I <sub>DD</sub>	At 10MHz, load=15pF			15	mA
Operating Voltage	V <sub>DD</sub>		2.25		3.63	V
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = +4mA (Standard drive)			0.4	V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -4mA (Standard drive)	V <sub>DD</sub> - 0.4			V
Output Current	I <sub>OSD</sub>	V <sub>OL</sub> = 0.4V, V <sub>OH</sub> = 2.4V (Standard drive)		10		mA
	I <sub>OHD</sub>	V <sub>OL</sub> = 0.4V, V <sub>OH</sub> = 2.4V (High Drive)		24		mA
Short-circuit Current	I <sub>s</sub>			±50		mA

**CRYSTAL SPECIFICATIONS**

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Fundamental Crystal Resonator Frequency	F <sub>XIN</sub>	10		30	MHz
3 <sup>rd</sup> Overtone Crystal Resonator Frequency	F <sub>XIN</sub>			75	MHz
Crystal Loading Rating (The IC can be programmed for any value in this range.)	C <sub>L (xtal)</sub>	5		20	pF
Maximum Sustainable Drive Level				500	μW
Operating Drive Level			100		μW
Crystal Shunt Capacitance	C <sub>0</sub>			6	pF
Effective Series Resistance, Fundamental, 10-30MHz	R <sub>s</sub>			30	Ω
Effective Series Resistance, 3 <sup>rd</sup> Overtone, 30-50MHz [C <sub>0</sub> < 4pF, C <sub>L</sub> =5pF/8pF]	ESR			100/70	Ω
Effective Series Resistance, 3 <sup>rd</sup> Overtone, 50-65MHz, [C <sub>0</sub> < 4pF, C <sub>L</sub> =5pF/8pF]	ESR			60/40	Ω
Effective Series Resistance, 3 <sup>rd</sup> Overtone, 65-75MHz [C <sub>0</sub> < 4pF, C <sub>L</sub> =5pF/8pF]	ESR			45/30	Ω

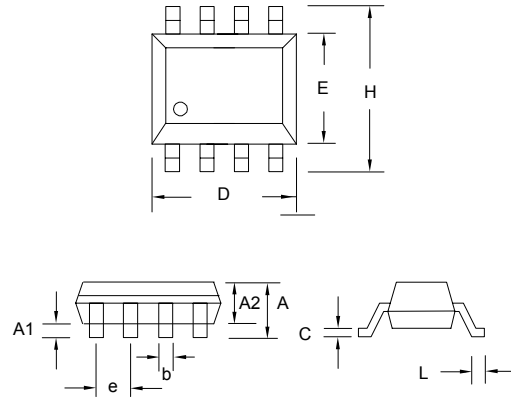
**Note:** A detailed crystal specification document is also available for this part

**Programmable Quick Turn Clock™**

**PACKAGE DRAWINGS (GREEN PACKAGE COMPLIANT)**

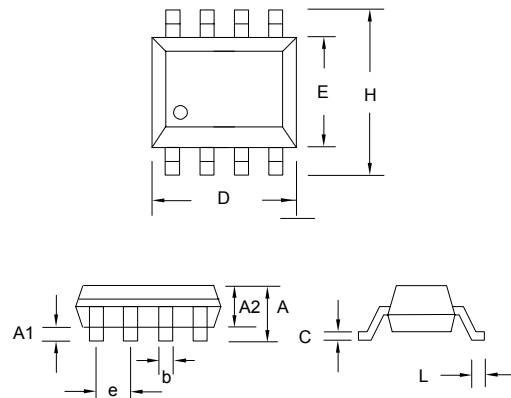
**MSOP 8L**

Symbol	Dimension in MM	
	Min.	Max.
A	---	1.10
A1	0.05	0.15
A2	0.81	0.91
B	0.25	0.40
C	0.13	0.23
D	2.90	3.10
E	2.90	3.10
H	4.90 BSC	
L	0.445	0.648
e	0.65 BSC	



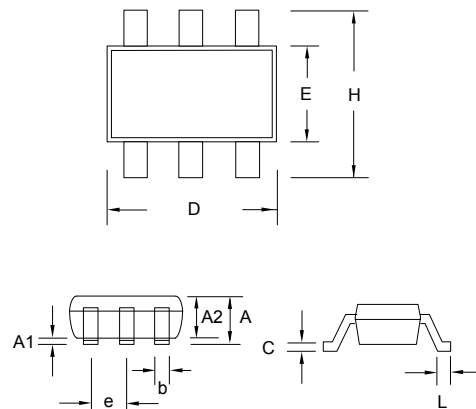
**SOP 8L**

Symbol	Dimension in MM	
	Min.	Max.
A	1.35	1.75
A1	0.10	0.25
A2	1.25	1.50
B	0.33	0.53
C	0.19	0.27
D	4.80	5.00
E	3.80	4.00
H	5.80	6.20
L	0.40	0.89
e	1.27 BSC	



**SOT-23 6 L**

Symbol	Dimension in MM	
	Min.	Max.
A	1.05	1.35
A1	0.05	0.15
A2	1.00	1.20
B	0.30	0.50
C	0.08	0.20
D	2.80	3.00
E	1.50	1.70
H	2.60	3.0
L	0.35	0.55
e	0.95 BSC	



**Programmable Quick Turn Clock™**

**ORDERING INFORMATION**

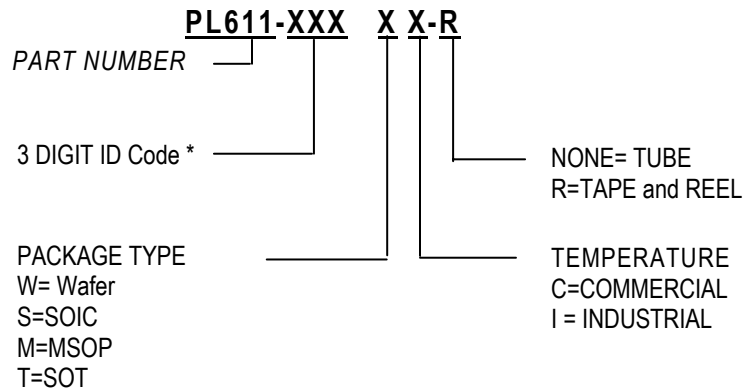
**For part ordering, please contact our Sales Department:**

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



\* PhaseLink will assign a unique 3-digit ID code for each approved programmed part number.

\* PhaseLink offers Green Package Only for this product family.

Part / Order Number	Marking	Package Option
PL611-20WC	P611-20WC	Wafer
PL611-20-XXXSC	C2XXX	8-Pin SOIC (Tube)
PL611-20-XXXSC-R	C2XXX	8-Pin SOIC (Tape and Reel)
PL611-20-XXXMC	C2XXX	8-Pin MSOP (Tube)
PL611-20-XXXMC-R	C2XXX	8-Pin MSOP (Tape and Reel)
PL611-20-XXXTC-R	C2XXX	6-Pin SOT-23 (Tape and 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.