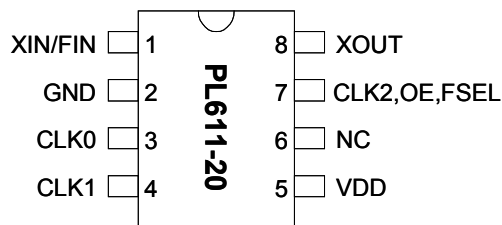


**Programmable Quick Turn Clock™**

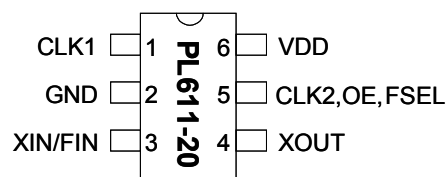
**FEATURES**

- 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**

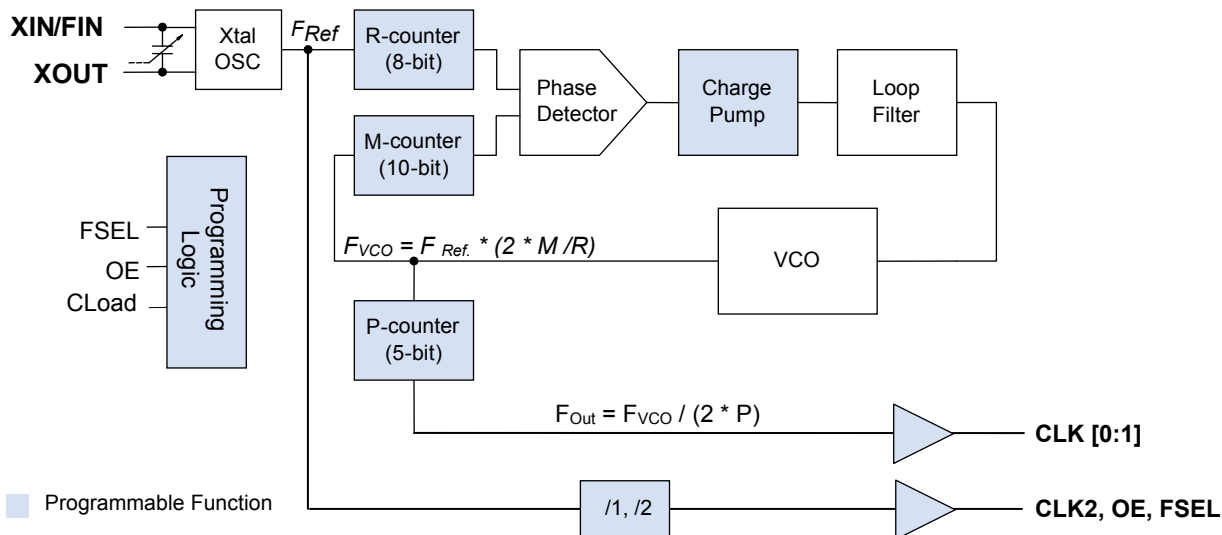


**SOT-23**

**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" data-bbox="883 1373 1468 1591"> <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
V <sub>DD</sub> 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

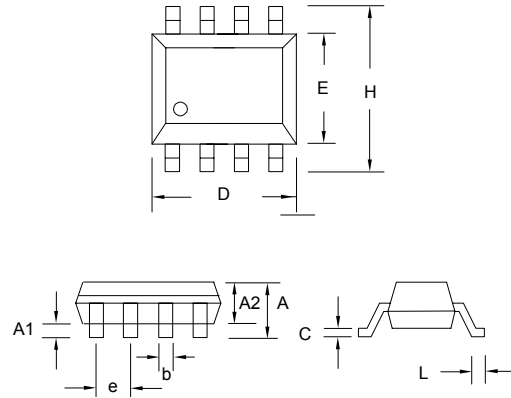
**Note:** A detailed crystal specification document is also available for this part

**Programmable Quick Turn Clock™**

**PACKAGE DRAWINGS (GREEN PACKAGE COMPLIANT)**

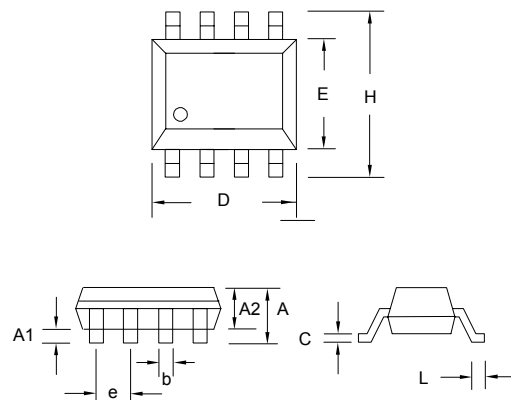
**MSOP 8L**

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	



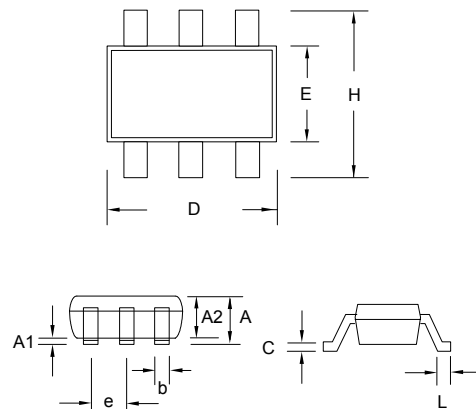
**SOP 8L**

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**

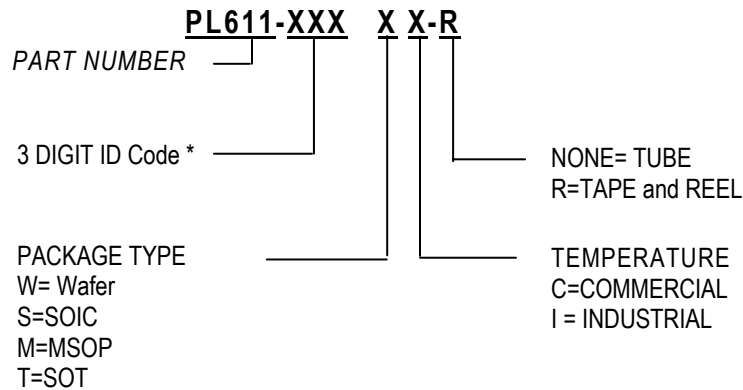
**For part ordering, please contact our Sales Department:**

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)

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