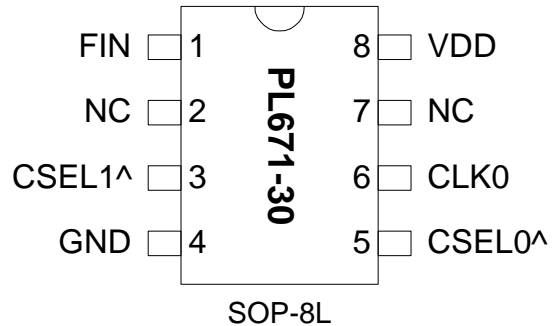


PicoEMI™ Programmable Spread Spectrum Clock

FEATURES

- Accepts Reference Clock input
 - Reference Clock: 1MHz - 200MHz
- Output Frequency up to 200MHz
- Center and Down Spread Spectrum Modulation
- Four selectable pre-programmed configurations
- Max 100ps Cycle to Cycle jitter
- Single 2.5V ~ 3.3V, ± 10% power supply
- Operating temperature range from -40°C to 85°C
- Available in SOP-8L GREEN/RoHS compliant Package

PIN CONFIGURATION



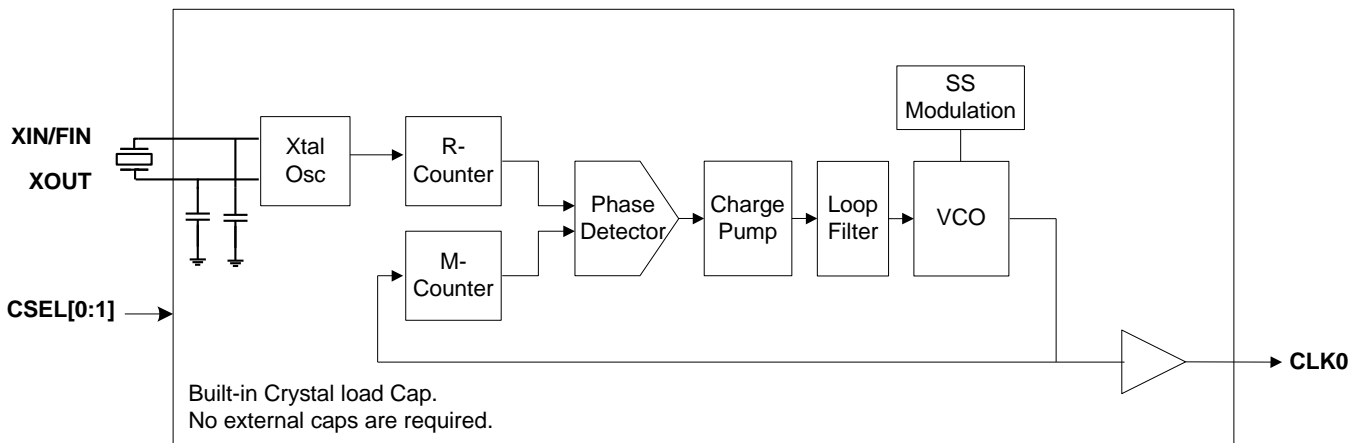
Note: ^ Denotes 60KΩ Pull-up resistor

DESCRIPTION

The PL671-30 is a high performance programmable spread spectrum clock. It allows for programming the modulation type (Center or Down Spread) and 16 modulation magnitudes ($\pm 0.125\%$ to $\pm 2.0\%$ or -0.25% to -4.0%). The CSEL[0:1] pins can switch between four pre-programmed configurations adding to the flexibility.

CSEL1	CSEL0	Input (MHz)	Spread Spectrum Type	Spread Spectrum Modulation Amplitude	Output (MHz)
0	0	1 - 200	Configurable as Center or Down	Configurable as Center: $\pm 0.125\%$ to $\pm 2.0\%$ Down: -0.25% to -4.0%	1 – 200 (Programmable Multiplier)
0	1				
1	0				
1	1				

BLOCK DIAGRAM



PicoEMI™ Programmable Spread Spectrum Clock**PACKAGE PIN ASSIGNMENT**

Name	SOP-8L	Type	Description
FIN	1	I	Reference clock input pin
NC	2,7	-	No Connection
CSEL[1:0]	3,5	I	Selector pins used to toggle between four pre-programmed configurations. These pins have 60K ohm internal pull up resistor. There are four possible pre-defined configurations can be chosen from the following combination. - Spread Spectrum modulation Type (Center or Down) - Spread Spectrum modulation Amplitude Center Spread - $\pm 0.125\%$ to $\pm 2.0\%$ in $\pm 0.125\%$ steps Down Spread - -0.25% to -4.0% in 0.25% steps) - Output Clock Drive Strength (4mA, 8mA, 16mA)
GND	4	P	Ground connection
CLK0	6	O	Spread Spectrum Clock Output
VDD	8	P	VDD connection (2.25~3.63V)

LAYOUT RECOMMENDATIONS

The following guidelines are to assist you with a performance optimized PCB design:

Signal Integrity and Termination Considerations

- Keep traces as short as possible.
- Trace = Inductor. With a capacitive load this equals ringing!
- Long trace = Transmission Line. Without proper termination this will cause reflections (looks like ringing).
- Design long traces (>1 inch) as “striplines” or “microstrips” with defined impedance.
- Match trace at one side to avoid reflections bouncing back and forth.

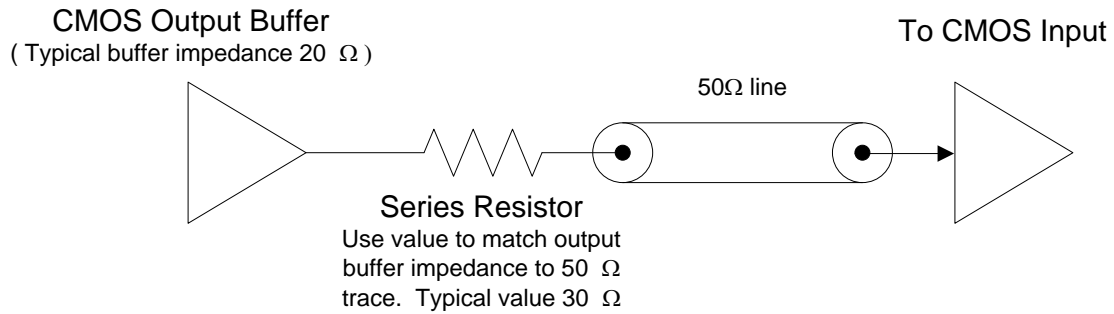
Decoupling and Power Supply Considerations

- Place decoupling capacitors as close as possible to the VDD pin(s) to limit noise from the power supply
- Multiple VDD pins should be decoupled separately for best performance.
- Addition of a ferrite bead in series with VDD can help prevent noise from other board sources
- Value of decoupling capacitor is frequency dependant. Typical values to use are $0.1\mu\text{F}$ for designs using frequencies $< 50\text{MHz}$ and $0.01\mu\text{F}$ for designs using frequencies $> 50\text{MHz}$.

PicoEMI™ Programmable Spread Spectrum Clock

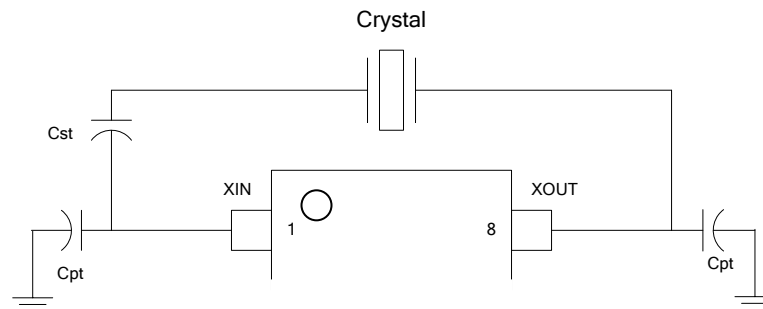
Typical CMOS termination

Place Series Resistor as close as possible to CMOS output



Crystal Tuning Circuit

Series and parallel capacitors used to fine tune the crystal load to the circuit load.



CST - Series Capacitor, used to lower circuit load to match crystal load. Raises frequency offset. This can be eliminated by using a crystal with a Cload of equal or greater value than the oscillator.

CPT - Parallel Capacitors, Used to raise the circuit load to match the crystal load. Lowers frequency offset.

PicoEMI™ Programmable Spread Spectrum Clock
ELECTRICAL SPECIFICATIONS
ABSOLUTE MAXIMUM RATINGS

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage Range	V_{DD}	-0.5	4.6	V
Input Voltage Range	V_I	-0.5	$V_{DD}+0.5$	V
Output Voltage Range	V_O	-0.5	$V_{DD}+0.5$	V
Soldering Temperature (Green package)			260	°C
Data Retention @ 85°C		10		Year
Storage Temperature	T_S	-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. *Operating temperature is guaranteed by design. Parts are tested to commercial grade only.

AC SPECIFICATIONS

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input (FIN) Frequency	@ $V_{DD} = 3.3V$	1		200	MHz
	@ $V_{DD} = 2.5V$			166	
Input (FIN) Signal Amplitude	Internally AC coupled (High Frequency)	0.9		V_{DD}	Vpp
Input (FIN) Signal Amplitude	Internally AC coupled (Low Frequency) $3.3V \leq 50MHz$, $2.5V \leq 40MHz$	0.1		V_{DD}	Vpp
Output Frequency	@ $V_{DD} = 3.3V$			200	MHz
	@ $V_{DD} = 2.5V$			166	MHz
Settling Time	At power-up (after V_{DD} increases over 2.25V)			2	ms
Output Rise Time	15pF Load, 10/90% V_{DD} , Standard Drive		2.0	3.0	ns
	15pF Load, 10/90% V_{DD} , High Drive		1.2	1.7	ns
Output Fall Time	15pF Load, 90/10% V_{DD} , Standard Drive		2.0	3.0	ns
	15pF Load, 90/10% V_{DD} , High Drive		1.2	1.7	ns
Duty Cycle	At $V_{DD} / 2$	45	50	55	%
Cycle to Cycle Jitter*	$T_{CYC-CYC}$ Over output frequency range @ 3.3V			100	ps

* Note: Jitter performance depends on the programming parameters.

PicoEMI™ Programmable Spread Spectrum Clock

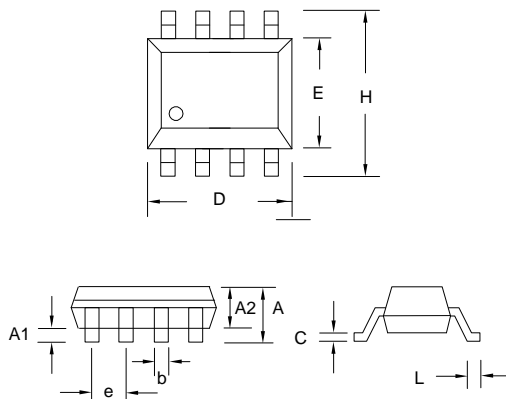
DC SPECIFICATIONS

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current, Dynamic, with Loaded Outputs	I_{DD}	At 25MHz, 3.3V, load=15pF			15	mA
Operating Voltage	V_{DD}		2.25		3.63	V
Output Low Voltage	V_{OL}	$I_{OL} = +4mA$ (Std. Drive)			0.4	V
Output High Voltage	V_{OH}	$I_{OH} = -4mA$ (Std. Drive)	$V_{DD} - 0.4$			V
Output Current, Low Drive	I_{OSD}	$V_{OL} = 0.4V, V_{OH} = 2.4V$	4			mA
Output Current, Standard Drive	I_{OSD}	$V_{OL} = 0.4V, V_{OH} = 2.4V$	8			mA
Output Current, High Drive	I_{OHD}	$V_{OL} = 0.4V, V_{OH} = 2.4V$	16			mA

PACKAGE DRAWING (GREEN PACKAGE COMPLIANT)

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	



PicoEMI™ Programmable Spread Spectrum Clock

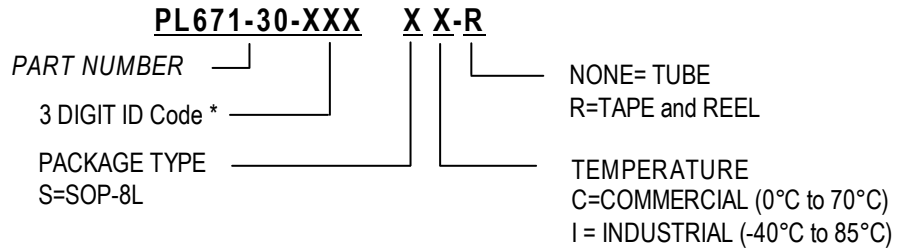
ORDERING INFORMATION (GREEN PACKAGE COMPLIANT)

For part ordering, please contact our Sales Department:

2180 Fortune Drive, San Jose, CA 95131, USA
 Tel: (408) 944-0800 Fax: (408) 474-1000

PART NUMBER

The order number for this device is a combination of the following:
 Part Number, Package Type and Operating Temperature Range



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

Part/Order Number	Marking†	Package Option
PL671-30-XXXSC	P671-30 XXX	8-Pin SOP (Tube)
PL671-30-XXXSC-R	P671-30 XXX	8-Pin SOP (Tape and Reel)

† Note: 'XXX' designates marking identifier that, at times, could be independent of the part number.
 Please consult your Micrel sales representative for marking information.

Micrel Inc., reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Micrel is believed to be accurate and reliable. However, Micrel 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: *Micrel'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 Micrel Inc.*