

rev 0.1

Spread Spectrum Clock Generator

Features

- Generates a 4X low EMI spread spectrum clock of the input frequency.
- Input frequency : 15MHz
- Output frequency : 60MHz
- Internal loop filter minimizes external components and board space.
- Selectable Centre Spread frequency deviation: $\pm 0.5\%$, $\pm 1.0\%$, $\pm 1.5\%$, $\pm 2.0\%$
- Low power CMOS design
- $3.3V \pm 0.3V$ Operating Voltage
- Available in Commercial Temperature range
- Available in 8-pin TSSOP

output. PCS3P2189A offers four selectable centre spread options of $\pm 0.5\%$, $\pm 1.0\%$, $\pm 1.5\%$, $\pm 2.0\%$, (Refer Spread Deviation Selection Table). PCS3P2189A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. The PCS3P2189A allows significant system cost savings by reducing the number of circuit board layers, ferrite beads, and shielding that are traditionally required to pass EMI regulations. PCS3P2189A has spread spectrum ON/OFF option. The PCS3P2189A uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

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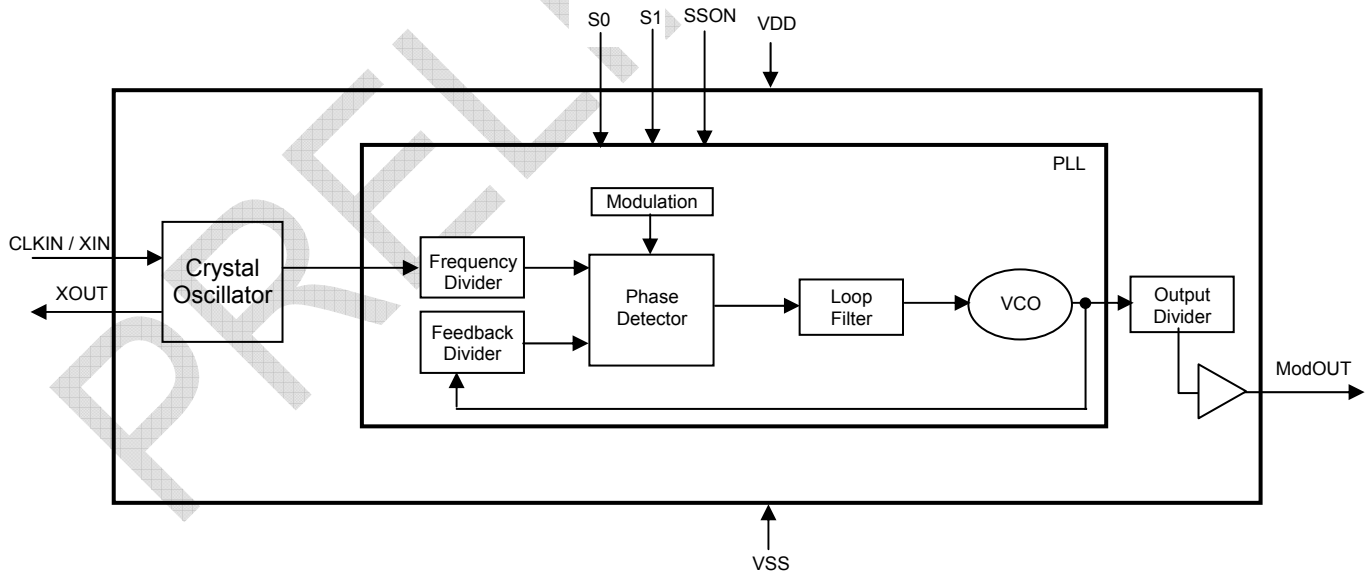
Product Description

PCS3P2189A is a versatile spread spectrum frequency modulator that generates a low EMI 4x clock at the

Application

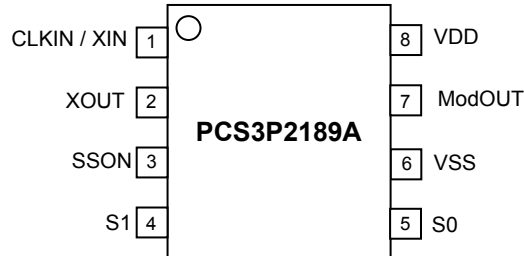
PCS3P2189A is targeted for LCD panel application

Block Diagram



Notice: The information in this document is subject to change without notice.

Pin Configurations



Pin Description

Pin#	Pin Name	Type	Description
1	CLKIN / XIN	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected either to an external crystal or an external reference clock.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	SSON	I	Modulation enables pin. When HIGH enables spread spectrum modulation. Has an Internal pull up resistor
4	S1	I	Spread range select. Digital logic input used to select frequency deviation (Refer <i>Spread Deviation Table</i>). This pin has an internal pull-up resistor.
5	S0	O	Spread range select. Digital logic input used to select frequency deviation (Refer <i>Spread Deviation Table</i>). This pin has an internal pull-up resistor.
6	VSS	P	Ground Connection. Connect to system ground.
7	ModOUT	O	Low EMI 4x clock output.
8	VDD	P	Power Supply Voltage Pin. Connect to +3.3V.

Spread Deviation Selection Table

S1	S0	Deviation
0	0	± 0.5%
0	1	± 1.0%
1	0	± 1.5%
1	1	± 2.0%

Modulation Enable Setting Table

SSON	Modulation
L	No Modulation
H	Modulation

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD	Supply Voltage pin with respect to Ground	-0.5 to +4.6	V
V _{IN}	Input Voltage pin with respect to Ground	VSS-0.5 to VDD+0.5	V
V _{OUT}	Output Voltage pin with respect to Ground	VSS-0.5 to VDD+0.5	V
T _{STG}	Storage temperature	-55 to +125	°C
T _A	Operating temperature	0 to +70	°C
T _s	Max. Soldering Temperature (10 sec)	260	°C
T _J	Junction Temperature	-40 to +125	°C
T _{DV}	Static Discharge Voltage (As per JEDEC STD22- A114-B)	2	KV

Note: These are stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

DC Electrical Characteristics

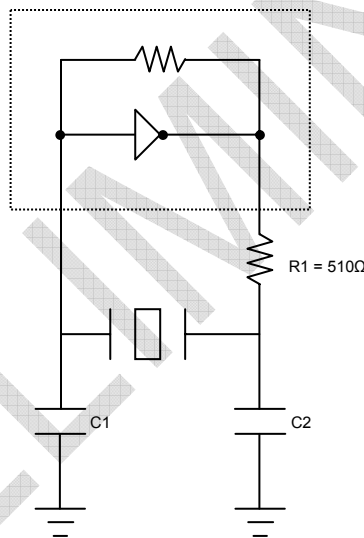
Symbol	Parameter	Min	Typ	Max	Unit
V _{IL}	Input low voltage	VSS – 0.3	-	0.8	V
V _{IH}	Input high voltage	2.0	-	VDD+ 0.3	V
I _{IL}	Input low current	-	-	-35	µA
I _{IH}	Input high current	-	-	+35	µA
I _{XOL}	X _{OUT} output low current (V _{XOL} @ 0.4V, VDD = 3.3V)	-	3	-	mA
I _{XOH}	X _{OUT} output high current (V _{XOH} @ 2.5V, VDD = 3.3V)	-	3	-	mA
V _{OL}	Output low voltage I _{OL} = 4mA	VSS	-	0.4	V
V _{OH}	Output high voltage I _{OH} = -4mA	VDD-0.5	-	VDD	V
I _{CC}	Dynamic supply current , TBD MHz Output, no load		TBD	TBD	mA
I _{DD}	Static supply current standby mode		TBD		uA
VDD	Operating voltage	3.0	3.3	3.6	V
t _{ON}	Power up time (first locked clock cycle after power up)	-	2	5	mS
Z _{OUT}	Clock output impedance	-	TBD	-	Ω
C _{IN}	Input Capacitance	-	-	TBD	pF
C _L	Load Capacitance	-	-	15	pF

AC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
f_{IN}	Input frequency		15		MHz
f_{OUT}	Output frequency		60		MHz
t_{LH}^*	Output rise time (Measured from 0.8V to 2.0V)	-	TBD	-	nS
t_{HL}^*	Output fall time (Measured from 2.0V to 0.8V)	-	TBD	-	nS
t_{JC}	Jitter (Cycle to cycle), $T_a=25^{\circ}C$ and $V_{DD}=3.3V$ No Load Capacitance	-	-	TBD	pS
t_D	Output duty cycle	40	50	60	%
M_F	Modulation Frequency , Input Frequency =15MHz		32.4		KHz

* t_{LH} and t_{HL} are measured with a capacitive load of 15pF

Typical Crystal Oscillator Circuit

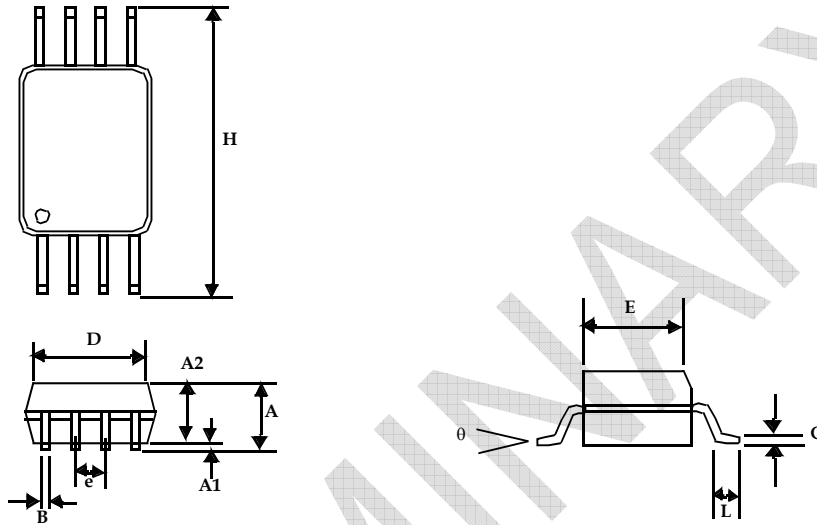


Typical Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	15MHz
Frequency tolerance	± 50 ppm or better at 25°C
Operating temperature range	-25°C to +85°C
Storage temperature	-40°C to +85°C
Load capacitance	18pF
Shunt capacitance	7pF maximum
ESR	25Ω

Package Information

Mechanical Package Outline 8-Pin TSSOP



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

Note: Controlling dimensions are millimeters
TSSOP – 0.034 grams unit weight



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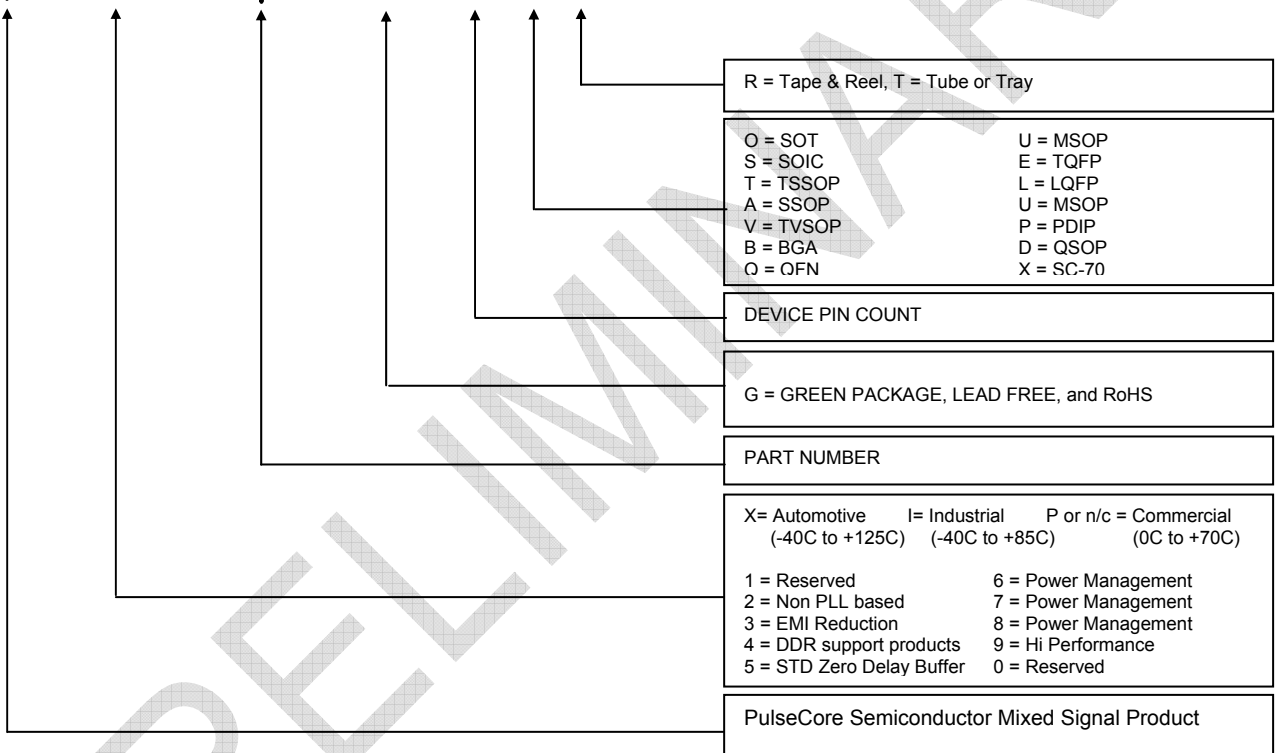
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Ordering Codes

Part Number	Marking	Package Type	Temperature
PCS3P2189AG-08TT	3P2189AG	8-Pin TSSOP, TUBE, Green	Commercial
PCS3P2189AG-08TR	3P2189AG	8-Pin TSSOP, TAPE & REEL, Green	Commercial

Device Ordering Information

PCS3P2189AG-08TR



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PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200
Campbell, CA 95008
Tel: 408-879-9077
Fax: 408-879-9018
www.pulsecoresemi.com

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Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003

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