

PCS3P2189A

Product Preview

Spread Spectrum Clock Generator

Description

PCS3P2189A is a versatile spread spectrum frequency modulator that generates a low EMI 4x clock at the output. PCS3P2189A offers four selectable centre spread options of $\pm 0.5\%$, $\pm 1.0\%$, $\pm 1.5\%$, $\pm 2.0\%$, (Refer to *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.

Application

PCS3P2189A is targeted for LCD panel application.

Features

- Generates a 4X Low EMI Spread Spectrum Clock of the Input Frequency
- Input Frequency: 10 MHz – 25 MHz
- Output Frequency: 40 MHz – 100 MHz
- Internal Loop Filter Minimizes External Components and Board Space
- Selectable Centre Spread Frequency Deviation: $\pm 0.5\%$, $\pm 1.0\%$, $\pm 1.5\%$, $\pm 2.0\%$
- Supply Voltage: 3.3 V \pm 0.3 V
- Commercial and Industrial Temperature Range
- 8-pin TSSOP Package
- Low Power CMOS Process
- This is a Pb-Free Device

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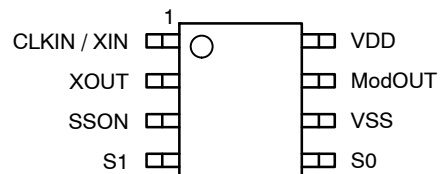
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TSSOP-8
T SUFFIX
CASE 948AL

PIN CONFIGURATION



PCS3P2189A

(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

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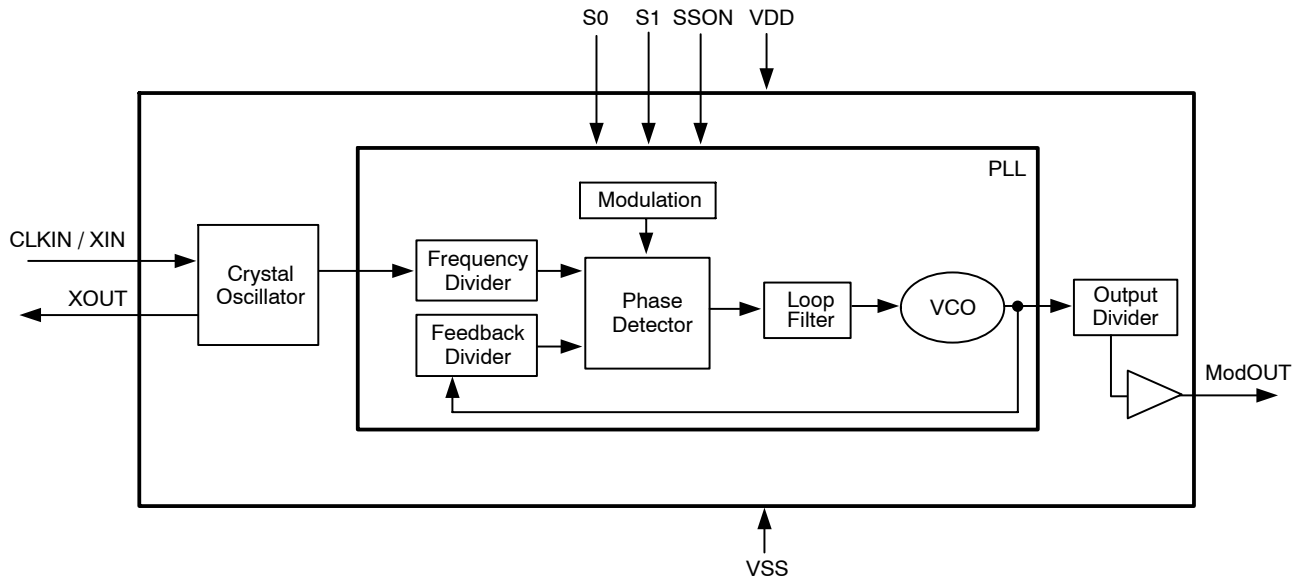


Figure 1. Block Diagram

Table 1. ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{DD}	Supply Voltage pin with respect to Ground	-0.5 to +4.6	V
V_{IN}	Input Voltage pin with respect to Ground	$V_{SS}-0.5$ to $V_{DD}+0.5$	V
V_{OUT}	Output Voltage pin with respect to Ground	$V_{SS}-0.5$ to $V_{DD}+0.5$	V
T_{STG}	Storage temperature	-55 to +125	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (As per JEDEC STD22- A114-B)	2	KV

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Table 2. PIN DESCRIPTION

Pin#	Pin Name	Type	Description
1	CLKIN / XIN	I	Crystal connection or External reference Clock Input
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 +3.3 V.

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Table 3. SPREAD DEVIATION SELECTION TABLE (For an Input CLK = 15 MHz)

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

Table 4. MODULATION ENABLE SETTING TABLE

SSON	Modulation
L	No Modulation
H	Modulation

Table 5. 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			–50	μA
I _{IH}	Input high current			+50	μA
V _{OL}	Output low voltage	I _{OL} = 4 mA	VSS	0.4	V
V _{OH}	Output high voltage	I _{OH} = –4 mA	2.4	VDD	V
I _{CC}	Dynamic supply current (Unloaded Output)	7	14	20	mA
I _{DD}	Static supply current standby, CLKIN/XIN pulled LOW			6	mA
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		50		Ω
C _{IN}	Input Capacitance		5		pF
C _L	Load Capacitance			15	pF

Table 6. AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
XIN/CLKIN	Input Clock frequency	10	15	25	MHz
ModOUT	Output Modulated Clock frequency	40	60	100	MHz
M _F	Modulation Frequency	26	39	65	KHz
t _{LH} (Note 1)	Output rise time (Measured from 20% to 80%)		2	2.5	nS
t _{HL} (Note 1)	Output fall time (Measured from 80% to 20%)		1.5	2	nS
t _{JC}	Cycle-to-Cycle Jitter		±250	±325	pS
t _{JP}	Period Jitter (With SSOFF)		±200	±250	pS
t _D	Output duty cycle	45	50	55	%

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

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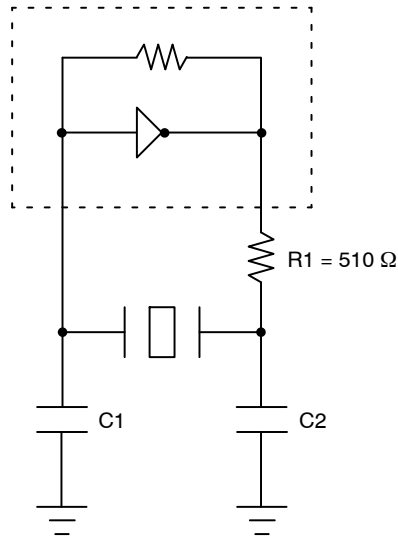


Figure 2. Typical Crystal Oscillator Circuit

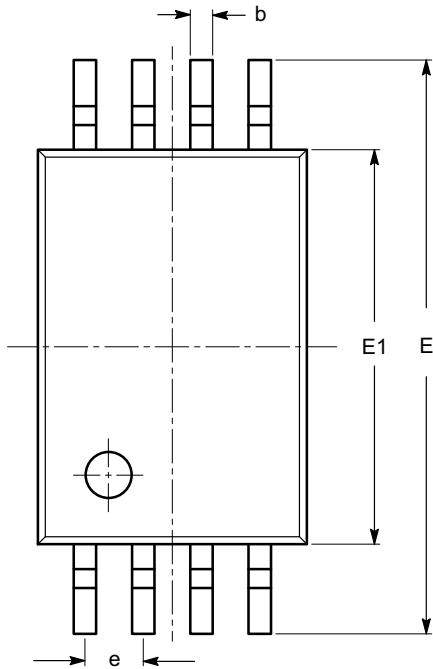
Table 7. TYPICAL CRYSTAL SPECIFICATIONS

Fundamental AT Cut Parallel Resonant Crystal	
Nominal frequency	15 MHz
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	18 pF
Shunt capacitance	7 pF maximum
ESR	25 Ω

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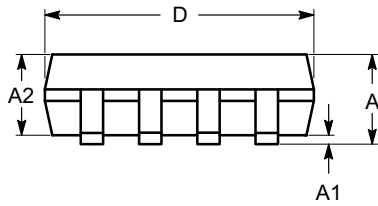
PACKAGE DIMENSIONS

TSSOP8, 4.4x3
CASE 948AL-01
ISSUE O

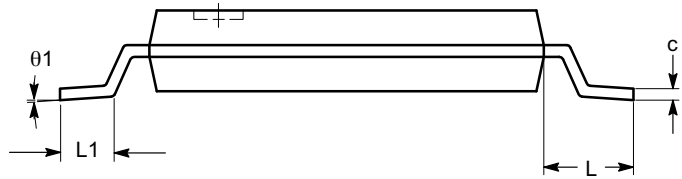


SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80	0.90	1.05
b	0.19		0.30
c	0.09		0.20
D	2.90	3.00	3.10
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e	0.65 BSC		
L	1.00 REF		
L1	0.50	0.60	0.75
θ	0°		8°

TOP VIEW



SIDE VIEW



END VIEW


Notes:

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-153.

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Table 8. ORDERING INFORMATION

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
PCS3I2189AG-08TT	3I2189AG	8-Pin TSSOP, TUBE, Green	Industrial
PCS3I2189AG-08TR	3I2189AG	8-Pin TSSOP, TAPE & REEL, Green	Industrial

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