

# PCS3P6100A

## Product Preview

# Spread Spectrum EMI Reduction IC for HD Display

### Product Description

PCS3P6100A is a versatile spread spectrum modulator designed specifically for a wide range of clock frequencies. The device addresses the need of a low EMI clock generator for use in display systems covering wide choice of pixel frequencies.

PCS3P6100A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. PCS3P6100A 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.

The Supply Voltage of the Device is 3.3 V / 2.5 V. It has two Spread Selection Pins, SS1% and SS2%. Refer to the *Spread Deviation Selection Table* for details. The Device is available in 6L-TSOT23 Package.

### Application

PCS3P6100A is targeted for use in Display Systems.

### Features

- Custom Clock Generator for Display Systems
- Wide Operating Frequency Range Covering Most of the Pixel Frequencies
- Generates a Low EMI 1x Output
- Four Spread Deviation Selection Options
- Supply Voltage: 3.3 V  $\pm$  0.3 V  
2.5 V  $\pm$  0.125 V
- Frequency Range: 3.3 V: 20 MHz – 130 MHz  
2.5 V: 30 MHz – 130 MHz
- ModRate 85 KHz @ 72 MHz
- 6L-TSOT23 (6L-TSOT26) Package
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



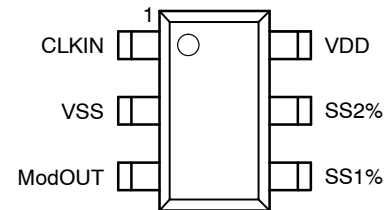
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TSOT-6  
J SUFFIX  
CASE 419AF

### PIN CONFIGURATION



(Top View)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

# PCS3P6100A

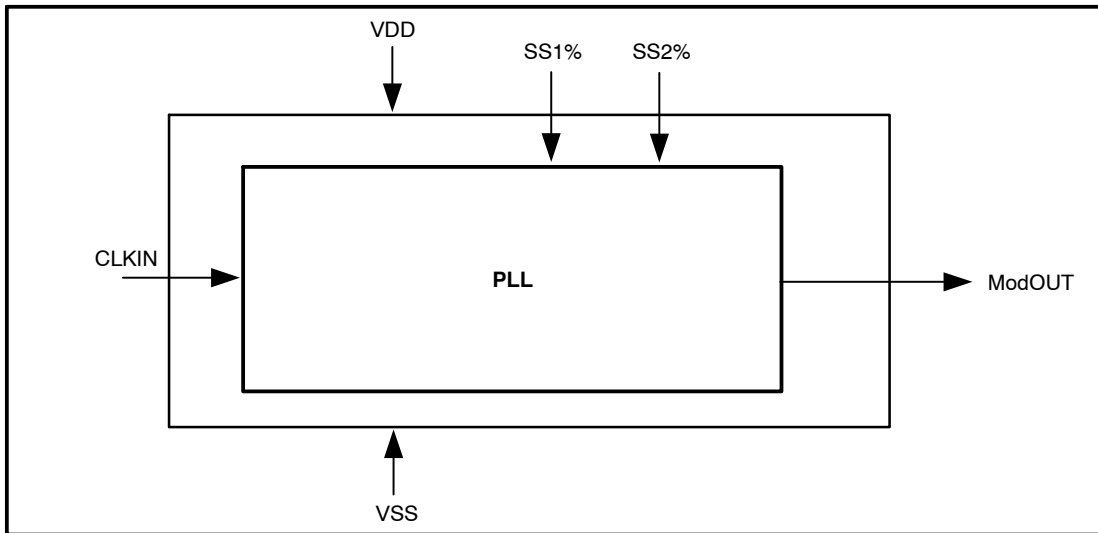


Figure 1. Block Diagram

Table 1. PIN DESCRIPTION

Pin#	Pin Name	Type	Description
1	CLKIN	Input	External Reference Input frequency.
2	VSS	Power	Ground to entire chip.
3	ModOUT	Output	Modulated Frequency Output.
4	SS1%	Input	Spread Deviation Selection Pin –1. Refer to <i>Spread Deviation Selection Table</i> for details. Has an Internal pull-up resistor.
5	SS2%	Input	Spread Deviation Selection Pin –2. Refer to <i>Spread Deviation Selection Table</i> for details. Has an Internal pull-up resistor.
6	VDD	Power	Power to entire chip.

Table 2. SPREAD DEVIATION SELECTION TABLE

SS2%	SS1%	Frequency Deviation
L	L	±1.50%
L	H	±1.25%
H	L	±0.75%
H	H	±1.00%

Table 3. MODRATE TABLE

ModRate	20 MHz – 40 MHz	40 MHz – 130 MHz
	Fin / 336	Fin / 840

Table 4. ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V <sub>DD</sub> , V <sub>IN</sub>	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T <sub>STG</sub>	Storage temperature	-65 to +125	°C
T <sub>S</sub>	Max. Soldering Temperature (10 sec)	260	°C
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>DV</sub>	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.

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**Table 5. OPERATING CONDITIONS FOR 2.5 V AND 3.3 V SUPPLY VOLTAGE**

Parameter	Description	Min	Max	Unit
V <sub>DD(2.5)</sub>	Supply Voltage	2.375	2.625	V
V <sub>DD(3.3)</sub>		3.0	3.6	
T <sub>A</sub>	Operating Temperature (Ambient Temperature)	-40	+85	°C
C <sub>L</sub>	Load Capacitance		15	pF

**Table 6. DC ELECTRICAL CHARACTERISTICS FOR 2.5 V SUPPLY**

Symbol	Parameter	Min	Typ	Max	Unit
V <sub>IL</sub>	Input low voltage	V <sub>SS</sub> - 0.3		0.7	V
V <sub>IH</sub>	Input high voltage	1.7		V <sub>DD</sub> + 0.3	V
I <sub>IL</sub>	Input low current			-35	μA
I <sub>IH</sub>	Input high current			35	μA
V <sub>OL</sub>	Output low voltage (V <sub>DD</sub> = 2.5 V, I <sub>OL</sub> = 8 mA)			0.6	V
V <sub>OH</sub>	Output high voltage (V <sub>DD</sub> = 2.5 V, I <sub>OH</sub> = -8 mA)	1.8			V
I <sub>DD</sub>	Static supply current (Note 1)			4	mA
I <sub>CC</sub>	Dynamic supply current (2.5 V and no load)		11		mA
V <sub>DD</sub>	Operating voltage	2.375	2.5	2.625	V
t <sub>ON</sub>	Power-up time (first locked cycle after power-up)			5	mS
C <sub>IN</sub>	Input Capacitance		5		pF
Z <sub>OUT</sub>	Output Impedance		40		Ω

1. CLKIN pin is pulled low.

**Table 7. AC ELECTRICAL CHARACTERISTICS FOR 2.5 V SUPPLY**

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	30		130	MHz
ModOUT	Output frequency	30		130	MHz
t <sub>LH</sub> (Note 2)	Output rise time (measured from 0.7 V to 1.7 V)		2.2		nS
t <sub>HL</sub> (Note 2)	Output fall time (measured from 1.7 V to 0.7 V)		1.2		nS
t <sub>JC</sub>	Jitter (Cycle-to-cycle)		±250		pS
t <sub>D</sub>	Output duty cycle	40	50	60	%

2. t<sub>LH</sub> and t<sub>HL</sub> are measured into a capacitive load of 15 pF.

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**Table 8. DC ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY**

Symbol	Parameter	Min	Typ	Max	Unit
V <sub>IL</sub>	Input low voltage	VSS – 0.3		0.8	V
V <sub>IH</sub>	Input high voltage	2.0		VDD + 0.3	V
I <sub>IL</sub>	Input low current			–35	μA
I <sub>IH</sub>	Input high current			35	μA
V <sub>OL</sub>	Output low voltage (VDD = 3.3 V, I <sub>OL</sub> = 8 mA)			0.4	V
V <sub>OH</sub>	Output high voltage (VDD = 3.3 V, I <sub>OH</sub> = –8 mA)	2.5			V
I <sub>DD</sub>	Static supply current (Note 3)			4.5	mA
I <sub>CC</sub>	Dynamic supply current (3.3 V and no load)		14		mA
V <sub>DD</sub>	Operating voltage	3.0	3.3	3.6	V
t <sub>ON</sub>	Power-up time (first locked cycle after power-up)			5	mS
C <sub>IN</sub>	Input Capacitance		5		pF
Z <sub>OUT</sub>	Output Impedance		40		Ω

3. CLKIN pin is pulled low.

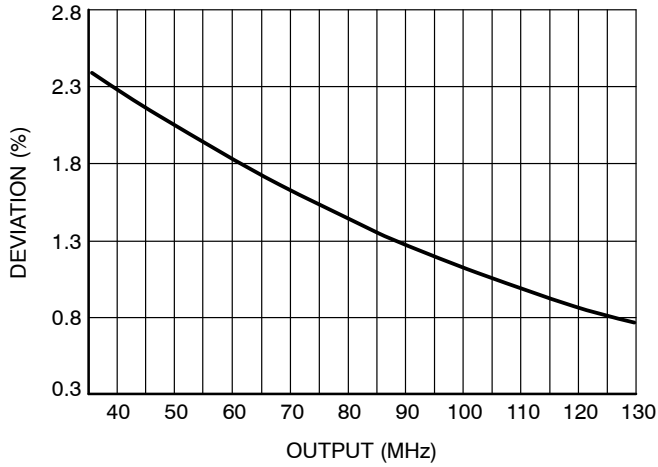
**Table 9. AC ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY**

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	20		130	MHz
ModOUT	Output frequency	20		130	MHz
t <sub>LH</sub> (Note 4)	Output rise time (measured from 0.8 V to 2.0 V)		1.5		nS
t <sub>HL</sub> (Note 4)	Output fall time (measured at 2.0 V to 0.8 V)		1.1		nS
t <sub>JC</sub>	Jitter (Cycle-to-cycle)		±225		pS
t <sub>D</sub>	Output duty cycle	45	50	55	%

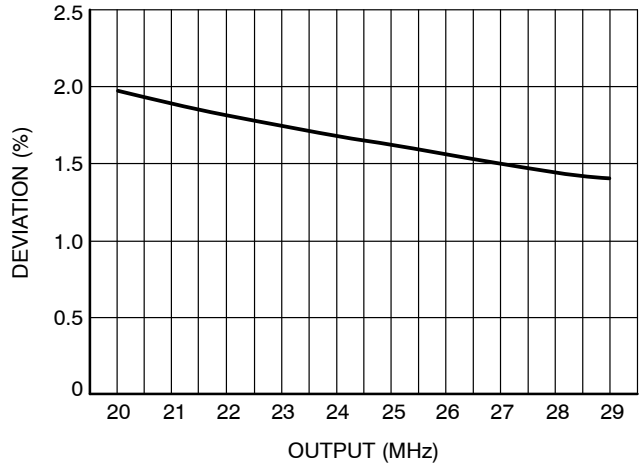
4. t<sub>LH</sub> and t<sub>HL</sub> are measured into a capacitive load of 15 pF.

# PCS3P6100A

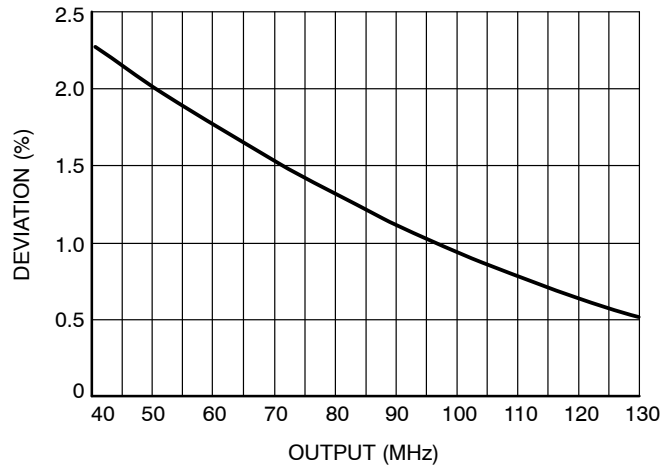
## DEVIATION CHARTS



**Figure 2. Deviation vs. Output Frequency (35 MHz to 130 MHz) at 25°C for VDD = 2.5 V**



**Figure 3. Deviation vs. Output Frequency (20 MHz to 29 MHz) at 25°C for VDD = 3.3 V**

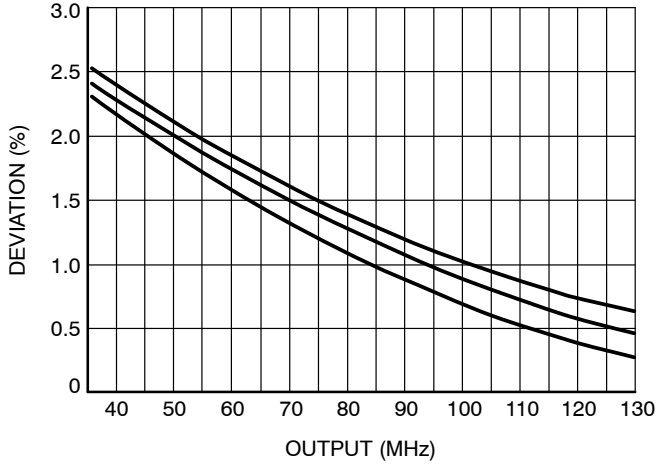


**Figure 4. Deviation vs. Output Frequency (40 MHz to 130 MHz) at 25°C for VDD = 3.3 V**

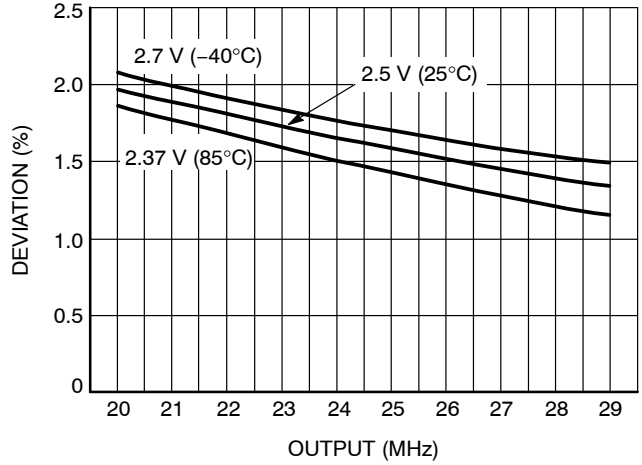
NOTE: Transition band is 30 MHz to 34 MHz for VDD = 2.5 V at 25°C. Deviation in this band is 2.64% ± 3%.  
Transition band is 30 MHz to 39 MHz for VDD = 3.3 V at 25°C. Deviation in this band is 1.67% ± 45%.

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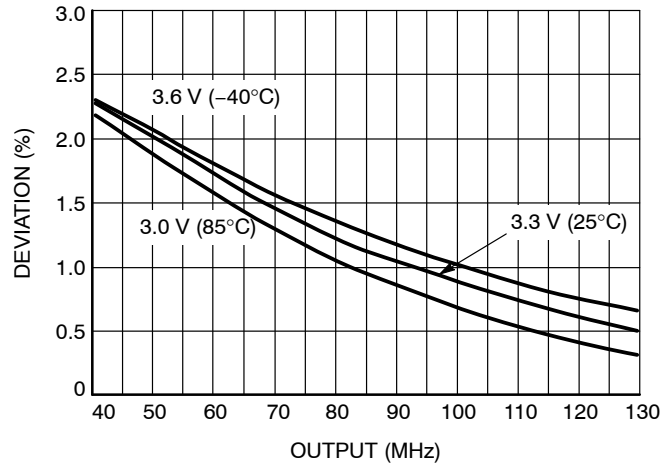
## DEVIATION CHARTS



**Figure 5. Deviation vs. Output Frequency (35 MHz to 130 MHz) across Temperature for VDD = 2.5 V ± 5%**



**Figure 6. Deviation vs. Output Frequency (20 MHz to 29 MHz) across Temperature for VDD = 3.3 V ± 0.3 V**



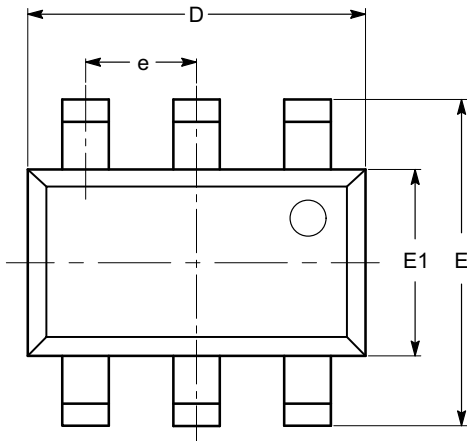
**Figure 7. Deviation vs. Output Frequency (40 MHz to 130 MHz) across Temperature for VDD = 3.3 V ± 0.3 V**

NOTE: Transition band is 30 MHz to 34 MHz for VDD = 2.5 V ± 5%, across -40°C to +85°C. Deviation in this band is 1.8% ± 53%.  
Transition band is 30 MHz to 39 MHz for VDD = 3.3 V ± 0.3 V, across -40°C to +85°C. Deviation in this band is 1.67% ± 60%.

# PCS3P6100A

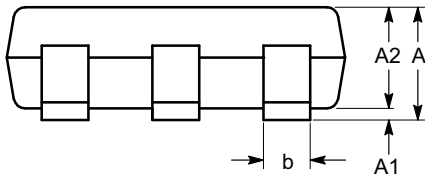
## PACKAGE DIMENSIONS

TSOT-23, 6 LEAD  
CASE 419AF-01  
ISSUE O

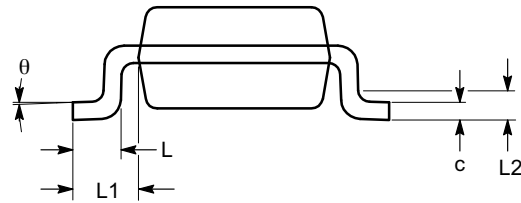


TOP VIEW

SYMBOL	MIN	NOM	MAX
A			1.00
A1	0.01	0.05	0.10
A2	0.80	0.87	0.90
b	0.30		0.45
c	0.12	0.15	0.20
D	2.90 BSC		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 TYP		
L	0.30	0.40	0.50
L1	0.60 REF		
L2	0.25 BSC		
$\theta$	0°		8°



SIDE VIEW



END VIEW

**Notes:**


- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-193.

# PCS3P6100A

**Table 10. ORDERING INFORMATION**

Part Number	Marking	Package Type	Temperature
PCS3I6100AG-06JR	AB2	6L-TSOT 23 (6L-TSOT 26), TAPE & REEL, Green	-40°C to +85°C

NOTE: A "microdot" placed at the end of last row of marking or just below the last row toward the center of package indicates Pb-free.

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