PCS3P6100A

Product Preview

Spread Spectrum EMI Reduction IC for HD Display

ON Semiconductor®

http://onsemi.com

TSOT−6
J SUFFIX
CASE 419AF

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

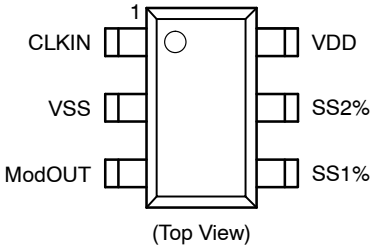
PCS3P6100A is targeted for use in Display Systems.

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 ± 0.3 V
  2.5 V ± 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.

PIN CONFIGURATION



(Top View)

ORDERING INFORMATION

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

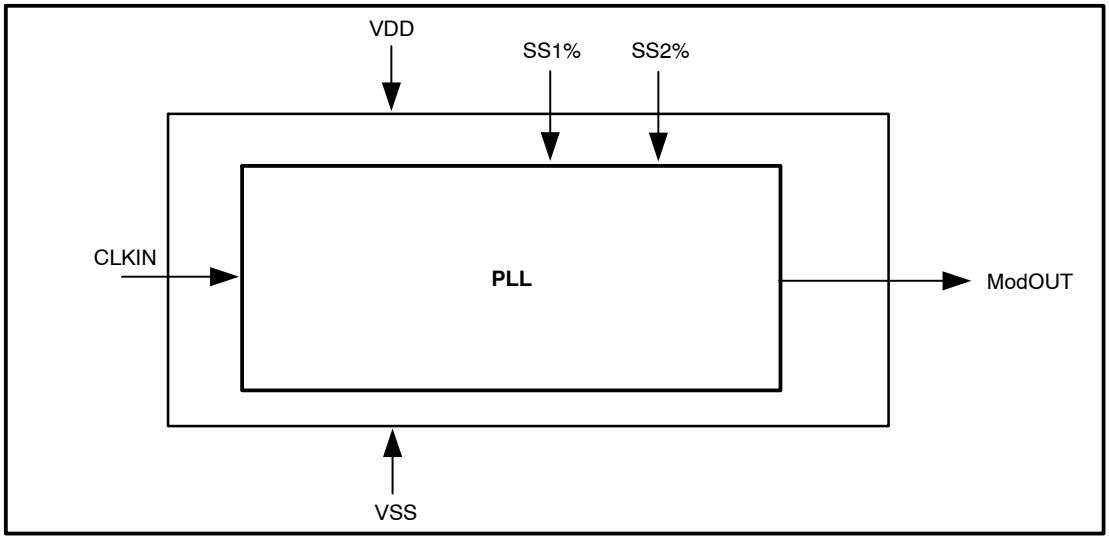


Figure 1. Block Diagram

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 *Spread Deviation Selection Table* for details. Has an Internal pull−up resistor.
5	SS2%	Input	Spread Deviation Selection Pin −2. Refer to *Spread Deviation Selection Table* 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_{DD}, V_{IN}	Voltage on any pin with respect to Ground	−0.5 to +4.6	V
T_{STG}	Storage temperature	−65 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 5. OPERATING CONDITIONS FOR 2.5 V AND 3.3 V SUPPLY VOLTAGE

Parameter	Description	Min	Max	Unit
$V_{DD(2.5)}$	Supply Voltage	2.375	2.625	V
$V_{DD(3.3)}$		3.0	3.6	
T_A	Operating Temperature (Ambient Temperature)	−40	+85	°C
C_L	Load Capacitance		15	pF

Table 6. DC ELECTRICAL CHARACTERISTICS FOR 2.5 V SUPPLY

Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	VSS − 0.3		0.7	V
V_{IH}	Input high voltage	1.7		VDD + 0.3	V
I_{IL}	Input low current			−35	μA
I_{IH}	Input high current			35	μA
V_{OL}	Output low voltage (VDD = 2.5 V, I_{OL} = 8 mA)			0.6	V
V_{OH}	Output high voltage (VDD = 2.5 V, I_{OH} = −8 mA)	1.8			V
I_{DD}	Static supply current (Note 1)			4	mA
I_{CC}	Dynamic supply current (2.5 V and no load)		11		mA
V_{DD}	Operating voltage	2.375	2.5	2.625	V
t_{ON}	Power−up time (first locked cycle after power−up)			5	mS
C_{IN}	Input Capacitance		5		pF
Z_{OUT}	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_{LH} (Note 2)	Output rise time (measured from 0.7 V to 1.7 V)		2.2		nS
t_{HL} (Note 2)	Output fall time (measured from 1.7 V to 0.7 V)		1.2		nS
t_{JC}	Jitter (Cycle−to−cycle)		±250		pS
t_D	Output duty cycle	40	50	60	%

2. t_{LH} and t_{HL} are measured into a capacitive load of 15 pF.

Table 8. DC ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY

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
V_{OL}	Output low voltage (VDD = 3.3 V, I_{OL} = 8 mA)			0.4	V
V_{OH}	Output high voltage (VDD = 3.3 V, I_{OH} = −8 mA)	2.5			V
I_{DD}	Static supply current (Note 3)			4.5	mA
I_{CC}	Dynamic supply current (3.3 V and no load)		14		mA
V_{DD}	Operating voltage	3.0	3.3	3.6	V
t_{ON}	Power−up time (first locked cycle after power−up)			5	mS
C_{IN}	Input Capacitance		5		pF
Z_{OUT}	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_{LH} (Note 4)	Output rise time (measured from 0.8 V to 2.0 V)		1.5		nS
t_{HL} (Note 4)	Output fall time (measured at 2.0 V to 0.8 V)		1.1		nS
t_{JC}	Jitter (Cycle−to−cycle)		±225		pS
t_D	Output duty cycle	45	50	55	%

4. t_{LH} and t_{HL} are measured into a capacitive load of 15 pF.

DEVIATION CHARTS

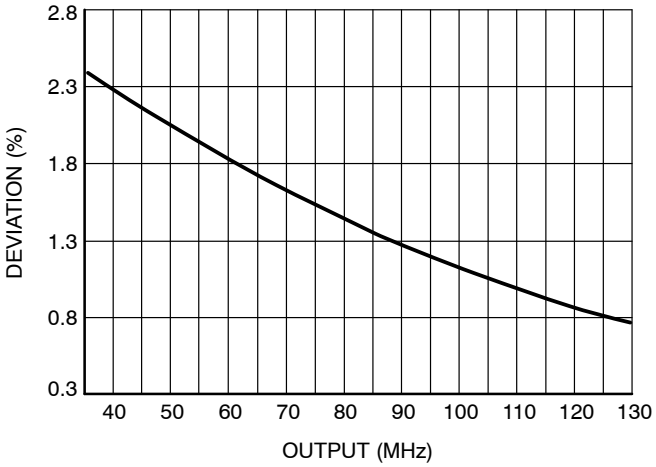


Figure 2. Deviation vs. Output Frequency (35 MHz to 130 MHz) at 25°C for VDD = 2.5 V

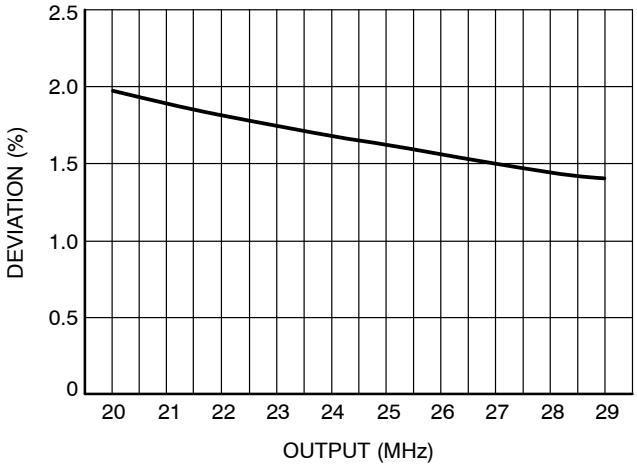


Figure 3. Deviation vs. Output Frequency (20 MHz to 29 MHz) at 25°C for VDD = 3.3 V

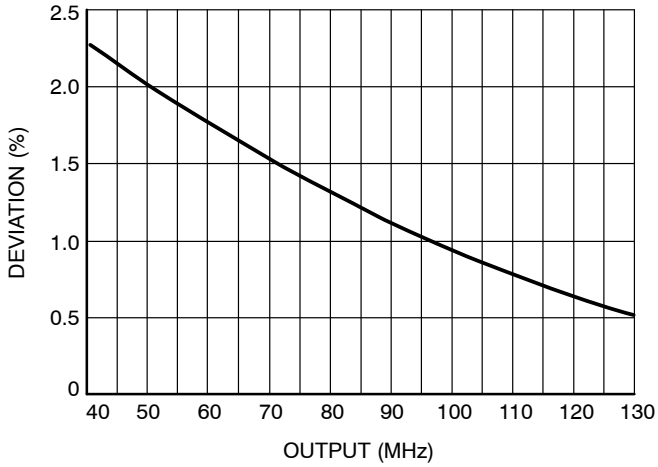


Figure 4. Deviation vs. Output Frequency (40 MHz to 130 MHz) at 25°C for VDD = 3.3 V

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%.

DEVIATION CHARTS

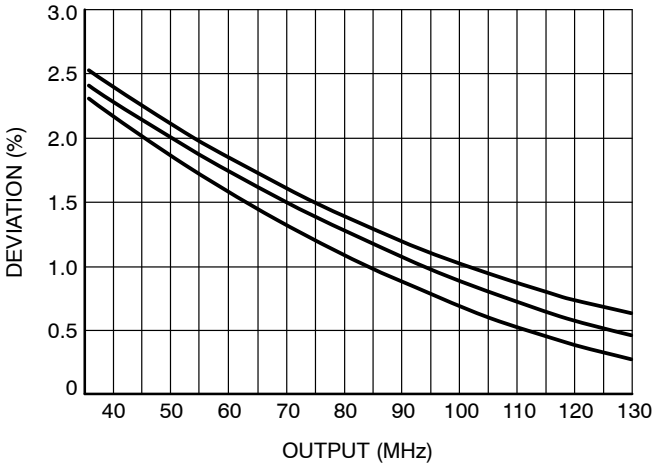


Figure 5. Deviation vs. Output Frequency (35 MHz to 130 MHz) across Temperature for VDD = 2.5 V ± 5%

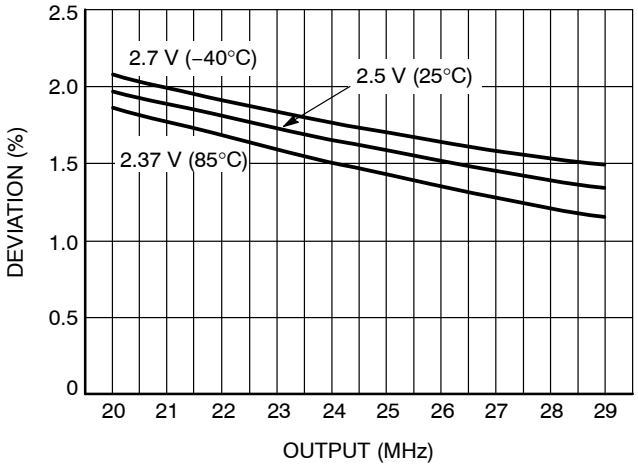


Figure 6. Deviation vs. Output Frequency (20 MHz to 29 MHz) across Temperature for VDD = 3.3 V ± 0.3 V

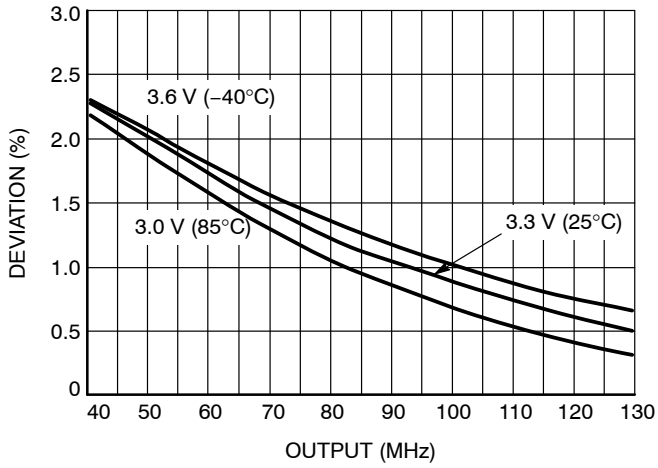
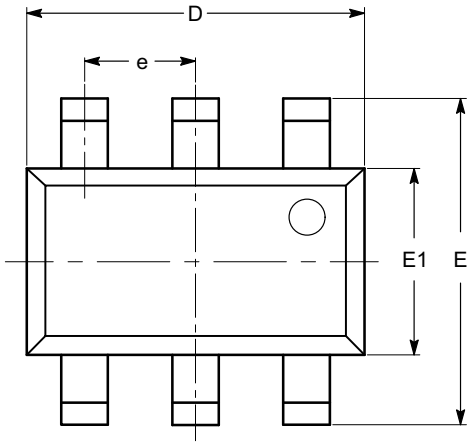


Figure 7. Deviation vs. Output Frequency (40 MHz to 130 MHz) across Temperature for VDD = 3.3 V ± 0.3 V

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%.

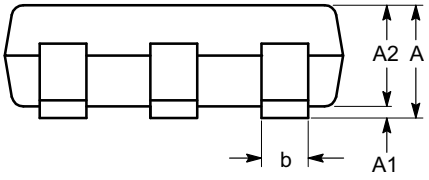
PACKAGE DIMENSIONS

TSOT−23, 6 LEAD
CASE 419AF−01
ISSUE O

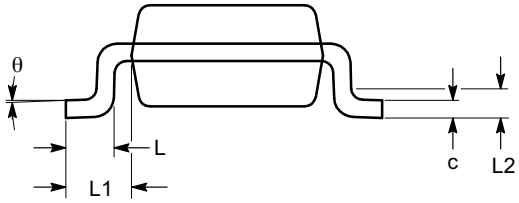


TOP VIEW

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	
θ	0°		8°



SIDE VIEW



END VIEW

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

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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
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Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

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For additional information, please contact your local Sales Representative

PCS3P6100A/D