



## Spread Spectrum EMI reduction IC for HD Display

### Features

- Custom Clock Generator for Display Systems
- Wide Operating Frequency Range covering most of the pixel frequencies
- Generates a low EMI 1x Output
- 4 Spread Deviation selection options
- Supply voltage : 3.3V  $\pm$  0.3V  
2.5V  $\pm$  0.125V
- Frequency range:
  - 3.3V: 20MHz – 130MHz
  - 2.5V: 30MHz – 130MHz
- ModRate: 85KHz @ 72MHz
- 6L-TSOT23 (6L-TSOT26) package

### 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.

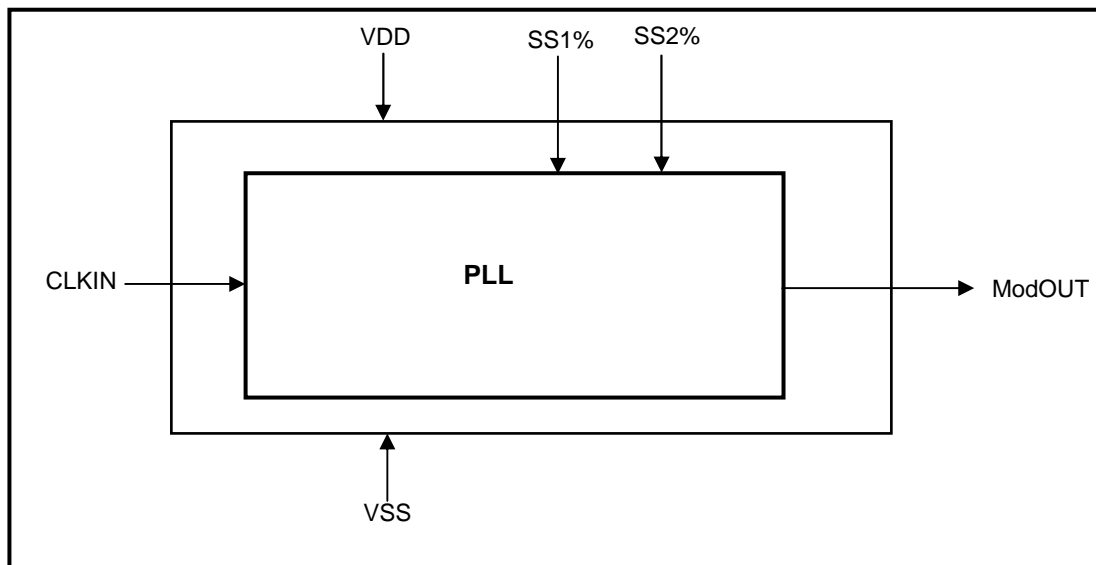
PCS3P6100A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. PCS3P6100A allows significant system cost savings by reducing the number of circuit board layers, ferrite beads, and shielding that are traditionally required to pass EMI regulations.

The Supply Voltage of the Device is 3.3V / 2.5V. 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

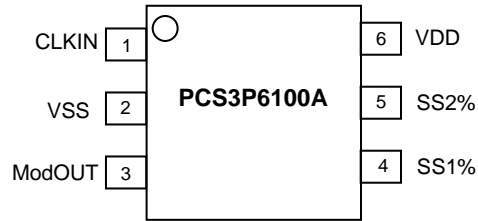
PCS3P6100A is targeted for use in Display Systems.

### Block Diagram



# PCS3P6100A

## Pin Configuration (6L-TSOT23 Package)



## Pin Description

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

## Spread Deviation Selection Table

SS2% Pin	SS1% Pin	Spread Deviation @ 66MHz
L	L	± 1.50%
L	H	± 1.25%
H	L	± 0.75%
H	H	± 1.00%

## ModRate Table

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

# PCS3P6100A

## 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

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.

## Operating Conditions for 2.5V and 3.3V 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

## DC Electrical Characteristics for 2.5V 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 = 2.5V, $I_{OL}$ = 8mA)			0.6	V
$V_{OH}$	Output high voltage (VDD = 2.5V, $I_{OH}$ = -8mA)	1.8			V
$I_{DD}$	Static supply current <sup>1</sup>			4	mA
$I_{CC}$	Dynamic supply current (2.5V 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

Note: 1.CLKIN pin is pulled low.

# PCS3P6100A

## AC Electrical Characteristics for 2.5V Supply

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	30		130	MHz
ModOUT	Output frequency	30		130	MHz
$t_{LH}^1$	Output rise time (measured from 0.7V to 1.7V)		2.2		nS
$t_{HL}^1$	Output fall time (measured from 1.7V to 0.7V)		1.2		nS
$t_{JC}$	Jitter (Cycle-to-cycle)		±250		pS
$t_D$	Output duty cycle	40	50	60	%

Note: 1.  $t_{LH}$  and  $t_{HL}$  are measured into a capacitive load of 15pF.

## DC Electrical Characteristics for 3.3V 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 = 3.3V, $I_{OL}$ = 8mA)			0.4	V
$V_{OH}$	Output high voltage (VDD = 3.3V, $I_{OH}$ = -8mA)	2.5			V
$I_{DD}$	Static supply current <sup>1</sup>			4.5	mA
$I_{CC}$	Dynamic supply current (3.3V 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

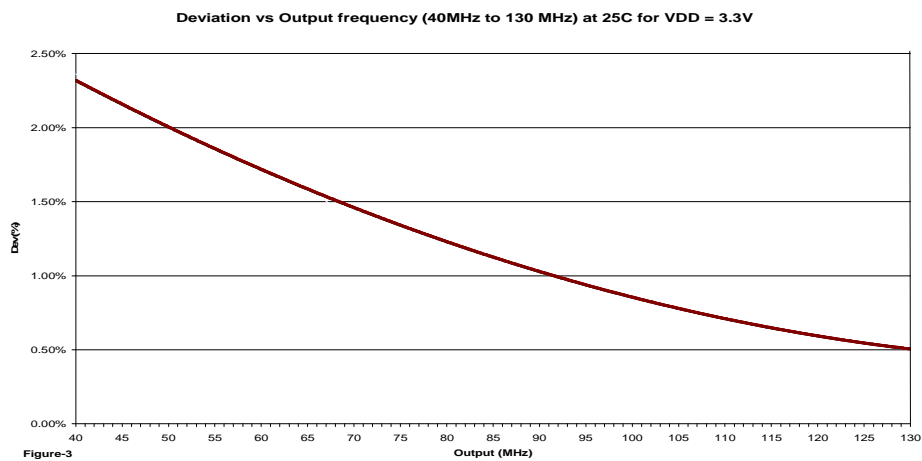
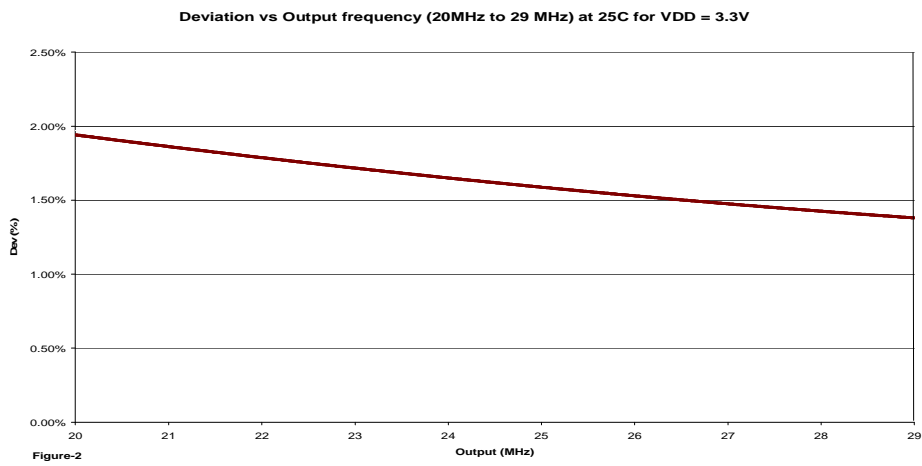
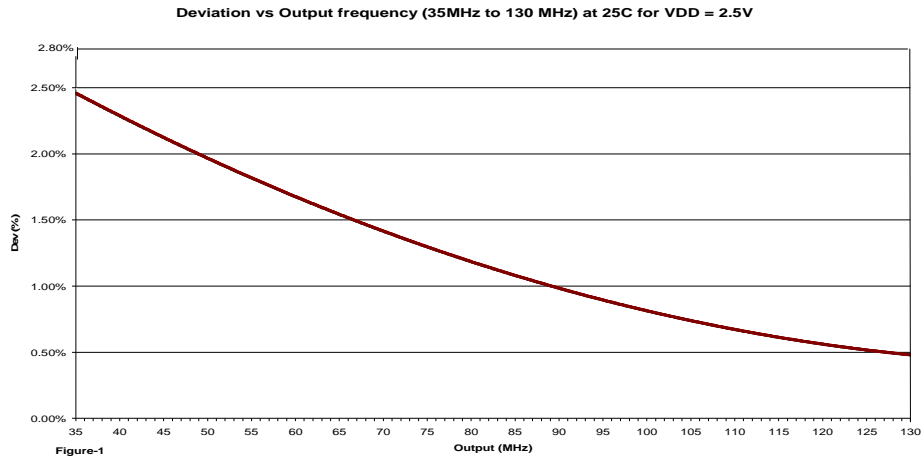
Note: 1. CLKIN pin is pulled low.

## AC Electrical Characteristics for 3.3V Supply

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	20		130	MHz
ModOUT	Output frequency	20		130	MHz
$t_{LH}^1$	Output rise time (measured from 0.8 to 2.0V)		1.5		nS
$t_{HL}^1$	Output fall time (measured at 2.0V to 0.8V)		1.1		nS
$t_{JC}$	Jitter (Cycle-to-cycle)		±225		pS
$t_D$	Output duty cycle	45	50	55	%

Note: 1.  $t_{LH}$  and  $t_{HL}$  are measured into a capacitive load of 15pF.

## Deviation Charts



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

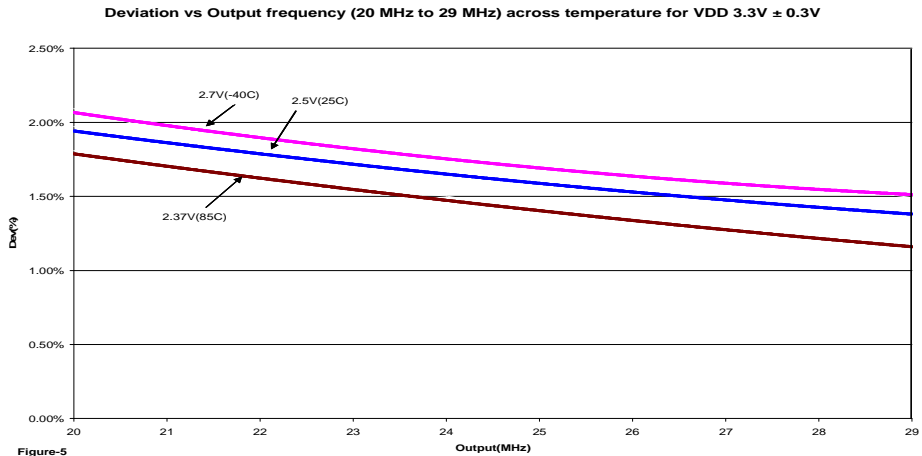
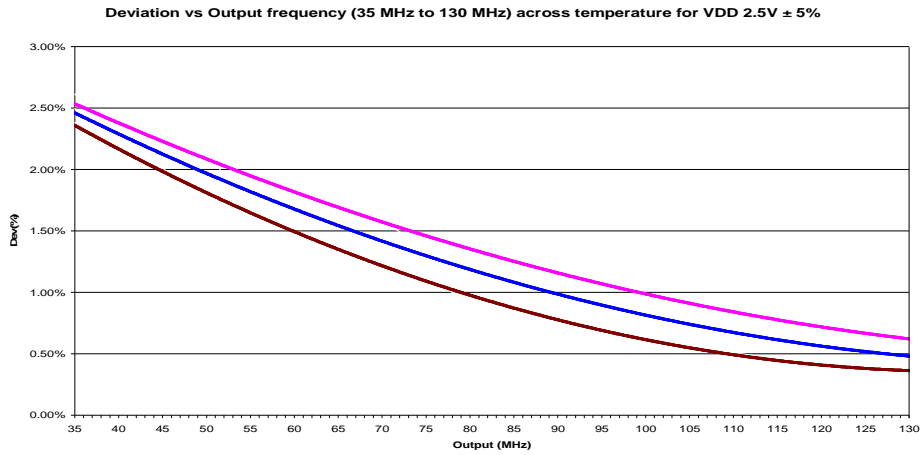


Figure-5

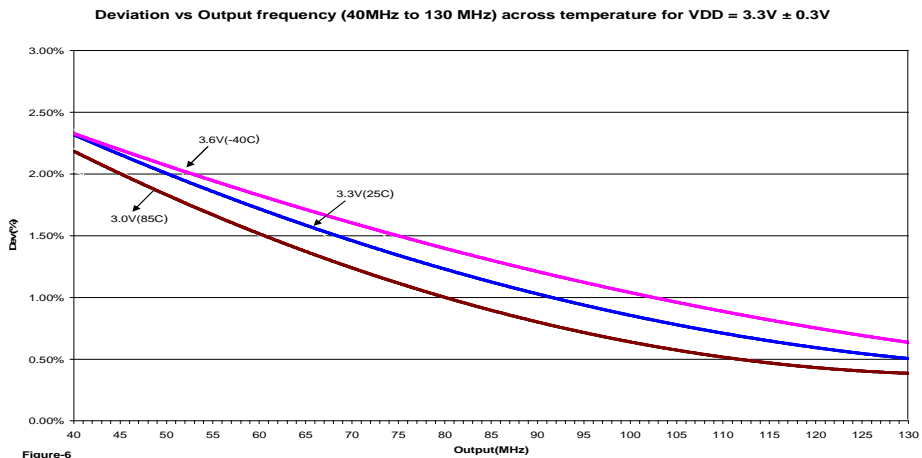
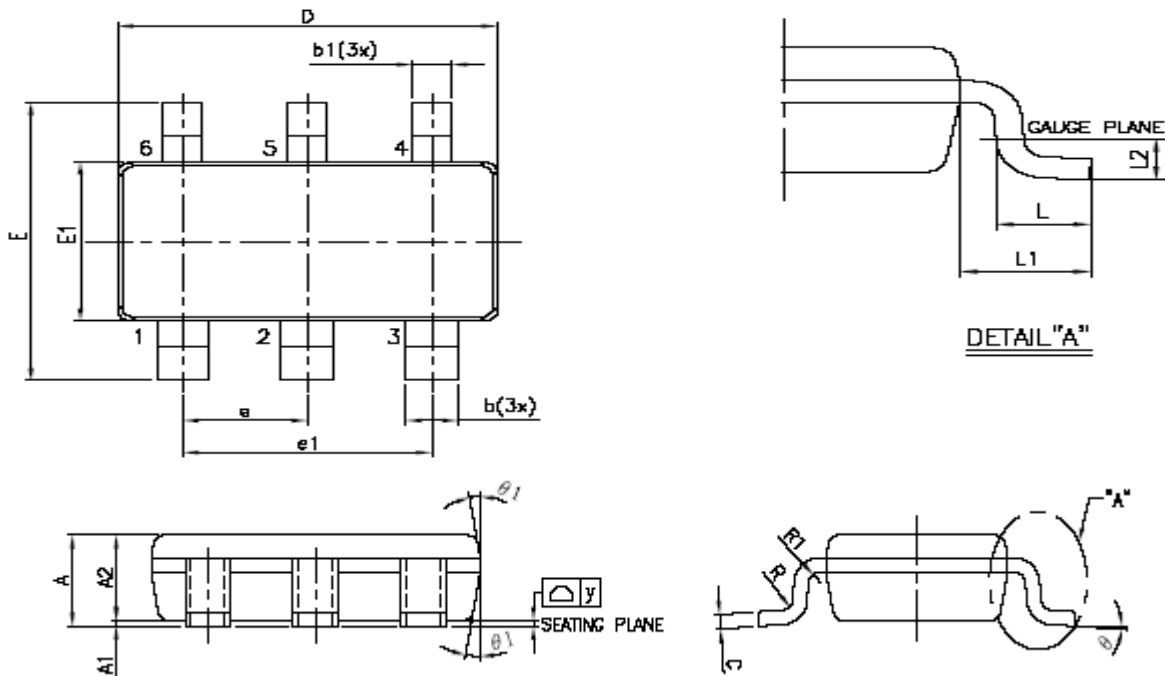


Figure-6

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

## Package Information

### 6L-TSOT23



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.0295	0.035	0.75	0.90
A1	0.00	0.0039	0.00	0.10
A2	0.0275	0.0314	0.70	0.80
b	0.0157	0.0197	0.40	0.50
b1	0.0118	0.0157	0.30	0.40
c	0.0031	0.0078	0.08	0.20
D	0.1141		2.90 REF	
E	0.1023	0.1181	2.60	3.00
E1	0.0590	0.0069	1.50	1.70
e	0.0374		0.95 BSC	
e1	0.0748		1.90 BSC	
L	0.0118	0.0236	0.30	0.60
L1	0.0236 REF		0.60 REF	
L2	0.0098 BSC		0.25 BSC	
R	0.0039	.....	0.10	.....
R1	0.0039	0.0098	0.10	0.25
θ	0°	8°	0°	8°
y	....	0.0039	....	0.10

# PCS3P6100A


## Ordering Codes

Part Number	Marking	Package Type	Temperature
PCS3I6100AG-06JR	AB2	6L-TSOT23 (6L-TSOT26), TAPE & REEL, Green	-40°C to +85°C

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.

Licensed under U.S Patent #5,488,627 and #5,631,921.

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

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. U.S Patent Pending; Timing-Safe and Active Bead are trademarks of PulseCore Semiconductor, a wholly owned subsidiary of ON Semiconductor. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## 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  
**Japan Customer Focus Center**  
Phone: 81-3-5773-3850

**ON Semiconductor Website:**  
[www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative