

NB3N6200C

2.5V/3.3V, Spread Spectrum EMI Reduction IC for HD Display

Description

NB3N6200C 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.

NB3N6200C reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of all clock dependent signals. NB3N6200C allows significant system cost savings by reducing the number of circuit board layers, ferrite beads, 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% to select among the four possible deviation options. The Frequency Deviation across the Frequency range remains within $\pm 10\%$ of the selected deviation. Refer to *the Frequency Deviation Selection Table for details*. The device is available in a 6 Pin TSOT23 Package, over Commercial, Industrial and Extended Industrial temperature range.

Features

- Wide Operating Frequency Range Covering Most of the Pixel Frequencies
- Generates a Low EMI 1x Output
- Frequency Range: 25 MHz – 120 MHz
- Four Frequency Deviation Selection Options: $\pm 1.50\%$, $\pm 1.25\%$, $\pm 0.75\%$, $\pm 1.00\%$
- Supply Voltage: 3.3 V \pm 0.3 V
2.5 V \pm 0.125 V
- ModRate 85 kHz @ 72 MHz
- Industrial and Extended Industrial Temperature Range
- TSOT23 6-Lead Package
- Replacement for PCS3I6200AG-06JR, with the same die
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Application

NB3N6200C is used as Low EMI Clock Generator for Display Systems including Liquid Crystal and Plasma Displays.



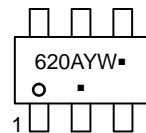
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MARKING DIAGRAM



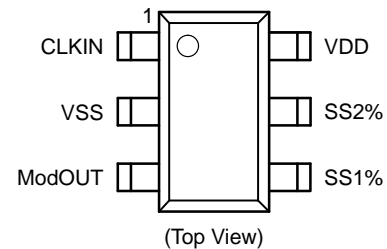
TSOT23 6-Lead
CASE 419AZ



620 = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

PIN CONFIGURATION



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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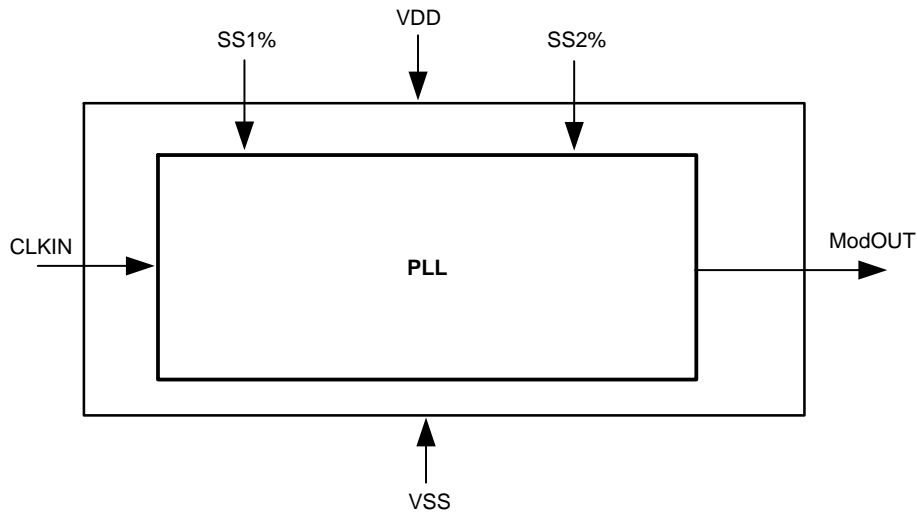


Figure 1. Block Diagram

Table 1. PIN DESCRIPTION

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

Table 2. FREQUENCY 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. 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 those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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Table 4. RECOMMENDED OPERATING CONDITIONS

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	Commercial	0	+70	°C
		Industrial	-40	+85	
		Extended Industrial	-40	+105	
C _L	Load Capacitance		15	pF	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

Table 5. DC ELECTRICAL CHARACTERISTICS FOR 2.5 V ± 0.125 V, V_{SS} = 0 V = GND

Symbol	Parameter	Min	Typ	Max	Unit
V _{IL}	Input low voltage	V _{SS} - 0.3		0.7	V
V _{IH}	Input high voltage	1.7		V _{DD} + 0.3	V
I _{IL}	Input low current			-35	μA
I _{IH}	Input high current			35	μA
V _{OL}	Output low voltage (V _{DD} = 2.5 V, I _{OL} = 8 mA)			0.6	V
V _{OH}	Output high voltage (V _{DD} = 2.5 V, I _{OH} = -8 mA)	1.8			V
I _{DD}	Static supply current (Note 1)			4	mA
I _{CC}	Dynamic supply current, Unloaded Output		9	11	mA
V _{DD}	Operating voltage	2.375	2.5	2.625	V
t _{ON}	Power-up time (first locked cycle after power-up)			3	mS
C _{IN}	Input Capacitance		5		pF
Z _{OUT}	Output Impedance		40		Ω

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. CLKIN pin is pulled low.

Table 6. AC ELECTRICAL CHARACTERISTICS FOR 2.5 V ± 0.125 V, V_{SS} = 0 V = GND

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	25		120	MHz
ModOUT	Output frequency	25		120	MHz
t _{LH} (Note 2)	Output rise time (measured from 0.7 V to 1.7 V)		2	2.7	nS
t _{HL} (Note 2)	Output fall time (measured from 1.7 V to 0.7 V)		1	1.5	nS
t _{JC}	Jitter (Cycle-to-cycle)		±250	±300	pS
t _D	Output duty cycle	40	50	60	%

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

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Table 7. DC ELECTRICAL CHARACTERISTICS FOR 3.3 V ± 0.3 V, VSS = 0 V = GND

Symbol	Parameter	Min	Typ	Max	Unit
V _{IL}	Input low voltage	V _{SS} - 0.3		0.8	V
V _{IH}	Input high voltage	2.0		V _{DD} + 0.3	V
I _{IL}	Input low current			-35	μA
I _{IH}	Input high current			35	μA
V _{OL}	Output low voltage (V _{DD} = 3.3 V, I _{OL} = 8 mA)			0.4	V
V _{OH}	Output high voltage (V _{DD} = 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, Unloaded Output		11	14	mA
V _{DD}	Operating voltage	3.0	3.3	3.6	V
t _{ON}	Power-up time (first locked cycle after power-up)			3	mS
C _{IN}	Input Capacitance		5		pF
Z _{OUT}	Output Impedance		35		Ω

3. CLKIN pin is pulled low.

Table 8. AC ELECTRICAL CHARACTERISTICS FOR 3.3 V ± 0.3 V, VSS = 0 V = GND (Note 5)

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input frequency	25		120	MHz
ModOUT	Output frequency	25		120	MHz
t _{LH} (Note 4)	Output rise time (measured from 0.8 V to 2.0 V)		1.3	2	nS
t _{HL} (Note 4)	Output fall time (measured at 2.0 V to 0.8 V)		0.9	1.3	nS
t _{JC}	Jitter (Cycle-to-cycle)		±225	±300	pS
t _D	Output duty cycle	45	50	55	%

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

5. All parameters are at an Extended Industrial temperature range unless otherwise stated.

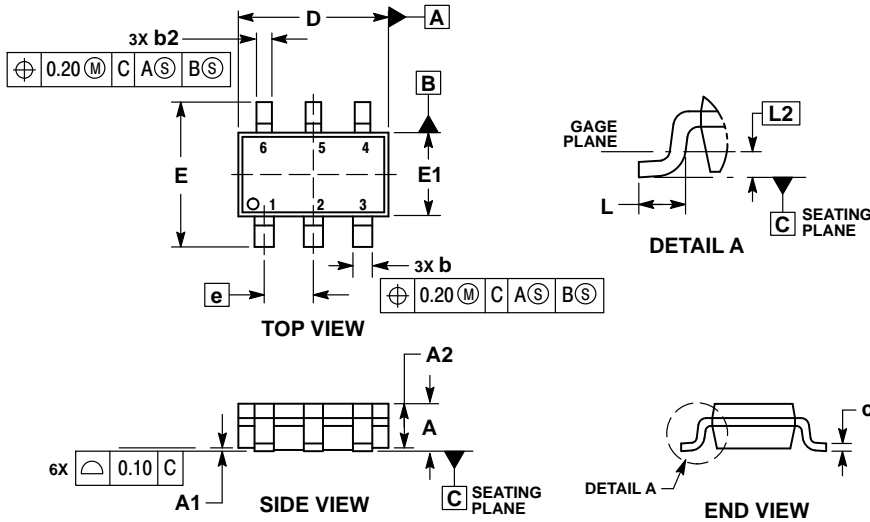
Table 9. ORDERING INFORMATION

Part Number	Marking	Temperature	Package Type	Shipping
NB3N6200CSNT1G	620	-40°C to +85°C	TSOT23 (Pb-Free)	3000 / Tape & Reel

NB3N6200C

PACKAGE DIMENSIONS

TSOT23 6-Lead
CASE 419AZ
ISSUE O

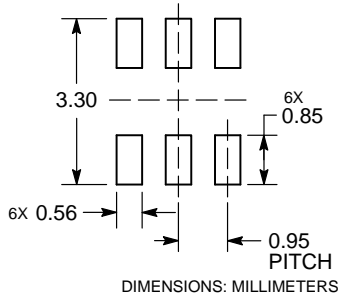


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DATUM C IS THE SEATING PLANE.

DIM	MILLIMETERS	
	MIN	MAX
A	—	1.00
A1	0.00	0.10
A2	0.80	0.90
b	0.30	0.45
b2	0.25	0.35
c	0.12	0.20
D	2.80	3.00
E	2.70	2.90
E1	1.50	1.70
e	0.95 BSC	
L	0.30	0.50
L2	0.25 BSC	

RECOMMENDED SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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