

NB2669A

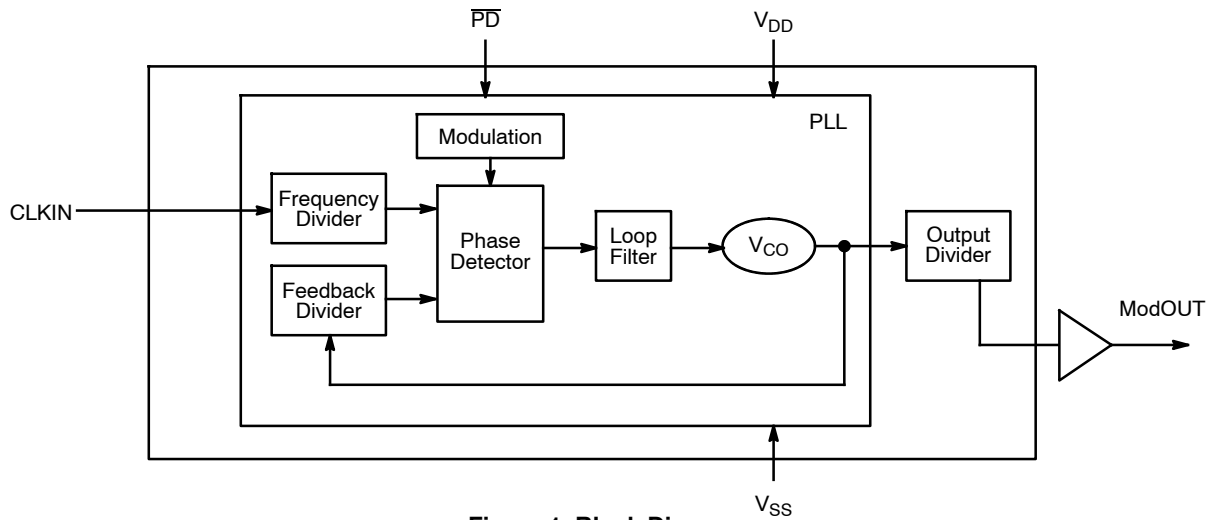


Figure 1. Block Diagram

Table 1. KEY SPECIFICATIONS

Description	Specification
Supply Voltages	$V_{DD} = 3.3 \text{ V} / 2.5 \text{ V}$
Frequency Range	For 2.5 V Supply For 3.3 V Supply
Cycle-to-Cycle Jitter	200 ps (maximum)
Output Duty Cycle	45/55% (worst case)
Modulation Rate Equation	$F_{IN}/256$
Frequency Deviation	$\pm 1\% @ 10 \text{ MHz}$

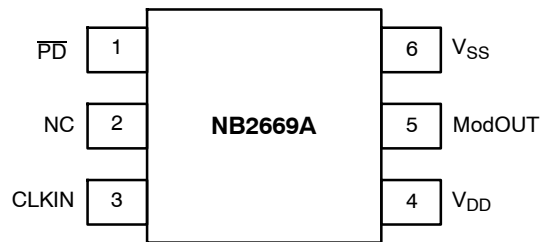


Figure 2. Pin Configuration

Table 2. PIN DESCRIPTION

Pin #	Pin Name	Type	Description
1	PD	I	Powerdown control pin. Pull low to enable Powerdown mode. Connect to V_{DD} if not used.
2	NC		No connect.
3	CLKIN	I	External reference frequency input.
4	V_{DD}	P	Power supply for the entire chip.
5	ModOUT	O	Spread spectrum clock output.
6	V_{SS}	P	Ground connection.

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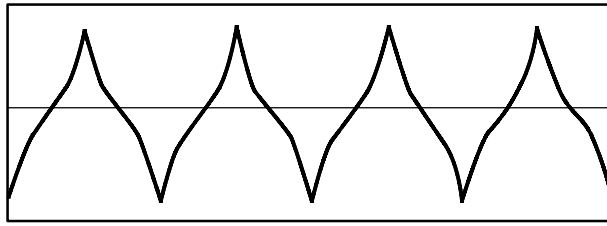


Figure 3. Modulation Profile

Table 3. MAXIMUM RATINGS

Symbol	Description	Rating	Unit
V_{DD}, V_{IN}	Voltage on any pin with respect to Ground	0.5 to + 7.0	V
T_{STG}	Storage Temperature	-65 to +125	°C
T_A	Operating Temperature	0 to 70	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (As per MIL-STD-883, Method 3015)	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 4. DC ELECTRICAL CHARACTERISTICS FOR 2.5 V SUPPLY (Test Conditions: All parameters are measured at room temperature 25°C)

Symbol	Description	Min	Typ	Max	Unit
V _{IL}	Input LOW Voltage	GND - 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
I _{XOL}	XOUT Output LOW Current (@ 0.5 V, V _{DD} = 2.5 V)		3.0		mA
I _{XOH}	XOUT Output HIGH Current (@ 1.8 V, V _{DD} = 2.5 V)		3.0		mA
V _{OL}	Output LOW Voltage (V _{DD} = 2.5 V, I _{OL} = 8.0 mA)			0.6	V
V _{OH}	Output HIGH Voltage (V _{DD} = 2.5 V, I _{OH} = 8.0 mA)	1.8			V
I _{DD}	Static Supply Current (Note 1)			10	μA
I _{CC}	Dynamic Supply Current (2.5 V, 10 MHz, and No Load)		2.0		mA
V _{DD}	Operating Voltage	2.375	2.5	2.625	V
t _{ON}	PLL first locked cycle time (Note 2)			5.0	mS
Z _{OUT}	Clock Output Impedance		50		Ω

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

1. XIN/CLKIN pin and \overline{PD} pin are pulled low.
2. V_{DD} and CLKIN input are stable, \overline{PD} pin is made high from low.

Table 5. AC ELECTRICAL CHARACTERISTICS FOR 2.5 V SUPPLY

Symbol	Description	Min	Typ	Max	Unit
CLKIN	Input Frequency	6.0		12	MHz
ModOUT	Output Frequency	6.0		12	MHz
f _d	Frequency Deviation Input Frequency = 6.0 MHz Input Frequency = 12 MHz			±1.48 ±0.79	%
t _{LH} (Note 3)	Output Rise Time (measured at 0.7 V to 1.7 V)	0.8	1.5	1.7	ns
t _{HL} (Note 3)	Output Fall Time (measured at 1.7 V to 0.7 V)	0.5	1.0	1.2	ns
t _{JC}	Jitter (Cycle-to-Cycle)			200	ps
t _D	Output Duty Cycle	45	50	55	%

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

3. t_{LH} and t_{HL} are measured at capacitive load of 15 pF.

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Table 6. DC ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY (Test Conditions: All parameters are measured at room temperature 25°C)

Symbol	Description	Min	Typ	Max	Unit
V _{IL}	Input LOW Voltage	GND - 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
I _{XOL}	XOUT Output LOW Current (@ 0.4 V, V _{DD} = 3.3 V)		3.0		mA
I _{XOH}	XOUT Output HIGH Current (@ 2.5 V, V _{DD} = 3.3 V)		3.0		mA
V _{OL}	Output LOW Voltage (V _{DD} = 3.3 V, I _{OL} = 8.0 mA)			0.4	V
V _{OH}	Output HIGH Voltage (V _{DD} = 3.3 V, I _{OH} = 8.0 mA)	2.5			V
I _{DD}	Static Supply Current (Note 4)			10	μA
I _{CC}	Dynamic Supply Current (3.3 V, 10 MHz, and No Load)		2.5		mA
V _{DD}	Operating Voltage	2.7	3.3	3.6	V
t _{ON}	PLL first locked cycle time (Note 5)			5.0	mS
Z _{OUT}	Clock Output Impedance		45		Ω

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

4. XIN/CLKIN pin and \overline{PD} pin are pulled low.
5. V_{DD} and CLKIN input are stable, \overline{PD} pin is made high from low.

Table 7. AC ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY

Symbol	Description	Min	Typ	Max	Unit
CLKIN	Input Frequency	6		13	MHz
ModOUT	Output Frequency	6		13	MHz
f _d	Frequency Deviation Input Frequency = 6.0 MHz Input Frequency = 13 MHz			±1.48 ±0.74	%
t _{LH} (Note 6)	Output Rise Time (measured at 0.8 V to 2.0 V)	0.5	1.3	1.5	ns
t _{HL} (Note 6)	Output Fall Time (measured at 2.0 V to 0.8 V)	0.4	0.9	1.1	ns
t _{JC}	Jitter (Cycle-to-Cycle)			200	ps
t _D	Output Duty Cycle	45	50	55	%

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

6. t_{LH} and t_{HL} are measured at capacitive load of 15 pF.

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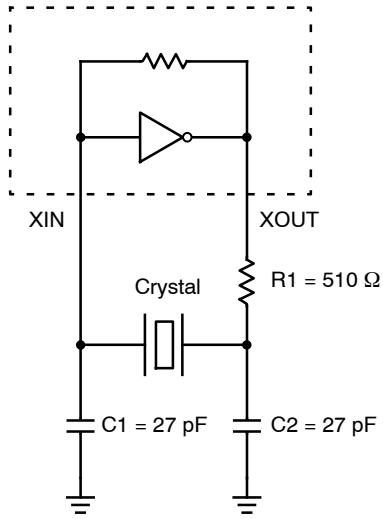


Figure 4. Typical Crystal Oscillator Circuit

Table 8. TYPICAL CRYSTAL SPECIFICATIONS

Fundamental AT Cut Parallel Resonant Crystal	
Nominal Frequency	14.31818 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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ORDERING INFORMATION

Device	Marking	Temperature Range	Package	Shipping [†]	Availability
NB2669ASNR2	E02	0°C - 70°C	TSOP-6 (TSOT-23-6)	2500 Tape & Reel	<i>Now</i>
NB2669ASNR2G	E02	0°C - 70°C	TSOP-6 (TSOT-23-6) (Pb-Free)	2500 Tape & Reel	<i>Contact Sales Representative</i>

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

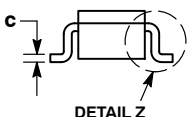
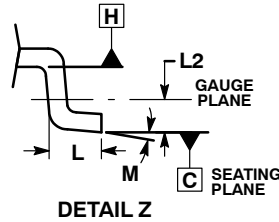
ON Semiconductor®



SCALE 2:1

TSOP-6 CASE 318G-02 ISSUE V

DATE 12 JUN 2012



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
5. PIN ONE INDICATOR MUST BE LOCATED IN THE INDICATED ZONE.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.90	3.00	3.10
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.85	0.95	1.05
L	0.20	0.40	0.60
L2	0.25 BSC		
M	0°	-	10°

- | | | | | | |
|--|--|---|---|---|--|
| <p>STYLE 1:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN</p> | <p>STYLE 2:
PIN 1. EMITTER 2
2. BASE 1
3. COLLECTOR 1
4. EMITTER 1
5. BASE 2
6. COLLECTOR 2</p> | <p>STYLE 3:
PIN 1. ENABLE
2. N/C
3. R BOOST
4. Vz
5. V in
6. V out</p> | <p>STYLE 4:
PIN 1. N/C
2. V in
3. NOT USED
4. GROUND
5. ENABLE
6. LOAD</p> | <p>STYLE 5:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2</p> | <p>STYLE 6:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR</p> |
| <p>STYLE 7:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. N/C
5. COLLECTOR
6. EMITTER</p> | <p>STYLE 8:
PIN 1. Vbus
2. D(in)
3. D(in)+
4. D(out)+
5. D(out)
6. GND</p> | <p>STYLE 9:
PIN 1. LOW VOLTAGE GATE
2. DRAIN
3. SOURCE
4. DRAIN
5. DRAIN
6. HIGH VOLTAGE GATE</p> | <p>STYLE 10:
PIN 1. D(OUT)+
2. GND
3. D(OUT)-
4. D(IN)-
5. VBUS
6. D(IN)+</p> | <p>STYLE 11:
PIN 1. SOURCE 1
2. DRAIN 2
3. DRAIN 2
4. SOURCE 2
5. GATE 1
6. DRAIN 1/GATE 2</p> | <p>STYLE 12:
PIN 1. I/O
2. GROUND
3. I/O
4. I/O
5. VCC
6. I/O</p> |
| <p>STYLE 13:
PIN 1. GATE 1
2. SOURCE 2
3. GATE 2
4. DRAIN 2
5. SOURCE 1
6. DRAIN 1</p> | <p>STYLE 14:
PIN 1. ANODE
2. SOURCE
3. GATE
4. CATHODE/DRAIN
5. CATHODE/DRAIN
6. CATHODE/DRAIN</p> | <p>STYLE 15:
PIN 1. ANODE
2. SOURCE
3. GATE
4. DRAIN
5. N/C
6. CATHODE</p> | <p>STYLE 16:
PIN 1. ANODE/CATHODE
2. BASE
3. EMITTER
4. COLLECTOR
5. ANODE
6. CATHODE</p> | <p>STYLE 17:
PIN 1. EMITTER
2. BASE
3. ANODE/CATHODE
4. ANODE
5. CATHODE
6. COLLECTOR</p> | |

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

GENERIC MARKING DIAGRAM*



- | | |
|--|---|
| <p>XXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb-Free Package</p> | <p>XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package</p> |
|--|---|

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

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

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