

NB3H60113GH1

3.3 V OmniClock Generator with Single Ended (LVCMOS) Output

The NB3H60113GH1, which is a member of the OmniClock family, is a low power PLL-based clock generator. The device accepts a 1.28 MHz / 1.54 MHz single ended (LVCMOS) reference clock as input. It generates one single ended (LVCMOS) output of 4x / 5x of Input Clock. CLKSEL (LVCMOS) control signal selects 4x / 5x Clock at the output. The device can be powered down using the Power Down pin (PDB).

Features

- Member of the OmniClock Family of Programmable Clock Generators
- Operating Power Supply: 3.3 V \pm 0.3 V
- I/O Standards
 - ◆ Input: 1.28 MHz / 1.54 MHz Reference Clock (LVCMOS)
 - ◆ Output: 4x / 5x of Input Clock (LVCMOS)
- Output Drive Current for Single Ended Output: 16 mA
- Power Saving Mode through Power Down Pin
- Temperature Range -40°C to 85°C
- Packaged in 8-Pin WDFN
- These are Pb-Free Devices

Typical Application

- Industrial



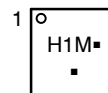
ON Semiconductor®

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WDFN8
CASE 511AT

MARKING DIAGRAM



H1 = Specific Device Code
M = Date Code
■ = Pb-Free Device

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

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BLOCK DIAGRAM

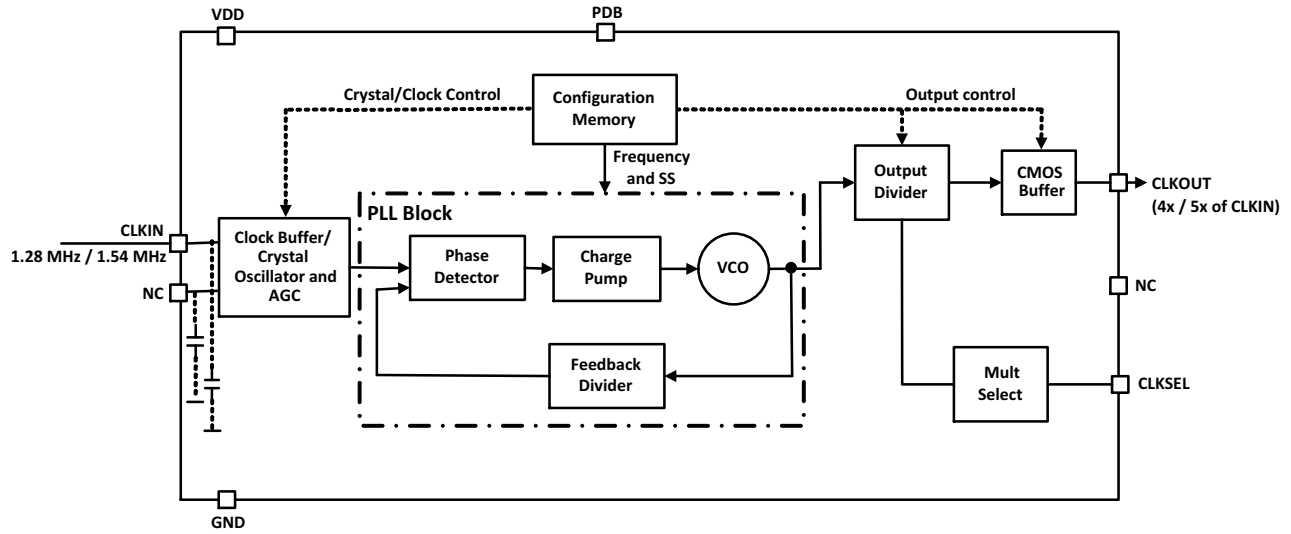


Figure 1. Simplified Block Diagram

PIN FUNCTION DESCRIPTION

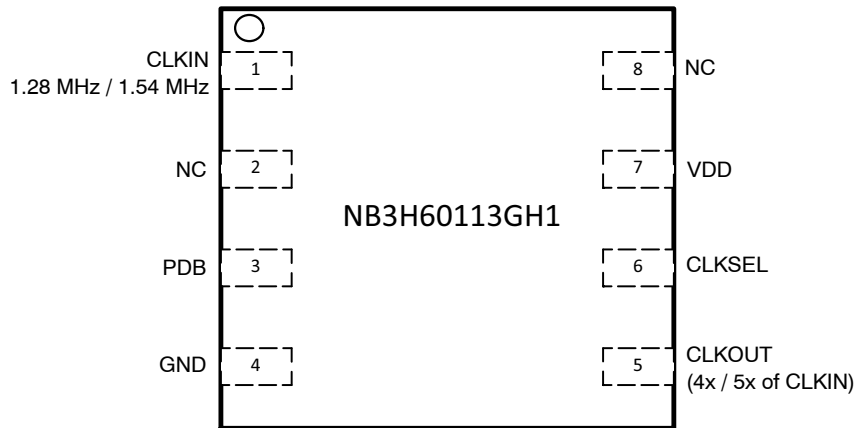


Figure 2. Pin Connections (Top View) – WDFN8

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Table 1. PIN DESCRIPTION

Pin No.	Pin Name	Pin Type	Description
1	CLKIN	Input	1.28 MHz / 1.54 MHz single-ended external reference input clock (LVCMOS)
2	NC	–	No Connection. Not to be connected to any circuit
3	PDB	Input	Asynchronous LVCMOS input. Active Low Master Reset to disable the device and set outputs Low. Internal pull-down resistor. This pin needs to be pulled High for normal Operation of the chip.
4	GND	Ground	Power supply ground
5	CLKOUT	Output	4x / 5x of Input Clock Single-ended (LVCMOS) output
6	CLKSEL	Input	Output Clock multiplier Selection input (LVCMOS). Selects 4x / 5x of CLKIN
7	VDD	Power	3.3 V Power Supply
8	NC	–	No Connection. Not to be connected to any circuit

Table 2. POWER DOWN FUNCTION TABLE

PDB	Function
0	Device Powered Down
1	Device Powered Up

Table 3. OUTPUT CLOCK SELECTION

CLKSEL	CLKOUT
0	4x CLKIN
1	5x CLKIN

NOTE: PDB has internal pull down resistor.

Table 4. ATTRIBUTES

Characteristic	Value
ESD Protection Human Body Model	2 kV
Internal Input Default State Pull up/ down Resistor	50 kΩ
Moisture Sensitivity, Indefinite Time Out of Dry Pack (Note 1)	MSL1
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	130 k
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

1. For additional information, see Application Note AND8003/D.

Table 5. ABSOLUTE MAXIMUM RATING (Note 2)

Symbol	Parameter	Rating	Unit
VDD	Positive power supply with respect to Ground	-0.5 to +4.6	V
V _I	Input Voltage with respect to chip ground	-0.5 to VDD + 0.5	V
T _A	Operating Ambient Temperature Range (Industrial Grade)	-40 to +85	°C
T _{STG}	Storage temperature	-65 to +150	°C
T _{SOL}	Max. Soldering Temperature (10 sec)	265	°C
θ _{JA}	Thermal Resistance (Junction-to-ambient) (Note 3)	0 lfpm 500 lfpm	°C/W °C/W
θ _{JC}	Thermal Resistance (Junction-to-case)	35 to 40	°C/W
T _J	Junction temperature	125	°C

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.

2. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and not valid simultaneously. If stress limits are exceeded device functional operation is not implied, damage may occur and reliability may be affected.

3. JEDEC standard multilayer board – 2S2P (2 signal, 2 power). ESD51.7 type board. Back side Copper heat spreader area 100 sq mm, 2 oz (0.070 mm) copper thickness.

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Table 6. RECOMMENDED OPERATION CONDITIONS

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V _{DD}	Core Power Supply Voltage	3.3 V operation	3.0	3.3	3.6	V
C _L	Clock output load capacitance for LVC MOS clock				15	pF
fc _{lkin}	Reference Clock Frequency	Single ended Clock input (LVC MOS)	1.2	1.28 / 1.54	1.6	MHz

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 7. DC ELECTRICAL CHARACTERISTICS (V_{DD} = 3.3 V ± 0.3 V; GND = 0 V, T_A = -40°C to +85°C)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
I _{DD_3.3 V}	Power Supply current	f _{out} = 4x / 5x of CLKIN		10		mA
I _{PD}	Power Down Supply Current	PDB is Low to make all outputs OFF			80	μA
V _{IH}	Input HIGH Voltage	Pin CLKIN, CLKSEL	0.65 V _{DD}		V _{DD}	V
		Pin PDB	0.85 V _{DD}		V _{DD}	
V _{IL}	Input LOW Voltage	Pin CLKIN, CLKSEL	0		0.35 V _{DD}	V
		Pin PDB	0		0.15 V _{DD}	
C _{in}	Input Capacitance	Pin PDB		4	6	pF

LVC MOS OUTPUT

V _{OH}	Output HIGH Voltage	V _{DD} = 3.3 V	I _{OH} = 16 mA	0.75*V _{DD}		V
V _{OL}	Output LOW Voltage	V _{DD} = 3.3 V	I _{OL} = 16 mA		0.25*V _{DD}	V

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.

Table 8. AC ELECTRICAL CHARACTERISTICS (V_{DD} = 3.3 V ± 0.3 V, GND = 0 V, T_A = -40°C to +85°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f _{out}	Single Ended Output Frequency			4x / 5x of CLKIN		MHz
t _{PU}	Stabilization time from Power-up	V _{DD} = 3.3 V		3.0		ms
t _{PD}	Stabilization time from Power Down	Time from falling edge on PDB pin to tri-stated outputs (Asynchronous)		3.0		ms
E _{ppm}	Synthesis Error			0		ppm

SINGLE ENDED OUTPUT (V_{DD} = 3.3 V ± 0.3 V, GND = 0 V, T_A = -40°C to 85°C)

t _r / t _f	Rise/Fall Time	Measured between 20% to 80% with 15 pF load, f _{out} = 4x / 5x of CLKIN, V _{DD} = 3.3 V		1		ns
t _{DC}	Output Clock Duty Cycle	V _{DD} = 3.3 V; Duty Cycle of Ref clock is 50% PLL Clock	45	50	55	%

PARAMETER MEASUREMENT TEST CIRCUIT

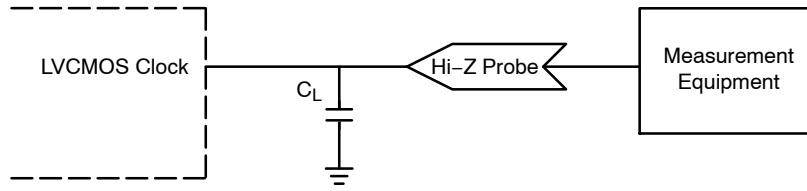


Figure 3. LVC MOS Clock Parameter Measurement

TIMING MEASUREMENT DEFINITIONS

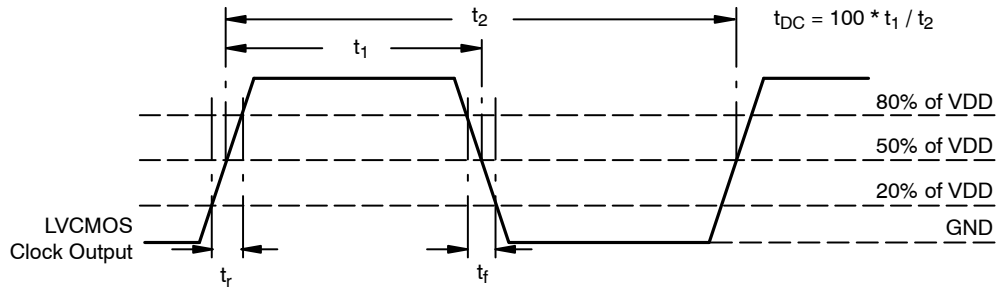


Figure 4. LVC MOS Measurement for AC Parameters

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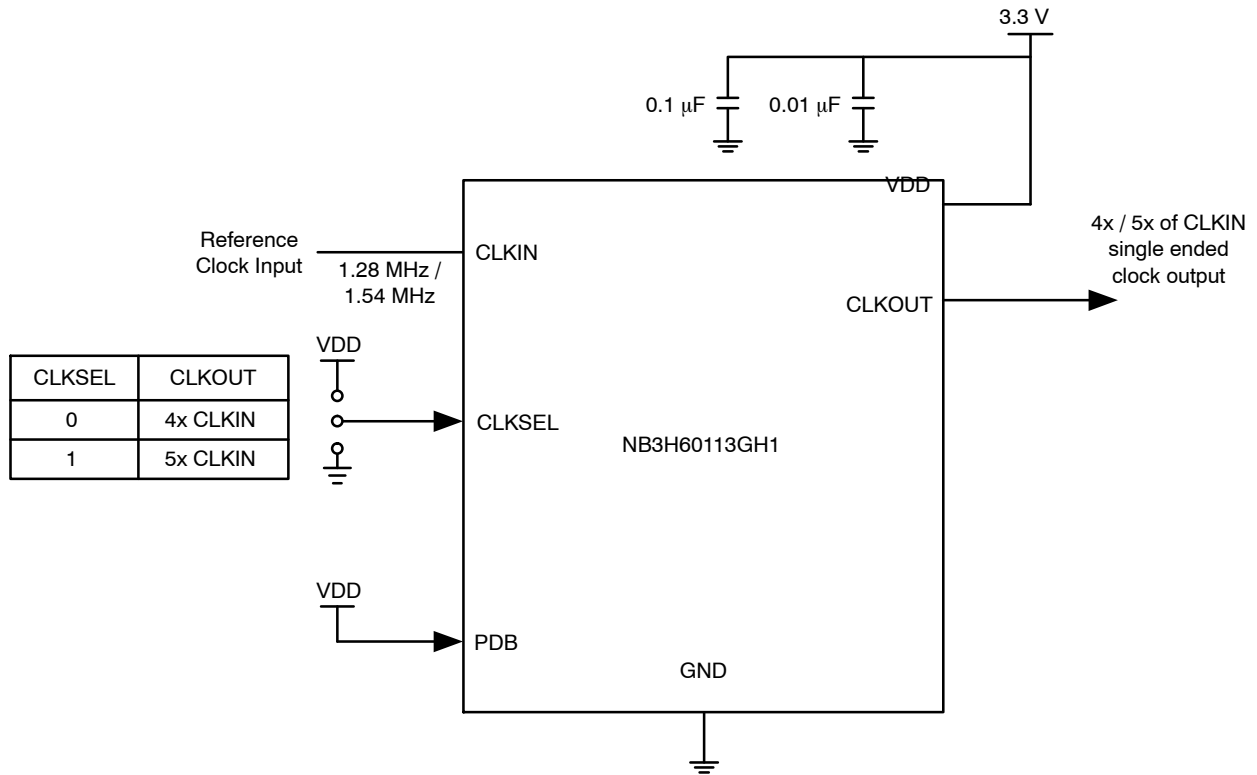


Figure 5. Typical Application Setup

ORDERING INFORMATION

Device	Case	Package	Shipping [†]
NB3H60113GH1MTR2G	511AT	DFN-8 (Pb-Free)	3000 / Tape & Reel

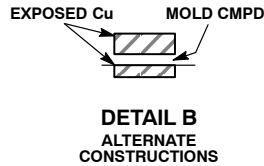
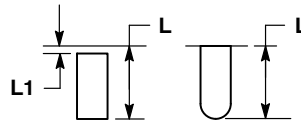
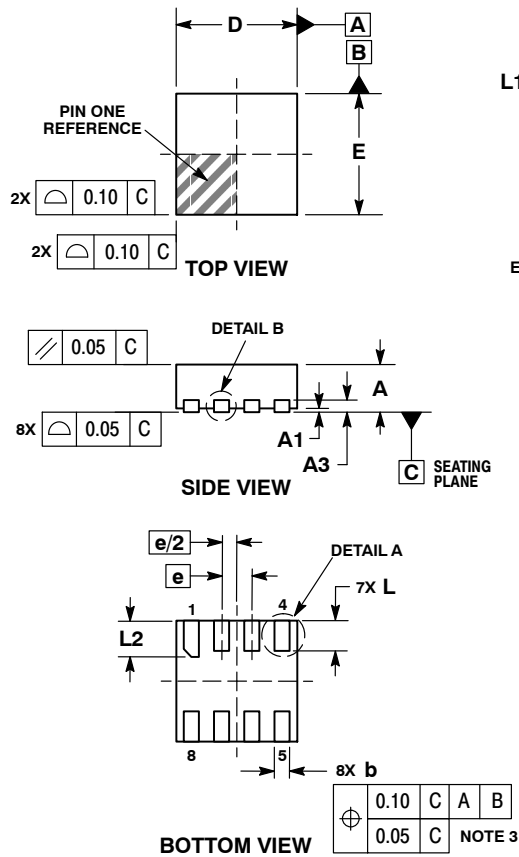
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NOTE: Please contact your ON Semiconductor sales representative for information on un-programmed versions of this device.

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PACKAGE DIMENSIONS

WDFN8 2x2, 0.5P CASE 511AT ISSUE O

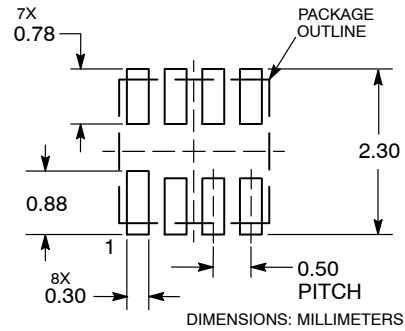


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP.

DIM	MILLIMETERS	
	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20	REF
b	0.20	0.30
D	2.00 BSC	
E	2.00 BSC	
e	0.50 BSC	
L	0.40	0.60
L1	---	0.15
L2	0.50	0.70

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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