

NB3L553

2.5 V / 3.3 V / 5.0 V 1:4 Clock Fanout Buffer

Description

The NB3L553 is a low skew 1-to-4 clock fanout buffer, designed for clock distribution in mind. The NB3L553 specifically guarantees low output-to-output skew. Optimal design, layout and processing minimize skew within a device and from device to device.

The output enable (OE) pin tri-states the outputs when low.

Features

- Input/Output Clock Frequency up to 200 MHz
- Low Skew Outputs (35 ps)
- Output Enable Mode Three-States Outputs
- Operating Range: $V_{DD} = 2.375 \text{ V to } 5.25 \text{ V}$
- Ideal for Networking Clocks
- Packaged in 8-pin SOIC
- Industrial Temperature Range
- These are Pb-Free Devices

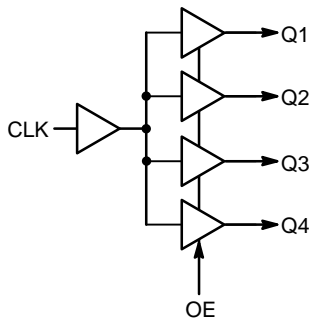


Figure 1. Block Diagram



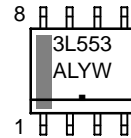
ON Semiconductor®

<http://onsemi.com>

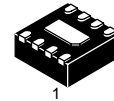
MARKING DIAGRAMS*



**SOIC-8
D SUFFIX
CASE 751**



3N553 = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb-Free Package



**DFN8
MN SUFFIX
CASE 506AA**

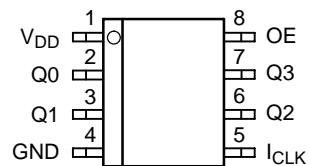


XX = Specific Device Code
M = Date Code

(Note: Microdot may be in either location)

*For additional marking information, refer to Application Note AND8002/D.

PINOUT



ORDERING INFORMATION

Device	Package	Shipping†
NB3L553DG	SOIC-8 (Pb-Free)	98 Units/Rail
NB3L553DR2G	SOIC-8 (Pb-Free)	2500/Tape & Reel
NB3L553MNR4G*	DFN-8 (Pb-Free)	1000/Tape & Reel

*Contact Sales Representative

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

NB3L553

OE	Function
0	Disable
1	Enable

Table 1. OE, Output Enable Function

PIN DESCRIPTION

Pin #	Name	Type	Description
1	V _{DD}	Power	Positive supply voltage (2.375 V to 5.25 V)
2	Q0	(LV)CMOS/(LV)TTL Output	Clock Output 0
3	Q1	(LV)CMOS/(LV)TTL Output	Clock Output 1
4	GND	Power	Negative supply voltage; Connect to ground, 0 V
5	ICLK	(LV)CMOS/(LV)TTL Input	Clock Input. 5.0 V tolerant
6	Q2	(LV)CMOS/(LV)TTL Output	Clock Output 2
7	Q3	(LV)CMOS/(LV)TTL Output	Clock Output 3
8	OE	(LV)CMOS/(LV)TTL Input	Output Enable for the clock outputs. Outputs are enabled when HIGH: connect to V _{DD} for normal operation; OE pin has internal pull-up resistor. Three-states outputs when LOW.

MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V _{DD}	Positive Power Supply	GND = 0 V	–	6.0	V
V _I	Input Voltage	–	–	GND –0.5 ≤ V _I ≤ V _{DD} + 0.5	V
T _A	Operating Temperature Range, Industrial	–	–	≥ –40 to ≤ +85	°C
T _{stg}	Storage Temperature Range	–	–	–65 to +150	°C
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	SOIC-8	190 130	°C/W °C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	(Note 1)	SOIC-8	41 to 44	°C/W

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.

1. JEDEC standard multilayer board – 2S2P (2 signal, 2 power)

ATTRIBUTES

Characteristic	Value
ESD Protection	Human Body Model > 2 kV Machine Model > 150 V Charged Device Model > TBD kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 2)	Level 1
Flammability Rating	Oxygen Index: 28 to 34 UL-94 code V-0 @ 0.125 in
Transistor Count	531 Devices
Meets or Exceeds JEDEC Standard EIA/JESD78 IC Latchup Test	

2. For additional Moisture Sensitivity information, refer to Application Note AND8003/D.

NB3L553

DC CHARACTERISTICS ($V_{DD} = 2.375 \text{ V to } 2.625 \text{ V}$, $GND = 0 \text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

Symbol	Characteristic	Min	Typ	Max	Unit
I_{DD}	Power Supply Current @ 135 MHz, No Load	–	25	TBD	mA
V_{OH}	Output HIGH Voltage – $I_{OH} = -16 \text{ mA}$	2.0	–	–	V
V_{OL}	Output LOW Voltage – $I_{OL} = 16 \text{ mA}$	–	–	0.4	V
V_{IH}, I_{CLK}	Input HIGH Voltage, I_{CLK}	$(V_{DD} \div 2) + 0.5$	–	3.8	V
V_{IL}, I_{CLK}	Input LOW Voltage, I_{CLK}	–	–	$(V_{DD} \div 2) - 0.5$	V
V_{IH}, OE	Input HIGH Voltage, OE	1.8	–	V_{DD}	V
V_{IL}, OE	Input LOW Voltage, OE	–	–	0.7	V
ZO	Nominal Output Impedance	–	20	–	Ω
CIN	Input Capacitance, I_{CLK}, OE	–	5.0	–	pF
IOS	Short Circuit Current	–	± 28	–	mA

DC CHARACTERISTICS ($V_{DD} = 3.15 \text{ V to } 3.45 \text{ V}$, $GND = 0 \text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

Symbol	Characteristic	Min	Typ	Max	Unit
I_{DD}	Power Supply Current @ 135 MHz, No Load	–	35	TBD	mA
V_{OH}	Output HIGH Voltage – $I_{OH} = -25 \text{ mA}$	2.4	–	–	V
V_{OL}	Output LOW Voltage – $I_{OL} = 25 \text{ mA}$	–	–	0.4	V
V_{OH}	Output HIGH Voltage – $I_{OH} = -12 \text{ mA}$ (CMOS level)	$V_{DD} - 0.4$	–	–	V
V_{IH}, I_{CLK}	Input HIGH Voltage, I_{CLK}	$(V_{DD} \div 2) + 0.7$	–	3.8	V
V_{IL}, I_{CLK}	Input LOW Voltage, I_{CLK}	–	–	$(V_{DD} \div 2) - 0.7$	V
V_{IH}, OE	Input HIGH Voltage, OE	2.0	–	V_{DD}	V
V_{IL}, OE	Input LOW Voltage, OE	0	–	0.8	V
ZO	Nominal Output Impedance	–	20	–	Ω
CIN	Input Capacitance, OE	–	5.0	–	pF
IOS	Short Circuit Current	–	± 50	–	mA

DC CHARACTERISTICS ($V_{DD} = 4.75 \text{ V to } 5.25 \text{ V}$, $GND = 0 \text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

Symbol	Characteristic	Min	Typ	Max	Unit
I_{DD}	Power Supply Current @ 135 MHz, – No Load	–	45	TBD	mA
V_{OH}	Output HIGH Voltage – $I_{OH} = -35 \text{ mA}$	2.4	–	–	V
V_{OL}	Output LOW Voltage – $I_{OL} = 35 \text{ mA}$	–	–	0.4	V
V_{OH}	Output HIGH Voltage – $I_{OH} = -12 \text{ mA}$ (CMOS level)	$V_{DD} - 0.4$	–	–	V
V_{IH}, I_{CLK}	Input HIGH Voltage, I_{CLK}	$(V_{DD} \div 2) + 1$	–	5.5	V
V_{IL}, I_{CLK}	Input LOW Voltage, I_{CLK}	–	–	$(V_{DD} \div 2) - 1$	V
V_{IH}, OE	Input HIGH Voltage, OE	2.0	–	V_{DD}	V
V_{IL}, OE	Input LOW Voltage, OE	–	–	0.8	V
ZO	Nominal Output Impedance	–	20	–	Ω
CIN	Input Capacitance, OE	–	5.0	–	pF
IOS	Short Circuit Current	–	± 80	–	mA

NB3L553

AC CHARACTERISTICS; $V_{DD} = 2.5\text{ V} \pm 5\%$ ($V_{DD} = 2.375\text{ V to } 2.625\text{ V}$, $GND = 0\text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

Symbol	Characteristic	Min	Typ	Max	Unit
f_{in}	Input Frequency	–	–	200	MHz
t_r/t_f	Output rise and fall times; 0.8 V to 2.0 V	–	1.0	1.5	ns
t_{pd}	Propagation Delay, CLK to Qn (Note 4)	2.2	3.0	5.0	ns
t_{skew}	Output-to-output skew; (Note 5)	–	35	–	ps
t_{skew}	Device-to-device skew, (Note 5)	–	–	500	ps

AC CHARACTERISTICS; $V_{DD} = 3.3\text{ V} \pm 5\%$ ($V_{DD} = 3.15\text{ V to } 3.45\text{ V}$, $GND = 0\text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

Symbol	Characteristic	Min	Typ	Max	Unit
f_{in}	Input Frequency	–	–	200	MHz
t_r/t_f	Output rise and fall times; 0.8 V to 2.0 V	–	0.6	1.0	ns
t_{pd}	Propagation Delay, CLK to Qn (Note 4)	2.0	2.4	4.0	ns
t_{skew}	Output-to-output skew; (Note 5)	–	35	50	ps
t_{skew}	Device-to-device skew, (Note 5)	–	–	500	ps

AC CHARACTERISTICS; $V_{DD} = 5.0\text{ V} \pm 5\%$ ($V_{DD} = 4.75\text{ V to } 5.25\text{ V}$, $GND = 0\text{ V}$, $T_A = -40^\circ\text{C to } +85^\circ\text{C}$) (Note 3)

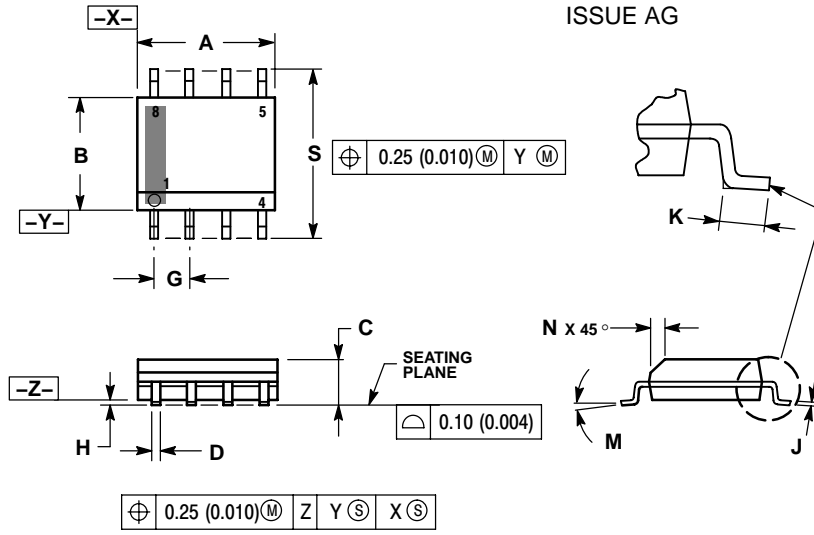
Symbol	Characteristic	Min	Typ	Max	Unit
f_{in}	Input Frequency	–	–	200	MHz
t_r/t_f	Output rise and fall times; 0.8 V to 2.0 V	–	0.3	0.7	ns
t_{pd}	Propagation Delay, CLK to Qn (Note 4)	1.8	2.5	4.0	ns
t_{skew}	Output-to-output skew; (Note 5)	–	35	–	ps
t_{skew}	Device-to-device skew, (Note 5)	–	–	500	ps

3. Outputs loaded with external $R_L = 33\text{-}\Omega$ series resistor and $C_L = 15\text{ pF}$ to GND for proper operation. Duty cycle out = duty in. A $0.01\text{ }\mu\text{F}$ decoupling capacitor should be connected between V_{DD} and GND.
4. Measured with rail-to-rail input clock
5. Measured on rising edges at $V_{DD} \div 2$ between any two outputs with equal loading.

NB3L553

PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AG

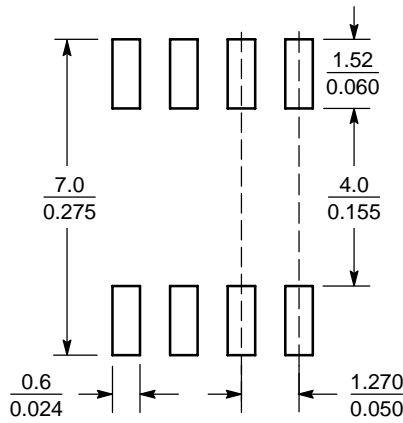


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



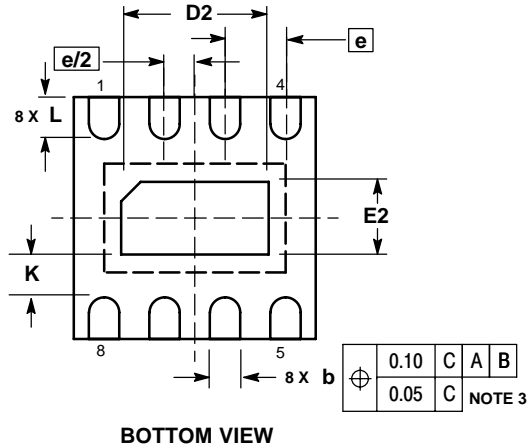
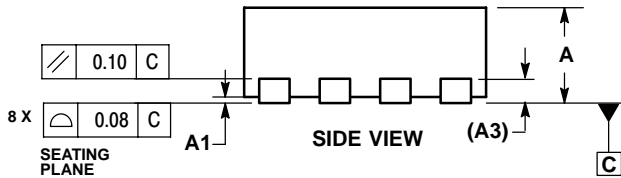
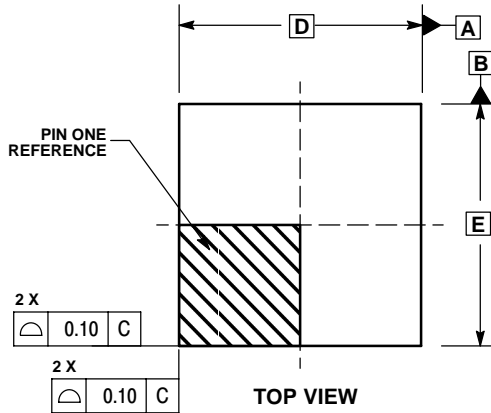
SCALE 6:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

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

NB3L553

PACKAGE DIMENSIONS

DFN8
CASE 506AA-01
ISSUE D



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 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.20	REF
b	0.20	0.30
D	2.00	BSC
D2	1.10	1.30
E	2.00	BSC
E2	0.70	0.90
e	0.50	BSC
K	0.20	---
L	0.25	0.35

ON Semiconductor and **ON** 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. 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 61312, Phoenix, Arizona 85082-1312 USA
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А