

#### Important notice

Dear Customer,

On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of <a href="http://www.nxp.com">http://www.nxp.com</a>, <a href="http://www.semiconductors.philips.com/">http://www.nxp.com</a>, <a href="http://www.nexperia.com/">http://www.nexperia.com/</a>, <a href="http://www.nexperia.com/">use http://www.nexperia.com/</a>

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use salesaddresses@nexperia.com (email)

Replace the copyright notice at the bottom of each page or elsewhere in the document, depending on the version, as shown below:

- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved

Should be replaced with:

- © Nexperia B.V. (year). All rights reserved.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

# 74HC541; 74HCT541

Octal buffer/line driver; 3-state

Rev. 4 — 3 March 2016

Product data sheet

#### 1. **General description**

The 74HC541; 74HCT541 is an octal non-inverting buffer/line driver with 3-state outputs. The device features two output enables (OE1 and OE2). A HIGH on OEn causes the outputs to assume a high-impedance OFF-state. Inputs include clamp diodes that enable the use of current limiting resistors to interface inputs to voltages in excess of V<sub>CC</sub>.

#### **Features and benefits** 2.

- Non-Inverting outputs
- Complies with JEDEC standard no. 7A
- Input levels:
  - ◆ For 74HC541: CMOS level ♦ For 74HCT541: TTL level
- ESD protection:
  - ♦ HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

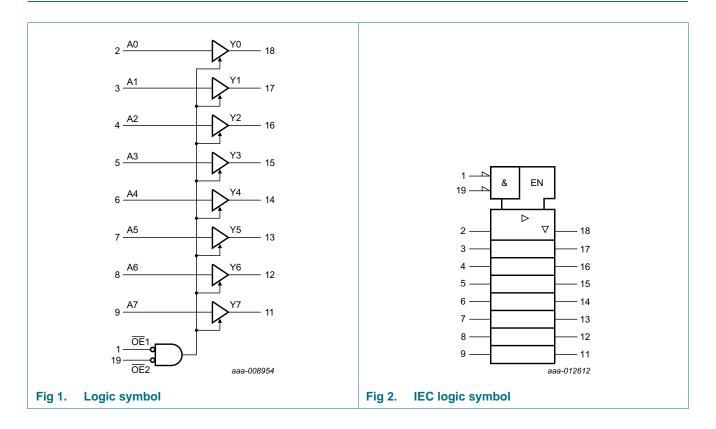
#### **Ordering information** 3.

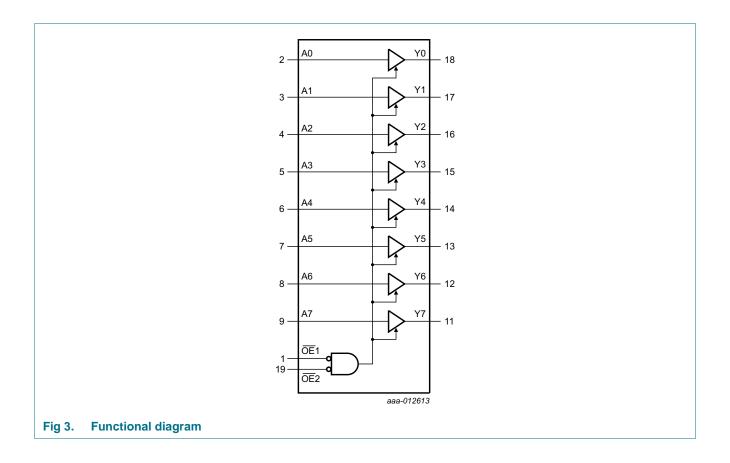
Table 1. **Ordering information** 

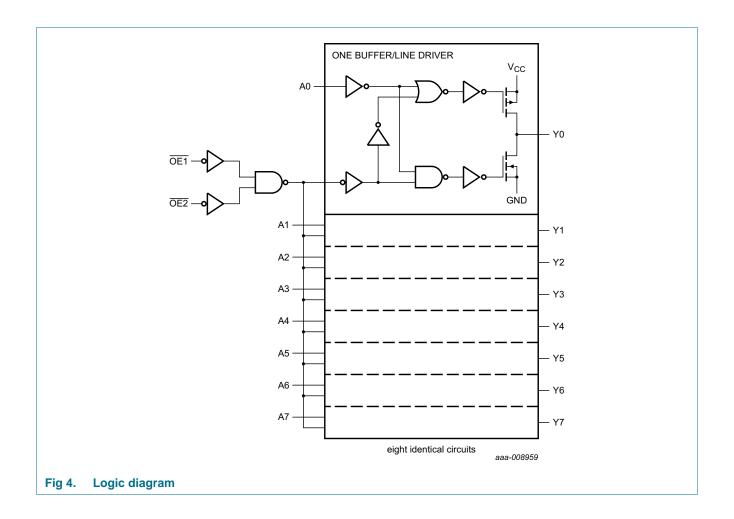
Type number	Package			
	Temperature range	Name	Description	Version
74HC541D	−40 °C to +125 °C	SO20	plastic small outline package; 20 leads;	SOT163-1
74HCT541D			body width 7.5 mm	
74HC541DB	−40 °C to +125 °C	SSOP20	plastic shrink small outline package; 20 leads;	SOT339-1
74HCT541DB			body width 5.3 mm	
74HC541PW	-40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads;	SOT360-1
74HCT541PW			body width 4.4 mm	



## 4. Functional diagram

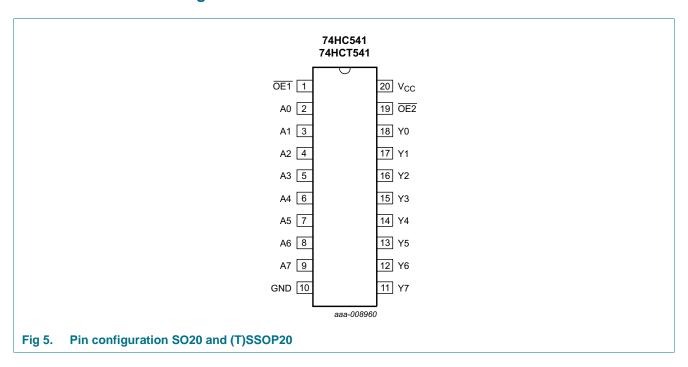






### 5. Pinning information

#### 5.1 Pinning



### 5.2 Pin description

Table 2. Pin description

Pin	Description
1	output enable input (active LOW)
2, 3, 4, 5, 6, 7, 8, 9	data input
10	ground (0 V)
18, 17, 16, 15, 14, 13, 12, 11	data output
19	output enable input (active LOW)
20	supply voltage
	1 2, 3, 4, 5, 6, 7, 8, 9 10 18, 17, 16, 15, 14, 13, 12, 11 19

### 6. Functional description

Table 3. Functional table[1]

Control		Input	Output
OE1	OE2	An	Yn
L	L	L	L
L	L	Н	Н
X	Н	X	Z
Н	X	X	Z

[1] H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

74HC\_HCT541

All information provided in this document is subject to legal disclaimers.

### 7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions		Min	Max	Unit
V <sub>CC</sub>	supply voltage			-0.5	+7	V
I <sub>IK</sub>	input clamping current	$V_I < -0.5 \text{ V or } V_I > V_{CC} + 0.5 \text{ V}$	<u>[1]</u>	-	±20	mA
I <sub>OK</sub>	output clamping current	$V_{O} < -0.5 \text{ V or } V_{O} > V_{CC} + 0.5 \text{ V}$	[1]	-	±20	mA
Io	output current	$-0.5 \text{ V} < \text{V}_{\text{O}} < \text{V}_{\text{CC}} + 0.5 \text{ V}$		-	±35	mA
I <sub>CC</sub>	supply current			-	70	mA
I <sub>GND</sub>	ground current			-70	-	mA
T <sub>stg</sub>	storage temperature			-65	+150	°C
P <sub>tot</sub>	total power dissipation	SO20, SSOP20, TSSOP20	[2]	-	500	mW

<sup>[1]</sup> The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

Symbol	Parameter	Conditions	•	74HC541			74HCT541		
			Min	Тур	Max	Min	Тур	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
VI	input voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
Vo	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 2.0 V	-	-	625	-	-	-	ns/V
		$V_{CC} = 4.5 \text{ V}$	-	1.67	139	-	1.67	139	ns/V
		$V_{CC} = 6.0 \text{ V}$	-	-	83	-	-	-	ns/V

<sup>[2]</sup> For SO20 packages: above 70 °C the value of P<sub>tot</sub> derates linearly with 8 mW/K.
For (T)SSOP20 packages: above 60 °C the value of P<sub>tot</sub> derates linearly with 5.5 mW/K.

### 9. Static characteristics

Table 6. Static characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	T <sub>ar</sub>	<sub>nb</sub> = 25	°C		= –40 °C 85 °C		= −40 °C 125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
74HC54	1									
V <sub>IH</sub>	HIGH-level	V <sub>CC</sub> = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
	input voltage	V <sub>CC</sub> = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V <sub>CC</sub> = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
V <sub>IL</sub>	LOW-level	V <sub>CC</sub> = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
	input voltage	V <sub>CC</sub> = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	2.8	1.8	-	1.8	-	1.8	V
V <sub>OH</sub>	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$								
	output voltage	$I_{O} = -20 \mu A; V_{CC} = 2.0 V$	1.9	2.0	-	1.9	-	1.9	-	V
	$I_{O} = -20 \mu A; V_{CC} = 4.5 V$	4.4	4.5	-	4.4	-	4.4	-	V	
		$I_{O} = -20 \mu A; V_{CC} = 6.0 \text{ V}$	5.9	6.0	-	5.9	-	5.9	-	V
	$I_{O} = -6.0 \text{ mA}; V_{CC} = 4.5 \text{ V}$	3.98	4.32	-	3.84	-	3.7	-	V	
		$I_{O} = -7.8 \text{ mA}; V_{CC} = 6.0 \text{ V}$	5.48	5.81	-	5.34	-	5.2	-	V
V <sub>OL</sub> LOW-level		$V_I = V_{IH}$ or $V_{IL}$								
output voltage	$I_O = 20 \mu A; V_{CC} = 2.0 \text{ V}$	-	0	0.1	-	0.1	-	0.1	V	
		$I_O = 20 \mu A; V_{CC} = 4.5 V$	-	0	0.1	-	0.1	-	0.1	V
		$I_O = 20 \mu A; V_{CC} = 6.0 \text{ V}$	-	0	0.1	-	0.1	-	0.1	V
		$I_{O} = 6.0 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	0.15	0.26	-	0.33	-	0.4	V
		$I_{O} = 7.8 \text{ mA}; V_{CC} = 6.0 \text{ V}$	-	0.16	0.26	-	0.33	-	0.4	V
l <sub>l</sub>	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μА
l <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 6.0$ V; $V_O = V_{CC}$ or GND	-	-	±0.5	-	±5.0	-	±10	μА
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 6.0 \text{ V}$	-	-	8.0	-	80	-	160	μА
C <sub>I</sub>	input capacitance		-	3.5	-	-	-	-	-	pF
74HCT5	41					1	1		1	
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$								
	output voltage	I <sub>O</sub> = -20 μA	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = -6.0 mA	3.98	4.32	-	3.84	-	3.7	-	V
V <sub>OL</sub>	LOW-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$								+
	output voltage	I <sub>O</sub> = 20 μA;	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 6.0 mA;	-	0.16	0.26	-	0.33	-	0.4	V

74HC\_HCT541

All information provided in this document is subject to legal disclaimers.

 Table 6.
 Static characteristics ...continued

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Tan	T <sub>amb</sub> = 25 °C		T <sub>amb</sub> = -40 °C to +85 °C			= –40 °C 125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
I <sub>1</sub>	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.1	-	±1.0	-	±1.0	μΑ
I <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 5.5$ V; $V_O = V_{CC}$ or GND	-	-	±0.5	-	±5.0	-	±10	μА
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	8.0	-	80	-	160	μΑ
Δl <sub>CC</sub>	additional supply current	per input pin; $I_O = 0$ A; $V_I = V_{CC} - 2.1$ V; other inputs at $V_{CC}$ or GND; $V_{CC} = 4.5$ V to 5.5 V								
		An input	-	70	252	-	315	-	343	μΑ
		OE1 input	-	150	540	-	675	-	735	μΑ
		OE2 input	-	100	360	-	450	-	490	μΑ
C <sub>I</sub>	input capacitance		-	3.5	-	-	-	-	-	pF

### 10. Dynamic characteristics

#### Table 7. Dynamic characteristics

 $GND = 0 \ V; \ C_L = 50 \ pF;$  for test circuit, see <u>Figure 8</u>.

Symbol	Parameter	Conditions	Tai	<sub>mb</sub> = 25	S °C	$T_{amb} = -40^{\circ}$	°C to +125 °C	Unit
			Min	Тур	Max	Max (85 °C)	Max (125 °C)	
74HC54	1		'					
t <sub>pd</sub>	propagation delay	An to Yn; see Figure 6	1					
		V <sub>CC</sub> = 2.0 V	-	33	115	145	175	ns
		V <sub>CC</sub> = 4.5 V	-	12	23	29	35	ns
		$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$	-	10	-	-	-	ns
		V <sub>CC</sub> = 6.0 V	-	10	20	25	30	ns
t <sub>en</sub>	enable time	OEn to Yn; see Figure 7	]					
		V <sub>CC</sub> = 2.0 V	-	55	160	200	240	ns
		V <sub>CC</sub> = 4.5 V	-	20	32	40	48	ns
		V <sub>CC</sub> = 6.0 V	-	16	27	34	41	ns
t <sub>dis</sub>	disable time	OEn to Yn; see Figure 7	]					
		V <sub>CC</sub> = 2.0 V	-	61	160	200	240	ns
		V <sub>CC</sub> = 4.5 V	-	22	32	40	48	ns
		V <sub>CC</sub> = 6.0 V	-	18	27	34	41	ns
t <sub>t</sub>	transition time	see Figure 6	]					
		V <sub>CC</sub> = 2.0 V	-	14	60	75	90	ns
		V <sub>CC</sub> = 4.5 V	-	5	12	15	18	ns
		V <sub>CC</sub> = 6.0 V	-	4	10	13	15	ns

Table 7. Dynamic characteristics

 $GND = 0 \text{ V; } C_L = 50 \text{ pF; for test circuit, see } Figure 8.$ 

Symbol	Parameter	Conditions	Conditions		<sub>nb</sub> = 25	°C	T <sub>amb</sub> = -40 °	C to +125 °C	Unit
				Min	Тур	Max	Max (85 °C)	Max (125 °C)	
$C_{PD}$	power dissipation capacitance	per package; V <sub>I</sub> = GND to V <sub>CC</sub>	[3]	-	37	-	-	-	pF
74HCT5	41					1		1	
t <sub>pd</sub>	propagation delay	An to Yn; see Figure 6	[1]						
		V <sub>CC</sub> = 4.5 V		-	15	28	35	42	ns
		$V_{CC} = 5.0 \text{ V}; C_L = 15 \text{ pF}$		-	12	-	-	-	ns
t <sub>en</sub>	enable time	OEn to Yn; see Figure 7	[1]						
		V <sub>CC</sub> = 4.5 V		-	21	35	44	53	ns
t <sub>dis</sub>	disable time	OEn to Yn; see Figure 7	[1]						
		V <sub>CC</sub> = 4.5 V		-	21	35	44	53	ns
t <sub>t</sub>	transition time	V <sub>CC</sub> = 4.5 V; see <u>Figure 6</u>	[2]	-	5	12	15	18	ns
C <sub>PD</sub>	power dissipation capacitance	per package; V <sub>I</sub> = GND to V <sub>CC</sub> – 1.5 V	[3]	-	39	-	-	-	pF

[1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .

 $t_{\text{en}}$  is the same as  $t_{\text{PZL}}$  and  $t_{\text{PZH}}.$ 

 $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .

[2]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .

[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ):

 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$ 

 $f_i$  = input frequency in MHz;

 $f_o$  = output frequency in MHz;

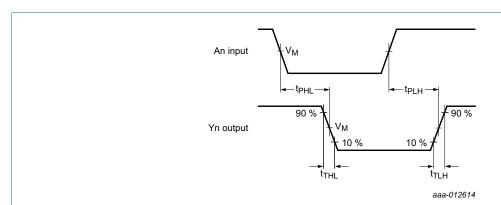
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

 $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

#### 11. Waveforms



Measurement points are given in Table 8.

V<sub>OL</sub> and V<sub>OH</sub> are typical voltage output levels that occur with the output load.

Fig 6. Input to output propagation delays

74HC\_HCT541

All information provided in this document is subject to legal disclaimers

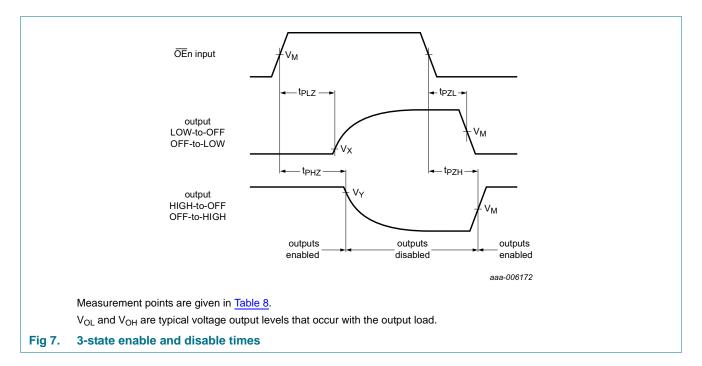
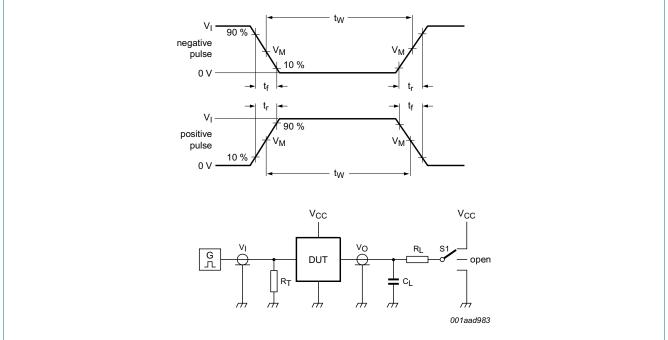


Table 8. Measurement points

Туре	Input	Output					
	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>			
74HC541	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>	0.1V <sub>CC</sub>	0.9V <sub>CC</sub>			
74HCT541	1.3 V	1.3 V	0.1V <sub>CC</sub>	0.9V <sub>CC</sub>			

10 of 18



Test data is given in Table 9.

Definitions test circuit:

 $R_T$  = Termination resistance should be equal to output impedance  $Z_0$  of the pulse generator

 $C_L$  = Load capacitance including jig and probe capacitance

R<sub>L</sub> = Load resistance

S1 = Test selection switch

Fig 8. Test circuit for measuring switching times

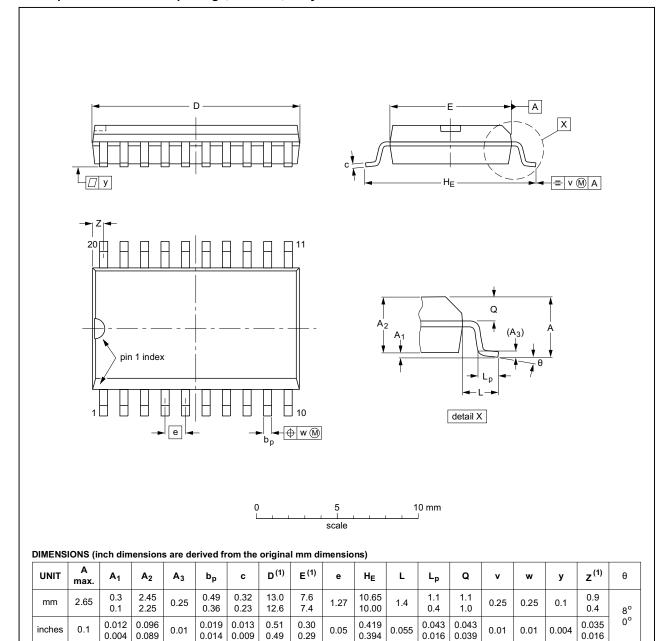
Table 9. Test data

Туре	Input		Load		S1 position			
	VI	t <sub>r</sub> , t <sub>f</sub>	CL	R <sub>L</sub>	t <sub>PHL</sub> , t <sub>PLH</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>	
74HC541	V <sub>CC</sub>	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>	
74HCT541	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>	

### 12. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



#### Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT163-1	075E04	MS-013				<del>99-12-27</del> 03-02-19	

Fig 9. Package outline SOT163-1 (SO20)

74HC\_HCT541

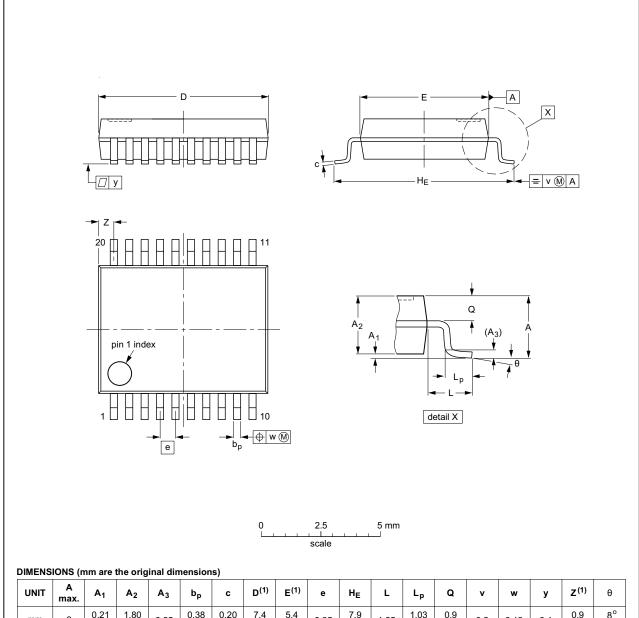
All information provided in this document is subject to legal disclaimers.

© NXP Semiconductors N.V. 2016. All rights reserved.

12 of 18

#### SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1



UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	<b>A</b> <sub>3</sub>	bp	С	D <sup>(1)</sup>	E <sup>(1)</sup>	е	HE	L	Lp	ø	v	¥	у	Z <sup>(1)</sup>	θ
mm	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

#### Note

1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT339-1		MO-150				<del>99-12-27</del> 03-02-19	

Fig 10. Package outline SOT339-1 (SSOP20)

74HC\_HCT541

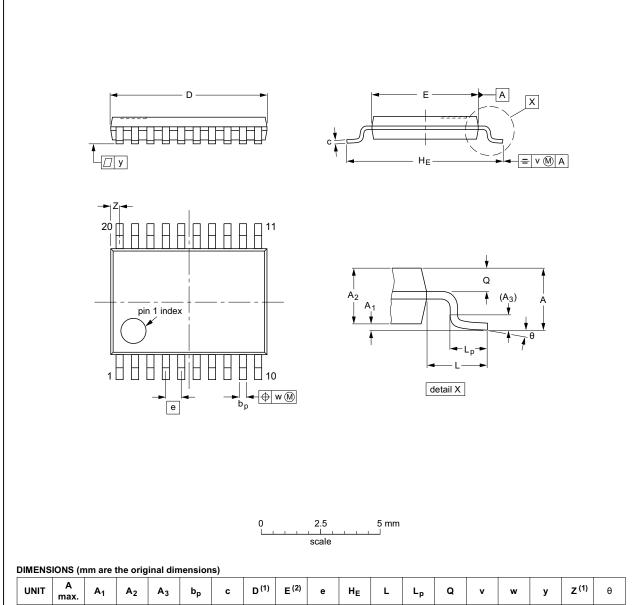
All information provided in this document is subject to legal disclaimers.

© NXP Semiconductors N.V. 2016. All rights reserved.

13 of 18

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	<b>A</b> <sub>3</sub>	bp	С	D <sup>(1)</sup>	E (2)	е	HE	L	Lp	Q	٧	w	у	Z <sup>(1)</sup>	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°

#### Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT360-1		MO-153				<del>99-12-27</del> 03-02-19	

Fig 11. Package outline SOT360-1 (TSSOP20)

74HC\_HCT541

All information provided in this document is subject to legal disclaimers.

### 13. Abbreviations

#### Table 10. Abbreviations

Acronym	Description
CMOS	Complementary Metal-Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
TTL	Transistor-Transistor Logic
MM	Machine Model

## 14. Revision history

#### Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT541 v.4	20160303	Product data sheet	-	74HC_HCT541 v.3.1
Modifications:	Type numbers	s 74HC541N and 74HCT541N	(SOT146-1) remove	ed.
74HC_HCT541 v.3.1	20150828	Product data sheet	-	74HC_HCT541 v.3
Modifications:	Corrected typ	o in Product name title		
74HC_HCT541 v.3	20140415	Product data sheet	-	74HC_HCT541_CNV v.2
Modifications:		this data sheet has been rede NXP Semiconductors.	signed to comply wi	th the new identity
	<ul> <li>Legal texts ha</li> </ul>	ave been adapted to the new c	ompany name wher	e appropriate.
74HC_HCT541_CNV v.2	19901201	Product specification	-	-

### 15. Legal information

#### 15.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions"
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

#### 15.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification** — The information and data provided in a Product data sheet shall define the specification of the product as agreed between NXP Semiconductors and its customer, unless NXP Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the NXP Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

#### 15.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <a href="http://www.nxp.com/profile/terms">http://www.nxp.com/profile/terms</a>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

74HC\_HCT541

All information provided in this document is subject to legal disclaimers.

## 74HC541; 74HCT541

#### Octal buffer/line driver; 3-state

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond

NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

#### 15.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

#### 16. Contact information

For more information, please visit: http://www.nxp.com

For sales office addresses, please send an email to: salesaddresses@nxp.com

# 74HC541; 74HCT541

#### **NXP Semiconductors**

Octal buffer/line driver; 3-state

### 17. Contents

1	General description
2	Features and benefits 1
3	Ordering information 1
4	Functional diagram 2
5	Pinning information 5
5.1	Pinning
5.2	Pin description 5
6	Functional description 5
7	Limiting values 6
8	Recommended operating conditions 6
9	Static characteristics 7
10	Dynamic characteristics 8
11	Waveforms
12	Package outline
13	Abbreviations
14	Revision history
15	Legal information
15.1	Data sheet status
15.2	Definitions
15.3	Disclaimers
15.4	Trademarks17
16	Contact information
17	Contents

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

## **Mouser Electronics**

**Authorized Distributor** 

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

### NXP:

74HC541D,652 74HC541DB,112 74HC541DB,118 74HC541D,653 74HC541N,652 74HC541PW,112

74HC541PW,118 74HCT541D,652 74HCT541DB,112 74HCT541DB,118 74HCT541D,653 74HCT541PW,118