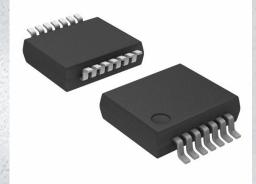


# 74HCT126DB,118 Datasheet

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**Detailed Description** 

74HCT126DB,118-DG Nexperia USA Inc.

74HCT126DB,118

IC BUF NON-INVERT 5.5V 14SSOP

Buffer, Non-Inverting 4 Element 1 Bit per Element 3 -State Output 14-SSOP

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# Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
74HCT126DB,118	Nexperia USA Inc.
Series:	Product Status:
74HCT	Obsolete
Logic Type:	Number of Elements:
Buffer, Non-Inverting	4
Number of Bits per Element:	Input Type:
1	
Output Type:	Current - Output High, Low:
3-State	6mA, 6mA
Voltage - Supply:	Operating Temperature:
4.5V ~ 5.5V	-40°C ~ 125°C (TA)
Mounting Type:	Package / Case:
Surface Mount	14-SSOP (0.209", 5.30mm Width)
Supplier Device Package:	Base Product Number:
14-SSOP	74HCT126

# Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	



### 1. General description

The 74HC126; 74HCT126 is a quad buffer/line driver with 3-state outputs controlled by the output enable inputs (nOE). A LOW on nOE causes the outputs to assume a high-impedance OFF-state. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

### 2. Features and benefits

- Wide supply voltage range from 2.0 V to 6.0 V
- CMOS low power dissipation
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
  - JESD8C (2.7 V to 3.6 V)
  - JESD7A (2.0 V to 6.0 V)
- Input levels:
  - For 74HC126: CMOS levels
  - For 74HCT126: TTL levels
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

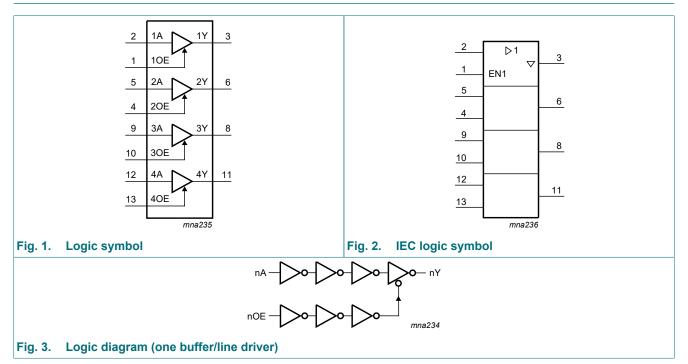
### 3. Ordering information

Type number	Package	Package										
	Temperature range	Name	Description	Version								
<u>74HC126D</u> 74HCT126D	-40 °C to +125 °C	SO14	plastic small outline package; 14 leads; body width 3.9 mm	<u>SOT108-1</u>								
74HC126PW 74HCT126PW	-40 °C to +125 °C	TSSOP14	plastic thin shrink small outline package; 14 leads; body width 4.4 mm	<u>SOT402-1</u>								

# ne<mark>x</mark>peria

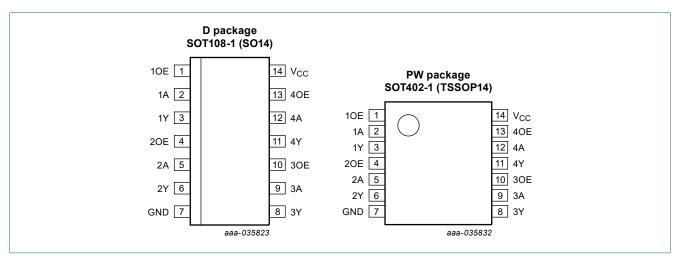
Quad buffer/line driver; 3-state

## 4. Functional diagram



### 5. Pinning information

### 5.1. Pinning



### 5.2. Pin description

Symbol	Pin	Description
10E, 20E, 30E, 40E	1, 4, 10, 13	data enable input (active HIGH)
1A, 2A, 3A, 4A	2, 5, 9, 12	data input
1Y, 2Y, 3Y, 4Y	3, 6, 8, 11	data output
GND	7	ground (0 V)
V <sub>CC</sub>	14	supply voltage

### 6. Functional description

#### Table 3. Function table

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

Control	Input	Output
nOE	nA	nY
Н	L	L
н	Н	Н
L	X	Z

### 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 V or $V_{I}$ > $V_{CC}$ + 0.5 V	[1]	-	±20	mA
I <sub>OK</sub>	output clamping current	$V_{\rm O}$ < -0.5 V or $V_{\rm O}$ > $V_{\rm CC}$ + 0.5 V	[1]	-	±20	mA
lo	output current	$-0.5 V < V_O < V_{CC} + 0.5 V$		-	±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	T <sub>amb</sub> = -40 °C to +125 °C	[2]	-	500	mW

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

[2] For SOT108-1 (SO14) package: Ptot derates linearly with 10.1 mW/K above 100 °C.

For SOT402-1 (TSSOP14) package: Ptot derates linearly with 7.3 mW/K above 81 °C.

# 8. Recommended operating conditions

#### Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions		74HC126	3	74HCT126			Unit
			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 <sub>CC</sub> = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V <sub>CC</sub> = 6.0 V	-	-	83	-	-	-	ns/V

### 9. Static characteristics

#### Table 6. Static characteristics

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

Symbol	Parameter	Conditions		25 °C		-40 °C t	o +85 °C	-40 °C to	Unit	
			Min	Тур	Max	Min	Мах	Min	Max	-
74HC12	6									-
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
VIL	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	$V_{I} = V_{IH} \text{ or } V_{IL}$								
	output voltage	I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	V
V <sub>OL</sub>	LOW-level	$V_{I} = V_{IH} \text{ or } V_{IL}$								
	output voltage	I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
l <sub>l</sub>	input leakage current	$V_{I} = V_{CC}$ or GND; $V_{CC} = 6.0$ V	-	-	±0.1	-	±1.0	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 6.0 \text{ V};$ $V_{O} = V_{CC} \text{ or GND}$	-	±0.5	-	±5.0	-	±10	-	μA
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 6.0$ V	-	-	8.0	-	80	-	160	μA

# 74HC126; 74HCT126

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

Symbol	Parameter	Conditions		25 °C		-40 °C t	o +85 °C	-40 °C to +125 °C		Unit
			Min	Тур	Max	Min	Мах	Min	Max	1
CI	input capacitance		-	3.5	-	-	-	-	-	pF
74HCT1	26							·		
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	$V_{CC}$ = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$								
	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 output voltage	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$								
		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
l <sub>l</sub>	input leakage current	$V_{I} = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	±0.1	-	±1.0	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 5.5 \text{ V};$ $V_{O} = V_{CC} \text{ or GND}$	-	-	±0.5	-	±5.0	-	±10	μA
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	8.0	-	80	-	160	μA
ΔI <sub>CC</sub>	additional supply current	per input pin; $V_I = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A};$ other inputs at $V_{CC}$ or GND; $V_{CC} = 4.5 \text{ V}$ to 5.5 V	-	100	360	-	450	-	490	μA
Cı	input capacitance		-	3.5	-	-	-	-	-	pF

## **10.** Dynamic characteristics

#### Table 7. Dynamic characteristics

 $GND = 0 V; C_L = 50 pF;$  for test circuit, see Fig. 6.

Symbol	Parameter	Conditions		25 °C		-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Тур	Max	Min	Max	Min	Max	1
74HC12	6					1	<u> </u>			
t <sub>pd</sub>	propagation	nA to nY; see Fig. 4 [1]								
	delay	V <sub>CC</sub> = 2.0 V	-	30	100	-	125	-	150	ns
		V <sub>CC</sub> = 4.5 V	-	11	20	-	25	-	30	ns
		V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF	-	9	-	-	-	-	-	ns
		V <sub>CC</sub> = 6.0 V	-	9	17	-	21	-	26	ns
t <sub>en</sub>	enable time	nOE to nY; see Fig. 5 [1]								
		V <sub>CC</sub> = 2.0 V	-	41	125	-	155	-	190	ns
		V <sub>CC</sub> = 4.5 V	-	15	25	-	31	-	38	ns
		V <sub>CC</sub> = 6.0 V	-	12	21	-	26	-	32	ns
t <sub>dis</sub>	disable time	nOE to nY; see Fig. 5 [1]								
		V <sub>CC</sub> = 2.0 V	-	41	125	-	155	-	190	ns
		V <sub>CC</sub> = 4.5 V	-	15	25	-	31	-	38	ns
		V <sub>CC</sub> = 6.0 V	-	12	21	-	26	-	32	ns

# 74HC126; 74HCT126

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

Symbol	Parameter	Conditions			25 °C		-40 °C te	o +85 °C	-40 °C to +125 °C		Unit
				Min	Тур	Мах	Min	Max	Min	Max	
t <sub>t</sub>	transition	see Fig. 4 [	1]								
	time	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
C <sub>PD</sub>	power dissipation capacitance	per package; [ V <sub>I</sub> = GND to V <sub>CC</sub>	2]	-	23	-	-	-	-	-	pF
74HCT1	26							1			
t <sub>pd</sub>	propagation delay	nA to nY; see Fig. 4 [	1]								
		V <sub>CC</sub> = 4.5 V		-	14	24	-	30	-	36	ns
		V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF		-	11	-	-	-	-	-	ns
t <sub>en</sub>	enable time	nOE to nY; see Fig. 5; [ $V_{CC}$ = 4.5 V	1]	-	13	25	-	31	-	38	ns
t <sub>dis</sub>	disable time	nOE to nY; see Fig. 5; [ $V_{CC}$ = 4.5 V	1]	-	18	28	-	35	-	42	ns
t <sub>t</sub>	transition time	V <sub>CC</sub> = 4.5 V; see <u>Fig. 4</u> [	1]	-	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	2]	-	24	-	-	-	-	-	pF

 $\begin{array}{l} t_{t} \text{ is the same as } t_{THL} \text{ and } t_{TLH}. \\ \end{tabular} \\$ 

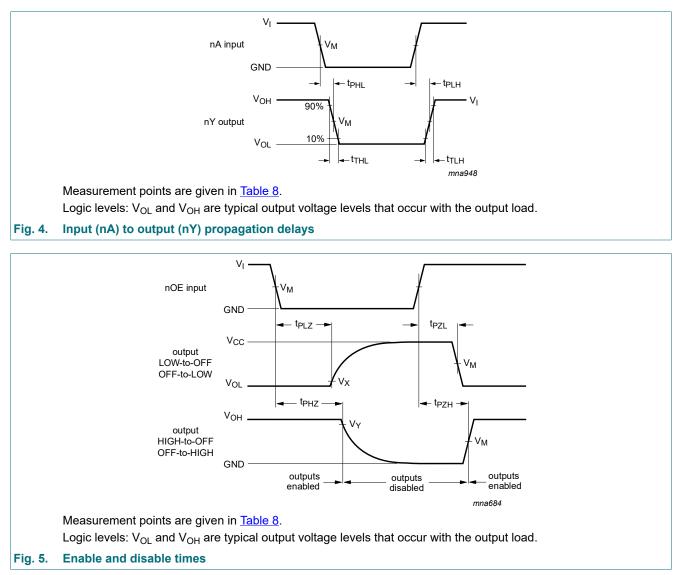
 $V_{CC}$  = supply voltage in V;

N = number of inputs switching;

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

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



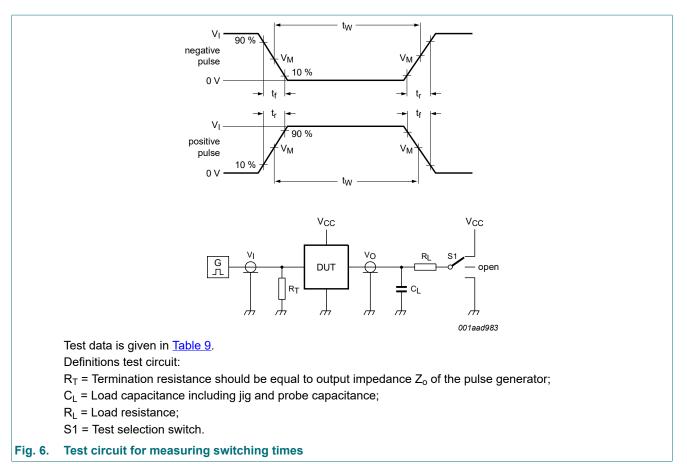


#### Table 8. Measurement points

Туре	Input	Output		
	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>
74HC126	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	0.1 × V <sub>CC</sub>	$0.9 \times V_{CC}$
74HCT126	1.3 V	1.3 V	0.1 × V <sub>CC</sub>	$0.9 \times V_{CC}$

# 74HC126; 74HCT126

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

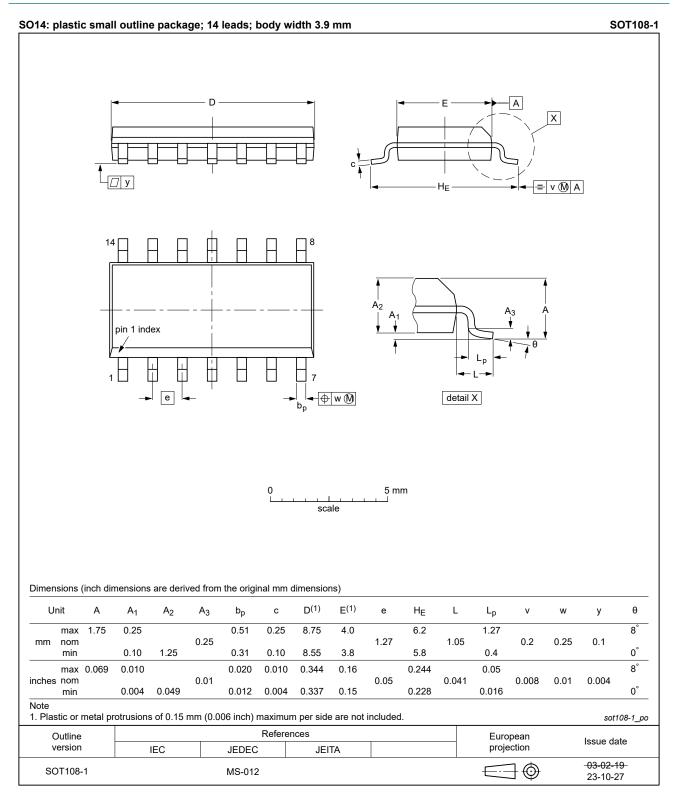


#### Table 9. Test data

Type Input		Load		S1 position			
	VI	t <sub>r</sub> , t <sub>f</sub>	CL	RL	t <sub>PHL</sub> , t <sub>PLH</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
74HC126	V <sub>CC</sub>	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>
74HCT126	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>

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

## 11. Package outline



#### Fig. 7. Package outline SOT108-1 (SO14)

# 74HC126; 74HCT126

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

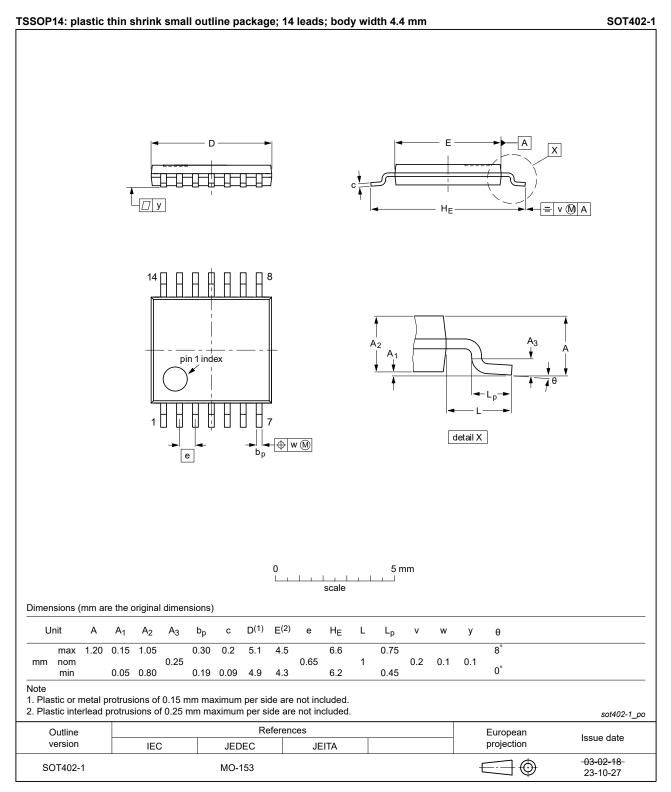


Fig. 8. Package outline SOT402-1 (TSSOP14)

# 12. Abbreviations

Table 10. Abbrev	viations
Acronym	Description
CDM	Charged Device Model
CMOS	Complementary Metal-Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
TTL	Transistor-Transistor Logic

# 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
74HC_HCT126 v.7	20240229	Product data sheet	-	74HC_HCT126 v.6		
Modifications:		<ul> <li><u>Section 2</u>: ESD specification updated according to the latest JEDEC standard.</li> <li><u>Fig. 7</u>, <u>Fig. 8</u>: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153</li> </ul>				
74HC_HCT126 v.6	20221228	Product data sheet	-	74HC_HCT126 v.5		
Modifications:	Section 2 u	<u>Section 2</u> updated (errata).				
74HC_HCT126 v.5	20210712	Product data sheet	-	74HC_HCT126 v.4		
	guidelines c Legal texts Type number <u>Section 2</u> u	have been adapted to the ers 74HC126DB and 74HC	new company nar CT126DB (SOT33	ne where appropriate. 7-1/SSOP14) removed.		
74HC_HCT126 v.4	20151201	Product data sheet	-	74HC_HCT126 v.3		
Modifications:	Type numbers 74HC126N and 74HCT126N (SOT27-1) removed.					
74HC_HCT126 v.3	20140922	Product data sheet	-	74HC_HCT126_CNV v.2		
Modifications:	guidelines o	guidelines of NXP Semiconductors.				
74HC_HCT126_CNV v.2	19901201	Product specification	-	-		

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

### 14. Legal information

#### 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.

 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 <u>https://www.nexperia.com</u>.

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# 74HC126; 74HCT126

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