

1. General description

The 74HC126-Q100; 74HCT126-Q100 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} .

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

2. Features and benefits

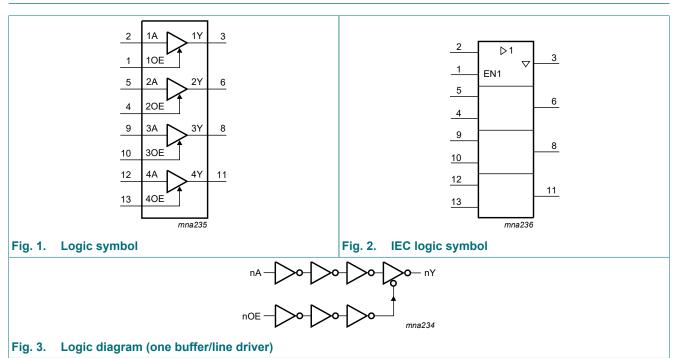
- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
 Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- Wide supply voltage range from 2.0 V to 6.0 V
- CMOS low power dissipation
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
 - JESD8C (2.7 V to 3.6 V)
 - JESD7A (2.0 V to 6.0 V)
- Input levels:
 - For 74HC126-Q100: CMOS levels
 - For 74HCT126-Q100: 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

3. Ordering information

Table 1. Ordering information								
Type number Package								
	Temperature range	Name	Description	Version				
74HC126D-Q100 74HCT126D-Q100	-40 °C to +125 °C	SO14	plastic small outline package; 14 leads; body width 3.9 mm	<u>SOT108-1</u>				
74HC126PW-Q100 74HCT126PW-Q100	-40 °C to +125 °C	TSSOP14	plastic thin shrink small outline package; 14 leads; body width 4.4 mm	<u>SOT402-1</u>				

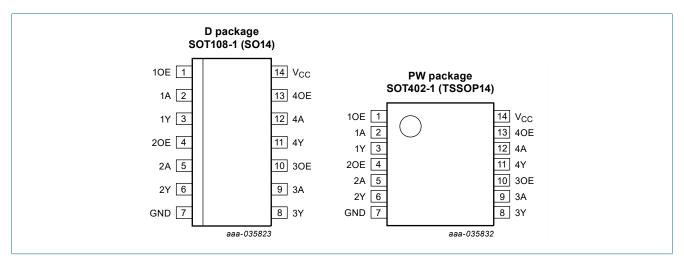
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4. Functional diagram



5. Pinning information

5.1. Pinning



5.2. Pin description

Table 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 _{CC}	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.

	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 _{CC}	supply voltage			-0.5	+7	V
I _{IK}	input clamping current	$V_{\rm I}$ < -0.5 V or $V_{\rm I}$ > $V_{\rm CC}$ + 0.5 V	[1]	-	±20	mA
I _{ОК}	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 _{CC}	supply current			-	70	mA
I _{GND}	ground current			-70	-	mA
T _{stg}	storage temperature			-65	+150	°C
P _{tot}	total power dissipation	T _{amb} = -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: P_{tot} 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	74	IC126-Q	100	74H	Unit		
			Min	Тур	Max	Min	Тур	Max	
V _{CC}	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
VI	input voltage		0	-	V _{CC}	0	-	V _{CC}	V
Vo	output voltage		0	-	V _{CC}	0	-	V _{CC}	V
T _{amb}	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall rate	V _{CC} = 2.0 V	-	-	625	-	-	-	ns/V
		V _{CC} = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V _{CC} = 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	o +125 °C	Unit
			Min	Тур	Max	Min	Мах	Min	Max	-
74HC12	6-Q100									-
VIH	HIGH-level	V _{CC} = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
	input voltage	V _{CC} = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V _{CC} = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
VIL	LOW-level	V _{CC} = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
	input voltage	V _{CC} = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
	V _{CC} = 6.0 V	-	2.8	1.8	-	1.8	-	1.8	V	
V _{OH} HIGH-level		$V_{I} = V_{IH} \text{ or } V_{IL}$								
	output voltage	I _O = -20 μA; V _{CC} = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I _O = -20 μA; V _{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I _O = -20 μA; V _{CC} = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		I _O = -6.0 mA; V _{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I _O = -7.8 mA; V _{CC} = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	V
V _{OL}	LOW-level	$V_{I} = V_{IH} \text{ or } V_{IL}$								
	output voltage	I _O = 20 μA; V _{CC} = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 20 μA; V _{CC} = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 20 μA; V _{CC} = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 6.0 mA; V _{CC} = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I _O = 7.8 mA; V _{CC} = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
lı	input leakage current	$V_{I} = V_{CC}$ or GND; $V_{CC} = 6.0$ V	-	-	±0.1	-	±1.0	-	±1.0	μA
I _{OZ}	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 _{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 6.0$ V	-	-	8.0	-	80	-	160	μA

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-Q100	,								
V _{IH}	HIGH-level input voltage	V _{CC} = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	2.0	-	V
V _{IL}	LOW-level input voltage	V_{CC} = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V _{OH}	HIGH-level	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$								
	output voltage	I _O = -20 μA	4.4	4.5	-	4.4	-	4.4	-	V
		I _O = -6.0 mA	3.98	4.32	-	3.84	-	3.7	-	V
V _{OL} LOW-level	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$									
	output voltage	I _O = 20 μA	-	0	0.1	-	0.1	-	0.1	V
		I _O = 6.0 mA	-	0.16	0.26	-	0.33	-	0.4	V
lı	input leakage current	$V_{I} = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	±0.1	-	±1.0	-	±1.0	μA
I _{OZ}	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 _{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	8.0	-	80	-	160	μA
ΔI _{CC}	additional supply current	per input pin; $V_1 = V_{CC} - 2.1 \text{ V}; I_0 = 0 \text{ A};$ 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 t	o +85 °C	-40 °C to	o +125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	1
74HC12	6-Q100					1			-	
t _{pd}	propagation	nA to nY; see Fig. 4 [1]								
	delay	V _{CC} = 2.0 V	-	30	100	-	125	-	150	ns
		V _{CC} = 4.5 V	-	11	20	-	25	-	30	ns
	V _{CC} = 5.0 V; C _L = 15 pF	-	9	-	-	-	-	-	ns	
	V _{CC} = 6.0 V	-	9	17	-	21	-	26	ns	
t _{en}	enable time	nOE to nY; see Fig. 5 [1]								
		V _{CC} = 2.0 V	-	41	125	-	155	-	190	ns
		V _{CC} = 4.5 V	-	15	25	-	31	-	38	ns
		V _{CC} = 6.0 V	-	12	21	-	26	-	32	ns
t _{dis}	disable time	nOE to nY; see Fig. 5 [1]								
		V _{CC} = 2.0 V	-	41	125	-	155	-	190	ns
		V _{CC} = 4.5 V	-	15	25	-	31	-	38	ns
		V _{CC} = 6.0 V	-	12	21	-	26	-	32	ns

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Symbol	Parameter	Conditions			25 °C		-40 °C to	o +85 °C	-40 °C to +125 °C		Unit
					Тур	Max	Min	Max	Min	Max	
t _t	transition	see Fig. 4	[1]								
	time	V _{CC} = 2.0 V		-	14	60	-	75	-	90	ns
		V _{CC} = 4.5 V		-	5	12	-	15	-	18	ns
		V _{CC} = 6.0 V		-	4	10	-	13	-	15	ns
C _{PD}	power dissipation capacitance	per package; V _I = GND to V _{CC}	[2]	-	23	-	-	-	-	-	pF
74HCT1	26-Q100						1				
t _{pd}	t _{pd} propagation	nA to nY; see Fig. 4	[1]								
	delay	V _{CC} = 4.5 V		-	14	24	-	30	-	36	ns
		V _{CC} = 5.0 V; C _L = 15 pF		-	11	-	-	-	-	-	ns
t _{en}	enable time	nOE to nY; see Fig. 5; $V_{CC} = 4.5 V$	[1]	-	13	25	-	31	-	38	ns
t _{dis}	disable time	nOE to nY; see Fig. 5; $V_{CC} = 4.5 V$	[1]	-	18	28	-	35	-	42	ns
t _t	transition time	V _{CC} = 4.5 V; see <u>Fig. 4</u>	[1]	-	5	12	-	15	-	18	ns
C _{PD}	power dissipation capacitance	per package; V _I = GND to V _{CC} - 1.5 V	[2]	-	24	-	-	-	-	-	pF

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

 V_{CC} = supply voltage in V;

N = number of inputs switching;

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



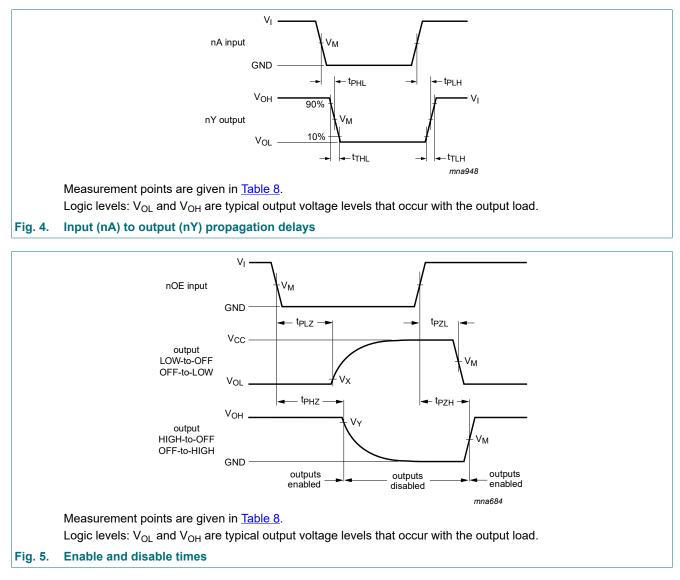


Table 8. Measurement points

Туре	Input	Output					
	V _M	V _M	V _X	V _Y			
74HC126-Q100	0.5 × V _{CC}	0.5 × V _{CC}	0.1 × V _{CC}	0.9 × V _{CC}			
74HCT126-Q100	1.3 V	1.3 V	0.1 × V _{CC}	$0.9 \times V_{CC}$			

74HC126-Q100; 74HCT126-Q100

Quad buffer/line driver; 3-state

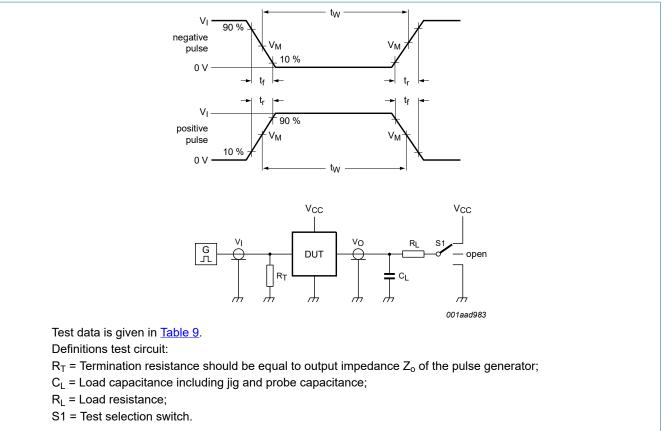


Fig. 6. Test circuit for measuring switching times

Table 9. Test data

Туре	Input		Load		S1 position			
	VI	t _r , t _f	CL	R _L	t _{PHL} , t _{PLH}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}	
74HC126-Q100	V _{CC}	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}	
74HCT126-Q100	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}	

11. Package outline

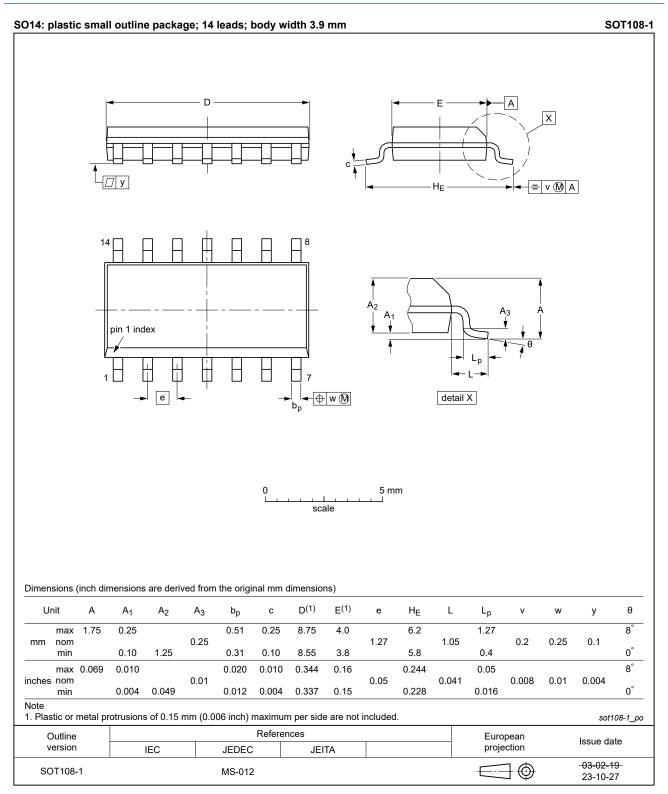


Fig. 7. Package outline SOT108-1 (SO14)

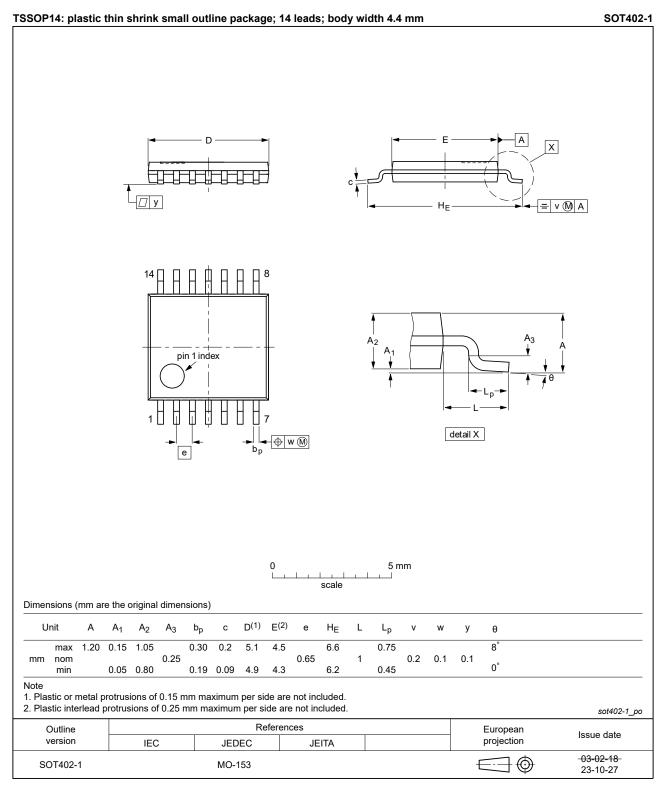


Fig. 8. Package outline SOT402-1 (TSSOP14)

12. Abbreviations

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

13. Revision history

Table 11. Revision history						
Document ID	Release date	Data sheet status	Change notice	Supersedes		
74HC_HCT126_Q100 v.4	20240229	Product data sheet	-	74HC_HCT126_Q100 v.3		
Modifications:	 <u>Section 2</u>: ESD specification updated according to the latest JEDEC standard. <u>Fig. 7</u>, <u>Fig. 8</u>: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153 					
74HC_HCT126_Q100 v.3	20221228	Product data sheet	-	74HC_HCT126_Q100 v.2		
Modifications:	<u>Section 2</u> updated (errata).					
74HC_HCT126_Q100 v.2	20210712	Product data sheet	-	74HC_HCT126_Q100 v.1		
Modifications:	 The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. <u>Section 2</u> updated. <u>Section 7</u>: Derating values for P_{tot} total power dissipation have been updated. 					
74HC_HCT126_Q100 v.1	20130320	Product data sheet	-	-		

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.
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Quad buffer/line driver; 3-state

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74HC_HCT126_Q100

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