74HC367; 74HCT367

Hex buffer/line driver; 3-state Rev. 4 — 24 February 2021

Product data sheet

1. General description

The 74HC367; 74HCT367 is a hex buffer/line driver with 3-state outputs controlled by the output enable inputs (nOE). A HIGH on nOE causes the outputs to assume a high impedance OFF-state. Inputs include clamp diodes. It 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)
- 3-state outputs
- Input levels:
 - For 74HC367: CMOS level
 - For 74HCT367: TTL level
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

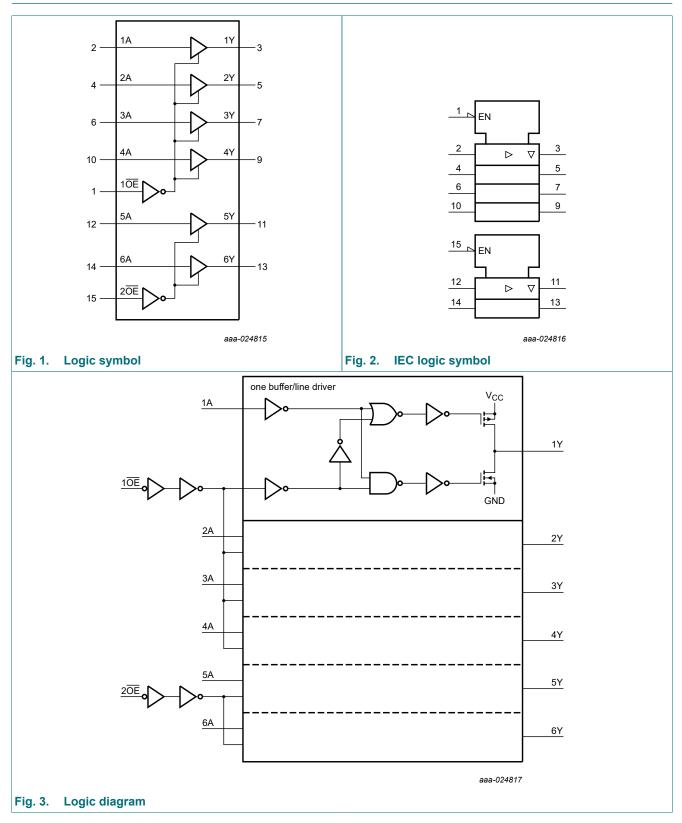
3. Ordering information

Table 1. Ordering information

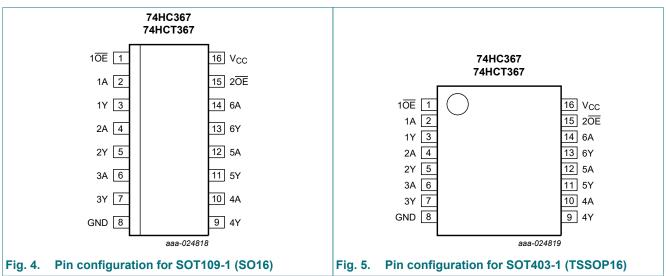
Type number	Package								
	Temperature range	Name	Description	Version					
74HC367D	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1					
74HCT367D									
74HC367PW	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads;	SOT403-1					
74HCT367PW			body width 4.4 mm						

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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	1, 15	output enable input (active LOW)
1A, 2A, 3A, 4A, 5A, 6A	2, 4, 6, 10, 12, 14	data input
1Y, 2Y, 3Y, 4Y, 5Y, 6Y	3, 5, 7, 9, 11, 13	bus output
GND	8	ground (0 V)
V _{cc}	16	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 nOE	Output	
nOE	nA	nY
L	L	L
L	Н	Н
Н	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	-	±20	mA
I _{ОК}	output clamping current	$V_{\rm O}$ < -0.5 V or $V_{\rm O}$ > $V_{\rm CC}$ + 0.5 V	-	±20	mA
I _O	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	[1] -	500	mW

For SOT109-1 (SO16) package: P_{tot} derates linearly with 12.4 mW/K above 110 °C.
 For SOT403-1 (TSSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

Symbol	Parameter	Conditions	74HC367			74HCT367			Unit
			Min	Тур	Мах	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	
74HC367	7									
V _{IH}	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
V _{IL}	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} or V _{IL}								
	output voltage	I _O = -20 μΑ; 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
I	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	$V_I = V_{IH} \text{ or } V_{IL}; V_{CC} = 6.0 \text{ V};$ $V_O = V_{CC} \text{ or } \text{GND}$	-	-	±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
CI	input capacitance		-	3.5	-	-	-	-	-	pF

74HC367; 74HCT367

Hex buffer/line driver; 3-state

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	
74HCT3	67	1						1		
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	l _O = -20 μA	4.4	4.5	-	4.4	-	4.4	-	V
		I _O = -6 mA	3.98	4.32	-	3.84	-	3.7	-	V
V _{OL}		$V_{I} = V_{IH} \text{ or } V_{IL}; V_{CC} = 4.5 \text{ V}$								
	output voltage	l _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
I _I	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; $V_{CC} = 5.5$ V; $I_O = 0$ A	-	-	8.0	-	80	-	160	μA
ΔI _{CC}	additional supply current	per input pin; $V_I = V_{CC} - 2.1 V$; other inputs at V_{CC} or GND; $V_{CC} = 4.5 V$ to 5.5 V; $I_0 = 0 A$								
		10E, nA inputs	-	100	360	-	450	-	490	μA
		20E input	-	90	324	-	405	-	441	μA
Cı	input capacitance		-	3.5	-	-	-	-	-	pF

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); C_L = 50 pF unless otherwise specified; for test circuit, see Fig. 8.

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	1
74HC36	7	1	I					1	-	
t _{pd}	propagation	nA to nY; see Fig. 6 [1]								
	delay	V _{CC} = 2.0 V	-	28	95	-	120	-	145	ns
		V _{CC} = 4.5 V	-	10	19	-	24	-	29	ns
		V _{CC} = 5.0 V; C _L = 15 pF	-	8	-	-	-	-	-	ns
		V _{CC} = 6.0 V	-	8	16	-	20	-	25	ns
t _{en}	enable time	nOE to nY; see Fig. 7 [1]								
		V _{CC} = 2.0 V	-	44	150	-	190	-	225	ns
		V _{CC} = 4.5 V	-	16	30	-	38	-	45	ns
		V _{CC} = 6.0 V	-	13	26	-	33	-	38	ns
t _{dis}	disable time	nOE to nY; see Fig. 7 [1]								
	V _{CC} = 2.0 V	-	55	150	-	190	-	225	ns	
	V _{CC} = 4.5 V	-	20	30	-	38	-	45	ns	
		V _{CC} = 6.0 V	-	16	26	-	33	-	38	ns
t _t	transition time	see <u>Fig. 6</u> [1]								
		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 buffer; V_1 = GND to V_{CC} [2]	-	30	-	-	-	-	-	pF
74HCT3	67			1	1	1		<u> </u>		1
t _{pd}	propagation	nA to nY; see Fig. 6 [1]								
	delay	V _{CC} = 4.5 V	-	14	25	-	31	-	38	ns
		V _{CC} = 5.0 V; C _L = 15 pF	-	11	-	-	-	_	-	ns
t _{en}	enable time	nOE to nY; V_{CC} = 4.5 V; [1] see Fig. 7	-	16	35	-	44	-	53	ns
t _{dis}	disable time	nOE to nY; V _{CC} = 4.5 V; [1] see <u>Fig. 7</u>	-	21	35	-	44	-	53	ns
t _t	transition time	V _{CC} = 4.5 V; see <u>Fig. 6</u> [1]	-	5	12	-	15	-	18	ns
C _{PD}	power dissipation capacitance	per buffer; [2] $V_I = GND$ to $V_{CC} - 1.5 V$	-	32	-	-	-	-	-	pF

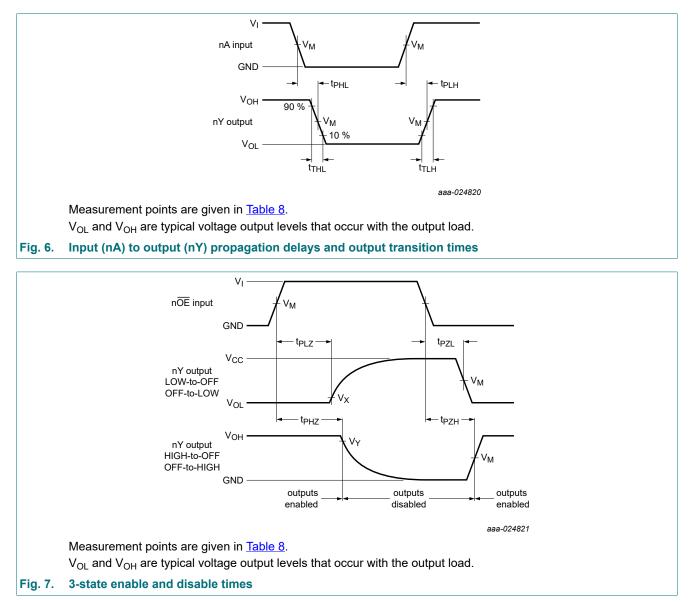
[1] t_{pd} is the same as t_{PHL} and t_{PLH} ; t_{en} is the same as t_{PZH} and t_{PZL} ; t_{dis} is the same as t_{PHZ} and t_{PLZ} ; t_t is the same as t_{THL} and t_{TLH} . [2] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W): $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma (C_L \times V_{CC}^2 \times f_o)$ where:

 f_i = input frequency in MHz; fo = output frequency in MHz;

 C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching; $\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.



10.1. Waveforms and test circuit

Table 8. Measurement points

Туре	Input	Output				
	V _M	V _M	V _X	V _Y		
74HC367	0.5 × V _{CC}	0.5 × V _{CC}	0.1 × V _{CC}	0.9 × V _{CC}		
74HCT367	1.3 V	1.3 V	0.1 × V _{CC}	$0.9 \times V_{CC}$		

74HC367; 74HCT367

Hex buffer/line driver; 3-state

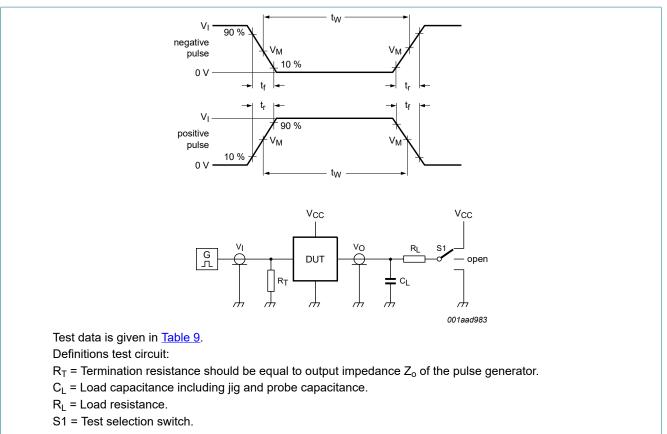


Fig. 8. Test circuit for measuring switching times

Table 9. Test data

Туре	Input		Load		S1 position		
	VI	t _r , t _f	CL	RL	t _{PHL} , t _{PLH}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}
74HC367	V _{CC}	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}
74HCT367	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	GND	V _{CC}

11. Package outline

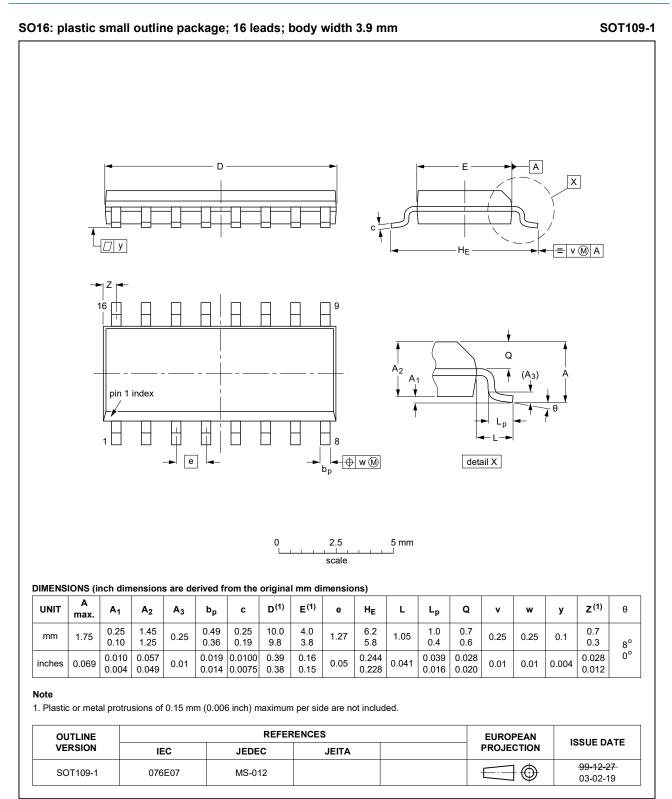


Fig. 9. Package outline SOT109-1 (SO16)

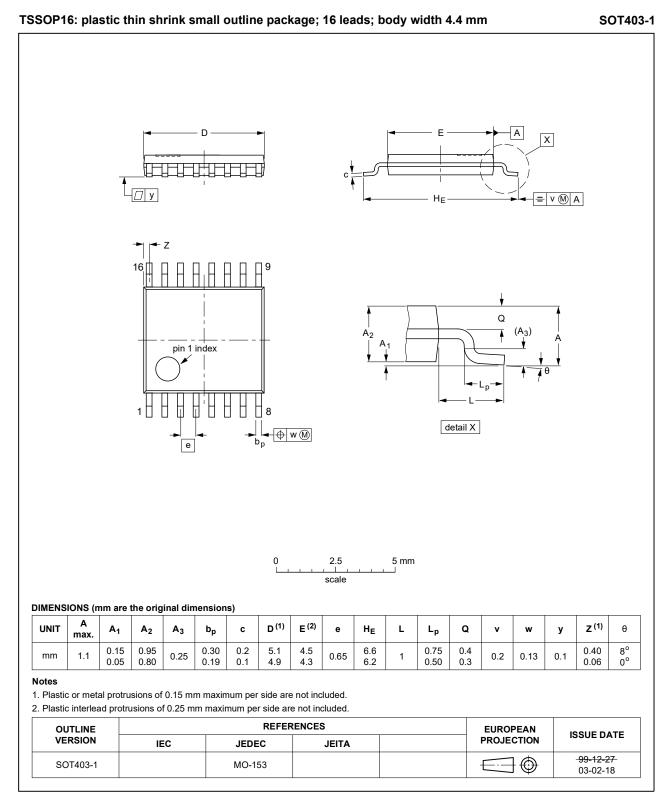


Fig. 10. Package outline SOT403-1 (TSSOP16)

⁷⁴HC_HCT367

12. Abbreviations

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

13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes			
74HC_HCT367 v.4	20210224	Product data sheet	-	74HC_HCT367 v.3			
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 updated. Type numbers 74HC367DB and 74HCT367DB (SOT338-1 / SSOP16) removed. 						
74HC_HCT367 v.3	20161017	Product data sheet	-	74HC_HCT367_CNV v.2			
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74HC_HCT367_CNV v.2	19901201	Product specification	-	-			

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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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