74AUP2G00

Low-power dual 2-input NAND gate Rev. 5 — 21 October 2010

Product data sheet

General description 1.

The 74AUP2G00 provides dual 2-input NAND function.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V.

This device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing a damaging backflow current through the device when it is powered down.

2. **Features and benefits**

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- Complies with JEDEC standards:
 - ◆ JESD8-12 (0.8 V to 1.3 V)
 - ◆ JESD8-11 (0.9 V to 1.65 V)
 - JESD8-7 (1.2 V to 1.95 V)
 - ◆ JESD8-5 (1.8 V to 2.7 V)
 - ◆ JESD8-B (2.7 V to 3.6 V)
- ESD protection:
 - HBM JESD22-A114F Class 3A exceeds 5000 V
 - MM JESD22-A115-A exceeds 200 V
 - CDM JESD22-C101E exceeds 1 000 V
- Low static power consumption; I_{CC} = 0.9 μA (maximum)
- Latch-up performance exceeds 100 mA per JESD78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial power-down mode operation
- Multiple package options
- 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
74AUP2G00DC	–40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G00GT	–40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 \times 1.95 \times 0.5 mm	SOT833-1
74AUP2G00GF	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 \times 1 \times 0.5 mm	SOT1089
74AUP2G00GD	–40 °C to +125 °C	XSON8U	plastic extremely thin small outline package; no leads; 8 terminals; UTLP based; body $3\times2\times0.5$ mm	SOT996-2
74AUP2G00GM	–40 °C to +125 °C	XQFN8U	plastic extremely thin quad flat package; no leads; 8 terminals; UTLP based; body $1.6\times1.6\times0.5$ mm	SOT902-1
74AUP2G00GN	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 \times 1.0 \times 0.35 mm	SOT1116
74AUP2G00GS	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 \times 1.0 \times 0.35 mm	SOT1203

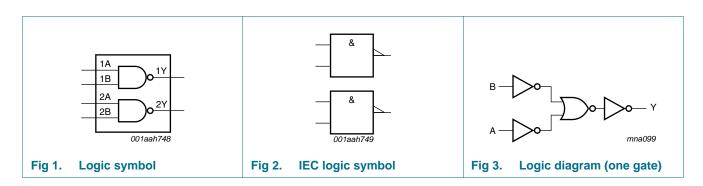
4. Marking

Table 2. Marking codes

Type number	Marking code ^[1]
74AUP2G00DC	p00
74AUP2G00GT	p00
74AUP2G00GF	pA
74AUP2G00GD	p00
74AUP2G00GM	p00
74AUP2G00GN	pA
74AUP2G00GS	pA

^[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

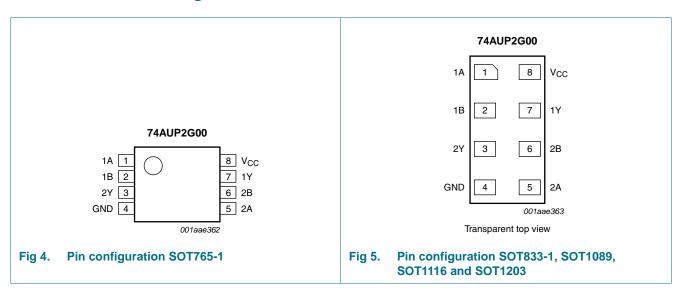
5. Functional diagram

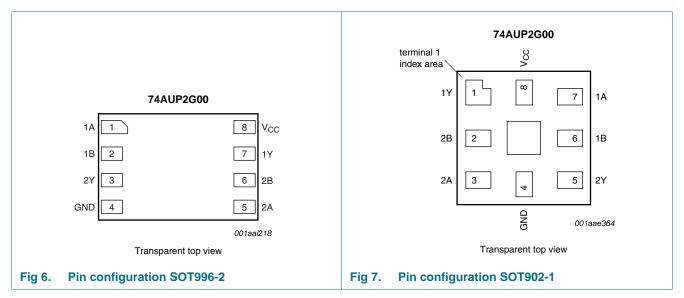


74AUP2G00

6. Pinning information

6.1 Pinning





6.2 Pin description

Table 3. Pin description

Symbol	Pin	Pin		
	SOT765-1, SOT833-1, SOT1089, SOT996-2, SOT1116 and SOT1203	SOT902-1		
1A, 2A	1, 5	7, 3	data input	
1B, 2B	2, 6	6, 2	data input	
GND	4	4	ground (0 V)	
1Y, 2Y	7, 3	1, 5	data output	
V_{CC}	8	8	supply voltage	
74AUP2G00	All information provided	in this document is subject to legal di	isclaimers. © NXP B.V. 2010. All rights reser	

74AUP2G00

Low-power dual 2-input NAND gate

7. Functional description

Table 4. Function table[1]

NXP Semiconductors

Input	Output	
nA	nB	nY
L	L	Н
L	Н	Н
Н	L	Н
Н	Н	L

^[1] H = HIGH voltage level; L = LOW voltage level.

8. Limiting values

Table 5. Limiting values

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

		, ,		1.0	,
Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	+4.6	V
I _{IK}	input clamping current	V _I < 0 V	-50	-	mA
V_{I}	input voltage		<u>[1]</u> –0.5	+4.6	V
I _{OK}	output clamping current	V _O < 0 V	-50	-	mA
Vo	output voltage	Active mode and Power-down mode	<u>[1]</u> –0.5	+4.6	V
Io	output current	$V_O = 0 V \text{ to } V_{CC}$	-	±20	mA
I _{CC}	supply current		-	50	mA
I _{GND}	ground current		-50	-	mA
T _{stg}	storage temperature		-65	+150	°C
P _{tot}	total power dissipation	$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$	[2] _	250	mW

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

9. Recommended operating conditions

Table 6. Operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		8.0	3.6	V
VI	input voltage		0	3.6	V
Vo	output voltage	Active mode	0	V_{CC}	V
		Power-down mode; V _{CC} = 0 V	0	3.6	V
T _{amb}	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	$V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	200	ns/V

^[2] For VSSOP8 packages: above 110 °C the value of P_{tot} derates linearly at 8.0 mW/K.
For XSON8, XSON8U and XQFN8U packages: above 118 °C the value of P_{tot} derates linearly at 7.8 mW/K.

74AUP2G00

Low-power dual 2-input NAND gate

10. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$T_{amb} = 2$	5 °C					
V_{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	$0.70 \times V_{CC}$	-	-	V
		V _{CC} = 0.9 V to 1.95 V	$0.65 \times V_{CC}$	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	$0.30 \times V_{CC}$	V
		V _{CC} = 0.9 V to 1.95 V	-	-	$0.35 \times V_{CC}$	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = -20 \mu A$; $V_{CC} = 0.8 \text{ V}$ to 3.6 V	V _{CC} - 0.1	-	-	V
		$I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.75 \times V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.11	-	-	V
		$I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.32	-	-	V
		$I_{O} = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	2.05	-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.9	-	-	V
		$I_{O} = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.72	-	-	V
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.6	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = 20 μ A; V_{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		$I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.3 \times V_{CC}$	V
		$I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.31	V
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.31	V
		$I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.31	V
		$I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.44	V
		I_{O} = 2.7 mA; V_{CC} = 3.0 V	-	-	0.31	V
		$I_{O} = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.44	V
I _I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V	-	-	±0.1	μΑ
I _{OFF}	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.2	μΑ
ΔI_{OFF}	additional power-off leakage current	V_1 or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.2	μΑ
I _{CC}	supply current	V_I = GND or V_{CC} ; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V	-	-	0.5	μΑ
ΔI_{CC}	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ $V_{CC} = 3.3 \text{ V}$	[1] -	-	40	μΑ
Cı	input capacitance	V_{CC} = 0 V to 3.6 V; V_{I} = GND or V_{CC}	-	0.8	-	pF
Co	output capacitance	$V_O = GND; V_{CC} = 0 V$	-	1.7	-	pF

Low-power dual 2-input NAND gate

 Table 7.
 Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T _{amb} = -	40 °C to +85 °C					
V _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	$0.70 \times V_{CC}$	-	-	V
		V _{CC} = 0.9 V to 1.95 V	$0.65 \times V_{CC}$	-	-	V
		V_{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.35 \times V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V_{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V _{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_{O} = -20 \mu A$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	V _{CC} - 0.1	-	-	V
		$I_{O} = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.7 \times V_{CC}$	-	-	V
		$I_{O} = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.03	-	-	V
		$I_{O} = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.30	-	-	V
		$I_{O} = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.97	-	-	V
		$I_{O} = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.85	-	-	V
		$I_{O} = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.67	-	-	V
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.55	-	-	V
V _{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_{O} = 20 μ A; V_{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		$I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.3 \times V_{CC}$	V
		$I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.37	V
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.35	V
		$I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.33	V
		$I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.45	V
		$I_O = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.33	V
		$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.45	V
I	input leakage current	$V_I = GND$ to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	±0.5	μΑ
OFF	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.5	μΑ
∆l _{OFF}	additional power-off leakage current	V_1 or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.6	μΑ
СС	supply current	$V_I = GND \text{ or } V_{CC}; I_O = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.9	μΑ
Δl _{CC}	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A};$ $V_{CC} = 3.3 \text{ V}$	[1] -	-	50	μΑ

Low-power dual 2-input NAND gate

Table 7. Static characteristics ...continued
At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Тур	Max	Uni
T _{amb} = -	40 °C to +125 °C					
V _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	$0.75 \times V_{CC}$	-	-	V
		V _{CC} = 0.9 V to 1.95 V	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	$0.25 \times V_{CC}$	V
		V _{CC} = 0.9 V to 1.95 V	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	V
√ _{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_{O} = -20 \mu A$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	V _{CC} - 0.11	-	-	V
		$I_{O} = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.6 \times V_{CC}$	-	-	V
		$I_{O} = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	0.93	-	-	V
		$I_{O} = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.17	-	-	V
		$I_{O} = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.77	-	-	V
		$I_{O} = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.67	-	-	V
		$I_{O} = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.40	-	-	V
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.30	-	-	V
/ _{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = 20 \mu A$; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.11	٧
		I _O = 1.1 mA; V _{CC} = 1.1 V	-	-	$0.33 \times V_{CC}$	٧
		$I_{O} = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.41	٧
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.39	V
		$I_{O} = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.36	V
		$I_{O} = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.50	٧
		$I_{O} = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.36	V
		$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.50	V
I	input leakage current	$V_I = GND$ to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	±0.75	μΑ
OFF	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.75	μΑ
Moff	additional power-off leakage current	V_1 or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.75	μА
СС	supply current	V_I = GND or V_{CC} ; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V	-	-	1.4	μА
7l ^{CC}	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A};$ $V_{CC} = 3.3 \text{ V}$	[1] -	-	75	μА

^[1] One input at V_{CC} – 0.6 V, other input at V_{CC} or GND.

Low-power dual 2-input NAND gate

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9.

Symbol			T	_{amb} = 25	°C	T _{amb} =	-40 °C to	+125 °C	Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
$C_L = 5 p$	F		'		'				
t _{pd}	propagation delay	nA, nB to nY; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	17.5	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.5	5.3	11.0	2.1	12.2	13.5	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.0	3.8	6.8	1.8	7.8	8.6	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.6	3.1	5.3	1.4	6.2	6.9	ns
		V_{CC} = 2.3 V to 2.7 V	1.3	2.5	4.0	1.1	4.7	5.2	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.0	2.2	3.6	1.0	4.2	4.7	ns
C _L = 10	pF								
t _{pd}	propagation delay	nA, nB to nY; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	21.0	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.4	6.1	13.0	2.2	14.4	15.9	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.4	4.4	7.9	2.2	9.2	10.2	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.0	3.7	6.2	1.9	7.3	8.1	ns
		V_{CC} = 2.3 V to 2.7 V	1.4	3.0	4.7	1.3	5.6	6.2	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.3	2.8	4.3	1.2	4.9	5.4	ns
C _L = 15	pF								
t _{pd}	propagation delay	nA, nB to nY; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	24.5	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.4	6.9	14.8	3.1	16.5	18.2	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.8	5.0	8.9	2.5	10.5	11.6	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.0	4.1	7.0	2.0	8.3	9.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	3.5	5.3	1.5	6.4	7.1	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.6	3.2	4.9	1.4	5.7	6.3	ns
C _L = 30	pF								
t_{pd}	propagation delay	nA, nB to nY; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	34.8	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	4.6	9.2	20.1	4.1	22.6	24.9	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	3.0	6.5	11.8	2.9	14.0	15.4	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.6	5.4	9.3	2.3	11.1	12.3	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	2.4	4.6	7.1	2.1	8.5	9.4	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.3	4.3	6.5	2.1	7.6	8.4	ns

Low-power dual 2-input NAND gate

 Table 8.
 Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9.

Symbol	Parameter	arameter Conditions		T _{amb} = 25 °C		$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$			Unit	
				Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
$C_L = 5 pl$	F, 10 pF, 15 pF and	30 pF								
C_{PD}	power dissipation capacitance	$f_i = 1 \text{ MHz};$ $V_I = \text{GND to } V_{CC}$	[3]							
		$V_{CC} = 0.8 \text{ V}$		-	2.8	-	-	-	-	pF
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$		-	2.9	-	-	-	-	pF
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$		-	3.0	-	-	-	-	pF
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		-	3.0	-	-	-	-	pF
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		-	3.4	-	-	-	-	pF
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		-	3.9	-	-	-	-	pF

- [1] All typical values are measured at nominal V_{CC}.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL} .
- [3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

 f_0 = output frequency in MHz;

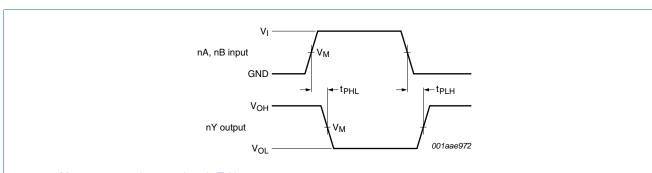
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

12. Waveforms



Measurement points are given in Table 9.

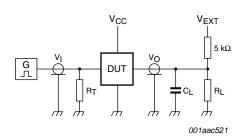
Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig 8. The data input (nA or nB) to output (nY) propagation delays

Table 9. Measurement points

Supply voltage	Output	Input					
V _{CC}	V _M	V _M	VI	$t_r = t_f$			
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V _{CC}	≤ 3.0 ns			

Low-power dual 2-input NAND gate



Test data is given in Table 10.

Definitions for test circuit:

R_L = Load resistance.

C_L = Load capacitance including jig and probe capacitance.

 R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator.

 V_{EXT} = External voltage for measuring switching times.

Fig 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Load		V _{EXT}				
V _{CC}	CL	R _L [1]	t _{PLH} , t _{PHL}	t _{PZH} , t _{PHZ}	t_{PZL}, t_{PLZ}		
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 k Ω or 1 M Ω	open	GND	$2\times V_{CC}$		

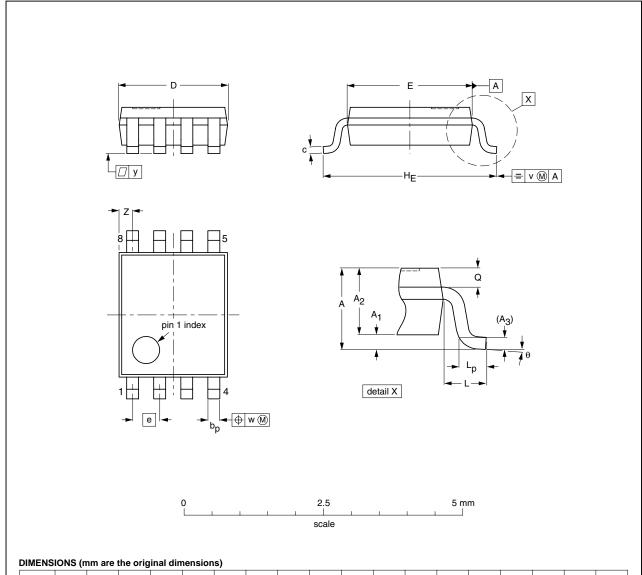
[1] For measuring enable and disable times R_L = 5 k Ω .

For measuring propagation delays, setup and hold times and pulse width R_L = 1 $M\Omega$.

13. Package outline

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1



UNIT	A max.	A ₁	A ₂	А3	bp	С	D ⁽¹⁾	E ⁽²⁾	е	HE	L	Lp	Q	v	w	у	Z ⁽¹⁾	θ
mm	1	0.15 0.00	0.85 0.60	0.12	0.27 0.17	0.23 0.08	2.1 1.9	2.4 2.2	0.5	3.2 3.0	0.4	0.40 0.15	0.21 0.19	0.2	0.13	0.1	0.4 0.1	8° 0°

Notes

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

OUTLINE		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE
SOT765-1		MO-187				02-06-07

Fig 10. Package outline SOT765-1 (VSSOP8)

74AUP2G00

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

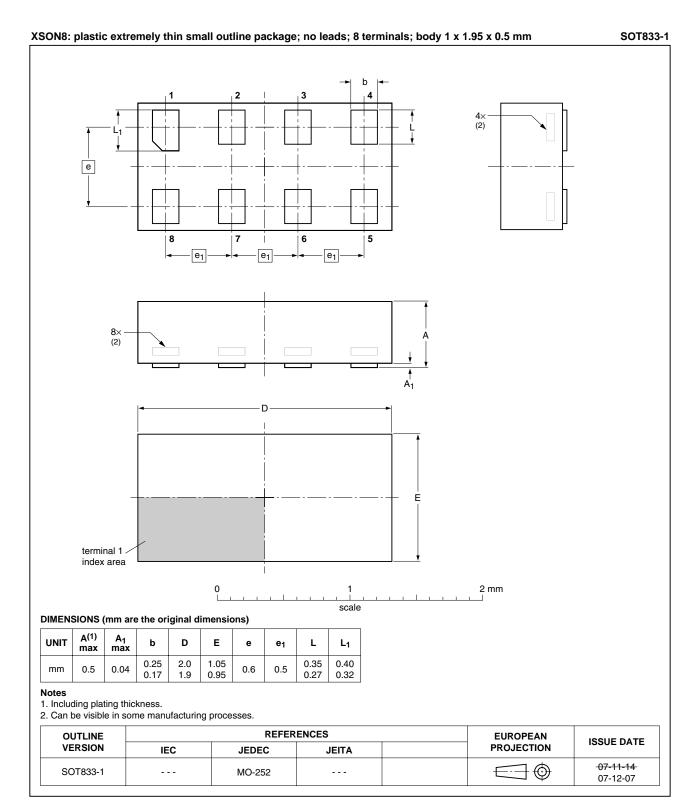


Fig 11. Package outline SOT833-1 (XSON8)

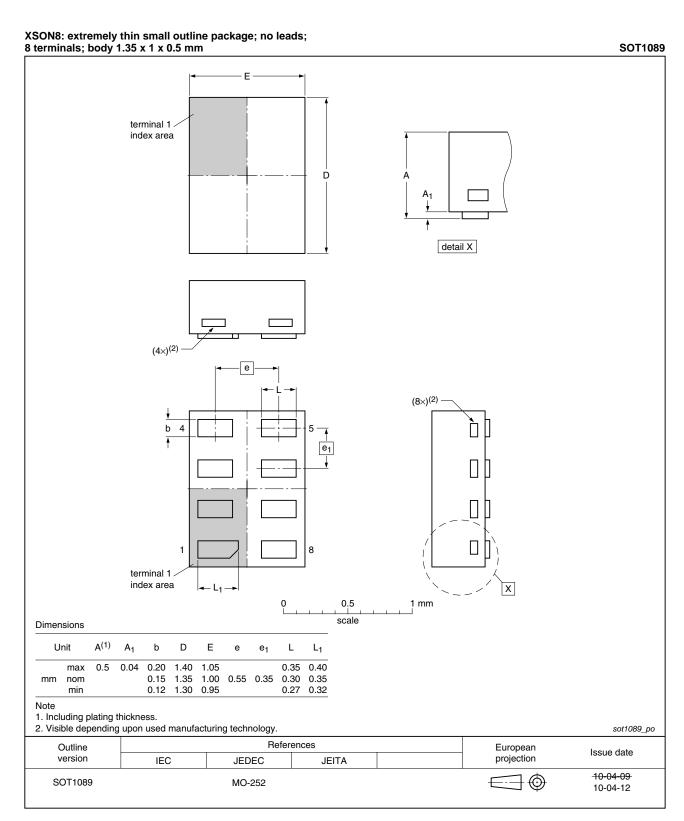


Fig 12. Package outline SOT1089 (XSON8)

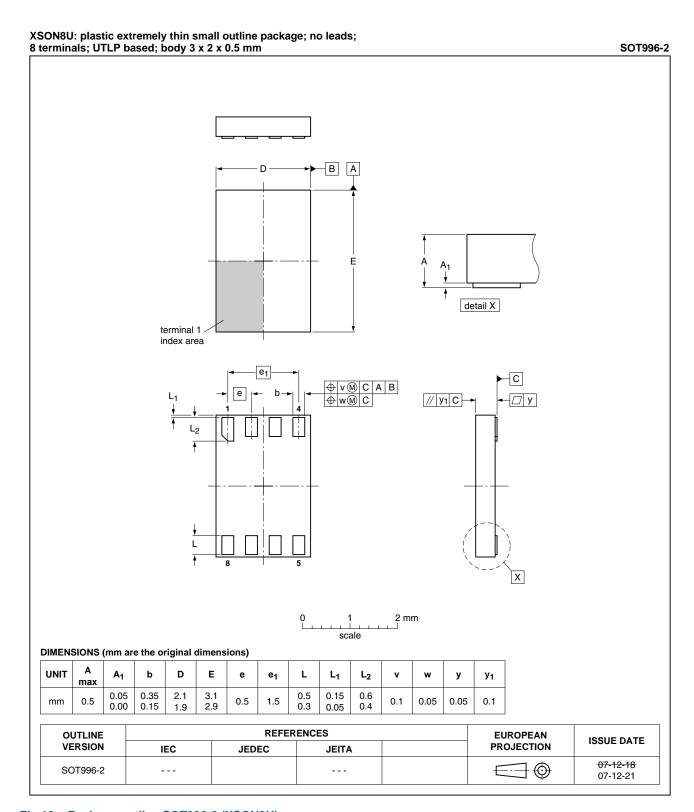


Fig 13. Package outline SOT996-2 (XSON8U)

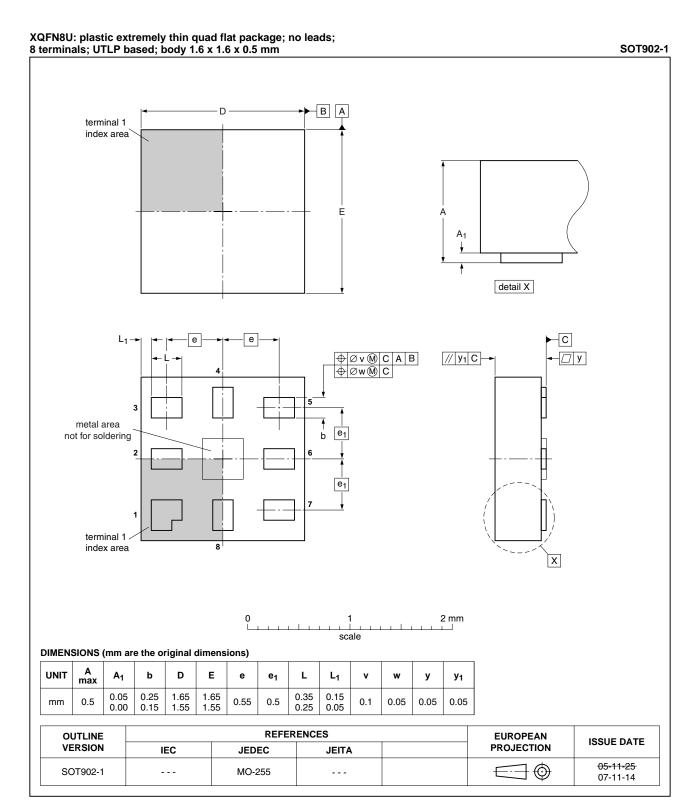


Fig 14. Package outline SOT902-1 (XQFN8U)

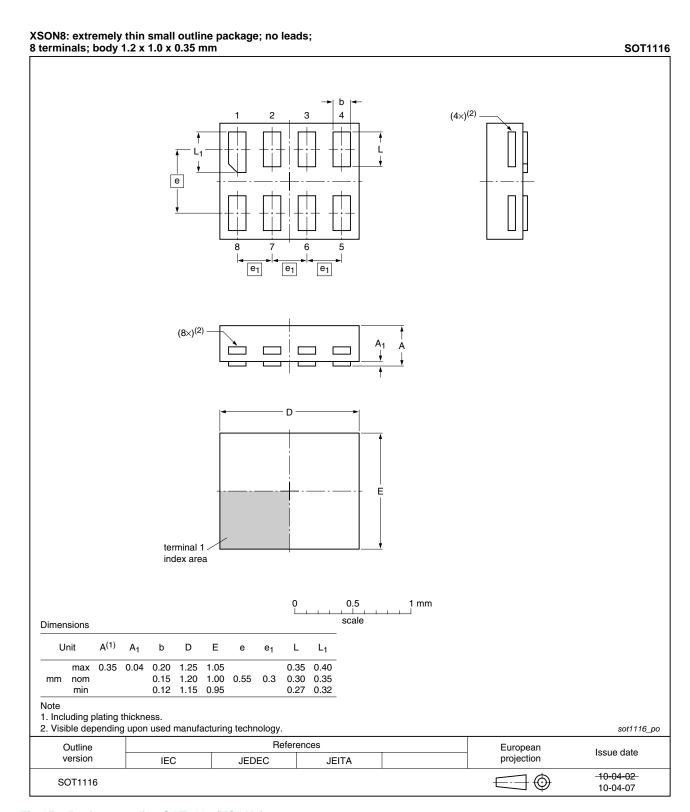


Fig 15. Package outline SOT1116 (XSON8)

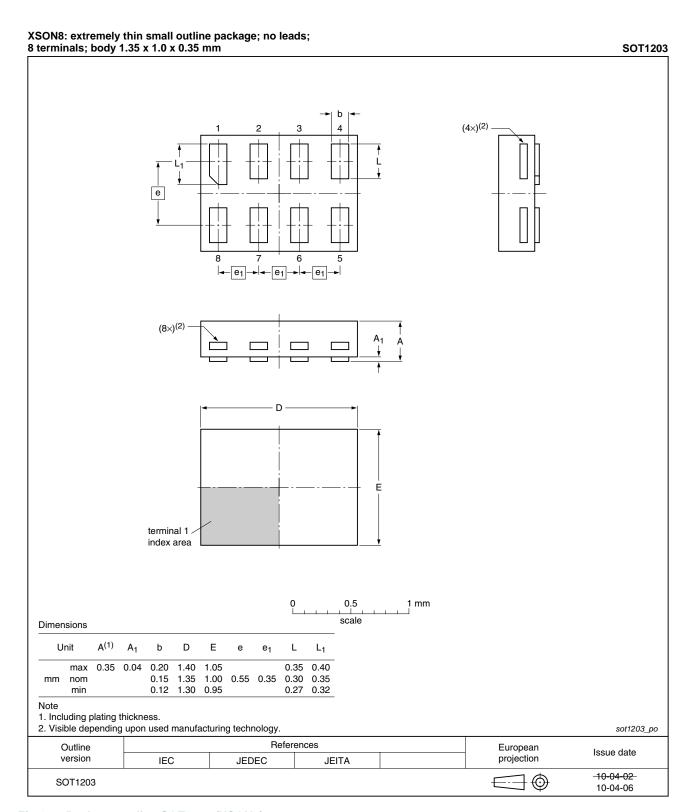


Fig 16. Package outline SOT1203 (XSON8)

Low-power dual 2-input NAND gate

14. Abbreviations

Table 11. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G00 v.5	20101021	Product data sheet	-	74AUP2G00 v.4
Modifications:	 Added type nu 	umber 74AUP2G00GF (SOT1089	9/XSON8 package).	
	 Added type nu 	ımber 74AUP2G00GN (SOT1116	6/XSON8 package).	
	 Added type nu 	mber 74AUP2G00GS (SOT1203	3/XSON8 package).	
74AUP2G00 v.4	20080605	Product data sheet	-	74AUP2G00 v.3
74AUP2G00 v.3	20080403	Product data sheet	-	74AUP2G00 v.2
74AUP2G00 v.2	20070515	Product data sheet	-	74AUP2G00 v.1
74AUP2G00 v.1	20060825	Product data sheet	-	-

Low-power dual 2-input NAND gate

16. Legal information

16.1 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.

16.2 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.

16.3 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.

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 in automotive applications — This NXP Semiconductors product has been qualified for use in automotive applications. The product is not designed, authorized or warranted to be

suitable for use in medical, military, aircraft, space or life support 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 accepts 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 http://www.nxp.com/profile/terms, 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.

74AUP2G00

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

Low-power dual 2-input NAND gate

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 national authorities.

16.4 Trademarks

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

17. Contact information

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

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

74AUP2G00

Low-power dual 2-input NAND gate

18. Contents

1	General description
2	Features and benefits
3	Ordering information 2
4	Marking 2
5	Functional diagram 2
6	Pinning information 3
6.1	Pinning
6.2	Pin description
7	Functional description 4
8	Limiting values 4
9	Recommended operating conditions 4
10	Static characteristics 5
11	Dynamic characteristics 8
12	Waveforms
13	Package outline
14	Abbreviations
15	Revision history
16	Legal information
16.1	Data sheet status
16.2	Definitions
16.3	Disclaimers
16.4	Trademarks20
17	Contact information 20
18	Contents 21

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