# **74AUP2G86**

## Low-power dual 2-input EXCLUSIVE-OR gate

Rev. 9 — 28 March 2019

Product data sheet

## 1. General description

The 74AUP2G86 provides the dual 2-input EXCLUSIVE-OR 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 1000 V
- Low static power consumption; I<sub>CC</sub> = 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<sub>CC</sub>
- I<sub>OFF</sub> circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C



Low-power dual 2-input EXCLUSIVE-OR gate

## 3. Ordering information

**Table 1. Ordering information** 

Type number	Package								
	Temperature range	Name	Description	Version					
74AUP2G86DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1					
74AUP2G86GT	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	SOT833-1					
74AUP2G86GF	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm	SOT1089					
74AUP2G86GM	-40 °C to +125 °C	XQFN8	plastic, extremely thin quad flat package; no leads; 8 terminals; body 1.6 × 1.6 × 0.5 mm	SOT902-2					
74AUP2G86GN	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm	SOT1116					
74AUP2G86GS	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm	SOT1203					

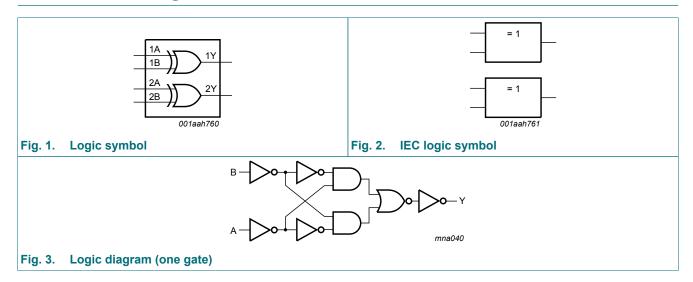
## 4. Marking

Table 2. Marking codes

Table 2. Marking codes							
Type number	Marking code [1]						
74AUP2G86DC	p86						
74AUP2G86GT	p86						
74AUP2G86GF	рН						
74AUP2G86GM	p86						
74AUP2G86GN	рН						
74AUP2G86GS	рН						

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

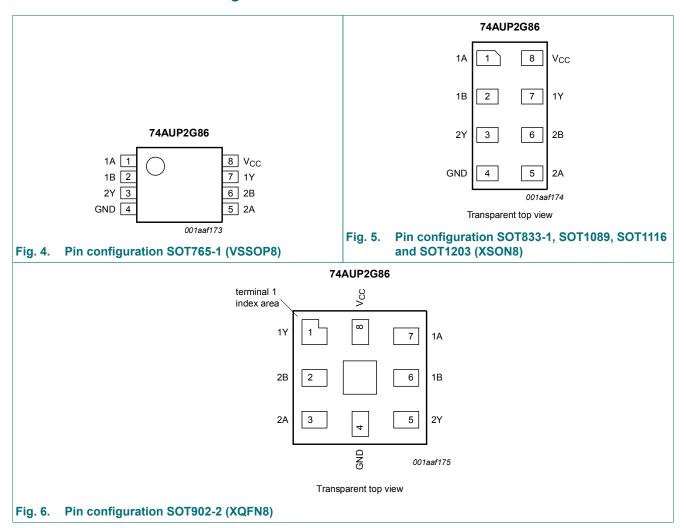
# 5. Functional diagram



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## 6. Pinning information

## 6.1. Pinning



## 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description	
	SOT765-1, SOT833-1, SOT1089, SOT1116 and SOT1203		
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 <sub>CC</sub>	8	8	supply voltage

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# 7. Functional description

#### **Table 4. Function table**

H = HIGH voltage level;

 $L = LOW \ voltage \ level.$ 

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

## 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).

Symbol	Parameter	Conditions		Min	Max	Unit
V <sub>CC</sub>	supply voltage			-0.5	+4.6	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V		-50	-	mA
VI	input voltage		[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V		-50	-	mA
Vo	output voltage	Active mode and Power-down mode	[1]	-0.5	+4.6	V
Io	output current	$V_O = 0 V \text{ to } V_{CC}$		-	±20	mA
I <sub>CC</sub>	supply current			-	50	mA
I <sub>GND</sub>	ground current			-50	-	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]	-	250	mW

<sup>[1]</sup> The 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 <sub>CC</sub>	supply voltage		0.8	3.6	V
VI	input voltage		0	3.6	V
Vo	output voltage	Active mode	0	$V_{CC}$	V
		Power-down mode; V <sub>CC</sub> = 0 V	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 0.8 V to 3.6 V	0	200	ns/V

<sup>[2]</sup> For VSSOP8 packages: above 110 °C the value of P<sub>tot</sub> derates linearly with 8.0 mW/K. For XSON8 and XQFN8 packages: above 118 °C the value of P<sub>tot</sub> derates linearly with 7.8 mW/K.

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## 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 <sub>amb</sub> = 2	25 °C					
V <sub>IH</sub>	HIGH-level input	V <sub>CC</sub> = 0.8 V	0.70V <sub>CC</sub>	-	-	V
	voltage	V <sub>CC</sub> = 0.9 V to 1.95 V	0.65V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input	V <sub>CC</sub> = 0.8 V	-	-	0.30V <sub>CC</sub>	V
	voltage	V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.35V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	$I_{\rm O}$ = -20 $\mu$ A; $V_{\rm CC}$ = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.75V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.11	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.32	-	-	V
		$I_{O}$ = -2.3 mA; $V_{CC}$ = 2.3 V		-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.9	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.72	-	-	V
		$I_{O}$ = -4.0 mA; $V_{CC}$ = 3.0 V	2.6	-	-	V
V <sub>OL</sub>	LOW-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	$I_O = 20 \mu A$ ; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.31	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.31	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.31	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.44	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.31	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.44	V
l <sub>l</sub>	input leakage current	$V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.1	μΑ
l <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O} = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.2	μΑ
Δl <sub>OFF</sub>	additional power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V to 0.2 V	-	-	±0.2	μΑ
I <sub>CC</sub>	supply current	$V_{I}$ = GND or $V_{CC}$ ; $I_{O}$ = 0 A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.5	μΑ
Δl <sub>CC</sub>	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 $V_{CC}$	-	0.6	-	pF
Co	output capacitance	$V_O = GND; V_{CC} = 0 V$	-	1.3	-	pF

	I Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> =	-40 °C to +85 °C					
$V_{IH}$	HIGH-level input	V <sub>CC</sub> = 0.8 V	0.70V <sub>CC</sub>	-	-	V
	voltage	V <sub>CC</sub> = 0.9 V to 1.95 V	0.65V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input	V <sub>CC</sub> = 0.8 V	-	-	0.30V <sub>CC</sub>	V
	voltage	V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.35V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.7V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.03	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.30	-	-	V
		$I_{\rm O}$ = -2.3 mA; $V_{\rm CC}$ = 2.3 V	1.97	-	-	V
		$I_{O}$ = -3.1 mA; $V_{CC}$ = 2.3 V	1.85	-	-	V
		$I_{\rm O}$ = -2.7 mA; $V_{\rm CC}$ = 3.0 V	2.67	-	-	V
		$I_{\rm O}$ = -4.0 mA; $V_{\rm CC}$ = 3.0 V	2.55	-	-	V
V <sub>OL</sub>	LOW-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.37	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.35	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.33	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	V
		$I_O = 2.7 \text{ mA; } V_{CC} = 3.0 \text{ V}$	-	-	0.33	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.45	V
l <sub>l</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	_	±0.5	μA
I <sub>OFF</sub>	power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	±0.5	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V to 0.2 V	-	-	±0.6	μA
I <sub>cc</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.9	μA
ΔI <sub>CC</sub>	additional supply current	$V_1 = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	50	μA
T =	-40 °C to +125 °C					
V <sub>IH</sub>	HIGH-level input	V <sub>CC</sub> = 0.8 V	0.75V <sub>CC</sub>		_	V
• 117	voltage	V <sub>CC</sub> = 0.9 V to 1.95 V	0.70V <sub>CC</sub>	_	_	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	_	_	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0			V
V <sub>IL</sub>	LOW-level input	V <sub>CC</sub> = 0.8 V		_	0.25V <sub>CC</sub>	V
▼ IL	voltage	V <sub>CC</sub> = 0.8 V V <sub>CC</sub> = 0.9 V to 1.95 V	-	<u> </u>	0.23V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	<u>-</u>	<del>-</del>	0.30V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V V <sub>CC</sub> = 3.0 V to 3.6 V	-		0.7	V

## Low-power dual 2-input EXCLUSIVE-OR gate

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>OH</sub>	HIGH-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.11	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.6V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	0.93	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.17	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.77	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.67	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.40	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.30	-	-	V
V <sub>OL</sub>	LOW-level output	$V_I = V_{IH}$ or $V_{IL}$				
	voltage	I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.41	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.39	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.50	V
I <sub>I</sub>	input leakage current	$V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.75	μΑ
I <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O} = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.75	μΑ
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V to 0.2 V	-	-	±0.75	μΑ
I <sub>CC</sub>	supply current	$V_I = GND \text{ or } V_{CC}; I_O = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	1.4	μΑ
ΔI <sub>CC</sub>	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	75	μΑ

<sup>[1]</sup> One input at  $V_{CC}$  - 0.6 V, other input at  $V_{CC}$  or GND.

# 11. Dynamic characteristics

## **Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 8.

Symbol	Parameter	Conditions	25 °C		-40 °C to +125 °C			Unit	
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
$C_L = 5 p$	F								
t <sub>pd</sub>	propagation	nA or nB to nY; see Fig. 7 [2]							
	delay	V <sub>CC</sub> = 0.8 V	-	21.2	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.3	5.9	13.1	2.1	14.3	15.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.8	4.1	7.7	1.6	8.8	9.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.5	3.3	5.9	1.4	6.9	7.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.2	2.6	4.4	1.1	5.3	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.3	4.0	0.9	4.7	5.2	ns

## Low-power dual 2-input EXCLUSIVE-OR gate

Symbol	Parameter Conditions			25 °C		-40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
C <sub>L</sub> = 10	pF	·				•			
t <sub>pd</sub>	propagation	nA or nB to nY; see Fig. 7 [2	]						
	delay	V <sub>CC</sub> = 0.8 V	-	24.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	6.8	14.8	2.4	16.2	17.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.8	8.7	1.9	10.0	11.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.8	3.9	6.7	1.7	8.0	8.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	3.1	5.2	1.4	6.2	6.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.9	4.8	1.3	5.6	6.2	ns
C <sub>L</sub> = 15	pF	'	-				1		
t <sub>pd</sub>	propagation	nA or nB to nY; see Fig. 7 [2	]						
	delay	V <sub>CC</sub> = 0.8 V	-	28.2	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.0	7.6	16.5	2.7	18.1	20.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.4	5.3	9.6	2.2	11.3	12.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	4.4	7.5	1.9	9.0	9.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.6	5.9	1.6	7.0	7.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	3.3	5.4	1.5	6.4	7.1	ns
C <sub>L</sub> = 30	pF		1				1		
t <sub>pd</sub>	propagation	nA or nB to nY; see Fig. 7 [2	]						
	delay	V <sub>CC</sub> = 0.8 V	-	38.5	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.9	9.9	21.5	3.5	24.1	26.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.2	6.9	12.5	2.8	14.8	16.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	5.7	9.8	2.5	11.7	12.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.4	4.7	7.6	2.2	9.1	10.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.2	4.4	7.1	2.1	8.3	9.2	ns
C <sub>L</sub> = 5 p	F, 10 pF, 15 pF a	and 30 pF	1	'		'	•	'	
C <sub>PD</sub>	power	$f = 1 \text{ MHz}; V_I = \text{GND to } V_{CC}$ [3	]						
	dissipation	V <sub>CC</sub> = 0.8 V	-	2.7	-	-	-	-	pF
	capacitance	V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.9	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	3.0	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.1	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.6	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.2	-	-	-	-	pF

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

f<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

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

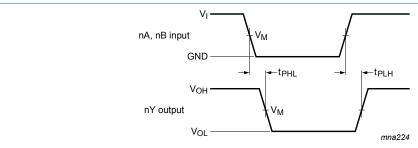
V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

 $\Sigma(C_L \times V_{CC}^2 \times f_0)$  = sum of the outputs.

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#### 11.1. Waveforms and test circuit



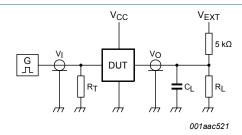
Measurement points are given in Table 9.

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

Fig. 7. The data input (nA or nB) to output (nY) propagation delays

Table 9. Measurement points

Supply voltage	Output	Input		
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	VI	$t_r = t_f$
0.8 V to 3.6 V	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>CC</sub>	≤ 3.0 ns



Test data is given in <u>Table 10</u>.

Definitions for test circuit:

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

 $C_L$  = Load capacitance including jig and probe capacitance.

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

V<sub>EXT</sub> = External voltage for measuring switching times.

Fig. 8. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Load		V <sub>EXT</sub>		
V <sub>CC</sub>	C <sub>L</sub>	R <sub>L</sub> [1]	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open	GND	2 × V <sub>CC</sub>

[1] For measuring enable and disable times  $R_L$  = 5  $k\Omega.$ 

For measuring propagation delays, set-up and hold times and pulse width  $R_{L}$  = 1  $\mbox{M}\Omega.$ 

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## 12. Package outline

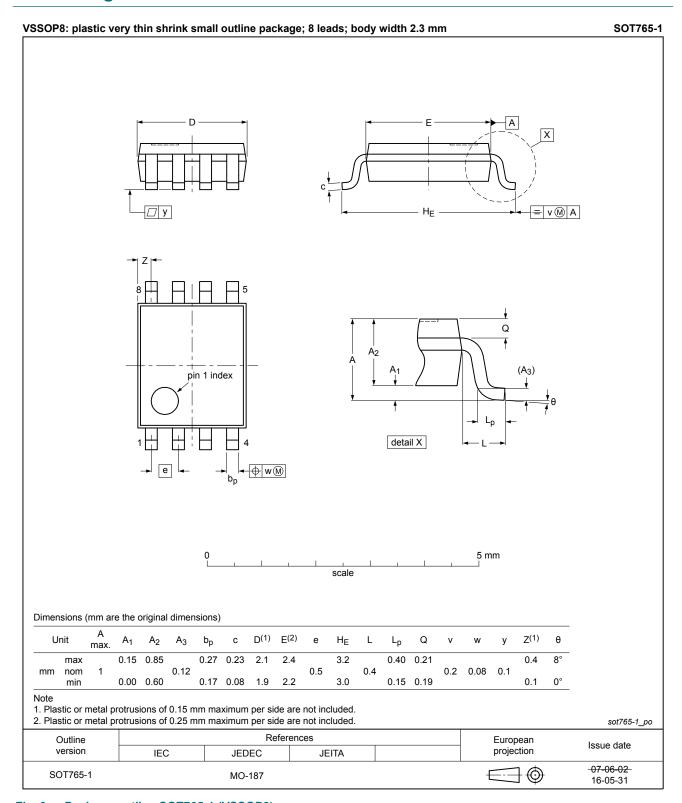


Fig. 9. Package outline SOT765-1 (VSSOP8)

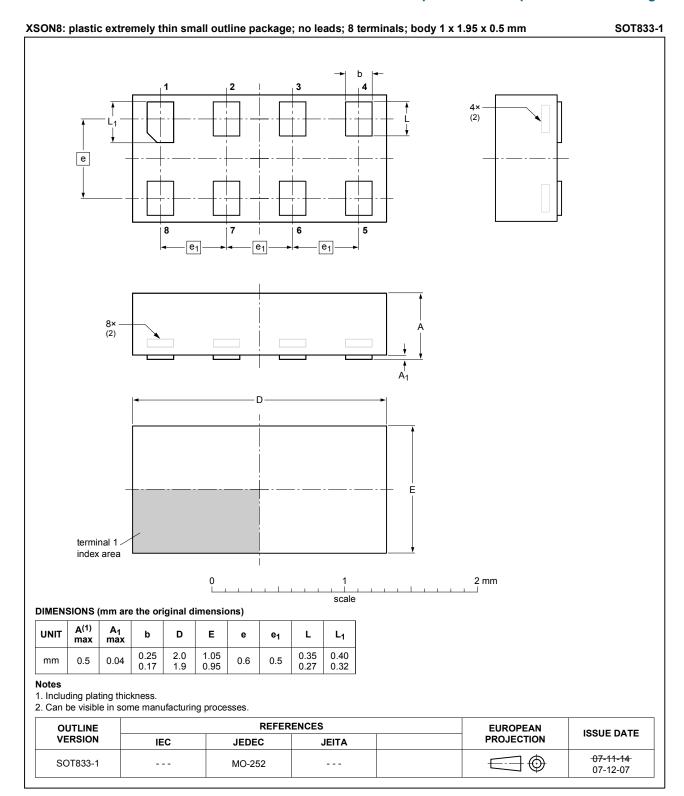


Fig. 10. Package outline SOT833-1 (XSON8)

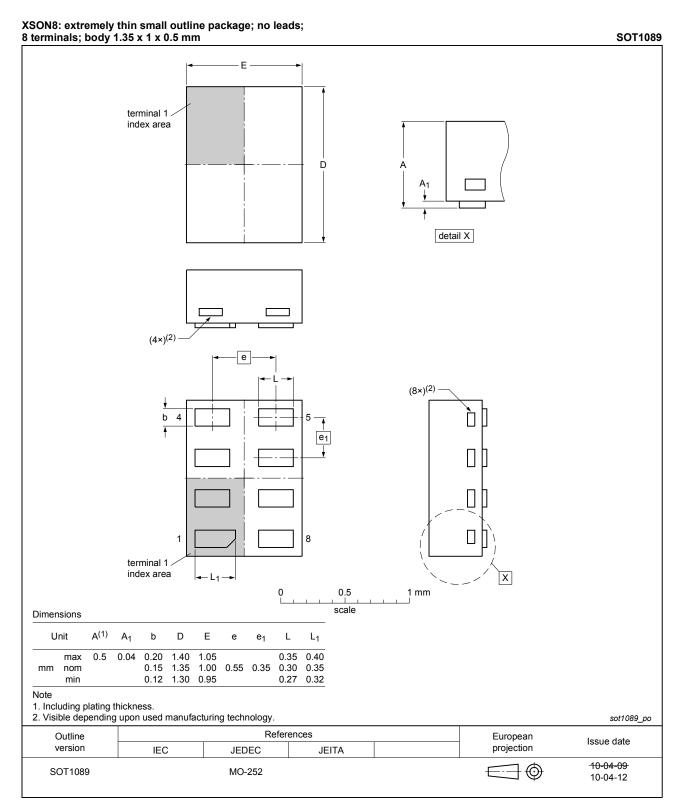


Fig. 11. Package outline SOT1089 (XSON8)

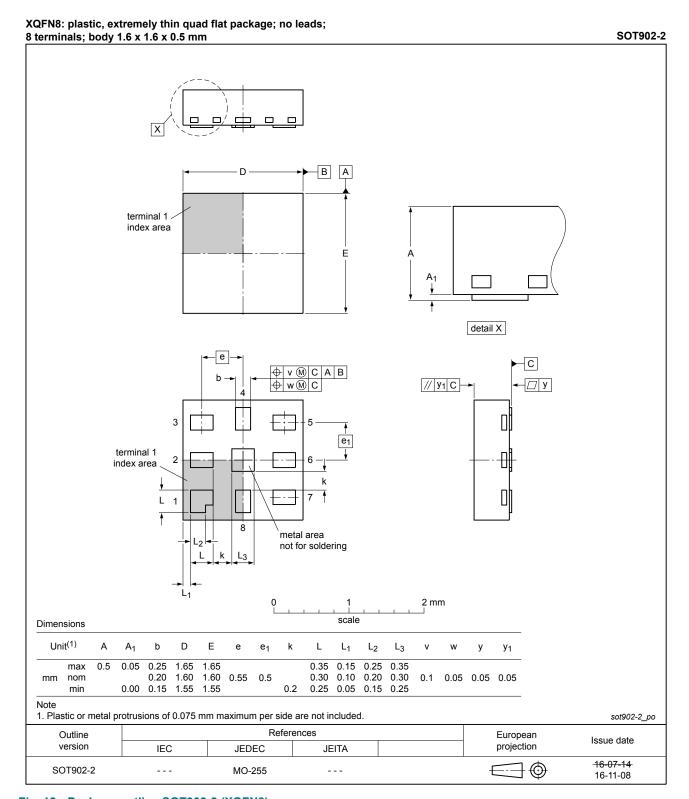


Fig. 12. Package outline SOT902-2 (XQFN8)

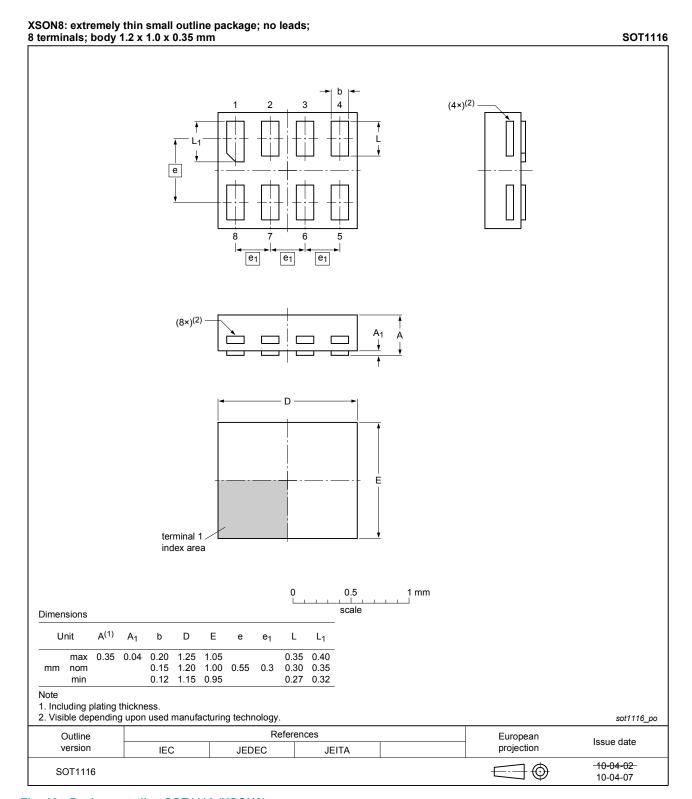


Fig. 13. Package outline SOT1116 (XSON8)

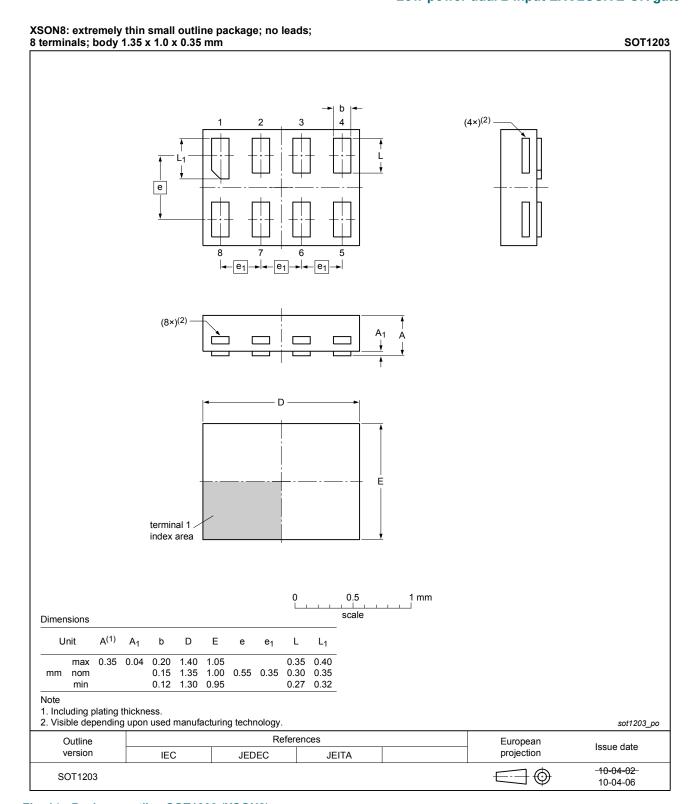


Fig. 14. Package outline SOT1203 (XSON8)

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## 13. Abbreviations

#### **Table 11. Abbreviations**

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

## 14. Revision history

#### **Table 12. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes	
74AUP2G86 v.9	20190328	Product data sheet	-	74AUP2G86 v.8	
Modifications:	<ul> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> </ul>				
	Legal texts have been adapted to the new company name where appropriate.				
	Type number 74AUP2G86GD (SOT996-2) removed.				
	<ul> <li>Package outline drawing <u>SOT765-1</u> (VSSOP8) updated.</li> </ul>				
<ul> <li>Package outline drawing <u>SOT902-2</u> (XQFN8) updated.</li> </ul>					
74AUP2G86 v.8	20130124	Product data sheet	-	74AUP2G86 v.7	
Modifications:	For type number 74AUP2G86GD XSON8U has changed to XSON8.				
74AUP2G86 v.7	20120614	Product data sheet	-	74AUP2G86 v.6	
74AUP2G86 v.6	20111208	Product data sheet	-	74AUP2G86 v.5	
74AUP2G86 v.5	20100727	Product data sheet	-	74AUP2G86 v.4	
74AUP2G86 v.4	20090629	Product data sheet	-	74AUP2G86 v.3	
74AUP2G86 v.3	20090504	Product data sheet	-	74AUP2G86 v.2	
74AUP2G86 v.2	20080319	Product data sheet	-	74AUP2G86 v.1	
74AUP2G86 v.1	20061009	Product data sheet	-	-	

## 15. 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.

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