# **74AUP2G17**

# Low-power dual Schmitt trigger

Rev. 9 — 31 January 2022

**Product data sheet** 

## 1. General description

The 74AUP2G17 is a dual buffer with Schmitt-trigger inputs. This device ensures 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 the potentially 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
- CMOS low power dissipation
- · High noise immunity
- Overvoltage tolerant inputs 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
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Low static power consumption; I<sub>CC</sub> = 0.9 μA (maximum)
- 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)
  - JESD8C (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
- · 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						
74AUP2G17GW	-40 °C to +125 °C	TSSOP6	plastic thin shrink small outline package; 6 leads; body width 1.25 mm	SOT363-2						
74AUP2G17GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886						
74AUP2G17GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115						
74AUP2G17GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202						



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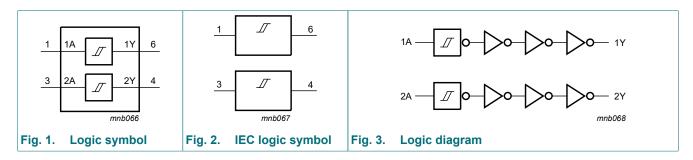
## 4. Marking

#### Table 2. Marking

Type number	Marking code[1]
74AUP2G17GW	pV
74AUP2G17GM	pV
74AUP2G17GN	pV
74AUP2G17GS	pV

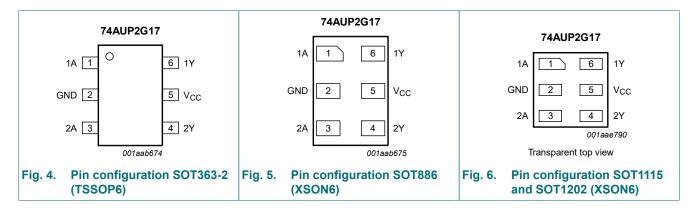
<sup>[1]</sup> The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram



# 6. Pinning information

## 6.1. Pinning



## 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
1A	1	data input
GND	2	ground (0 V)
2A	3	data input
2Y	4	data output
V <sub>CC</sub>	5	supply voltage
1Y	6	data output

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## 7. Functional description

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

 $H = HIGH \ voltage \ level; \ L = LOW \ voltage \ level.$ 

Input	Output
nA	nY
L	L
Н	Н

## 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	$V_O < 0 V$	-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	$T_{amb} = -40  ^{\circ}\text{C to } +125  ^{\circ}\text{C}$ [2]	-	250	mW

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

For SOT886 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

For SOT1115 (XSON6) package: Ptot derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package: Ptot derates linearly with 3.3 mW/K above 74 °C.

# 9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		0.8	3.6	V
VI	input voltage		0	3.6	V
Vo	output voltage	Active mode	0	V <sub>CC</sub>	V
		Power-down mode; V <sub>CC</sub> = 0 V	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C

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<sup>[2]</sup> For SOT363-2 (TSSOP6) package: Ptot derates linearly with 3.7 mW/K above 83 °C.

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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	5 °C					
V <sub>OH</sub>	HIGH-level output	$V_I = V_{T+}$ or $V_{T-}$				
	voltage	$I_{O}$ = -20 $\mu$ A; $V_{CC}$ = 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	0.75 × V <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	2.05	-	-	V
		$I_{O}$ = -3.1 mA; $V_{CC}$ = 2.3 V	1.9	-	-	V
		$I_{O}$ = -2.7 mA; $V_{CC}$ = 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	$V_I = V_{T+}$ or $V_{T-}$				
	voltage	$I_{O}$ = 20 $\mu$ A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <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 <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.1	μA
I <sub>OFF</sub>	power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.2	μΑ
ΔI <sub>OFF</sub>	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 <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	-	-	0.5	μA
ΔI <sub>CC</sub>	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$	-	-	40	μA
Cı	input capacitance	$V_I = GND \text{ or } V_{CC}$ ; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	1.1	-	pF
Co	output capacitance	$V_O = GND; V_{CC} = 0 V$	-	1.7	-	pF
T <sub>amb</sub> = -	40 °C to +85 °C					
V <sub>OH</sub>	HIGH-level output	$V_I = V_{T+}$ or $V_{T-}$				Т
	voltage	$I_{O}$ = -20 $\mu$ A; $V_{CC}$ = 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	0.7 × V <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
		$I_{O}$ = -2.3 mA; $V_{CC}$ = 2.3 V	1.97	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.85	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.67	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.55	-	-	V

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Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>OL</sub>	LOW-level output	$V_I = V_{T+}$ or $V_{T-}$				
VOL	voltage	$I_{O}$ = 20 $\mu$ A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <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 <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 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	μΑ
I <sub>OFF</sub>	power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.5	μΑ
Δl <sub>OFF</sub>	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
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	μΑ
Δl <sub>CC</sub>	additional supply current	$V_1 = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$	-	-	50	μΑ
T <sub>amb</sub> = -	40 °C to +125 °C		,			
V <sub>OH</sub>	HIGH-level output	$V_I = V_{T+}$ or $V_{T-}$				
	voltage	$I_{O}$ = -20 $\mu$ A; $V_{CC}$ = 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	0.6 × V <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
		$I_{O}$ = -2.3 mA; $V_{CC}$ = 2.3 V	1.77	-	-	V
		$I_{O}$ = -3.1 mA; $V_{CC}$ = 2.3 V	1.67	-	-	V
		$I_{O}$ = -2.7 mA; $V_{CC}$ = 3.0 V	2.40	-	-	V
		$I_{O}$ = -4.0 mA; $V_{CC}$ = 3.0 V	2.30	-	-	V
V <sub>OL</sub>	LOW-level output	$V_I = V_{T+}$ or $V_{T-}$				
	voltage	$I_{O}$ = 20 $\mu$ A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33 × V <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
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	-	-	±0.75	μΑ
l <sub>OFF</sub>	power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.75	μΑ
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	-	-	1.4	μΑ
ΔI <sub>CC</sub>	additional supply current	$V_1 = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$	-	-	75	μΑ

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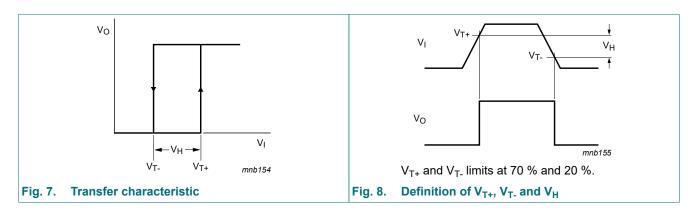
## 10.1. Transfer characteristics

**Table 8. Transfer characteristics** 

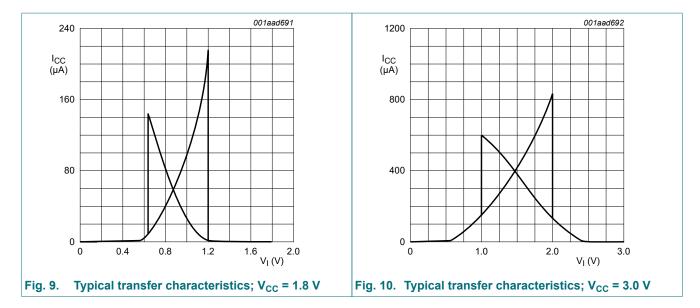
Voltages are referenced to GND (ground = 0 V; for test circuit see Fig. 12.

Symbol	Parameter	Conditions	25 °C			C to		°C to 5 °C	Unit	
			Min	Тур	Max	Min	Max	Min	Max	
$V_{T+}$	positive-going	see Fig. 7 and Fig. 8								
	threshold voltage	V <sub>CC</sub> = 0.8 V	0.30	-	0.60	0.30	0.60	0.30	0.62	V
		V <sub>CC</sub> = 1.1 V	0.53	-	0.90	0.53	0.90	0.53	0.92	V
		V <sub>CC</sub> = 1.4 V	0.74	-	1.11	0.74	1.11	0.74	1.13	V
		V <sub>CC</sub> = 1.65 V	0.91	-	1.29	0.91	1.29	0.91	1.31	V
		V <sub>CC</sub> = 2.3 V	1.37	-	1.77	1.37	1.77	1.37	1.80	V
		V <sub>CC</sub> = 3.0 V	1.88	-	2.29	1.88	2.29	1.88	2.32	V
$V_{T-}$	negative-going	see Fig. 7 and Fig. 8								
	threshold voltage	V <sub>CC</sub> = 0.8 V	0.10	-	0.60	0.10	0.60	0.10	0.60	V
		V <sub>CC</sub> = 1.1 V	0.26	-	0.65	0.26	0.65	0.26	0.65	V
		V <sub>CC</sub> = 1.4 V	0.39	-	0.75	0.39	0.75	0.39	0.75	V
		V <sub>CC</sub> = 1.65 V	0.47	-	0.84	0.47	0.84	0.47	0.84	V
		V <sub>CC</sub> = 2.3 V	0.69	-	1.04	0.69	1.04	0.69	1.04	V
		V <sub>CC</sub> = 3.0 V	0.88	-	1.24	0.88	1.24	0.88	1.24	V
V <sub>H</sub>	hysteresis voltage	(V <sub>T+</sub> - V <sub>T-</sub> ); see <u>Fig. 7</u> , <u>Fig. 8</u> , <u>Fig. 9</u> and <u>Fig. 10</u>								
		V <sub>CC</sub> = 0.8 V	0.07	-	0.50	0.07	0.50	0.07	0.50	V
		V <sub>CC</sub> = 1.1 V	0.08	-	0.46	0.08	0.46	0.08	0.46	V
		V <sub>CC</sub> = 1.4 V	0.18	-	0.56	0.18	0.56	0.18	0.56	V
		V <sub>CC</sub> = 1.65 V	0.27	-	0.66	0.27	0.66	0.27	0.66	V
		V <sub>CC</sub> = 2.3 V	0.53	-	0.92	0.53	0.92	0.53	0.92	V
		V <sub>CC</sub> = 3.0 V	0.79	-	1.31	0.79	1.31	0.79	1.31	V

## 10.2. Waveforms transfer characteristics



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# 11. Dynamic characteristics

#### **Table 9. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 12

Symbol	Parameter	Conditions	25 °C		-	°C to 5 °C		°C to 5 °C	Unit	
			Min	Typ [1]	Max	Min	Max	Min	Max	
C <sub>L</sub> = 5 p	F									
t <sub>pd</sub>	propagation	nA to nY; see Fig. 11 [2]								
	delay	V <sub>CC</sub> = 0.8 V	-	19.0	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	5.7	10.6	2.5	10.9	2.5	11.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.4	4.2	6.5	2.3	7.1	2.3	7.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.0	3.6	5.5	1.9	6.1	1.9	6.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.9	3.0	4.2	1.8	4.6	1.8	4.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.8	2.7	3.6	1.5	3.8	1.5	4.0	ns
C <sub>L</sub> = 10	pF									
t <sub>pd</sub>	propagation	nA to nY; see Fig. 11 [2]								
	delay	V <sub>CC</sub> = 0.8 V	-	22.5	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.9	6.6	12.4	2.7	12.9	2.7	13.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.6	4.8	7.8	2.4	8.3	2.4	8.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.5	4.2	6.3	2.4	6.8	2.4	7.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.3	3.5	4.8	2.1	5.3	2.1	5.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	3.3	4.4	2.0	4.6	2.0	4.8	ns

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Symbol	Parameter	Conditions		25 °C			°C to 5 °C		°C to 5 °C	Unit
			Min	Typ [1]	Max	Min	Max	Min	Max	
C <sub>L</sub> = 15	pF									
t <sub>pd</sub>	propagation	nA to nY; see Fig. 11 [2	]							
	delay	V <sub>CC</sub> = 0.8 V	-	26.0	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.2	7.4	14.1	3.1	14.7	3.1	14.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.1	5.4	8.7	2.8	9.5	2.8	9.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.7	4.7	7.1	2.7	7.8	2.7	8.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.6	4.0	5.6	2.5	6.0	2.5	6.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.5	3.7	4.9	2.2	5.2	2.2	5.5	ns
C <sub>L</sub> = 30	pF									
t <sub>pd</sub>	propagation	nA to nY; see Fig. 11 [2	]							
	delay	V <sub>CC</sub> = 0.8 V	-	36.3	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.9	9.7	19.0	3.7	19.8	3.7	20.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.5	7.0	11.2	3.6	12.4	3.6	13.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.5	6.0	9.2	3.4	10.1	3.4	10.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.4	5.1	7.0	3.2	7.5	3.2	7.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.3	4.8	6.2	3.1	7.1	3.1	7.5	ns
$C_L = 5 p$	F, 10 pF, 15 pF	and 30 pF	•							
C <sub>PD</sub>	power	$f_i = 1 \text{ MHz}; V_I = \text{GND to } V_{CC}$ [3	]							
	dissipation capacitance	V <sub>CC</sub> = 0.8 V	-	2.5	-	-	-	-	-	pF
	Сараспапсе	V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.7	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.8	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.0	-	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.5	-	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.0	-	-	-	-	-	pF

- [1] All typical values are measured at nominal  $V_{CC}$ .
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
   [3] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).
   P<sub>D</sub> = C<sub>PD</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>i</sub> × N + Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) where:
   f<sub>i</sub> = input frequency in MHz;

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

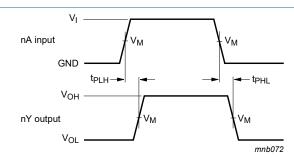
C<sub>L</sub> = output load capacitance in pF;

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

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

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#### 11.1. Waveforms and test circuit



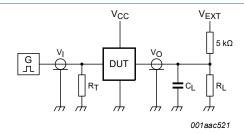
Measurement points are given in Table 10.

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

Fig. 11. The data input (nA) to output (nY) propagation delays

**Table 10. 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 Table 11.

Definitions for test circuit:

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

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

Fig. 12. Test circuit for measuring switching times

#### Table 11. Test data

Supply voltage	Load	V <sub>EXT</sub>			
V <sub>CC</sub>	CL	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, setup and hold times and pulse width  $R_L$  = 1 M $\Omega$ .

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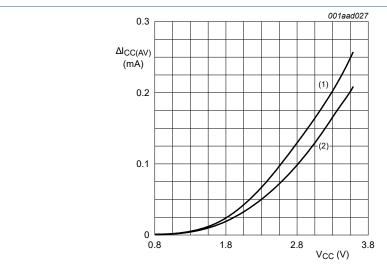
# 12. Application information

The slow input rise and fall times cause additional power dissipation, this can be calculated using the following formula:

 $P_{add} = f_i \times (t_r \times \Delta I_{CC(AV)} + t_f \times \Delta I_{CC(AV)}) \times V_{CC}$  where:

- P<sub>add</sub> = additional power dissipation (μW);
- f<sub>i</sub> = input frequency (MHz);
- t<sub>r</sub> = input rise time (ns); 10 % to 90 %;
- t<sub>f</sub> = input fall time (ns); 90 % to 10 %;
- ΔI<sub>CC(AV)</sub> = average additional supply current (μA).

Average  $\Delta I_{CC(AV)}$  differs with positive or negative input transitions, as shown in Fig. 13.



- (1) Positive-going edge.
- (2) Negative-going edge.

Linear change of  $\rm V_{\rm I}$  between 0.8 V and 2.0 V. All values given are typical, unless otherwise specified.

Fig. 13. Average I<sub>CC</sub> as a function of V<sub>CC</sub>

**Product data sheet** 

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# 13. Package outline

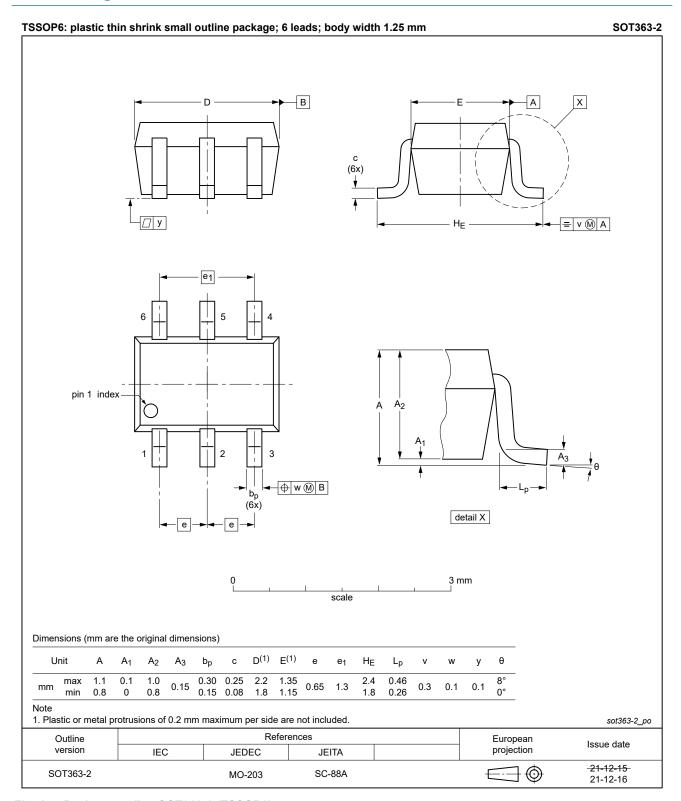


Fig. 14. Package outline SOT363-2 (TSSOP6)

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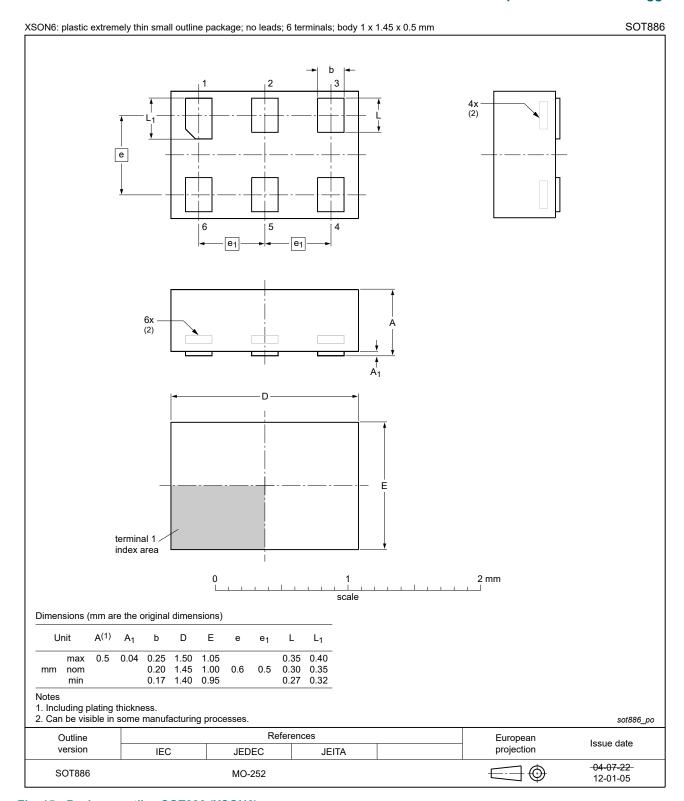


Fig. 15. Package outline SOT886 (XSON6)

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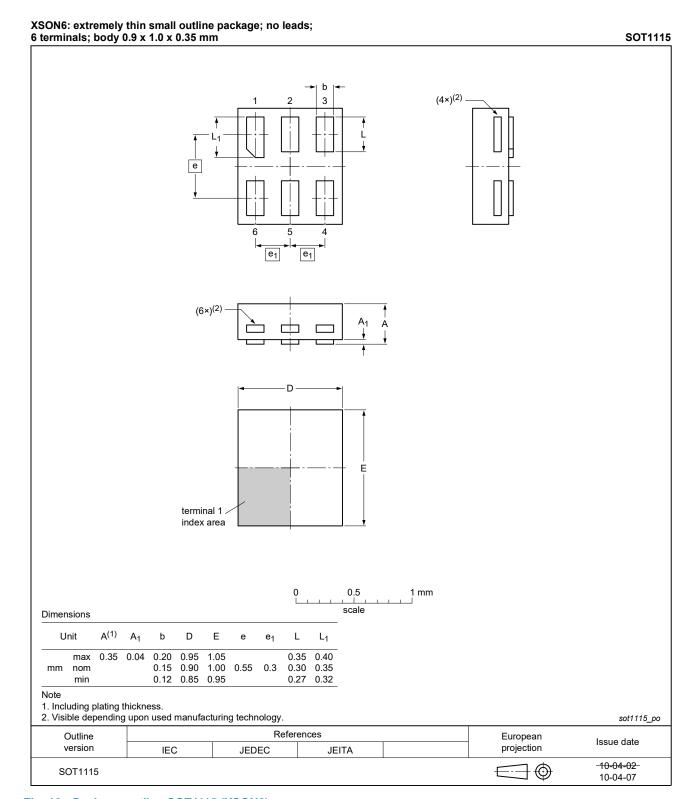


Fig. 16. Package outline SOT1115 (XSON6)

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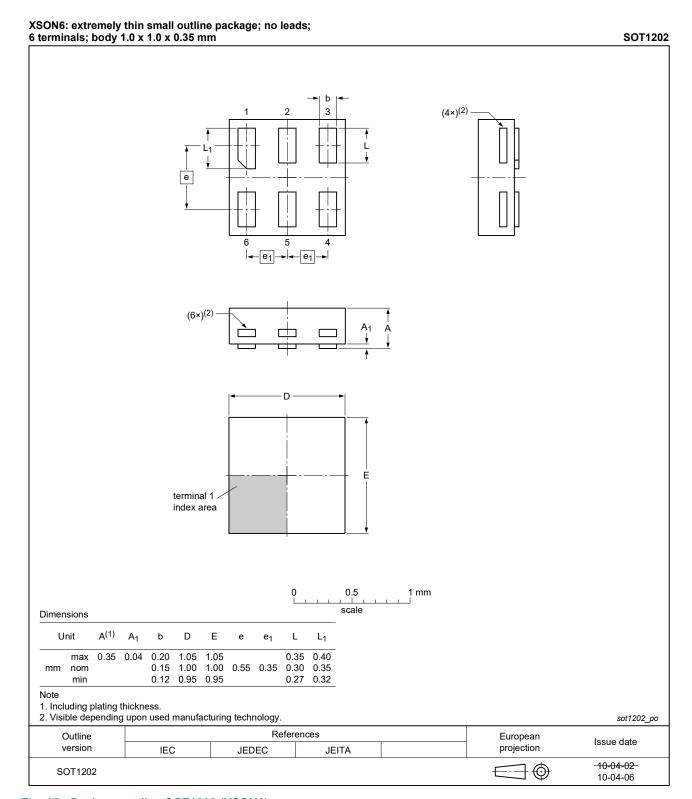


Fig. 17. Package outline SOT1202 (XSON6)

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## 14. Abbreviations

#### **Table 12. Abbreviations**

Acronym	Description
CDM	Charged Device Model
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model

# 15. Revision history

## Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes	
74AUP2G17 v.9	20220131	Product data sheet	-	74AUP2G17 v.8	
Modifications:	Package SOT363 (SC-88) changed to SOT363-2 (TSSOP6).				
74AUP2G17 v.8	20210809	Product data sheet	-	74AUP2G17 v.7	
Modifications:	<ul> <li>Type number 74AUP2G17GF (SOT891/XSON6) removed.</li> <li>Section 1 and Section 2 updated.</li> <li>Table 5: Derating values for Ptot total power dissipation updated.</li> </ul>				
74AUP2G17 v.7	20171129	Product data sheet	-	74AUP2G17 v.6	
Modifications:	<ul> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>				
74AUP2G17 v.6	20121204	Product data sheet	-	74AUP2G17 v.5	
Modifications:	Package outline drawing of SOT886 ( <u>Fig. 15</u> ) modified.				
74AUP2G17 v.5	20111205	Product data sheet	-	74AUP2G17 v.4	
74AUP2G17 v.4	20101103	Product data sheet	-	74AUP2G17 v.3	
74AUP2G17 v.3	20090706	Product data sheet	-	74AUP2G17 v.2	
74AUP2G17 v.2	20080110	Product data sheet	-	74AUP2G17 v.1	
74AUP2G17 v.1	20061107	Product data sheet	-	-	

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## 16. 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.
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