74AUP1G17

Low-power Schmitt trigger

Rev. 11 — 8 June 2018 Product data sheet

1 General description

The 74AUP1G17 provides the single Schmitt trigger buffer. It is capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

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 the damaging backflow current through the device when it is powered down.

The inputs switch at different points for positive and negative-going signals. The difference between the positive voltage V_{T+} and the negative voltage V_{T-} is defined as the input hysteresis voltage V_H.

2 Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 Class 3A exceeds 5000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 Class C3 exceeds 1000 V
  - MM: JESD22-A115-A exceeds 200 V
- Low static power consumption; I_{CC} = 0.9 μA (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 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
74AUP1G17GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G17GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753

nexperia

Type number	Package			
	Temperature range	Name	Description	Version
74AUP1G17GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm	SOT886
74AUP1G17GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm	SOT891
74AUP1G17GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm	SOT1115
74AUP1G17GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm	SOT1202
74AUP1G17GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm	SOT1226
74AUP1G17GX4	-40 °C to +125 °C	X2SON4	plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 x 0.6 x 0.32 mm	SOT1269-2

4 Marking

Table 2. Marking

Type number	Marking code[1]
74AUP1G17GW	pJ
74AUP1G17GV	pJ
74AUP1G17GM	pJ
74AUP1G17GF	pJ
74AUP1G17GN	pJ
74AUP1G17GS	pJ
74AUP1G17GX	pJ
74AUP1G17GX4	pJ

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

5 Functional diagram

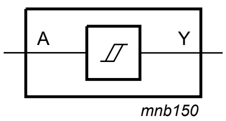


Figure 1. Logic symbol

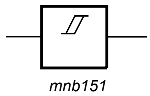


Figure 2. IEC logic symbo

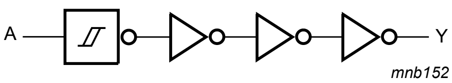


Figure 3. Logic diagram

6 Pinning information

6.1 Pinning

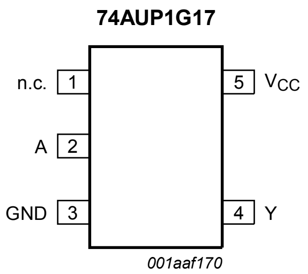


Figure 4. Pin configuration SOT353-1 and SOT753

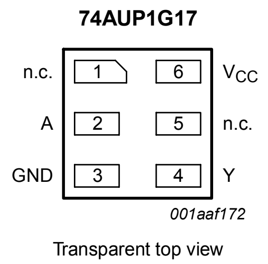


Figure 5. Pin configuration SOT886, SOT891, SOT1115 and SOT1202

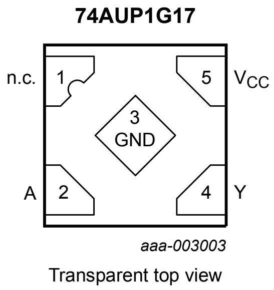


Figure 6. Pin configuration SOT1226 (X2SON5)

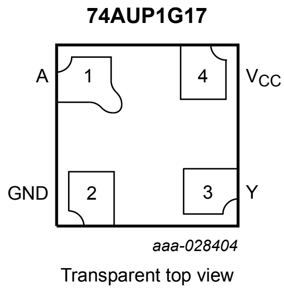


Figure 7. Pin configuration SOT1269-2 (X2SON4)

6.2 Pin description

Table 3. Pin description

Symbol	Pin			Description
	TSSOP5, SC-74A and X2SON5	XSON6	X2SON4	
n.c.	1	1, 5	-	not connected
A	2	2	1	data input
GND	3	3	2	ground (0 V)
Y	4	4	3	data output
V_{CC}	5	6	4	supply voltage

7 Functional description

Table 4. Function table

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

Input	Output
A	**Y**
L	L
H	H

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_{CC}	supply voltage		-0.5	+4.6	V
I_{IK}	input clamping current	$V_I < 0$ V	-50	-	mA
V_I	input voltage	[1]	-0.5	+4.6	V
I_{OK}	output clamping current	$V_O < 0$ V	-50	-	mA
V_O	output voltage	Active mode and Power-down mode [1]	-0.5	+4.6	V
I_O	output current	V_O = 0 V 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 °C to +125 °C			
		TSSOP5, SC-74A, XSON6 and X2SON5 package [2]	-	250	mW
		X2SON4 package [3]	-	150	mW

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

[2] For TSSOP5 and SC-74A packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.
For XSON6 and X2SON5 packages: above 118 °C the value of P_{tot} derates linearly with 7.8 mW/K.

[3] For X2SON4 packages: above 57 °C the value of P_{tot} derates linearly with 1.7 mW/K.

9 Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		0.8	3.6	V
V_I	input voltage		0	3.6	V
V_O	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

10 Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = 25 °C						
V_{OH}	HIGH-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = -20 μA; V_{CC} = 0.8 V to 3.6 V	V_{CC} - 0.1	-	-	V
		I_O = -1.1 mA; V_{CC} = 1.1 V	0.75 × V_{CC}	-	-	V
		I_O = -1.7 mA; V_{CC} = 1.4 V	1.11	-	-	V
		I_O = -1.9 mA; V_{CC} = 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_{OL}	LOW-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = 20 μA; V_{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		I_O = 1.1 mA; V_{CC} = 1.1 V	-	-	0.3 × V_{CC}	V
		I_O = 1.7 mA; V_{CC} = 1.4 V	-	-	0.31	V
		I_O = 1.9 mA; V_{CC} = 1.65 V	-	-	0.31	V
		I_O = 2.3 mA; V_{CC} = 2.3 V	-	-	0.31	V
		I_O = 3.1 mA; V_{CC} = 2.3 V	-	-	0.44	V
		I_O = 2.7 mA; V_{CC} = 3.0 V	-	-	0.31	V
		I_O = 4.0 mA; V_{CC} = 3.0 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	μA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V	-	-	±0.2	μA
ΔI_{OFF}	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	μA
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	μA
ΔI_{CC}	additional supply current	V_I = V_{CC} - 0.6 V; I_O = 0 A; V_{CC} = 3.3 V	-	-	40	μA
C_I	input capacitance	V_I = GND or V_{CC}; V_{CC} = 0 V to 3.6 V	-	1.1	-	pF
C_O	output capacitance	V_O = GND; V_{CC} = 0 V	-	1.7	-	pF

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +85 °C						
V_{OH}	HIGH-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = -20 µA; V_{CC} = 0.8 V to 3.6 V	V_{CC} - 0.1	-	-	V
		I_O = -1.1 mA; V_{CC} = 1.1 V	0.7 × V_{CC}	-	-	V
		I_O = -1.7 mA; V_{CC} = 1.4 V	1.03	-	-	V
		I_O = -1.9 mA; V_{CC} = 1.65 V	1.30	-	-	V
		I_O = -2.3 mA; V_{CC} = 2.3 V	1.97	-	-	V
		I_O = -3.1 mA; V_{CC} = 2.3 V	1.85	-	-	V
		I_O = -2.7 mA; V_{CC} = 3.0 V	2.67	-	-	V
		I_O = -4.0 mA; V_{CC} = 3.0 V	2.55	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = 20 µA; V_{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		I_O = 1.1 mA; V_{CC} = 1.1 V	-	-	0.3 × V_{CC}	V
		I_O = 1.7 mA; V_{CC} = 1.4 V	-	-	0.37	V
		I_O = 1.9 mA; V_{CC} = 1.65 V	-	-	0.35	V
		I_O = 2.3 mA; V_{CC} = 2.3 V	-	-	0.33	V
		I_O = 3.1 mA; V_{CC} = 2.3 V	-	-	0.45	V
		I_O = 2.7 mA; V_{CC} = 3.0 V	-	-	0.33	V
		I_O = 4.0 mA; V_{CC} = 3.0 V	-	-	0.45	V
I_I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V	-	-	±0.5	µA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V	-	-	±0.5	µA
ΔI_{OFF}	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_{CC}	supply current	V_I = GND or V_{CC}; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V	-	-	0.9	µA
ΔI_{CC}	additional supply current	$V_I = V_{CC}$ - 0.6 V; I_O = 0 A; V_{CC} = 3.3 V	-	-	50	µA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +125 °C						
V_{OH}	HIGH-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = -20 μA; V_{CC} = 0.8 V to 3.6 V	V_{CC} - 0.11	-	-	V
		I_O = -1.1 mA; V_{CC} = 1.1 V	0.6 × V_{CC}	-	-	V
		I_O = -1.7 mA; V_{CC} = 1.4 V	0.93	-	-	V
		I_O = -1.9 mA; V_{CC} = 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_{OL}	LOW-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		I_O = 20 μA; V_{CC} = 0.8 V to 3.6 V	-	-	0.11	V
		I_O = 1.1 mA; V_{CC} = 1.1 V	-	-	0.33 × V_{CC}	V
		I_O = 1.7 mA; V_{CC} = 1.4 V	-	-	0.41	V
		I_O = 1.9 mA; V_{CC} = 1.65 V	-	-	0.39	V
		I_O = 2.3 mA; V_{CC} = 2.3 V	-	-	0.36	V
		I_O = 3.1 mA; V_{CC} = 2.3 V	-	-	0.50	V
		I_O = 2.7 mA; V_{CC} = 3.0 V	-	-	0.36	V
		I_O = 4.0 mA; V_{CC} = 3.0 V	-	-	0.50	V
I_I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V	-	-	±0.75	μA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V	-	-	±0.75	μA
ΔI_{OFF}	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	μA
I_{CC}	supply current	V_I = GND or V_{CC}; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V	-	-	1.4	μA
ΔI_{CC}	additional supply current	$V_I = V_{CC}$ - 0.6 V; I_O = 0 A; V_{CC} = 3.3 V	-	-	75	μA

11 Dynamic characteristics

Table 8. Dynamic characteristics

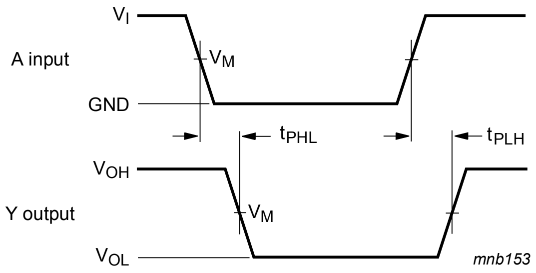
Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 9

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 pF									
t_{pd}	propagation delay	A to Y; see Figure 8 [2]							
		V_{CC} = 0.8 V	-	19.0	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.6	5.7	10.6	2.5	10.9	11.1	ns
		V_{CC} = 1.4 V to 1.6 V	2.4	4.2	6.5	2.3	7.1	7.4	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	3.6	5.5	1.9	6.1	6.3	ns
		V_{CC} = 2.3 V to 2.7 V	1.9	3.0	4.2	1.8	4.6	4.8	ns
		V_{CC} = 3.0 V to 3.6 V	1.8	2.7	3.6	1.5	3.8	4.0	ns
C_L = 10 pF									
t_{pd}	propagation delay	A to Y; see Figure 8 [2]							
		V_{CC} = 0.8 V	-	22.5	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.9	6.6	12.4	2.7	12.9	13.0	ns
		V_{CC} = 1.4 V to 1.6 V	2.6	4.8	7.8	2.4	8.3	8.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.5	4.2	6.3	2.4	6.8	7.1	ns
		V_{CC} = 2.3 V to 2.7 V	2.3	3.5	4.8	2.1	5.3	5.6	ns
		V_{CC} = 3.0 V to 3.6 V	2.1	3.3	4.4	2.0	4.6	4.8	ns
C_L = 15 pF									
t_{pd}	propagation delay	A to Y; see Figure 8 [2]							
		V_{CC} = 0.8 V	-	26.0	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.2	7.4	14.1	3.1	14.7	14.9	ns
		V_{CC} = 1.4 V to 1.6 V	3.1	5.4	8.7	2.8	9.5	9.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.7	4.7	7.1	2.7	7.8	8.2	ns
		V_{CC} = 2.3 V to 2.7 V	2.6	4.0	5.6	2.5	6.0	6.3	ns
		V_{CC} = 3.0 V to 3.6 V	2.5	3.7	4.9	2.2	5.2	5.5	ns

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 30 pF									
t_{pd}	propagation delay	A to Y; see Figure 8 [2]							
		V_{CC} = 0.8 V	-	36.3	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.9	9.7	19.0	3.7	19.8	20.1	ns
		V_{CC} = 1.4 V to 1.6 V	3.5	7.0	11.2	3.6	12.4	13.0	ns
		V_{CC} = 1.65 V to 1.95 V	3.5	6.0	9.2	3.4	10.1	10.7	ns
		V_{CC} = 2.3 V to 2.7 V	3.4	5.1	7.0	3.2	7.5	7.9	ns
		V_{CC} = 3.0 V to 3.6 V	3.3	4.8	6.2	3.1	7.1	7.5	ns
C_L = 5 pF, 10 pF, 15 pF and 30 pF									
C_{PD}	power dissipation capacitance	f = 1 MHz; V_I = GND to V_{CC} [3]							
		V_{CC} = 0.8 V	-	2.5	-	-	-	-	pF
		V_{CC} = 1.1 V to 1.3 V	-	2.7	-	-	-	-	pF
		V_{CC} = 1.4 V to 1.6 V	-	2.8	-	-	-	-	pF
		V_{CC} = 1.65 V to 1.95 V	-	3.0	-	-	-	-	pF
		V_{CC} = 2.3 V to 2.7 V	-	3.5	-	-	-	-	pF
		V_{CC} = 3.0 V to 3.6 V	-	4.0	-	-	-	-	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).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ where:
f_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V;
N = number of inputs switching;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

11.1 Waveform and test circuit



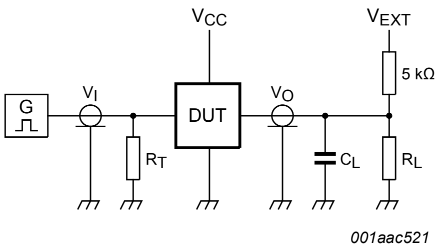
Measurement points are given in Table 9.

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

Figure 8. The data input (A) to output (Y) propagation delays

Table 9. Measurement points

Supply voltage	Output	Input		
V_{CC}	V_M	V_M	V_I	$t_r = t_f$
0.8 V to 3.6 V	0.5 x V_{CC}	0.5 x V_{CC}	V_{CC}	≤ 3.0 ns



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.

Figure 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Load		V_{EXT}		
V_{CC}	C_L	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 kΩ or 1 MΩ	open	GND	2 x V_{CC}

[1] For measuring enable and disable times, R_L = 5 kΩ, for measuring propagation delays, setup and hold times and pulse width R_L = 1 MΩ.

12 Transfer characteristics

Table 11. Transfer characteristics

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = 25 °C						
V_{T+}	positive-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.30	-	0.60	V
		V_{CC} = 1.1 V	0.53	-	0.90	V
		V_{CC} = 1.4 V	0.74	-	1.11	V
		V_{CC} = 1.65 V	0.91	-	1.29	V
		V_{CC} = 2.3 V	1.37	-	1.77	V
		V_{CC} = 3.0 V	1.88	-	2.29	V
V_{T-}	negative-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.10	-	0.60	V
		V_{CC} = 1.1 V	0.26	-	0.65	V
		V_{CC} = 1.4 V	0.39	-	0.75	V
		V_{CC} = 1.65 V	0.47	-	0.84	V
		V_{CC} = 2.3 V	0.69	-	1.04	V
		V_{CC} = 3.0 V	0.88	-	1.24	V
V_H	hysteresis voltage	see Figure 10, Figure 11, Figure 12 and Figure 13				
		V_{CC} = 0.8 V	0.07	-	0.50	V
		V_{CC} = 1.1 V	0.08	-	0.46	V
		V_{CC} = 1.4 V	0.18	-	0.56	V
		V_{CC} = 1.65 V	0.27	-	0.66	V
		V_{CC} = 2.3 V	0.53	-	0.92	V
		V_{CC} = 3.0 V	0.79	-	1.31	V

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +85 °C						
V_{T+}	positive-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.30	-	0.60	V
		V_{CC} = 1.1 V	0.53	-	0.90	V
		V_{CC} = 1.4 V	0.74	-	1.11	V
		V_{CC} = 1.65 V	0.91	-	1.29	V
		V_{CC} = 2.3 V	1.37	-	1.77	V
		V_{CC} = 3.0 V	1.88	-	2.29	V
V_{T-}	negative-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.10	-	0.60	V
		V_{CC} = 1.1 V	0.26	-	0.65	V
		V_{CC} = 1.4 V	0.39	-	0.75	V
		V_{CC} = 1.65 V	0.47	-	0.84	V
		V_{CC} = 2.3 V	0.69	-	1.04	V
		V_{CC} = 3.0 V	0.88	-	1.24	V
V_H	hysteresis voltage	see Figure 10, Figure 11, Figure 12 and Figure 13				
		V_{CC} = 0.8 V	0.07	-	0.50	V
		V_{CC} = 1.1 V	0.08	-	0.46	V
		V_{CC} = 1.4 V	0.18	-	0.56	V
		V_{CC} = 1.65 V	0.27	-	0.66	V
		V_{CC} = 2.3 V	0.53	-	0.92	V
		V_{CC} = 3.0 V	0.79	-	1.31	V

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +125 °C						
V_{T+}	positive-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.30	-	0.62	V
		V_{CC} = 1.1 V	0.53	-	0.92	V
		V_{CC} = 1.4 V	0.74	-	1.13	V
		V_{CC} = 1.65 V	0.91	-	1.31	V
		V_{CC} = 2.3 V	1.37	-	1.80	V
		V_{CC} = 3.0 V	1.88	-	2.32	V
V_{T-}	negative-going threshold voltage	see Figure 10 and Figure 11				
		V_{CC} = 0.8 V	0.10	-	0.60	V
		V_{CC} = 1.1 V	0.26	-	0.65	V
		V_{CC} = 1.4 V	0.39	-	0.75	V
		V_{CC} = 1.65 V	0.47	-	0.84	V
		V_{CC} = 2.3 V	0.69	-	1.04	V
		V_{CC} = 3.0 V	0.88	-	1.24	V
V_H	hysteresis voltage	see Figure 10, Figure 11, Figure 12 and Figure 13				
		V_{CC} = 0.8 V	0.07	-	0.50	V
		V_{CC} = 1.1 V	0.08	-	0.46	V
		V_{CC} = 1.4 V	0.18	-	0.56	V
		V_{CC} = 1.65 V	0.27	-	0.66	V
		V_{CC} = 2.3 V	0.53	-	0.92	V
		V_{CC} = 3.0 V	0.79	-	1.31	V

12.1 Waveforms transfer characteristics

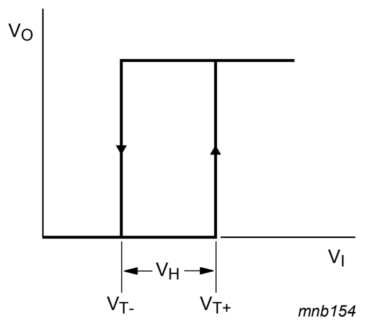
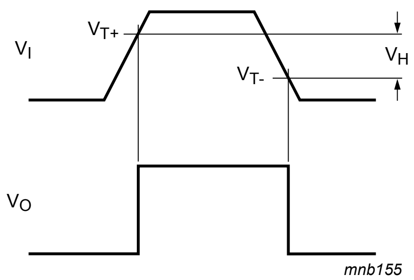


Figure 10. Transfer characteristic



V_{T+} and V_{T-} limits at 70 % and 20 %.

Figure 11. Definition of V_{T+}, V_{T-} and V_H

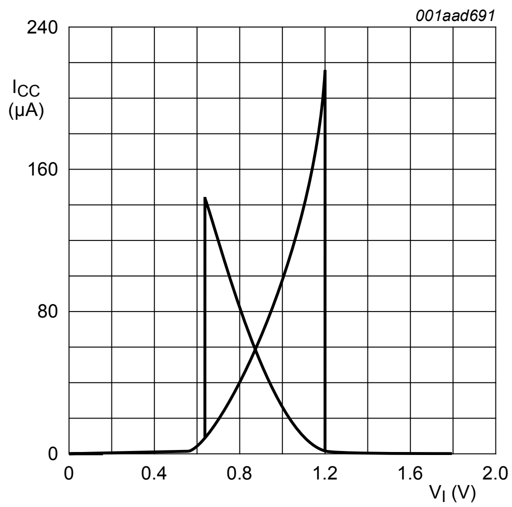


Figure 12. Typical transfer characteristics; V_{CC} = 1.8 V

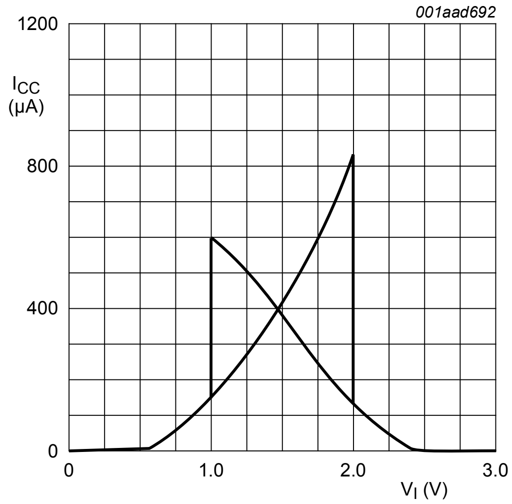


Figure 13. Typical transfer characteristics; V_{CC} = 3.0 V

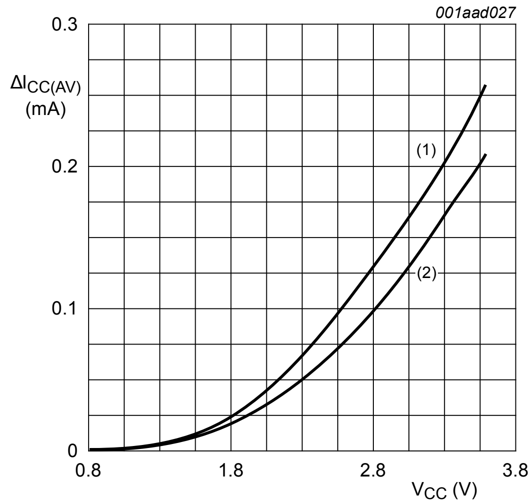
13 Application information

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

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

- P_{ad} = additional power dissipation (μW);
- f_i = input frequency (MHz);
- t_r = input rise time (ns); 10 % to 90 %;
- t_f = input fall time (ns); 90 % to 10 %;
- $I_{CC(AV)}$ = average additional supply current (μA).

Average I_{CC} differs with positive or negative input transitions, as shown in Figure 14.



(1) Positive-going edge.

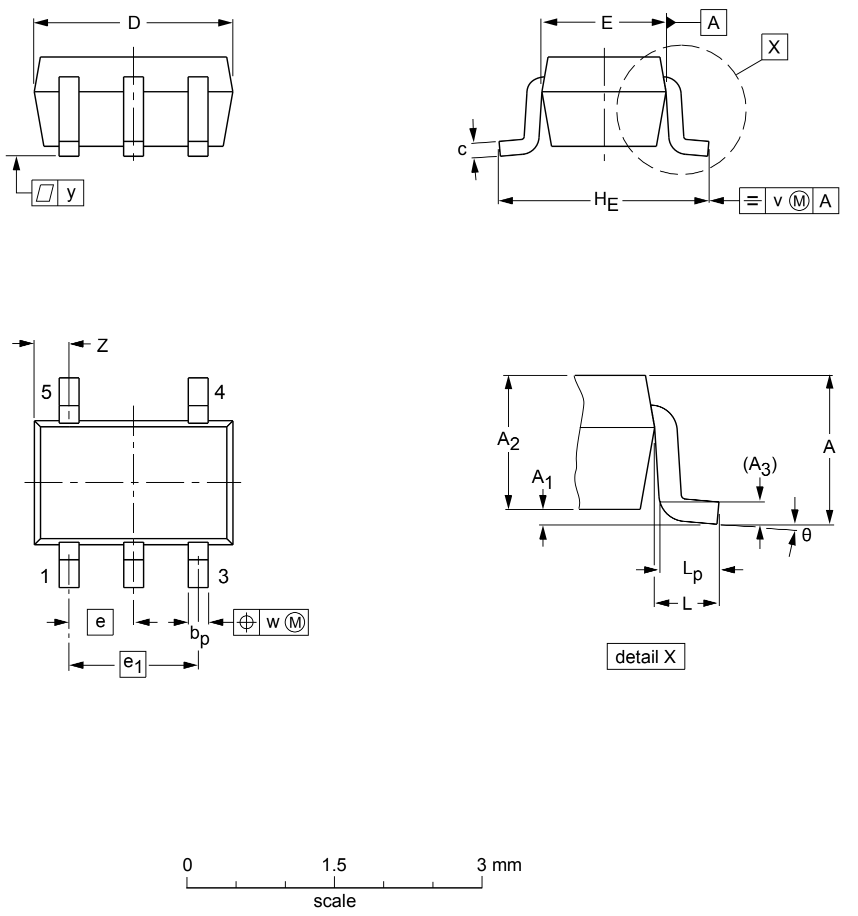
(2) Negative-going edge.

Linear change of V_I between 0.8 V and 2.0 V. All values given are typical, unless otherwise specified.

Figure 14. Average I_{CC} as a function of V_{CC}

14 Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm **SOT353-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D(1)	E(1)	e	e_1	H_E	L	L_p	v	w	y	Z(1)	θ
mm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

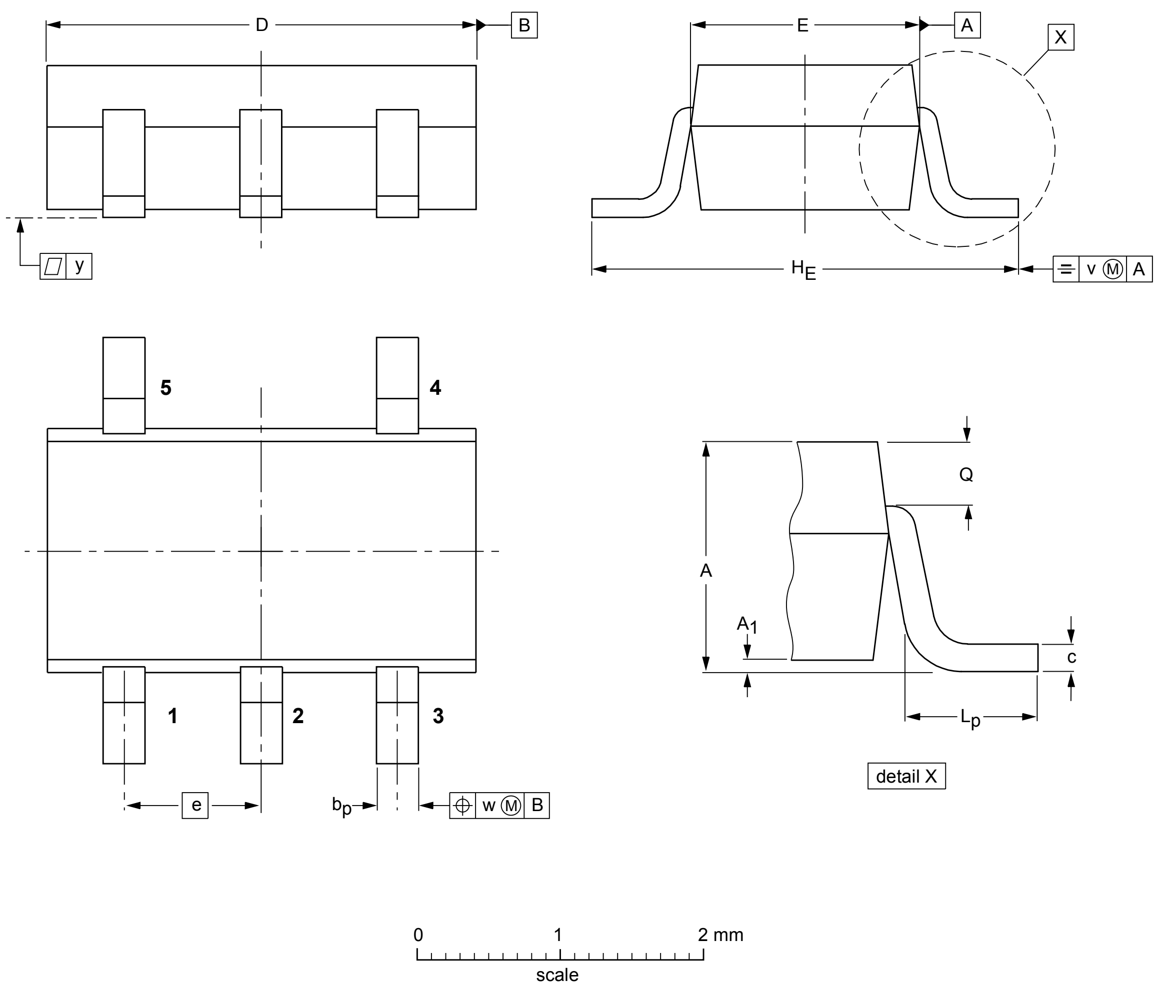
Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT353-1		MO-203	SC-88A			~~00-09-01~~ 03-02-19

Figure 15. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads **SOT753**



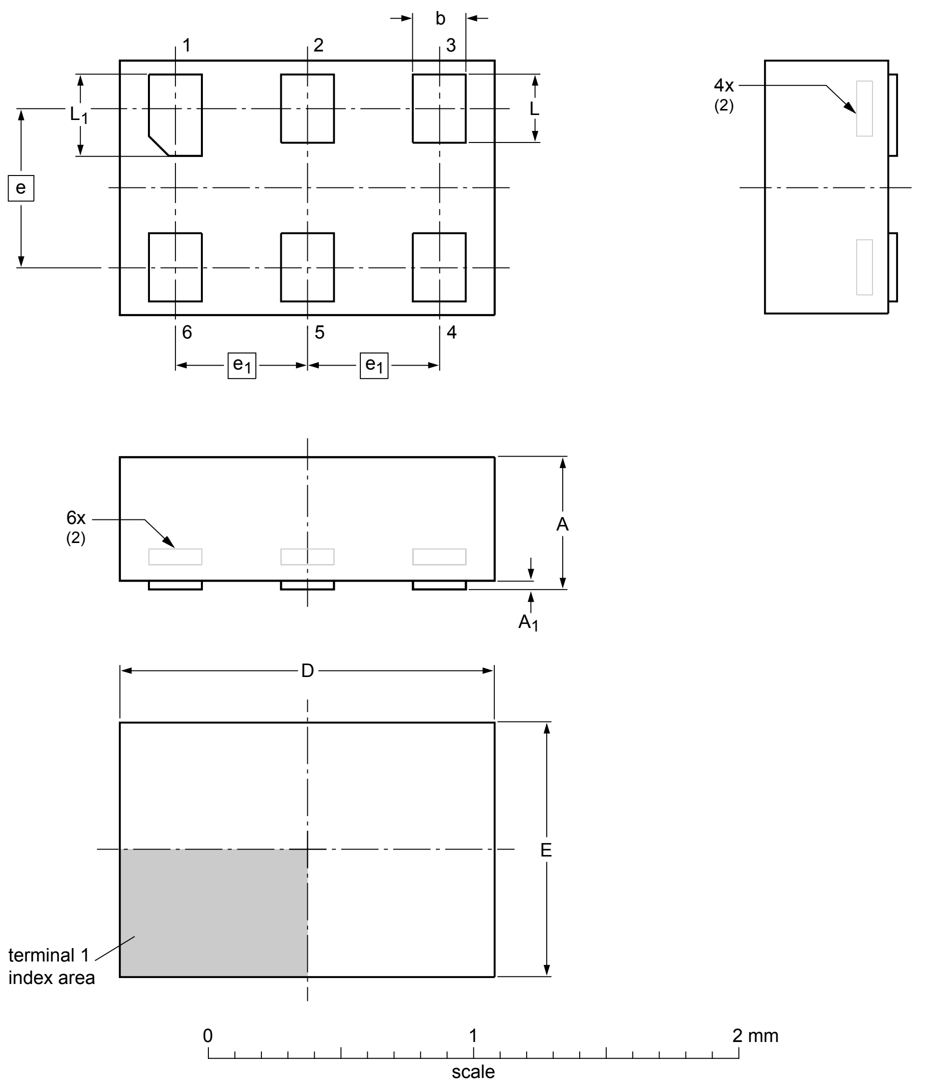
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.100 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT753			SC-74A			~~02-04-16~~ 06-03-16

Figure 16. Package outline SOT753 (SC-74A)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm SOT886



Dimensions (mm are the original dimensions)

Unit		$A^{(1)}$	A_1	b	D	E	e	e_1	L	L_1
mm	max	0.5	0.04	0.25	1.50	1.05			0.35	0.40
	nom			0.20	1.45	1.00	0.6	0.5	0.30	0.35
	min			0.17	1.40	0.95			0.27	0.32

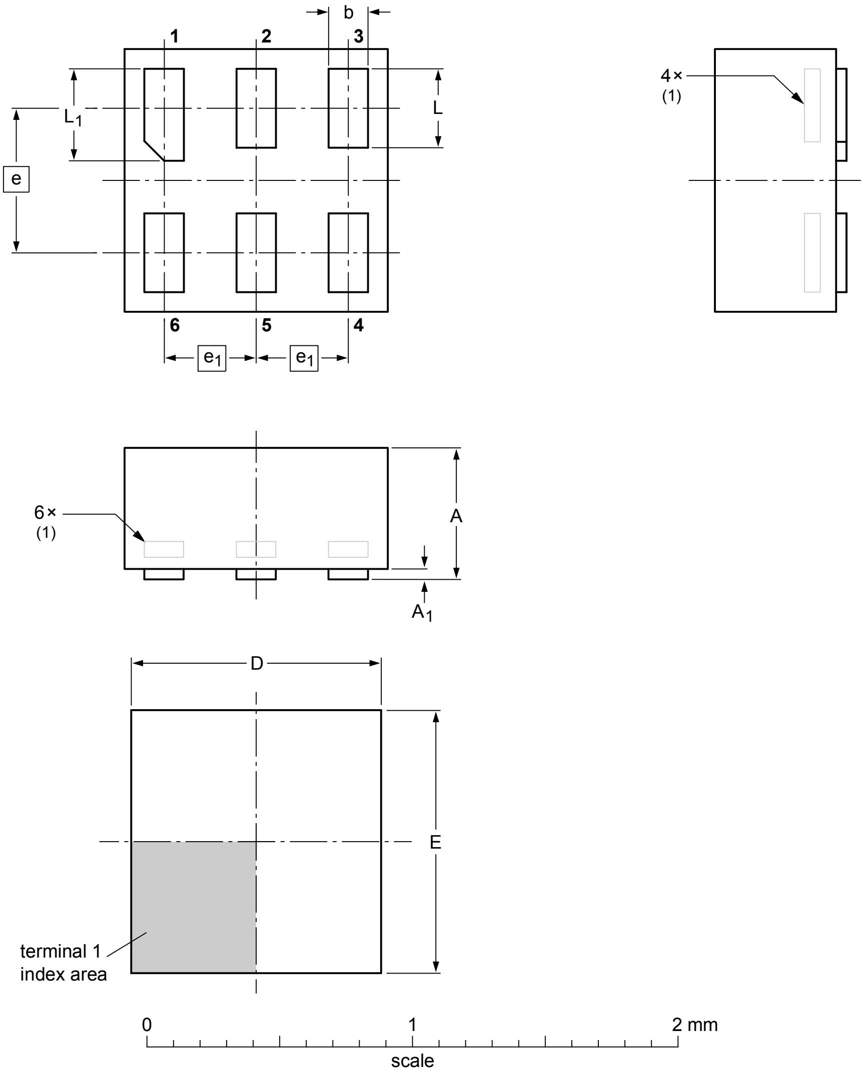
Notes
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

sot886_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT886		MO-252				~~04-07-22~~ 12-01-05

Figure 17. Package outline SOT886 (XSON6)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm **SOT891**



DIMENSIONS (mm are the original dimensions)

UNIT	A max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.20 0.12	1.05 0.95	1.05 0.95	0.55	0.35	0.35 0.27	0.40 0.32

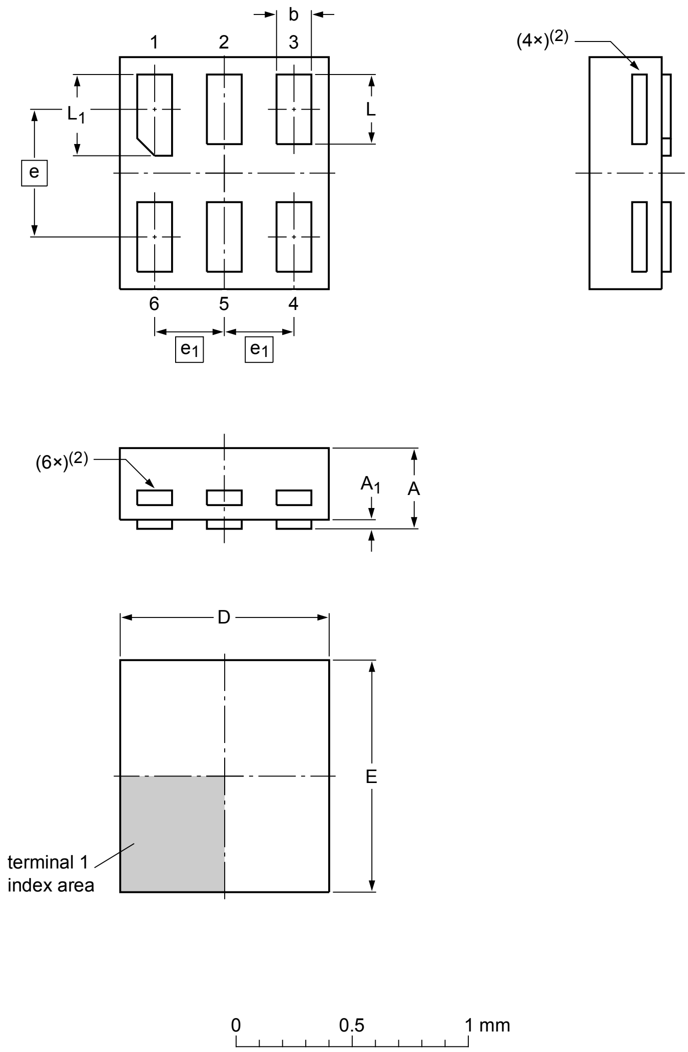
Note

1. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT891						~~05-04-06~~ 07-05-15

Figure 18. Package outline SOT891 (XSON6)

XSON6: extremely thin small outline package; no leads;
6 terminals; body 0.9 x 1.0 x 0.35 mm **SOT1115**



Dimensions

Unit		$A^{(1)}$	A_1	b	D	E	e	e_1	L	L_1
	max	0.35	0.04	0.20	0.95	1.05			0.35	0.40
mm	nom			0.15	0.90	1.00	0.55	0.3	0.30	0.35
	min			0.12	0.85	0.95			0.27	0.32

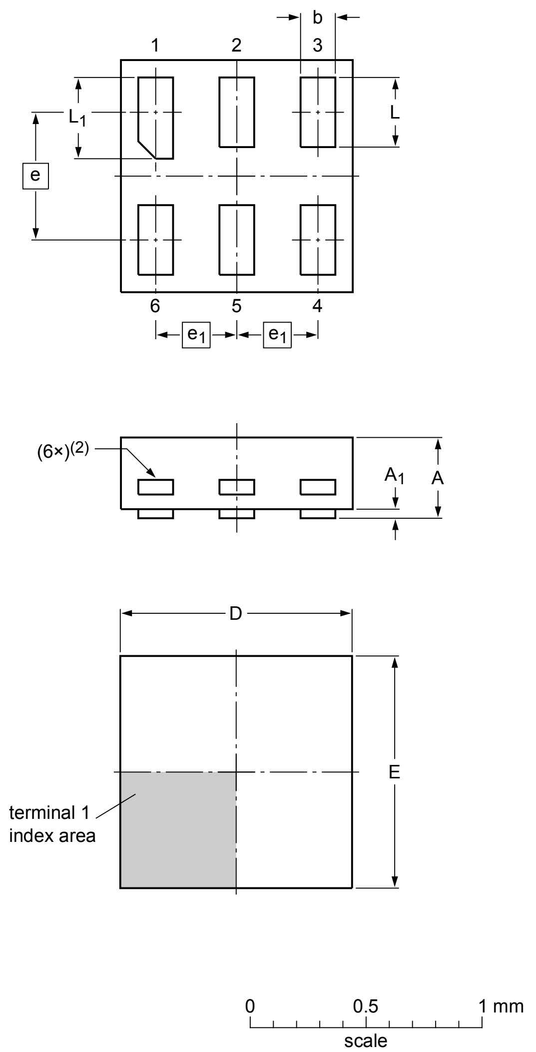
Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1115_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1115						~~10-04-02~~ 10-04-07

Figure 19. Package outline SOT1115 (XSON6)

XSON6: extremely thin small outline package; no leads;
6 terminals; body 1.0 x 1.0 x 0.35 mm **SOT1202**



Dimensions

Unit		$A^{(1)}$	A_1	b	D	E	e	e_1	L	L_1
mm	max	0.35	0.04	0.20	1.05	1.05			0.35	0.40
	nom			0.15	1.00	1.00	0.55	0.35	0.30	0.35
	min			0.12	0.95	0.95			0.27	0.32

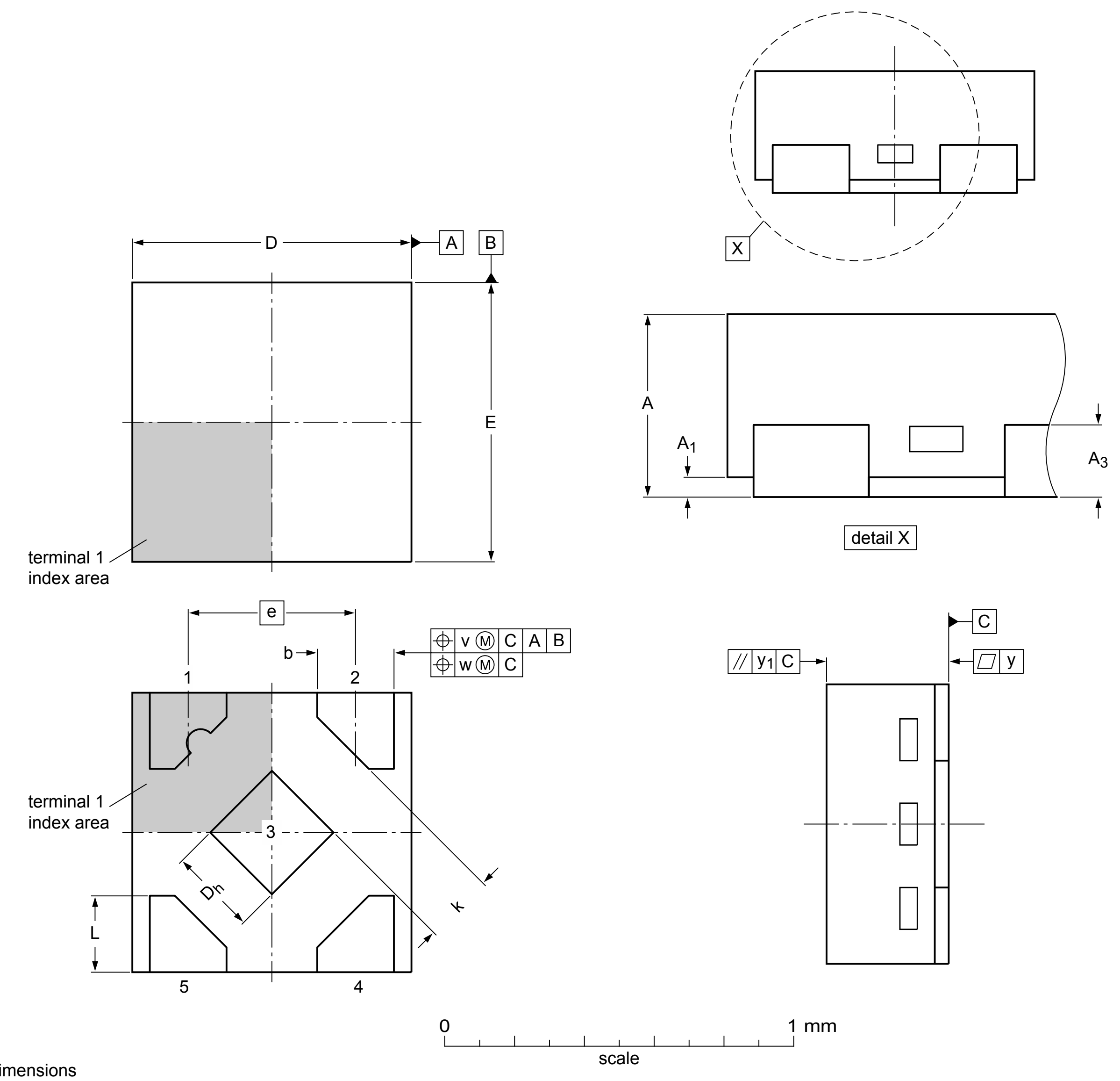
Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1202_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1202						~~10-04-02~~ 10-04-06

Figure 20. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm **SOT1226**



Dimensions

Unit		$A^{(1)}$	A_1	A_3	D	D_h	E	b	e	k	L	v	w	y	y_1
mm	max	0.35	0.04	0.128	0.85	0.30	0.85	0.27			0.27				
	nom				0.80	0.25	0.80	0.22	0.48		0.22	0.1	0.05	0.05	0.05
	min			0.040	0.75	0.20	0.75	0.17		0.20	0.17				

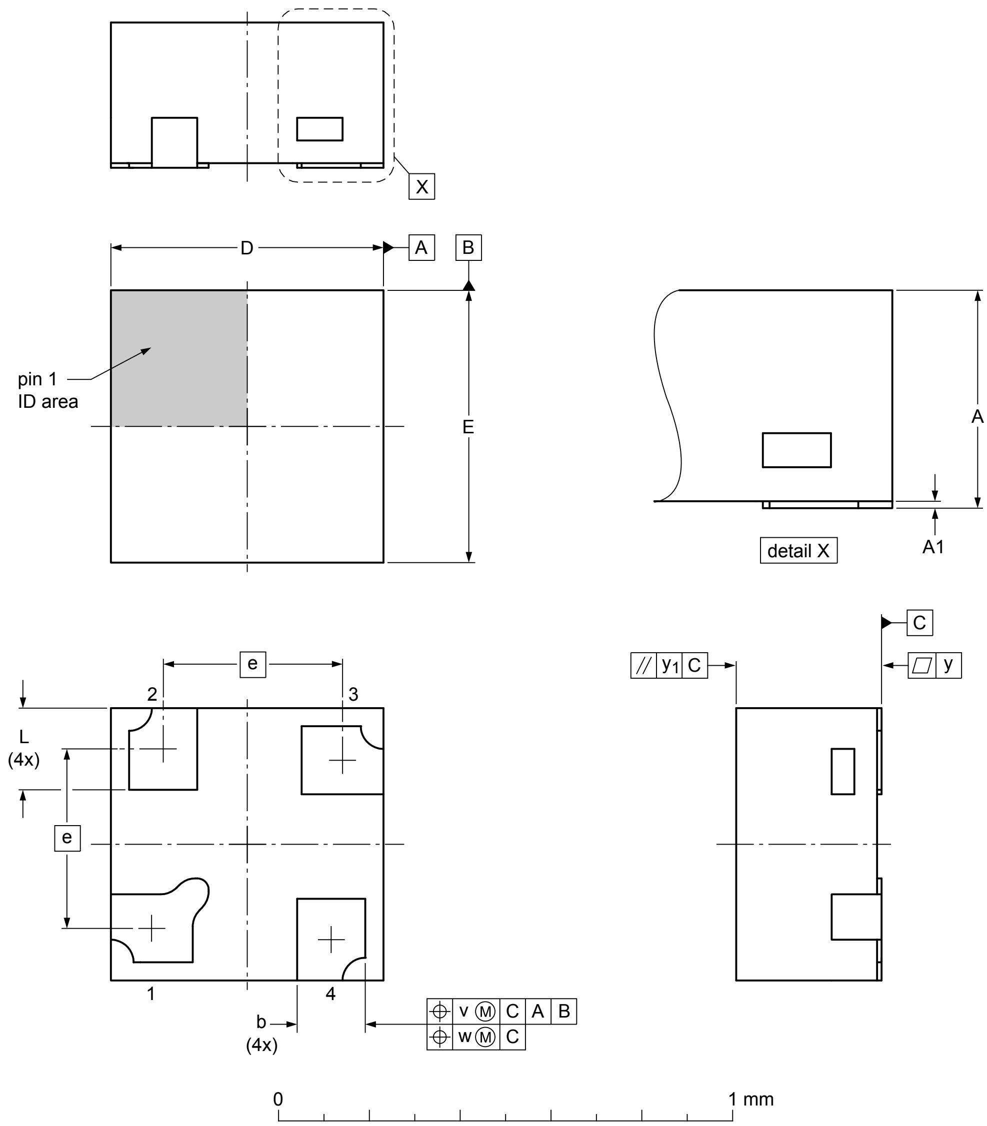
Note
1. Dimension A is including plating thickness.
2. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

sot1226_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	EIAJ			
SOT1226						~~12-04-10~~ 12-04-25

Figure 21. Package outline SOT1226 (X2SON5)

X2SON4: plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 x 0.6 x 0.32 mm **SOT1269-2**



Dimensions (mm are the original dimensions)

Unit		A	A_1	D	E	b	e	L	v	w	y	y_1
mm	max	0.35	0.04	0.65	0.65	0.20		0.23				
	nom	0.32	0.02	0.60	0.60	0.15	0.40	0.18	0.10	0.05	0.05	0.05
	min	0.30	0.00	0.55	0.55	0.10		0.13				

sot1269-2_po

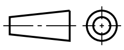
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1269-2		- - -				~~17-04-07~~ 17-06-30

Figure 22. Package outline SOT1269-2 (X2SON4)

15 Abbreviations

Table 12. Abbreviations

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

16 Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G17 v.11	20180608	Product data sheet	-	74AUP1G17 v.10
Modifications:	• Added type number 74AUP1G17GX4 (SOT1269-2)			
74AUP1G17 v.10	20170519	Product data sheet	-	74AUP1G17 v.9
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.			
74AUP1G17 v.9	20161104	Product data sheet	-	74AUP1G17 v.8
Modifications:	• Added type number 74AUP1G17GV (SOT753)			
74AUP1G17 v.8	20150115	Product data sheet	-	74AUP1G17 v.7
Modifications:	• Marking code Table 2: typo corrected in type number 74AUP1G17GX.			
74AUP1G17 v.7	20120716	Product data sheet	-	74AUP1G17 v.6
Modifications:	• Package outline drawing of SOT1226 (Figure 21) modified.			
74AUP1G17 v.6	20120412	Product data sheet	-	74AUP1G17 v.5
Modifications:	• Added type number 74AUP1G17GX (SOT1226) • Package outline drawing of SOT886 (Figure 17) modified.			
74AUP1G17 v.5	20111124	Product data sheet	-	74AUP1G17 v.4
Modifications:	• Legal pages updated.			
74AUP1G17 v.4	20100715	Product data sheet	-	74AUP1G17 v.3
74AUP1G17 v.3	20090710	Product data sheet	-	74AUP1G17 v.2
74AUP1G17 v.2	20060727	Product data sheet	-	74AUP1G17 v.1
74AUP1G17 v.1	20050726	Product data sheet	-	-

17 Legal information

17.1 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.nexperia.com.

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Date of release: 8 June 2018
Document identifier: 74AUP1G17

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