74AUP2G132

Low-power dual 2-input NAND Schmitt trigger

Rev. 03 — 15 December 2008 Product data sheet

1. General description

The 74AUP2G132 provides the dual 2-input NAND Schmitt trigger function which accept standard input signals. They are 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 a 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

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- ESD protection:
  - HBM JESD22-A114E Class 3A exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101C exceeds 1000 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. Applications

- Wave and pulse shaper
- Astable multivibrator
- Monostable multivibrator

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4. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AUP2G132DC	–40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G132GT	–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
74AUP2G132GD	–40 °C to +125 °C	XSON8U	plastic extremely thin small outline package; no leads; 8 terminals; UTLP based; body 3 × 2 × 0.5 mm	SOT996-2
74AUP2G132GM	–40 °C to +125 °C	XQFN8U	plastic extremely thin quad flat package; no leads; 8 terminals; UTLP based; body 1.6 × 1.6 × 0.5 mm	SOT902-1

5. Marking

Table 2. Marking codes

Type number	Marking code
74AUP2G132DC	aE2
74AUP2G132GT	aE2
74AUP2G132GD	aE2
74AUP2G132GM	aE2

6. Functional diagram

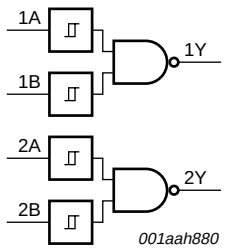


Fig 1. Logic symbol

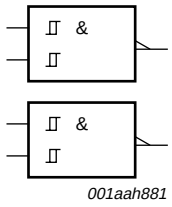


Fig 2. IEC logic symbol

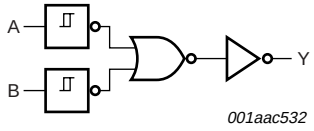


Fig 3. Logic diagram (one gate)

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7. Pinning information

7.1 Pinning

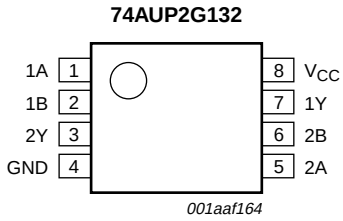


Fig 4. Pin configuration SOT765-1 (VSSOP8)

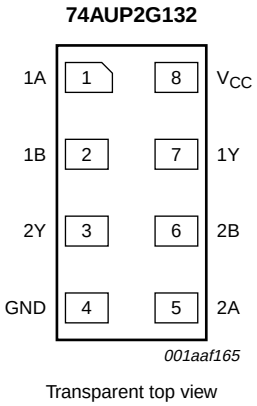


Fig 5. Pin configuration SOT833-1 (XSON8)

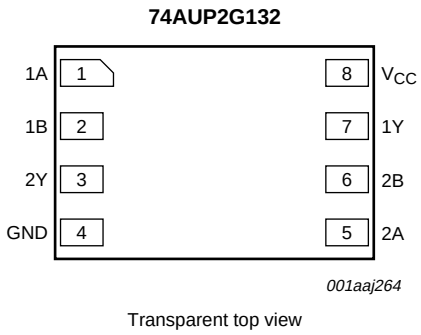


Fig 6. Pin configuration SOT996-2 (XSON8U)

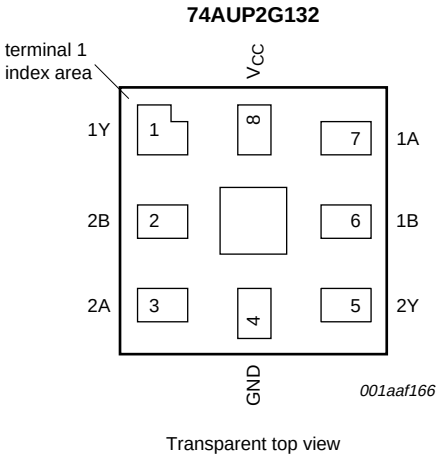


Fig 7. Pin configuration SOT902-1 (XQFN8U)

7.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1, SOT833-1 and SOT996-2	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

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8. Functional description

Table 4. Function table[1]

Input		Output
nA	**nB**	**nY**
L	L	H
L	H	H
H	L	H
H	H	L

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

9. 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	[2]	-	250	mW

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

[2] For VSSOP8 packages: above 110 °C the value of P_{tot} derates linearly with 8.0 mW/K.
For XSON8, XSON8U and XQFN8U packages: above 45 °C the value of P_{tot} derates linearly with 2.4 mW/K.

10. Recommended operating conditions

Table 6. 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

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11. 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	[1]	-	-	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
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

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Table 7. Static characteristics *…continued*

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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	[1]	-	-	50	µA
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

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Table 7. Static characteristics *…continued*

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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	[1]	-	-	75	µA

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

12. Dynamic characteristics

Table 8. Dynamic characteristics

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

Symbol	Parameter	Conditions		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 pF										
t_{pd}	propagation delay	nA or nB to nY; see Figure 8	[2]							
		V_{CC} = 0.8 V		-	22.5	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V		2.6	6.3	13.4	2.4	15.1	16.6	ns
		V_{CC} = 1.4 V to 1.6 V		2.2	4.6	8.2	1.9	9.7	10.7	ns
		V_{CC} = 1.65 V to 1.95 V		1.9	3.9	6.6	1.7	7.9	8.7	ns
		V_{CC} = 2.3 V to 2.7 V		1.7	3.2	5.3	1.5	6.2	6.8	ns
		V_{CC} = 3.0 V to 3.6 V		1.6	2.9	4.7	1.4	5.6	6.2	ns
C_L = 10 pF										
t_{pd}	propagation delay	nA or nB to nY; see Figure 8	[2]							
		V_{CC} = 0.8 V		-	26.1	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V		3.0	7.2	15.4	2.7	17.3	19.0	ns
		V_{CC} = 1.4 V to 1.6 V		2.5	5.2	9.3	2.2	11.0	12.1	ns
		V_{CC} = 1.65 V to 1.95 V		2.3	4.5	7.5	2.0	9.0	9.9	ns
		V_{CC} = 2.3 V to 2.7 V		2.1	3.8	6.1	1.8	7.2	7.9	ns
		V_{CC} = 3.0 V to 3.6 V		2.0	3.5	5.5	1.8	6.5	7.2	ns
C_L = 15 pF										
t_{pd}	propagation delay	nA or nB to nY; see Figure 8	[2]							
		V_{CC} = 0.8 V		-	29.6	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V		3.3	8.0	17.2	3.0	19.4	21.3	ns
		V_{CC} = 1.4 V to 1.6 V		2.8	5.8	10.4	2.5	12.3	13.5	ns
		V_{CC} = 1.65 V to 1.95 V		2.6	5.0	8.3	2.3	10.0	11.0	ns
		V_{CC} = 2.3 V to 2.7 V		2.3	4.2	6.7	2.1	7.9	8.7	ns
		V_{CC} = 3.0 V to 3.6 V		2.2	3.9	6.1	2.0	7.3	8.0	ns

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Table 8. Dynamic characteristics *…continued*

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

Symbol	Parameter	Conditions	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 = 30 pF									
t_{pd}	propagation delay	nA or nB to nY; see Figure 8 [2]							
		V_{CC} = 0.8 V	-	39.9	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	4.3	10.2	22.6	3.8	25.4	27.9	ns
		V_{CC} = 1.4 V to 1.6 V	3.6	7.3	13.3	3.2	15.8	17.4	ns
		V_{CC} = 1.65 V to 1.95 V	3.2	6.3	10.6	2.9	12.8	14.1	ns
		V_{CC} = 2.3 V to 2.7 V	3.0	5.3	8.5	2.7	10.1	11.1	ns
		V_{CC} = 3.0 V to 3.6 V	2.8	5.0	7.8	2.7	9.2	10.1	ns
C_L = 5 pF, 10 pF, 15 pF and 30 pF									
C_{PD}	power dissipation capacitance	f_i = 1 MHz; V_I = GND to V_{CC} [3]							
		V_{CC} = 0.8 V	-	2.6	-	-	-	-	pF
		V_{CC} = 1.1 V to 1.3 V	-	2.9	-	-	-	-	pF
		V_{CC} = 1.4 V to 1.6 V	-	3.0	-	-	-	-	pF
		V_{CC} = 1.65 V to 1.95 V	-	3.2	-	-	-	-	pF
		V_{CC} = 2.3 V to 2.7 V	-	3.8	-	-	-	-	pF
		V_{CC} = 3.0 V to 3.6 V	-	4.4	-	-	-	-	pF

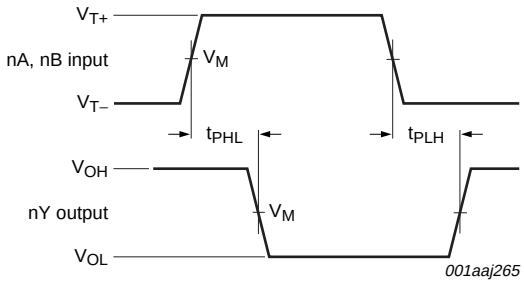
[1] All typical values are measured at nominal V_{CC}.

[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).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

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13. Waveforms



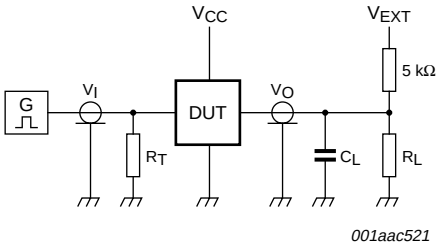
Measurement points are given in Table 9.

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	V_I	$t_r = t_f$
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V_{CC}	≤ 3.0 ns



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. Load circuitry for 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	$2 \times V_{CC}$

[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.

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14. Transfer characteristics

Table 11. Transfer characteristics

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

Symbol	Parameter	Conditions	T_{amb} = 25 °C			T_{amb} = −40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
V_{T+}	positive-going threshold voltage	see Figure 10 and Figure 11							
		V_{CC} = 0.8 V	0.30	-	0.60	0.30	0.60	0.62	V
		V_{CC} = 1.1 V	0.53	-	0.90	0.53	0.90	0.92	V
		V_{CC} = 1.4 V	0.74	-	1.11	0.74	1.11	1.13	V
		V_{CC} = 1.65 V	0.91	-	1.29	0.91	1.29	1.31	V
		V_{CC} = 2.3 V	1.37	-	1.77	1.37	1.77	1.80	V
		V_{CC} = 3.0 V	1.88	-	2.29	1.88	2.29	2.32	V
V_{T-}	negative-going threshold voltage	see Figure 10 and Figure 11							
		V_{CC} = 0.8 V	0.10	-	0.60	0.10	0.60	0.60	V
		V_{CC} = 1.1 V	0.26	-	0.65	0.26	0.65	0.65	V
		V_{CC} = 1.4 V	0.39	-	0.75	0.39	0.75	0.75	V
		V_{CC} = 1.65 V	0.47	-	0.84	0.47	0.84	0.84	V
		V_{CC} = 2.3 V	0.69	-	1.04	0.69	1.04	1.04	V
		V_{CC} = 3.0 V	0.88	-	1.24	0.88	1.24	1.24	V
V_H	hysteresis voltage	(V_{T+} − V_{T-}); see Figure 10, Figure 11, Figure 12 and Figure 13							
		V_{CC} = 0.8 V	0.07	-	0.50	0.07	0.50	0.50	V
		V_{CC} = 1.1 V	0.08	-	0.46	0.08	0.46	0.46	V
		V_{CC} = 1.4 V	0.18	-	0.56	0.18	0.56	0.56	V
		V_{CC} = 1.65 V	0.27	-	0.66	0.27	0.66	0.66	V
		V_{CC} = 2.3 V	0.53	-	0.92	0.53	0.92	0.92	V
		V_{CC} = 3.0 V	0.79	-	1.31	0.79	1.31	1.31	V

15. Waveforms transfer characteristics

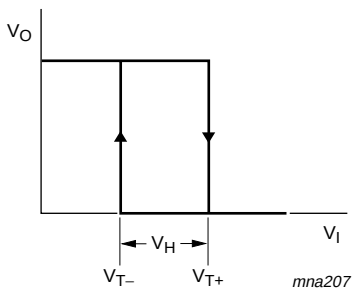
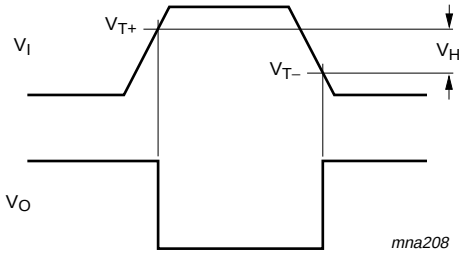


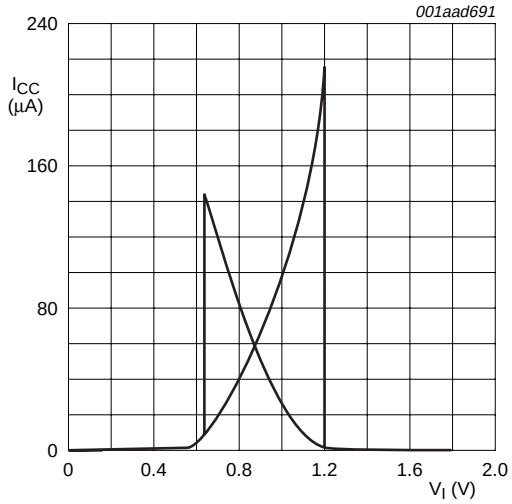
Fig 10. Transfer characteristic



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

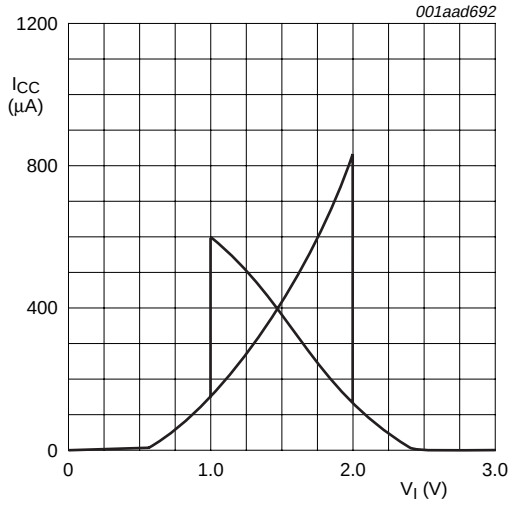
Fig 11. Definition of V_{T+}, V_{T-} and V_H

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V_{CC} = 3.0 V.

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



V_{CC} = 3.0 V.

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

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16. 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_{add} = additional power dissipation (μW);

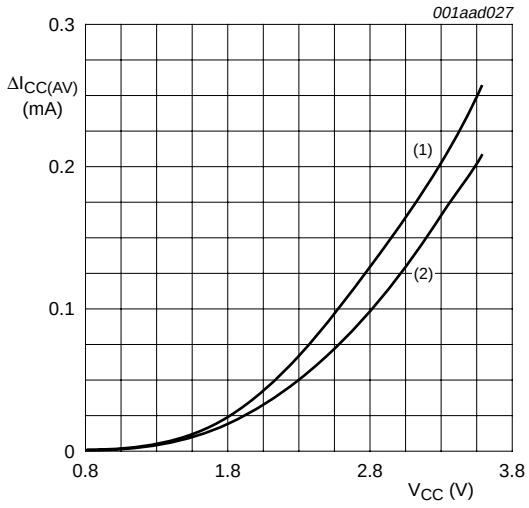
f_i = input frequency (MHz);

t_r = input rise time (ns); 10 % to 90 %;

t_f = input fall time (ns); 90 % to 10 %;

$\Delta I_{CC(AV)}$ = average additional supply current (μA).

Average $\Delta I_{CC(AV)}$ differs with positive or negative input transitions, as shown in Figure 14.



(1) Positive-going edge.

(2) Negative-going edge.

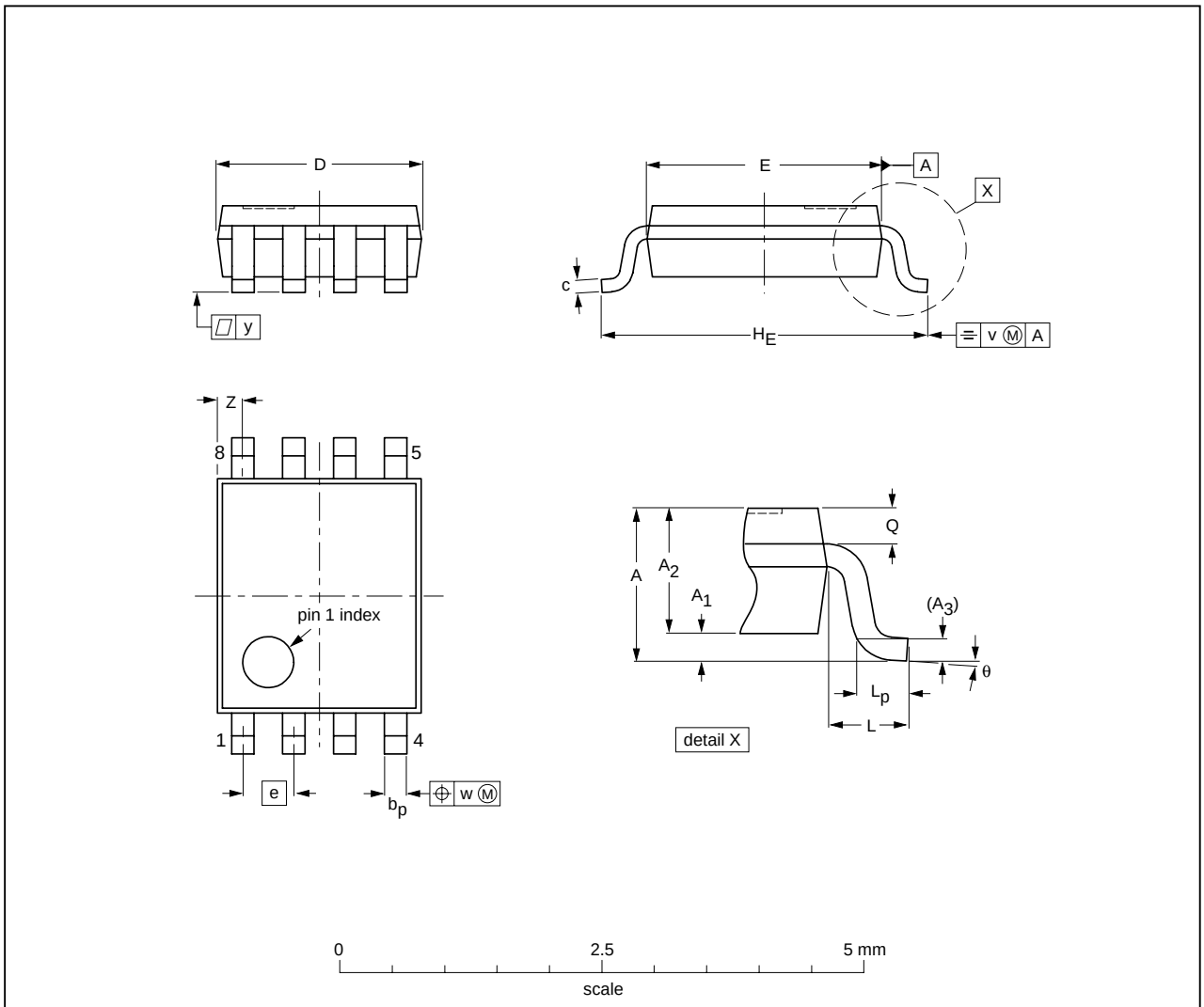
Linear change of V_I between 0.8 V and 2.0 V. All values given are typical, unless otherwise specified.

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

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17. Package outline

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm **SOT765-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	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

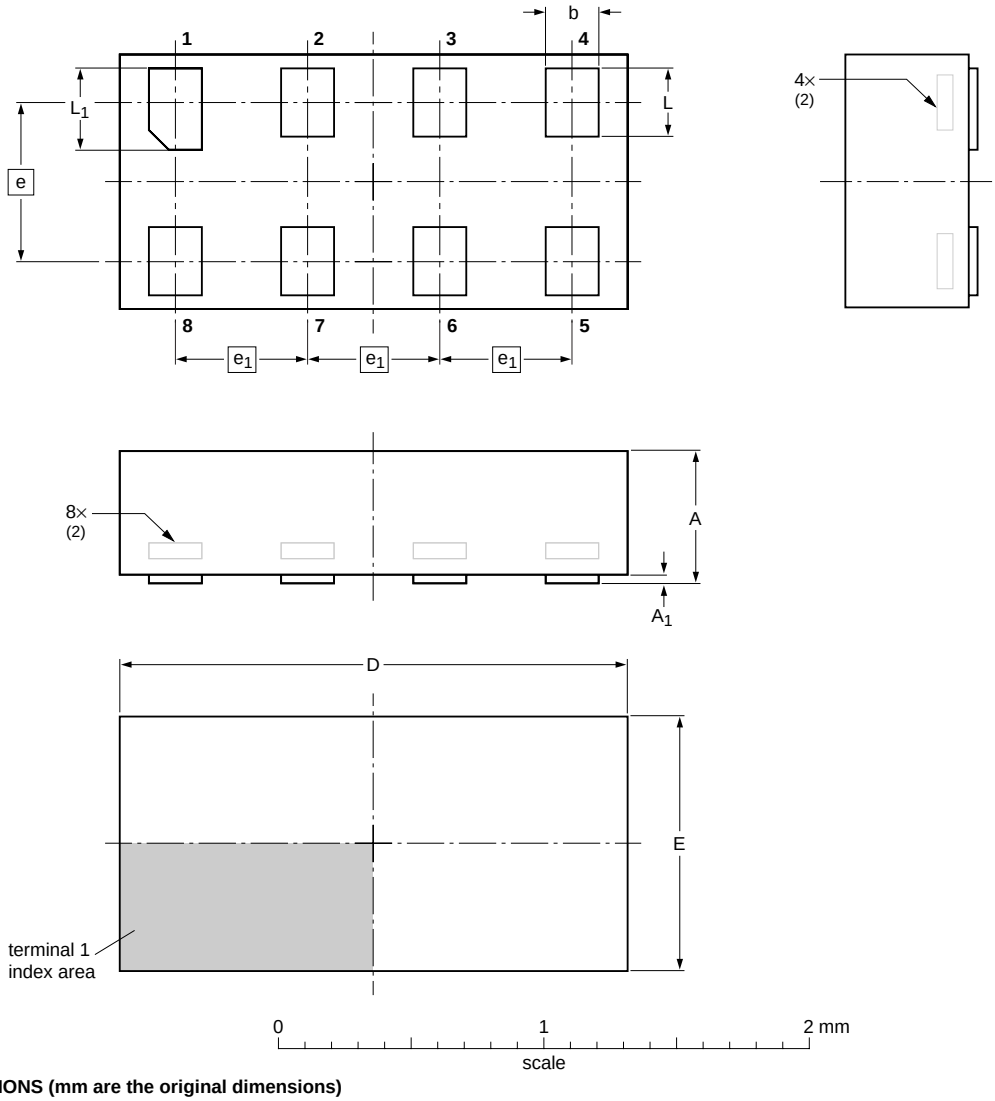
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

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

Fig 15. Package outline SOT765-1 (VSSOP8)

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XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm **SOT833-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max	A1 max	b	D	E	e	e1	L	L1
mm	0.5	0.04	0.25 0.17	2.0 1.9	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

Notes

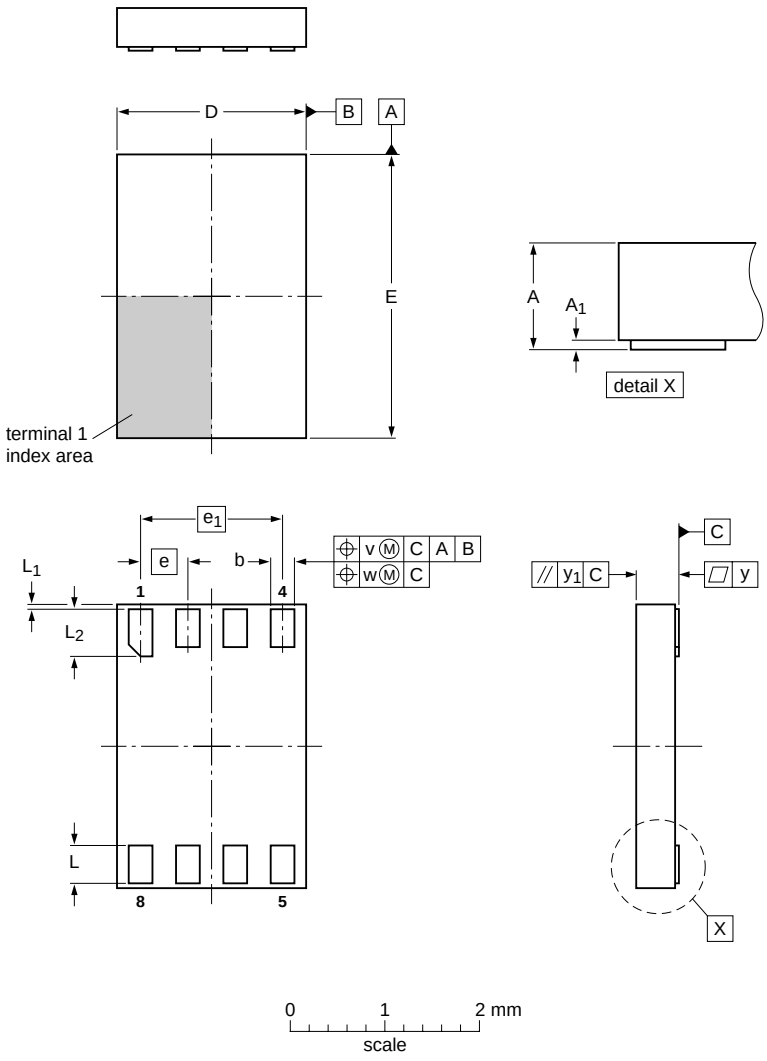
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT833-1	- - -	MO-252	- - -			~~07-11-14~~ 07-12-07

Fig 16. Package outline SOT833-1 (XSON8)

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XSON8U: plastic extremely thin small outline package; no leads; 8 terminals; UTLP based; body 3 x 2 x 0.5 mm **SOT996-2**



DIMENSIONS (mm are the original dimensions)

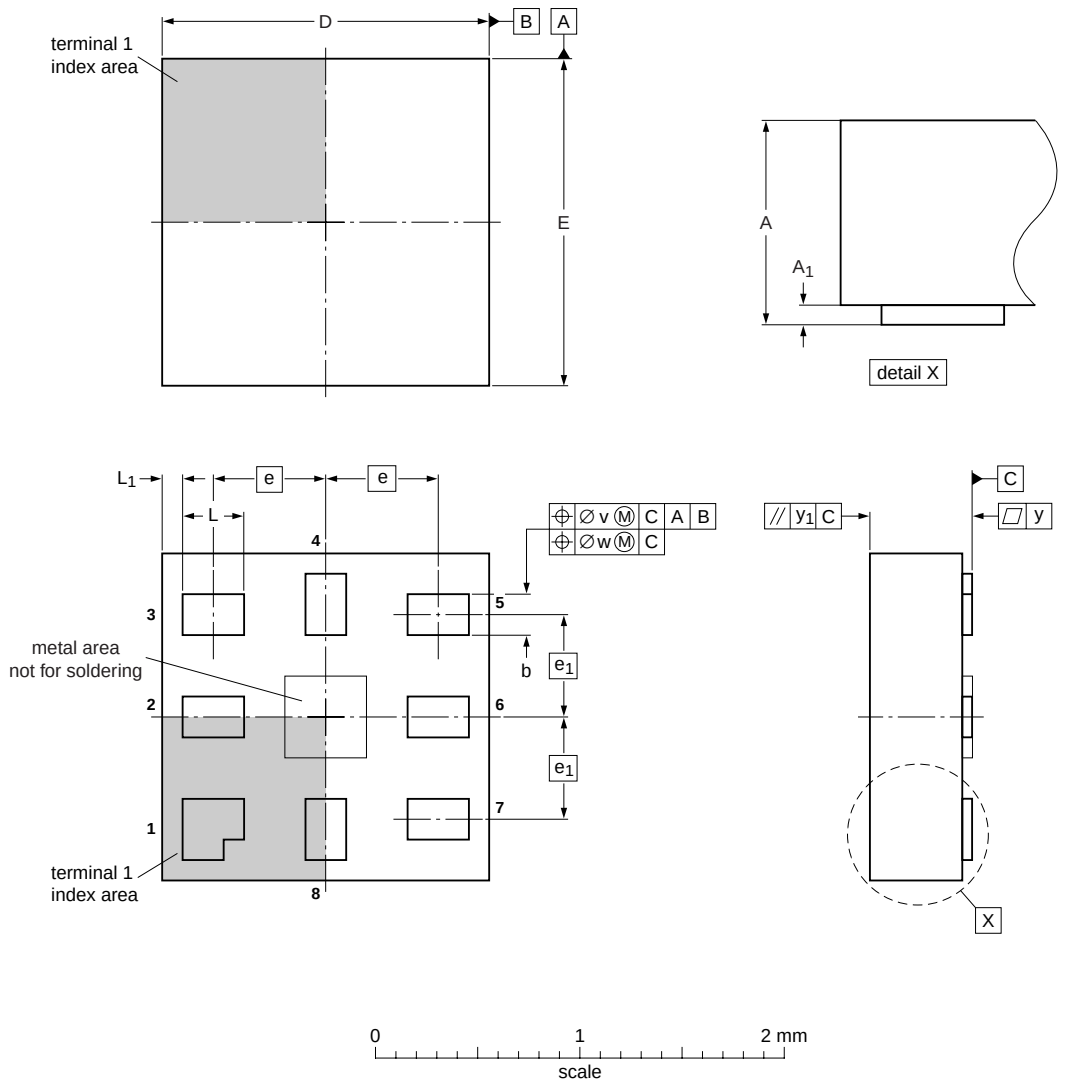
UNIT	A max	A_1	b	D	E	e	e_1	L	L_1	L_2	v	w	y	y_1
mm	0.5	0.05 0.00	0.35 0.15	2.1 1.9	3.1 2.9	0.5	1.5	0.5 0.3	0.15 0.05	0.6 0.4	0.1	0.05	0.05	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT996-2	- - -		- - -			~~07-12-18~~ 07-12-21

Fig 17. Package outline SOT996-2 (XSON8U)

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XQFN8U: plastic extremely thin quad flat package; no leads; 8 terminals; UTLP based; body 1.6 x 1.6 x 0.5 mm **SOT902-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max	A_1	b	D	E	e	e_1	L	L_1	v	w	y	y_1
mm	0.5	0.05 0.00	0.25 0.15	1.65 1.55	1.65 1.55	0.55	0.5	0.35 0.25	0.15 0.05	0.1	0.05	0.05	0.05

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT902-1	- - -	MO-255	- - -			~~05-11-25~~ 07-11-14

Fig 18. Package outline SOT902-1 (XQFN8U)

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18. Abbreviations

Table 12. Abbreviations

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

19. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G132_3	20081215	Product data sheet	-	74AUP2G132_2
Modifications:	• Added type number 74AUP2G132GD (XSON8U package).			
74AUP2G132_2	20080314	Product data sheet	-	74AUP2G132_1
74AUP2G132_1	20061018	Product data sheet	-	-

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20.1 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.

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