

74AUP2G80

Low-power dual D-type flip-flop; positive-edge trigger

Rev. 01 — 25 August 2006

Product data sheet

1. General description

The 74AUP2G80 is a high-performance, low-power, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families.

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

The 74AUP2G80 provides the single positive-edge triggered D-type flip-flop. Information on the data input is transferred to the \bar{Q} output on the LOW-to-HIGH transition of the clock pulse. The input pin D must be stable one setup time prior to the LOW-to-HIGH clock transition for predictable operation.

2. Features

- 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-A114-D Class 3A exceeds 5000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
 - ◆ CDM JESD22-C101-C exceeds 1000 V
- Low static power consumption; $I_{CC} = 0.9 \mu A$ (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

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3. Ordering information

Table 1. Ordering information

Type number	Package	Temperature range	Name	Description	Version
74AUP2G80DC	VSSOP8	-40 °C to +125 °C		plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G80GT	XSON8	-40 °C to +125 °C		plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	SOT833-1
74AUP2G80GM	XQFN8	-40 °C to +125 °C		plastic extremely thin quad flat package; no leads; 8 terminals; body 1.6 × 1.6 × 0.5 mm	SOT902-1

4. Marking

Table 2. Marking

Type number	Marking code
74AUP2G80DC	p80
74AUP2G80GT	p80
74AUP2G80GM	p80

5. Functional diagram

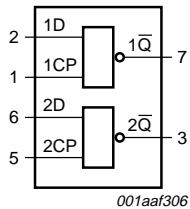


Fig 1. Logic symbol

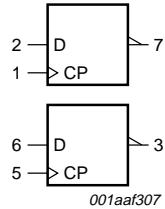


Fig 2. IEC logic symbol

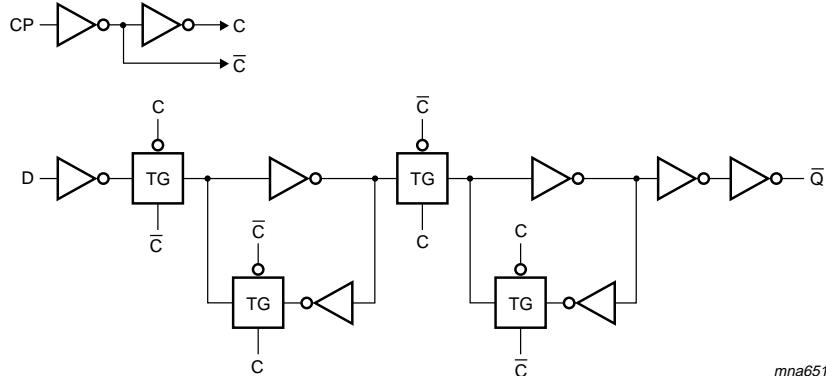


Fig 3. Logic diagram (one flip-flop)

6. Pinning information

6.1 Pinning

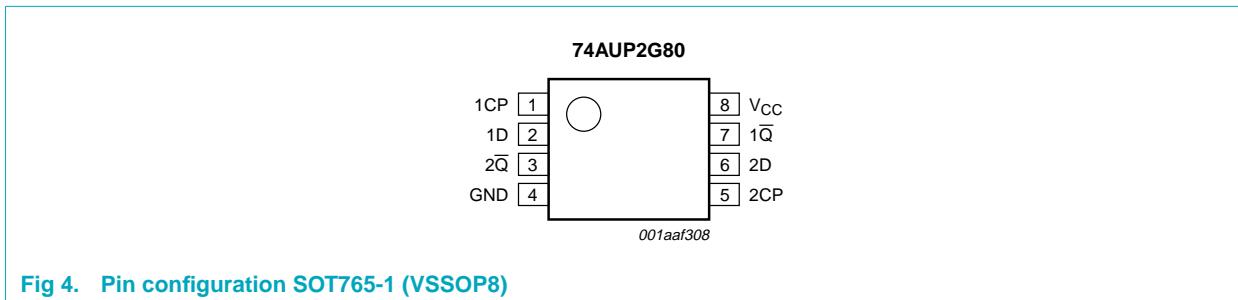


Fig 4. Pin configuration SOT765-1 (VSSOP8)

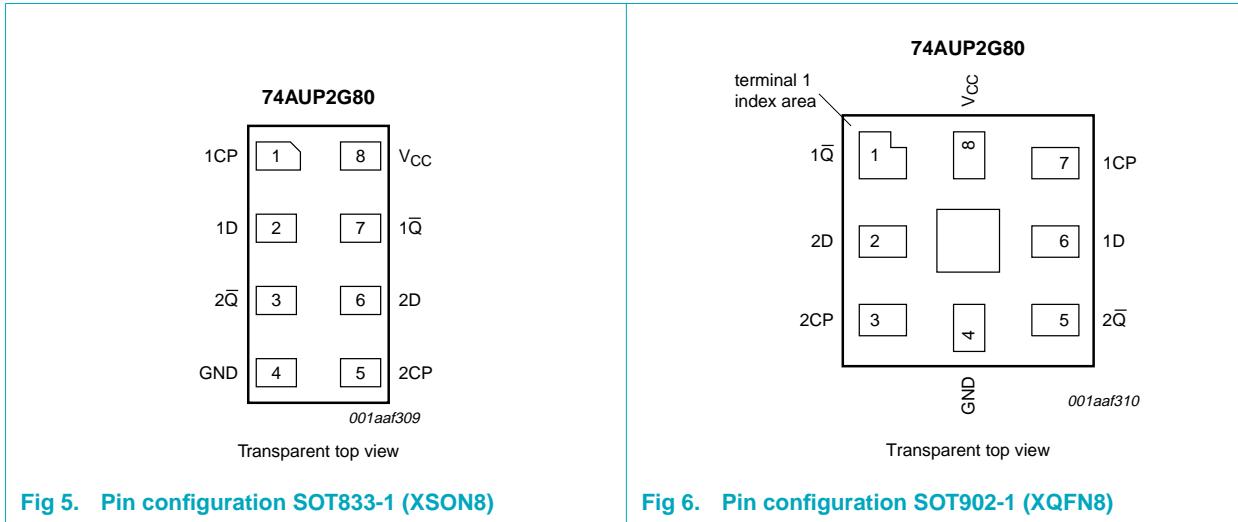


Fig 5. Pin configuration SOT833-1 (XSON8)

Fig 6. Pin configuration SOT902-1 (XQFN8)

6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1/SOT833-1	SOT902-1	
1CP	1	7	clock pulse input
1D	2	6	data input
2Q-bar	3	5	data output
GND	4	4	ground (0 V)
2CP	5	3	clock pulse input
2D	6	2	data input
1Q-bar	7	1	data output
V _{CC}	8	8	supply voltage

7. Functional description

Table 4. Function table^[1]

Input		Output
nCP	nD	nQ
↑	L	H
↑	H	L
L	X	q

- [1] H = HIGH voltage level;
- L = LOW voltage level;
- ↑ = LOW-to-HIGH CP transition;
- X = don't care;
- q = lower case letter indicates the state of referenced input, one setup time prior to the LOW-to-HIGH CP transition.

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 > V _{CC} or 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 and XQFN8 packages: above 45 °C the value of P_{tot} derates linearly with 2.4 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
Δt/ΔV	input transition rise and fall rate	V _{CC} = 0.8 V to 3.6 V	0	200	ns/V

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 _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	0.70 × V _{CC}	-	-	V
		V _{CC} = 0.9 V to 1.95 V	0.65 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	0.30 × V _{CC}	V
		V _{CC} = 0.9 V to 1.95 V	-	-	0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -20 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 _{IH} or V _{IL}				
		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 _{CC} = 0 V to 3.6 V; V _I = GND or V _{CC}	-	0.6	-	pF
C _O	output capacitance	V _O = GND; V _{CC} = 0 V	-	1.3	-	pF

Table 7. Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +85 °C						
V _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	0.70 × V _{CC}	-	-	V
		V _{CC} = 0.9 V to 1.95 V	0.65 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	0.30 × V _{CC}	V
		V _{CC} = 0.9 V to 1.95 V	-	-	0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -20 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 _{IH} or V _{IL}				
		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

Table 7. Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +125 °C						
V _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	0.75 × V _{CC}	-	-	V
		V _{CC} = 0.9 V to 1.95 V	0.70 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	0.25 × V _{CC}	V
		V _{CC} = 0.9 V to 1.95 V	-	-	0.30 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -20 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 _{IH} or V _{IL}				
		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	[1]	-	75	µA

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

11. Dynamic characteristics

Table 8. Dynamic characteristicsVoltages 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 (85 °C)	Max (85 °C)	Min (125 °C)	
C_L = 5 pF									
t _{pd}	propagation delay	nCP to nQ̄; see Figure 7 [2]							
		V _{CC} = 0.8 V	-	20.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	2.9	6.0	12.9	2.6	14.3	2.6	15.7
		V _{CC} = 1.4 V to 1.6 V	1.9	4.2	7.6	2.0	8.9	2.0	9.8
		V _{CC} = 1.65 V to 1.95 V	1.7	3.4	5.9	1.6	7.0	1.6	7.7
		V _{CC} = 2.3 V to 2.7 V	1.4	2.6	4.3	1.2	5.6	1.2	6.2
f _{max}	maximum frequency	nCP; see Figure 8							
		V _{CC} = 0.8 V	-	53	-	-	-	-	MHz
		V _{CC} = 1.1 V to 1.3 V	-	203	-	170	-	170	-
		V _{CC} = 1.4 V to 1.6 V	-	347	-	310	-	300	-
		V _{CC} = 1.65 V to 1.95 V	-	435	-	400	-	390	-
		V _{CC} = 2.3 V to 2.7 V	-	550	-	490	-	480	-
C _L = 10 pF	propagation delay	nCP to nQ̄; see Figure 7 [2]							
		V _{CC} = 0.8 V	-	24.6	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.3	6.9	14.9	3.0	16.5	3.0	18.2
		V _{CC} = 1.4 V to 1.6 V	2.6	4.8	8.8	2.3	10.3	2.3	11.3
		V _{CC} = 1.65 V to 1.95 V	2.3	3.9	6.8	2.0	8.1	2.0	8.9
		V _{CC} = 2.3 V to 2.7 V	1.9	3.1	5.1	1.7	6.3	1.7	6.9
f _{max}	maximum frequency	nCP; see Figure 8							
		V _{CC} = 0.8 V	-	52	-	-	-	-	MHz
		V _{CC} = 1.1 V to 1.3 V	-	192	-	150	-	150	-
		V _{CC} = 1.4 V to 1.6 V	-	324	-	280	-	230	-
		V _{CC} = 1.65 V to 1.95 V	-	421	-	310	-	250	-
		V _{CC} = 2.3 V to 2.7 V	-	486	-	370	-	360	-
C _L = 20 pF	propagation delay	nCP to nQ̄; see Figure 7 [2]							
		V _{CC} = 0.8 V	-	30.8	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.0	8.0	16.0	3.5	18.0	3.5	20.0
		V _{CC} = 1.4 V to 1.6 V	3.5	7.0	14.0	3.0	16.0	3.0	18.2
		V _{CC} = 1.65 V to 1.95 V	3.2	6.4	12.8	2.8	14.8	2.8	17.0
		V _{CC} = 2.3 V to 2.7 V	2.8	5.6	11.2	2.5	13.2	2.5	15.2
f _{max}	maximum frequency	nCP; see Figure 8							
		V _{CC} = 0.8 V	-	52	-	-	-	-	MHz
		V _{CC} = 1.1 V to 1.3 V	-	203	-	150	-	150	-
		V _{CC} = 1.4 V to 1.6 V	-	347	-	280	-	230	-
		V _{CC} = 1.65 V to 1.95 V	-	435	-	310	-	250	-
		V _{CC} = 2.3 V to 2.7 V	-	550	-	410	-	360	-

Table 8. Dynamic characteristics ...continuedVoltages 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 (85 °C)	Max (85 °C)	Min (125 °C)	
C_L = 15 pF									
t _{pd}	propagation delay	nCP to nQ; see Figure 7	[2]						
		V _{CC} = 0.8 V	-	28.2	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.0	7.6	16.7	3.4	18.6	3.4	20.5 ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.3	9.8	2.6	11.5	2.6	12.7 ns
		V _{CC} = 1.65 V to 1.95 V	2.6	4.4	7.6	2.3	9.1	2.3	10.0 ns
		V _{CC} = 2.3 V to 2.7 V	2.2	3.5	5.7	2.0	6.9	2.0	7.6 ns
f _{max}	maximum frequency	nCP; see Figure 8							
		V _{CC} = 0.8 V	-	50	-	-	-	-	MHz
		V _{CC} = 1.1 V to 1.3 V	-	181	-	120	-	120	- MHz
		V _{CC} = 1.4 V to 1.6 V	-	301	-	190	-	160	- MHz
		V _{CC} = 1.65 V to 1.95 V	-	407	-	240	-	190	- MHz
		V _{CC} = 2.3 V to 2.7 V	-	422	-	300	-	270	- MHz
C _L = 30 pF	propagation delay	nCP to nQ; see Figure 7	[2]						
		V _{CC} = 0.8 V	-	38.8	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.9	9.8	20.7	4.4	24.7	4.4	27.2 ns
		V _{CC} = 1.4 V to 1.6 V	4.0	6.8	12.7	3.5	15.0	3.5	16.5 ns
		V _{CC} = 1.65 V to 1.95 V	3.5	5.6	9.9	2.2	11.9	2.2	13.1 ns
		V _{CC} = 2.3 V to 2.7 V	3.1	4.5	7.5	2.8	9.3	2.8	10.2 ns
f _{max}	maximum frequency	nCP; see Figure 8							
		V _{CC} = 0.8 V	-	28	-	-	-	-	MHz
		V _{CC} = 1.1 V to 1.3 V	-	128	-	70	-	70	- MHz
		V _{CC} = 1.4 V to 1.6 V	-	206	-	120	-	110	- MHz
		V _{CC} = 1.65 V to 1.95 V	-	262	-	150	-	120	- MHz
		V _{CC} = 2.3 V to 2.7 V	-	269	-	190	-	170	- MHz
C _L = 5 pF, 10 pF, 15 pF and 30pF	setup time HIGH	nD to nCP; see Figure 8							
		V _{CC} = 0.8 V	-	2.5	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	-	0.5	-	2.4	-	2.4	- ns
		V _{CC} = 1.4 V to 1.6 V	-	0.3	-	1.2	-	1.2	- ns
		V _{CC} = 1.65 V to 1.95 V	-	0.3	-	0.8	-	0.8	- ns
		V _{CC} = 2.3 V to 2.7 V	-	0.2	-	0.6	-	0.6	- ns
		V _{CC} = 3.0 V to 3.6 V	-	0.2	-	0.4	-	0.4	- ns

Table 8. Dynamic characteristics ...continuedVoltages 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 (85 °C)	Max (85 °C)	Min (125 °C)	
$t_{su(L)}$	setup time LOW	nD to nCP; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	1.7	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	0.3	-	2.0	-	2.0	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	0.2	-	1.3	-	1.3	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	0.2	-	1.1	-	1.1	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	0.3	-	0.8	-	0.8	ns
t_h	hold time	nD to nCP; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	−2.1	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	−0.4	-	0	-	0	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	−0.3	-	0	-	0	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	−0.2	-	0	-	0	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	−0.2	-	0	-	0	ns
t_W	pulse width	nCP HIGH or LOW; see Figure 8							
		$V_{CC} = 0.8 \text{ V}$	-	5.2	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	1.0	-	3.0	-	3.0	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	0.8	-	2.0	-	2.0	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	0.6	-	2.0	-	2.0	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	0.5	-	2.0	-	2.0	ns
C_{PD}	power dissipation capacitance	$f = 1 \text{ MHz}; V_I = \text{GND to } V_{CC}$ ^[3]							
		$V_{CC} = 0.8 \text{ V}$	-	1.8	-	-	-	-	pF
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	1.8	-	-	-	-	pF
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	1.9	-	-	-	-	pF
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	2.0	-	-	-	-	pF
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	2.4	-	-	-	-	pF
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	2.9	-	-	-	-	pF

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

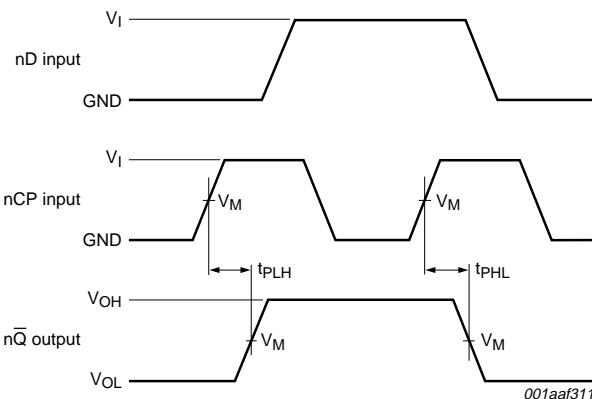
$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

 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;

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

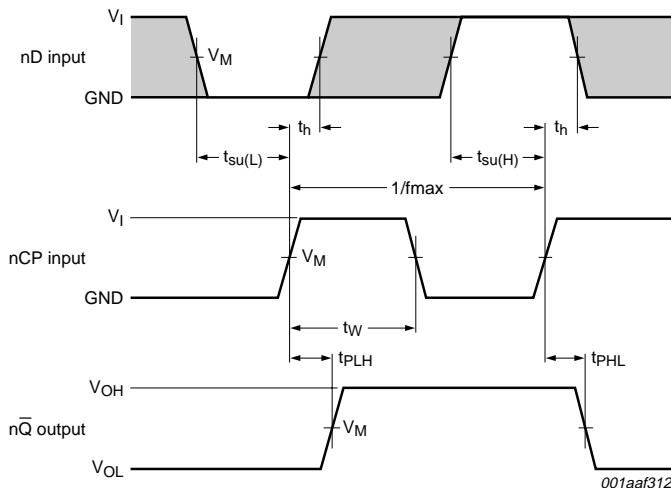
12. Waveforms



Measurement points are given in [Table 9](#).

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

Fig 7. The clock input (nCP) to output ($n\bar{Q}$) propagation delays



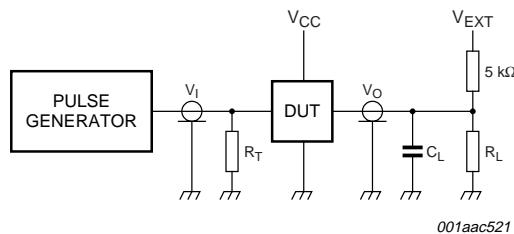
Measurement points are given in [Table 9](#).

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

Fig 8. The clock input (nCP) to output ($n\bar{Q}$) propagation delays, clock pulse width, nD to nCP setup and hold times and the nCP maximum frequency

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_0 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} 0.8 V to 3.6 V	C_L 5 pF, 10 pF, 15 pF and 30 pF R_L ^[1] 5 kΩ or 1 MΩ	t_{PLH}, t_{PHL} open t_{PZH}, t_{PHZ} GND t_{PZL}, t_{PLZ} $2 \times V_{CC}$

[1] For measuring enable and disable times $R_L = 5 \text{ k}\Omega$, for measuring propagation delays, setup and hold times and pulse width $R_L = 1 \text{ M}\Omega$.

13. Package outline

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

SOT765-1

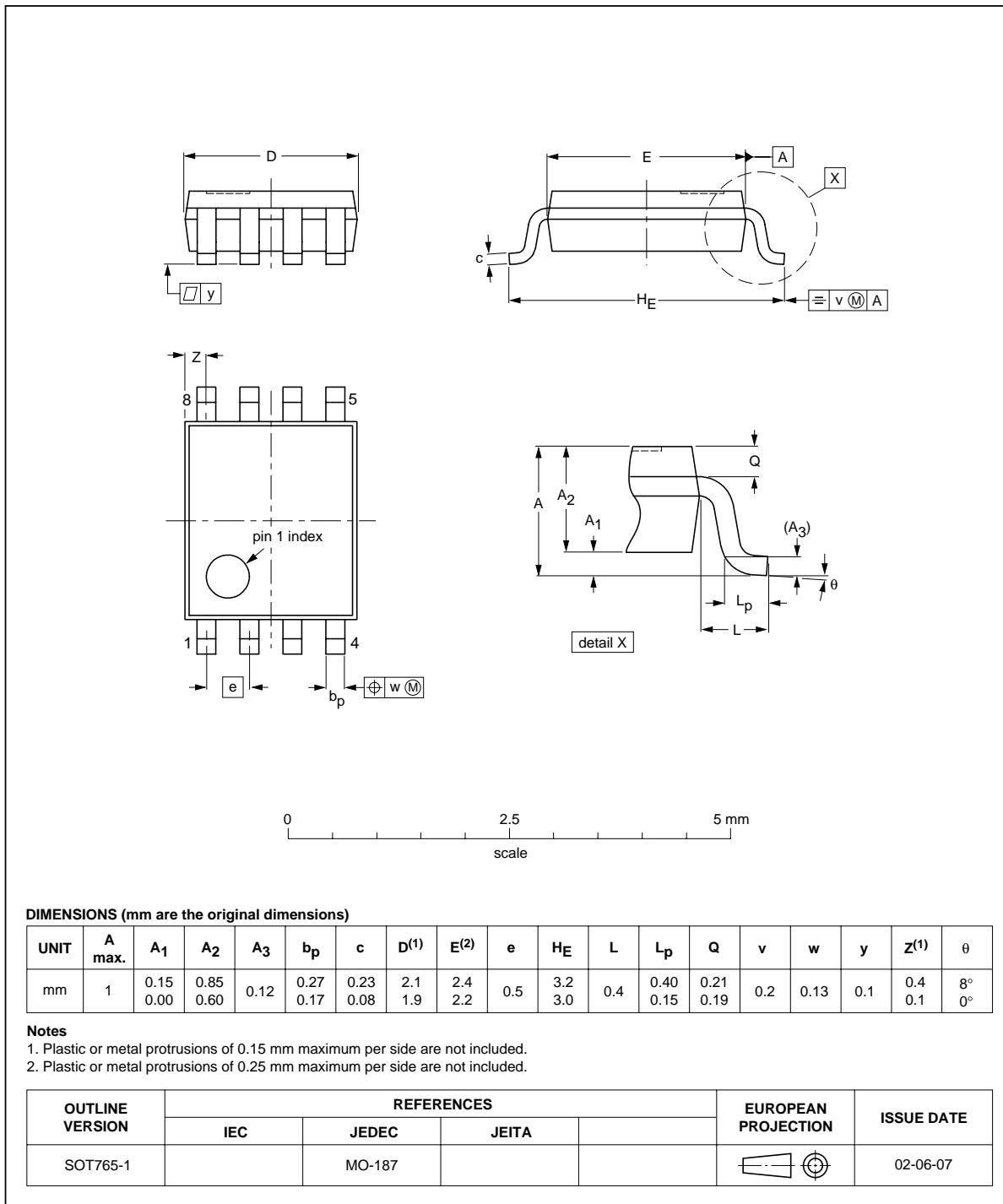


Fig 10. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

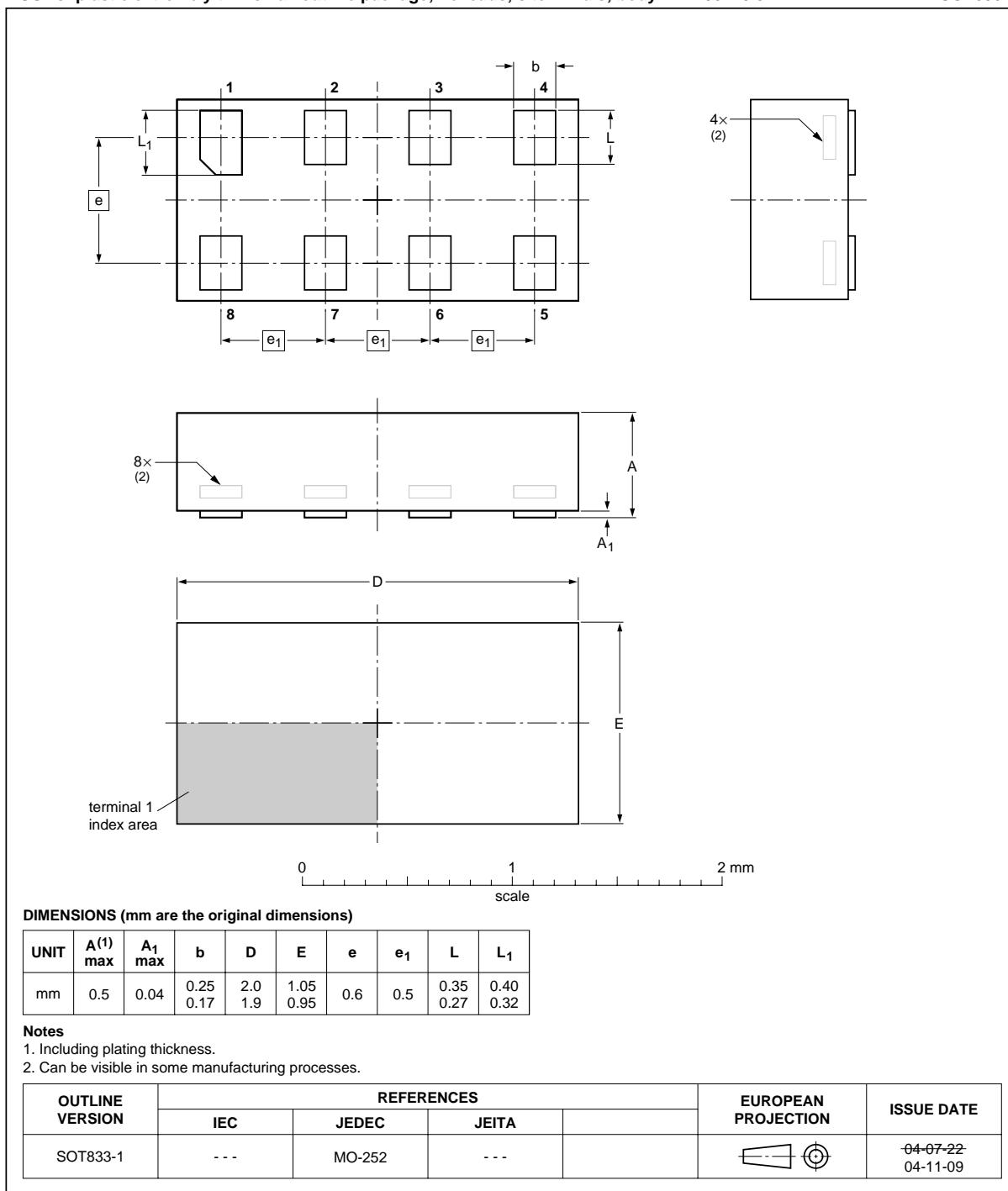


Fig 11. Package outline SOT833-1 (XSON8)

XQFN8: plastic extremely thin quad flat package; no leads; 8 terminals; body 1.6 x 1.6 x 0.5 mm

SOT902-1

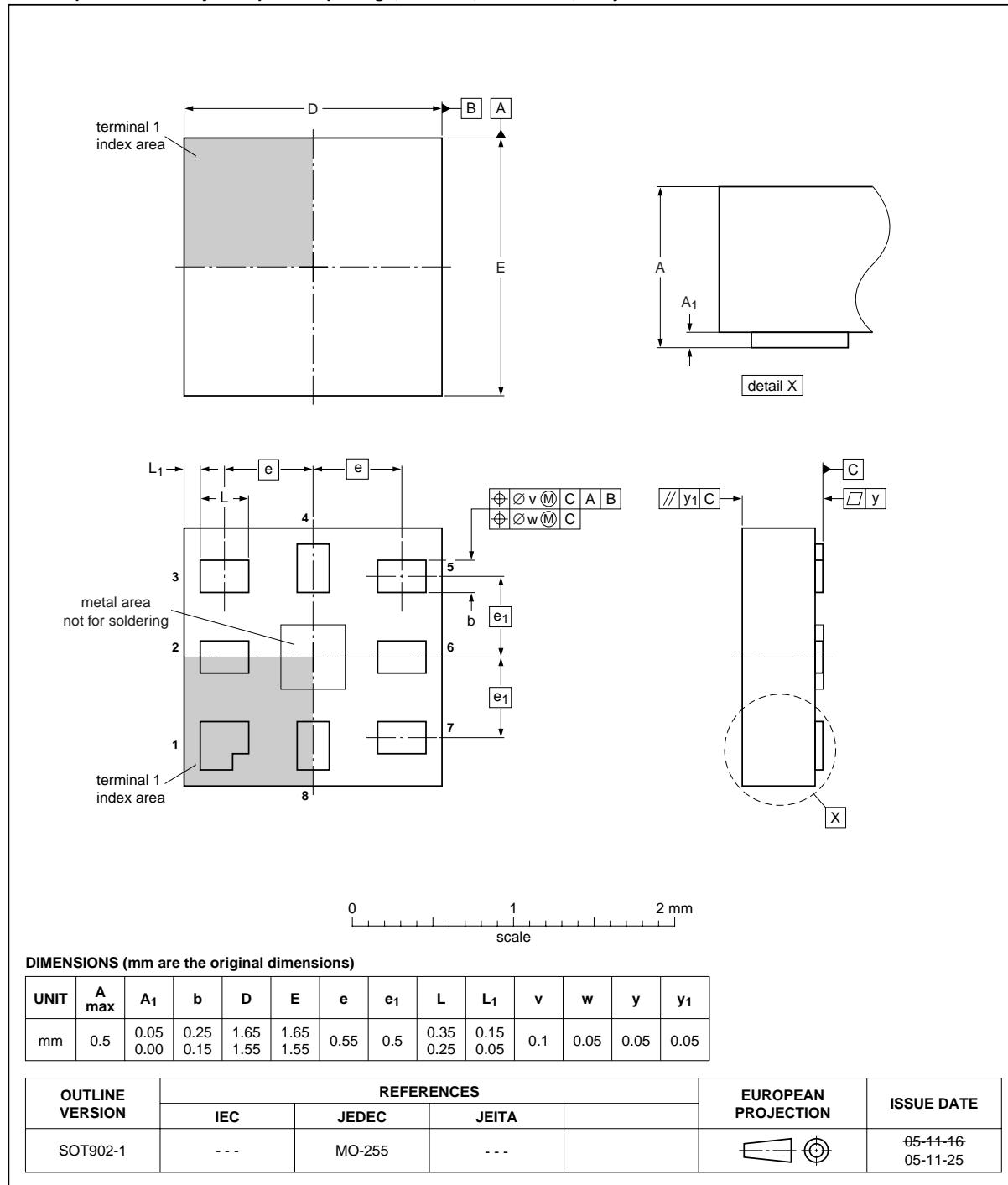


Fig 12. Package outline SOT902-1 (XQFN8)

14. Abbreviations

Table 11. 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

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G80_1	20060825	Product data sheet	-	-

16. Legal information

16.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section 'Definitions'.

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