

# 74AUP2G157

## Low-power 2-input multiplexer

Rev. 8 — 15 March 2019

Product data sheet

## 1. General description

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The 74AUP2G157 is a single 2-input multiplexer which selects data from two data inputs (I0 and I1) under control of a common data select input (S). The state of the common data select input determines the particular register from which the data comes. The output (Y,  $\bar{Y}$ ) presents the selected data in the true (non-inverted) and complement form. The enable input ( $\bar{E}$ ) is active LOW. When  $\bar{E}$  is HIGH, the output Y is forced LOW and the output  $\bar{Y}$  is forced HIGH regardless of all other input conditions.

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.

## 2. Features and benefits

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- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- Complies with JEDEC standards:
  - JESD8-12 (0.8 V to 1.3 V)
  - JESD8-11 (0.9 V to 1.65 V)
  - JESD8-7 (1.2 V to 1.95 V)
  - JESD8-5 (1.8 V to 2.7 V)
  - JESD8-B (2.7 V to 3.6 V)
- ESD protection:
  - HBM JESD22-A114F Class 3A exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (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

### 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AUP2G157DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G157GT	-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
74AUP2G157GF	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm	SOT1089
74AUP2G157GM	-40 °C to +125 °C	XQFN8	plastic, extremely thin quad flat package; no leads; 8 terminals; body 1.6 × 1.6 × 0.5 mm	SOT902-2
74AUP2G157GN	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm	SOT1116
74AUP2G157GS	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm	SOT1203

### 4. Marking

Table 2. Marking codes

Type number	Marking code [1]
74AUP2G157DC	a2P
74AUP2G157GT	a2P
74AUP2G157GF	aP
74AUP2G157GM	a2P
74AUP2G157GN	aP
74AUP2G157GS	aP

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

### 5. Functional diagram



Fig. 1. Logic symbol



Fig. 2. IEC logic symbol



Fig. 3. Logic diagram



Fig. 4. Functional diagram

## 6. Pinning information

### 6.1. Pinning



Fig. 5. Pin configuration SOT765-1 (VSSOP8)



Fig. 6. Pin configuration SOT833-1, SOT1089, SOT1116 and SOT1203 (XSON8)

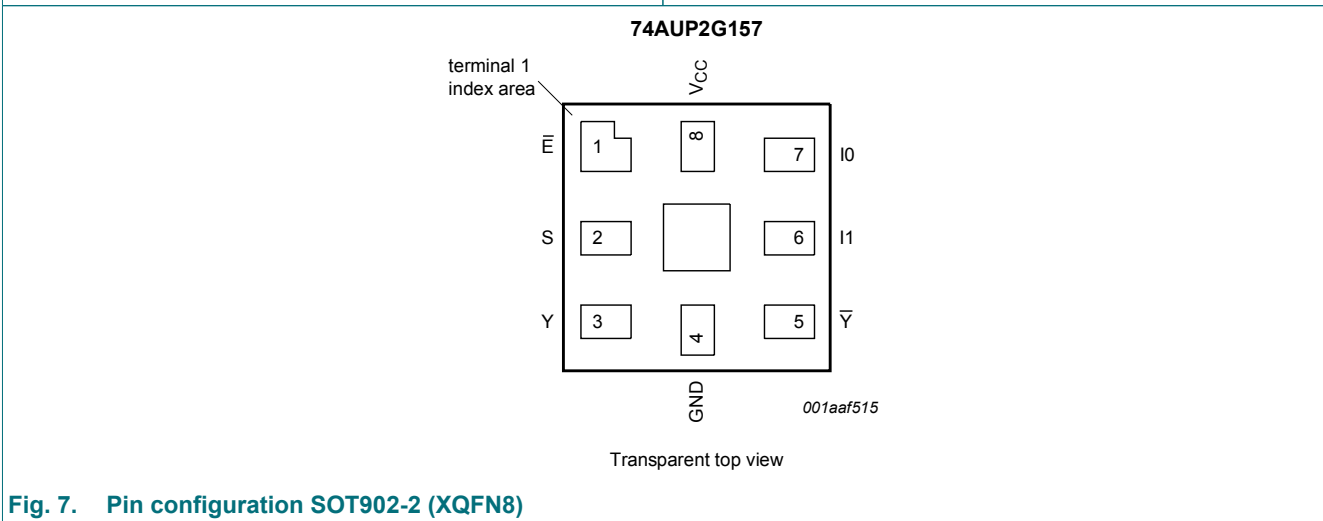


Fig. 7. Pin configuration SOT902-2 (XQFN8)

## 6.2. Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1, SOT833-1, SOT1089, SOT1116 and SOT1203	SOT902-2	
I0	1	7	data input from source 0
I1	2	6	data input from source 1
$\bar{Y}$	3	5	complement multiplexer output
GND	4	4	ground (0 V)
Y	5	3	true multiplexer output
S	6	2	data select input
$\bar{E}$	7	1	enable input (active LOW)
V <sub>CC</sub>	8	8	supply voltage

## 7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care.

Input				Output	
$\bar{E}$	S	I0	I1	Y	$\bar{Y}$
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		-0.5	+4.6	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage	[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode and Power-down mode [1]	-0.5	+4.6	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±20	mA
I <sub>CC</sub>	supply current		-	50	mA
I <sub>GND</sub>	ground current		-50	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C [2]	-	250	mW

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

## 9. 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
$\Delta t/\Delta V$	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
<b><math>T_{amb} = 25</math> °C</b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.70V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V	$0.65V_{CC}$	-	-	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	-	-	$0.30V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.35V_{CC}$	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 $V_{IL}$				
		$I_O = -20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.75V_{CC}$	-	-	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
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.1	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.3V_{CC}$	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	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{\text{OFF}}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$\Delta I_{\text{OFF}}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.5	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	40	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_I = \text{GND or } V_{CC}$	-	0.6	-	pF
$C_O$	output capacitance	$V_O = \text{GND}; V_{CC} = 0 \text{ V}$	-	1.3	-	pF
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.70V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.65V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.30V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.35V_{CC}$	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.7V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.03	-	-	V
		$I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.30	-	-	V
		$I_O = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.97	-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.85	-	-	V
		$I_O = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.67	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = 20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.1	V
		$I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.3V_{CC}$	V
		$I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.37	V
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.35	V
		$I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.33	V
		$I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.45	V
		$I_O = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.33	V
	$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.45	V	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{\text{OFF}}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{\text{OFF}}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.9	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	50	$\mu\text{A}$
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +125 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.75V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.70V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.25V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.30V_{CC}$	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.6V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	0.93	-	-	V
		$I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.17	-	-	V
		$I_O = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.77	-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.67	-	-	V
		$I_O = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.40	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = 20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.11	V
		$I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.33V_{CC}$	V
		$I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.41	V
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.39	V
		$I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.36	V
		$I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.50	V
		$I_O = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.36	V
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	1.4	$\mu\text{A}$
		$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	75	$\mu\text{A}$
		$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	1.4	$\mu\text{A}$

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

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 10.

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
<b>C<sub>L</sub> = 5 pF</b>									
t <sub>pd</sub>	propagation delay	I0, I1 to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	21.2	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.5	6.1	13.3	2.2	13.8	13.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	4.2	7.8	2.0	8.4	8.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	3.4	6.2	1.6	6.9	7.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	2.7	4.3	1.2	4.9	5.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.4	3.7	1.0	4.0	4.2	ns
		S to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	23.6	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	6.6	13.8	2.2	14.3	14.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	4.5	8.0	2.1	8.7	9.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	3.6	6.3	1.6	7.0	7.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	2.8	4.4	1.2	5.0	5.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.5	3.7	1.0	4.0	4.2	ns
		$\bar{E}$ to Y, $\bar{Y}$ ; see Fig. 9 [2]							
		V <sub>CC</sub> = 0.8 V	-	22.6	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.7	6.4	13.7	2.5	14.3	14.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	4.4	8.0	2.1	8.7	9.1	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.8	3.6	6.3	1.6	7.0	7.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	2.8	4.2	1.4	4.8	5.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.4	2.5	3.6	1.1	3.9	4.2	ns



Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
<b>C<sub>L</sub> = 10 pF</b>									
t <sub>pd</sub>	propagation delay	I0, I1 to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	24.5	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.9	6.9	15.1	2.5	15.6	15.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.8	8.9	2.4	9.6	10.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	4.0	7.1	1.9	7.9	8.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.9	3.2	5.0	1.6	5.7	6.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	2.9	4.4	1.3	4.7	5.0	ns
		S to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	27.2	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.0	7.4	15.5	2.6	16.1	16.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	5.1	9.0	2.4	9.8	10.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	4.2	7.2	1.9	8.0	8.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.9	3.4	5.1	1.6	5.7	6.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	3.0	4.4	1.4	4.7	5.0	ns
		$\bar{E}$ to Y, $\bar{Y}$ ; see Fig. 9 [2]							
		V <sub>CC</sub> = 0.8 V	-	25.9	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.1	7.2	15.5	2.8	16.1	16.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	5.0	9.0	2.4	9.8	10.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.1	7.1	1.9	8.0	8.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.9	3.3	4.9	1.7	5.5	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.7	3.0	4.2	1.5	4.6	4.8	ns

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
<b>C<sub>L</sub> = 15 pF</b>									
t <sub>pd</sub>	propagation delay	I0, I1 to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	27.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	7.7	16.8	2.8	17.4	17.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.5	5.4	9.8	2.7	10.6	11.2	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	4.4	7.8	2.2	8.7	9.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.2	3.7	5.6	1.9	6.4	6.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.4	4.9	1.6	5.3	5.6	ns
		S to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	30.7	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	8.2	17.2	2.9	17.9	18.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.6	5.7	10.0	2.7	10.9	11.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	4.7	7.9	2.2	8.9	9.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.2	3.8	5.7	1.9	6.5	6.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.5	5.0	1.6	5.4	5.7	ns
		$\bar{E}$ to Y, $\bar{Y}$ ; see Fig. 9 [2]							
		V <sub>CC</sub> = 0.8 V	-	29.1	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.5	8.0	17.2	3.1	17.9	18.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.8	5.6	9.9	2.7	10.9	11.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	4.6	7.9	2.2	8.9	9.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.2	3.8	5.5	2.0	6.2	6.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.4	4.7	1.8	5.1	5.4	ns

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
<b>C<sub>L</sub> = 30 pF</b>									
t <sub>pd</sub>	propagation delay	I0, I1 to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	35.4	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.3	9.8	21.6	3.7	22.5	22.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.3	6.9	12.4	3.4	13.6	14.4	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.1	5.7	10.0	2.8	11.3	11.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.9	4.8	7.2	2.6	8.2	8.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.8	4.4	6.4	2.3	6.9	7.3	ns
		S to Y, $\bar{Y}$ ; see Fig. 8 [2]							
		V <sub>CC</sub> = 0.8 V	-	38.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.4	10.5	22.0	3.7	23.0	23.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.3	7.2	12.6	3.5	13.9	14.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.1	5.9	10.1	2.8	11.4	12.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.9	4.9	7.3	2.6	8.3	8.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.5	6.4	2.3	6.9	7.3	ns
		$\bar{E}$ to Y, $\bar{Y}$ ; see Fig. 9 [2]							
		V <sub>CC</sub> = 0.8 V	-	36.8	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.4	10.1	22.1	3.9	23.0	23.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.6	7.1	12.6	3.5	13.8	14.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.1	5.8	10.0	2.8	11.3	12.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.9	4.9	7.1	2.7	8.0	8.5	ns
V <sub>CC</sub> = 3.0 V to 3.6 V	2.7	4.5	6.2	2.4	6.7	7.0	ns		
<b>C<sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF</b>									
C <sub>PD</sub>	power dissipation capacitance	f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3]							
		V <sub>CC</sub> = 0.8 V	-	5.2	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	5.5	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	5.7	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	6.0	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	6.9	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	7.9	-	-	-	-	pF

- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [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).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:  
 f<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

11.1. Waveforms and test circuit

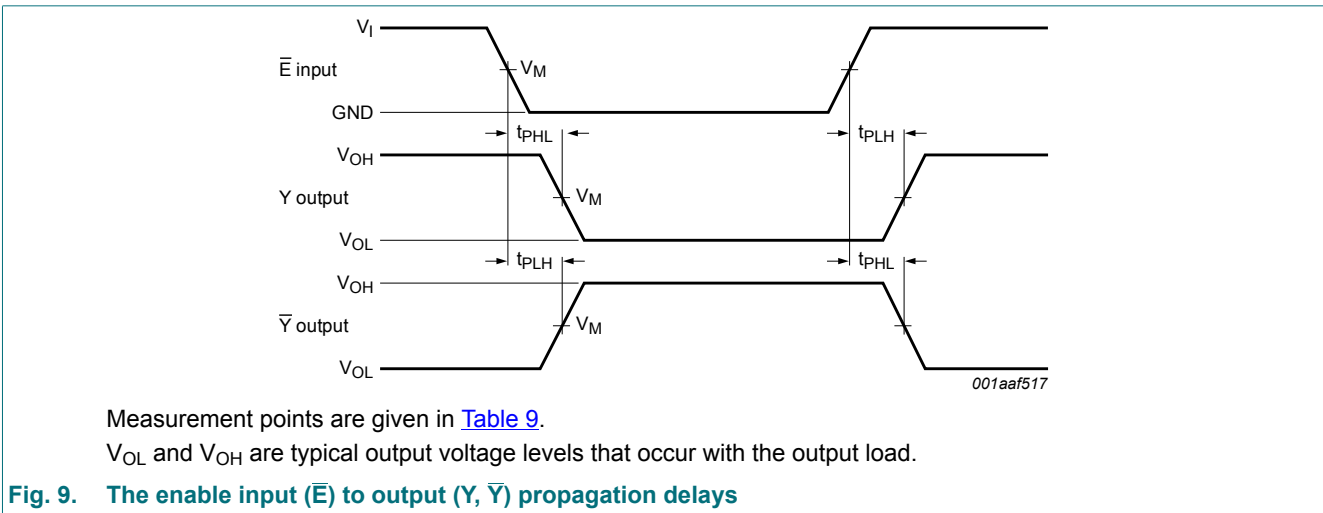


Table 9. Measurement points

Supply voltage	Output	Input		
$V_{CC}$	$V_M$	$V_M$	$V_I$	$t_r = t_f$
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ 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. 10. 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	$2 \times V_{CC}$	

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

## 12. Package outline

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

SOT765-1



Fig. 11. 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. 12. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1 x 0.5 mm

SOT1089

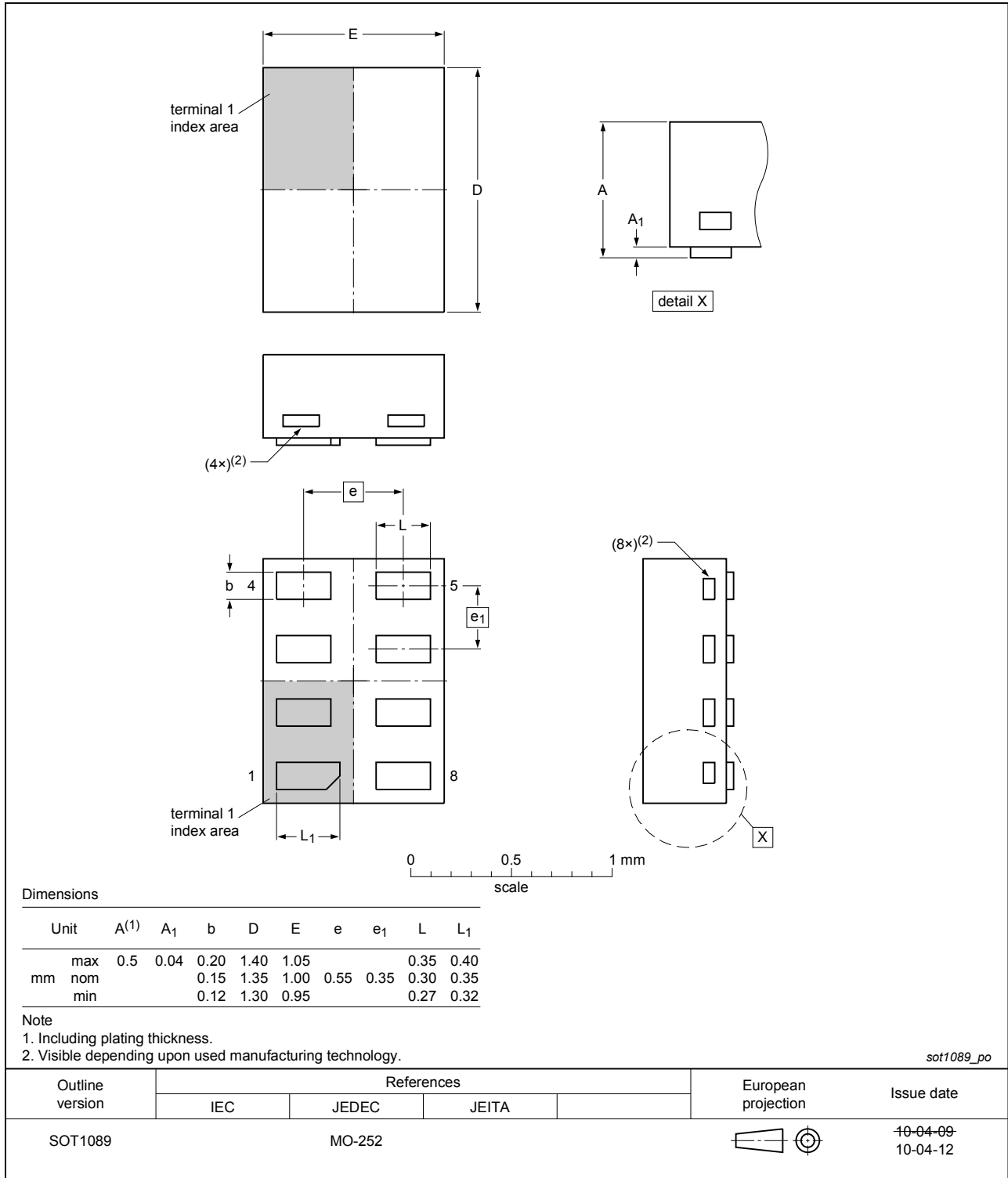


Fig. 13. Package outline SOT1089 (XSON8)



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

SOT902-2



Fig. 14. Package outline SOT902-2 (XQFN8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.2 x 1.0 x 0.35 mm

SOT1116

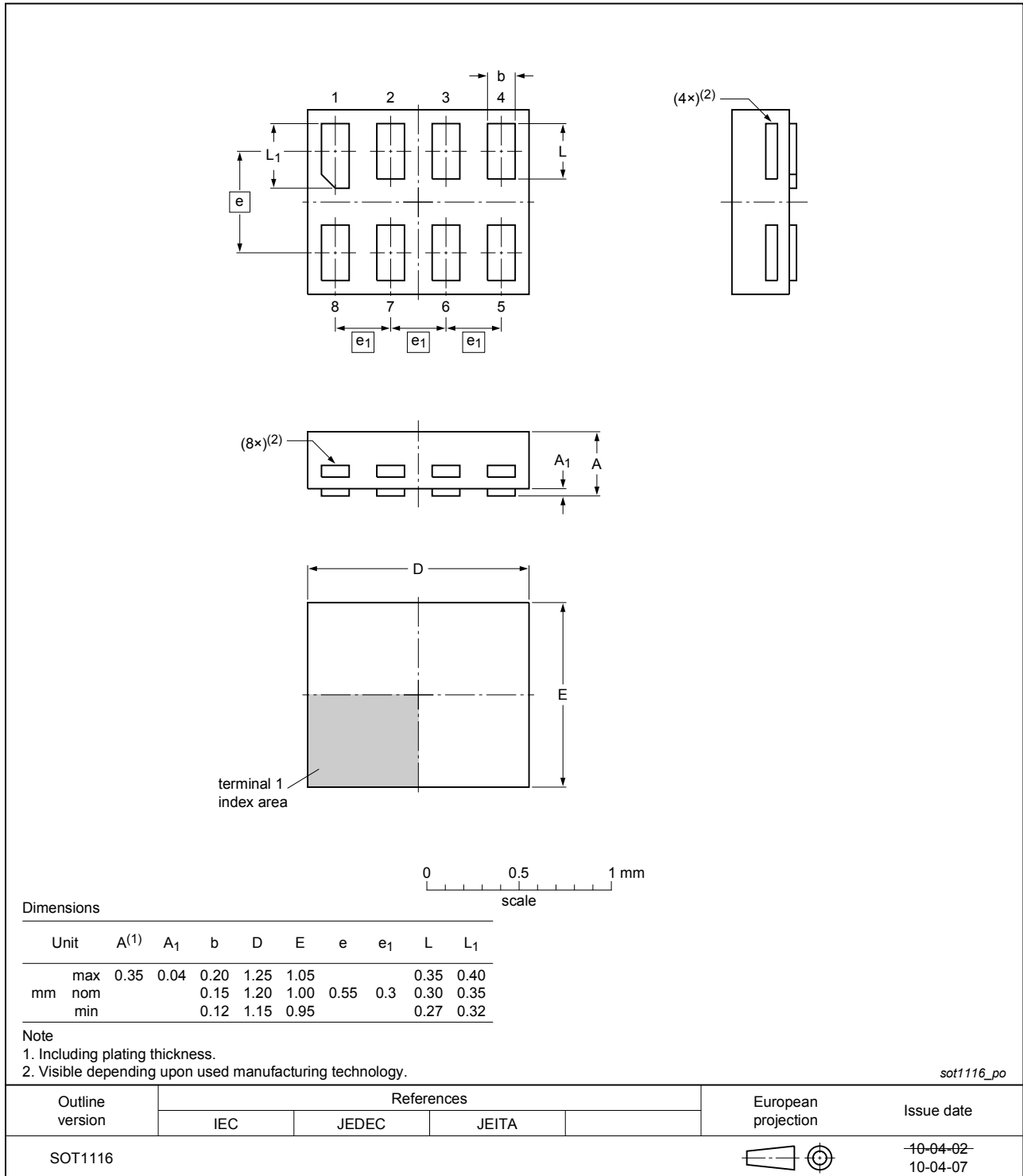


Fig. 15. Package outline SOT1116 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1.0 x 0.35 mm

SOT1203



Fig. 16. Package outline SOT1203 (XSON8)

## 13. Abbreviations

Table 11. Abbreviations

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

## 14. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G157 v.8	20190315	Product data sheet	-	74AUP2G157 v.7
Modifications:	<ul style="list-style-type: none"> <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> <li>Type number 74AUP2G157GD (SOT996-2) removed.</li> <li>Package outline drawing <a href="#">SOT765-1</a> (VSSOP8) updated.</li> <li>Package outline drawing <a href="#">SOT902-2</a> (XQFN8) updated.</li> </ul>			
74AUP2G157 v.7	20130118	Product data sheet	-	74AUP2G157 v.6
Modifications:	<ul style="list-style-type: none"> <li>For type number 74AUP2G157GD XSON8U has changed to XSON8.</li> </ul>			
74AUP2G157 v.6	20120606	Product data sheet	-	74AUP2G157 v.5
74AUP2G157 v.5	20111205	Product data sheet	-	74AUP2G157 v.4
74AUP2G157 v.4	20100730	Product data sheet	-	74AUP2G157 v.3
74AUP2G157 v.3	20080702	Product data sheet	-	74AUP2G157 v.2
74AUP2G157 v.2	20080219	Product data sheet	-	74AUP2G157 v.1
74AUP2G157 v.1	20061006	Product data sheet	-	-

## 15. Legal information

### Data sheet status

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

- [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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