

74AUP2G125

Low-power dual buffer/line driver; 3-state

Rev. 02 — 19 April 2007

Product data sheet

1. General description

The 74AUP2G125 provides the dual non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ($\overline{\text{nOE}}$). A HIGH level at pin $\overline{\text{nOE}}$ causes the output to assume a high-impedance OFF-state. This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input ($\overline{\text{nOE}}$) is HIGH.

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

- 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; $I_{\text{CC}} = 0.9 \mu\text{A}$ (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}
- Input-disable feature allows floating input conditions
- I_{OFF} circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ and $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$

3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AUP2G125DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G125GT	-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
74AUP2G125GM	-40 °C to +125 °C	XQFN8	plastic extremely thin quad flat package; no leads; 8 terminals; body 1.6 × 1.6 × 0.5 mm	SOT902-1

4. Marking

Table 2. Marking

Type number	Marking code
74AUP2G125DC	p25
74AUP2G125GT	p25
74AUP2G125GM	p25

5. Functional diagram

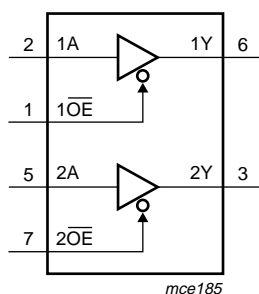


Fig 1. Logic symbol

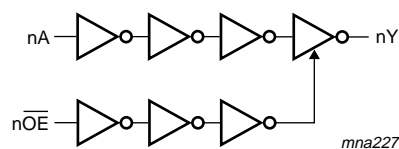


Fig 2. Logic diagram (one gate)

6. Pinning information

6.1 Pinning

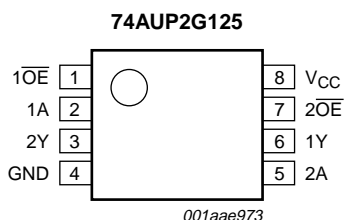


Fig 3. Pin configuration SOT765-1 (VSSOP8)

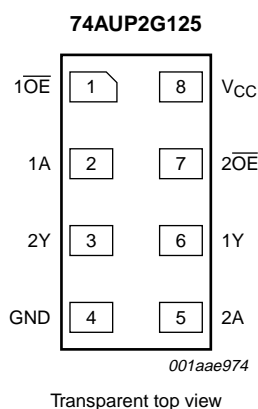


Fig 4. Pin configuration SOT833-1 (XSON8)

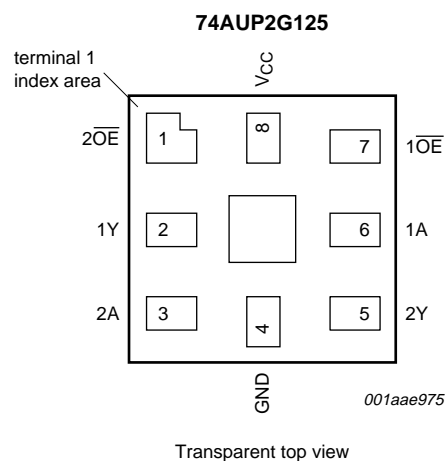


Fig 5. Pin configuration SOT902-1 (XQFN8)

6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1 and SOT833-1	SOT902-1	
$1\overline{OE}$	1	7	output enable input $1\overline{OE}$ (active LOW)
1A	2	6	data input 1A
2Y	3	5	data output 2Y
GND	4	4	ground (0 V)
2A	5	3	data input 2A
1Y	6	2	data output 1Y
$2\overline{OE}$	7	1	output enable input $2\overline{OE}$ (active LOW)
V_{CC}	8	8	supply voltage

7. Functional description

Table 4. Function table^[1]

Input		Output	
nOE	nA	nY	
L	L	L	
L	H	H	
H	X	Z	

- [1] H = HIGH voltage level;
L = LOW voltage level;
X = Don't care;
Z = high-impedance OFF-state.

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	[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
$\Delta t/\Delta V$	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
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 _{OZ}	OFF-state output current	V _I = V _{IH} or V _{IL} ; V _O = 0 V 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

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_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	40	μ A
		nOE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	110	μ A
		all inputs; $V_I =$ GND to 3.6 V; nOE = GND; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	-	1	μ A
C_I	input capacitance	$V_{CC} = 0$ V to 3.6 V; $V_I =$ GND or V_{CC}	-	0.8	-	pF	
C_O	output capacitance	output enabled; $V_O =$ GND; $V_{CC} = 0$ V	-	1.4	-	pF	
		output disabled; $V_{CC} = 0$ V to 3.6 V; $V_O =$ GND or V_{CC}	-	1.3	-	pF	
$T_{amb} = -40$ °C to $+85$ °C							
V_{IH}	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.70 \times V_{CC}$	-	-	V	
		$V_{CC} = 0.9$ V to 1.95 V	$0.65 \times V_{CC}$	-	-	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	-	-	$0.30 \times V_{CC}$	V	
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.35 \times V_{CC}$	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}					
		$I_O = -20$ μ 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	$0.7 \times V_{CC}$	-	-	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	
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = 20$ μ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.1	V	
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.3 \times V_{CC}$	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_I	input leakage current	$V_I =$ GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	± 0.5	μ A	
		$V_I = V_{IH}$ or V_{IL} ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	± 0.5	μ A	
I_{OFF}	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	± 0.5	μ A	

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	-	-	± 0.6	μ A
I_{CC}	supply current	$V_I = \text{GND}$ or V_{CC} ; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.9	μ A
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	50	μ A
		nOE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	120	μ A
		all inputs; $V_I = \text{GND}$ to 3.6 V; nOE = GND; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	1	μ A
$T_{amb} = -40$ °C to $+125$ °C						
V_{IH}	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V	$0.70 \times V_{CC}$	-	-	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	-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.30 \times V_{CC}$	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}				
		$I_O = -20$ μ A; $V_{CC} = 0.8$ V to 3.6 V	$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.6 \times V_{CC}$	-	-	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}				
		$I_O = 20$ μ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.11	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.33 \times V_{CC}$	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	$V_I = \text{GND}$ to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	± 0.75	μ A
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL} ; $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	± 0.75	μ A
I_{OFF}	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	± 0.75	μ A

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	μ A
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	μ A
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	75	μ A
		nOE input; $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	180	μ A
		all inputs; $V_I = GND$ to 3.6 V; nOE = GND; $V_{CC} = 0.8$ V to 3.6 V	[2]	-	1	μ A

[1] One input at $V_{CC} - 0.6$ V, other input at V_{CC} or GND.[2] To show I_{CC} remains very low when the input-disable feature is enabled.

11. Dynamic characteristics

Table 8. Dynamic characteristicsVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

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	nA to nY; see Figure 6 [2]							
		$V_{CC} = 0.8$ V	-	20.6	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	2.8	5.5	10.5	2.5	11.7	12.9	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.2	3.9	6.1	2.0	7.3	8.1	ns
		$V_{CC} = 1.65$ V to 1.95 V	1.9	3.2	4.8	1.7	6.1	6.7	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.6	2.6	3.6	1.4	4.3	4.9	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.4	2.4	3.1	1.2	3.9	4.4	ns
t_{en}	enable time	n \overline{OE} to nY; see Figure 7 [3]							
		$V_{CC} = 0.8$ V	-	69.9	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	3.1	6.1	11.8	2.9	13.9	15.4	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.5	4.2	6.6	2.3	7.7	8.3	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.1	3.4	5.1	2.0	6.2	6.8	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.8	2.6	3.7	1.7	4.5	5.0	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.7	2.4	3.1	1.7	3.5	3.9	ns
t_{dis}	disable time	n \overline{OE} to nY; see Figure 7 [4]							
		$V_{CC} = 0.8$ V	-	14.3	-	-	-	-	ns
		$V_{CC} = 1.1$ V to 1.3 V	2.7	4.3	6.5	2.7	7.3	8.2	ns
		$V_{CC} = 1.4$ V to 1.6 V	2.1	3.2	4.4	2.1	5.1	5.7	ns
		$V_{CC} = 1.65$ V to 1.95 V	2.0	3.0	4.3	2.0	5.0	5.7	ns
		$V_{CC} = 2.3$ V to 2.7 V	1.4	2.2	2.9	1.4	3.3	4.1	ns
		$V_{CC} = 3.0$ V to 3.6 V	1.7	2.5	3.2	1.7	3.4	3.9	ns

Table 8. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 10 pF									
t _{pd}	propagation delay	nA to nY; see Figure 6 ^[2]							
		V _{CC} = 0.8 V	-	24.0	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.2	6.4	12.3	3.0	13.8	15.2	ns
		V _{CC} = 1.4 V to 1.6 V	2.1	4.5	7.3	1.9	8.5	9.4	ns
		V _{CC} = 1.65 V to 1.95 V	1.9	3.8	5.5	1.7	6.8	7.6	ns
		V _{CC} = 2.3 V to 2.7 V	2.1	3.2	4.2	1.6	5.3	5.9	ns
		V _{CC} = 3.0 V to 3.6 V	1.8	3.0	3.8	1.6	4.6	5.2	ns
t _{en}	enable time	n $\overline{\text{OE}}$ to nY; see Figure 7 ^[3]							
		V _{CC} = 0.8 V	-	73.7	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.6	6.9	13.5	3.4	15.8	17.5	ns
		V _{CC} = 1.4 V to 1.6 V	2.3	4.8	7.7	2.2	8.6	9.4	ns
		V _{CC} = 1.65 V to 1.95 V	2.0	3.9	5.8	1.9	6.8	7.4	ns
		V _{CC} = 2.3 V to 2.7 V	1.8	3.2	4.3	1.7	5.3	5.9	ns
		V _{CC} = 3.0 V to 3.6 V	1.7	3.0	3.9	1.7	4.3	4.8	ns
t _{dis}	disable time	n $\overline{\text{OE}}$ to nY; see Figure 7 ^[4]							
		V _{CC} = 0.8 V	-	32.7	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.4	5.4	7.9	3.4	8.8	9.9	ns
		V _{CC} = 1.4 V to 1.6 V	2.2	4.1	5.5	2.2	6.2	7.1	ns
		V _{CC} = 1.65 V to 1.95 V	2.2	4.2	5.6	1.9	6.3	7.1	ns
		V _{CC} = 2.3 V to 2.7 V	1.7	3.0	3.8	1.7	4.5	5.1	ns
		V _{CC} = 3.0 V to 3.6 V	2.1	3.8	4.8	1.7	5.0	5.6	ns
C_L = 15 pF									
t _{pd}	propagation delay	nA to nY; see Figure 6 ^[2]							
		V _{CC} = 0.8 V	-	27.4	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.6	7.2	14.1	3.3	15.8	17.5	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.1	8.1	2.5	9.8	10.9	ns
		V _{CC} = 1.65 V to 1.95 V	2.2	4.3	6.3	2.0	7.9	8.8	ns
		V _{CC} = 2.3 V to 2.7 V	2.0	3.7	4.9	1.8	6.0	6.7	ns
		V _{CC} = 3.0 V to 3.6 V	2.0	3.5	4.4	1.8	5.4	6.1	ns
t _{en}	enable time	n $\overline{\text{OE}}$ to nY; see Figure 7 ^[3]							
		V _{CC} = 0.8 V	-	77.5	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.0	7.7	15.2	3.7	17.6	19.6	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.3	8.4	2.5	9.8	10.7	ns
		V _{CC} = 1.65 V to 1.95 V	2.3	4.4	6.5	2.1	7.7	8.5	ns
		V _{CC} = 2.3 V to 2.7 V	2.1	3.6	5.0	2.0	6.1	6.8	ns
		V _{CC} = 3.0 V to 3.6 V	2.0	3.5	4.4	1.9	4.9	5.5	ns

Table 8. Dynamic characteristics ...continuedVoltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
t _{dis}	disable time	n $\overline{O}E$ to nY; see Figure 7 ^[4]							
		V _{CC} = 0.8 V	-	60.8	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.3	6.5	9.2	3.7	10.3	11.6	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.0	6.5	2.5	7.4	8.4	ns
		V _{CC} = 1.65 V to 1.95 V	3.0	5.3	7.0	2.1	7.4	8.9	ns
		V _{CC} = 2.3 V to 2.7 V	2.1	3.8	4.9	2.0	5.1	6.4	ns
		V _{CC} = 3.0 V to 3.6 V	2.9	5.0	6.2	1.9	6.6	7.4	ns
C_L = 30 pF									
t _{pd}	propagation delay	nA to nY; see Figure 6 ^[2]							
		V _{CC} = 0.8 V	-	37.4	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.8	9.5	19.0	4.4	21.6	24.0	ns
		V _{CC} = 1.4 V to 1.6 V	4.0	6.7	10.8	3.0	13.0	14.5	ns
		V _{CC} = 1.65 V to 1.95 V	2.9	5.6	8.4	2.6	10.3	11.5	ns
		V _{CC} = 2.3 V to 2.7 V	2.7	4.8	6.3	2.5	7.8	8.7	ns
		V _{CC} = 3.0 V to 3.6 V	2.7	4.6	5.8	2.5	7.5	8.3	ns
t _{en}	enable time	n $\overline{O}E$ to nY; see Figure 7 ^[3]							
		V _{CC} = 0.8 V	-	88.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	5.2	9.9	19.8	4.8	22.8	25.3	ns
		V _{CC} = 1.4 V to 1.6 V	4.0	6.8	10.8	3.1	12.6	14.1	ns
		V _{CC} = 1.65 V to 1.95 V	3.0	5.6	8.5	2.8	10.2	11.3	ns
		V _{CC} = 2.3 V to 2.7 V	2.7	4.8	6.5	2.6	7.8	8.8	ns
		V _{CC} = 3.0 V to 3.6 V	2.7	4.6	6.0	2.6	6.9	7.7	ns
t _{dis}	disable time	n $\overline{O}E$ to nY; see Figure 7 ^[4]							
		V _{CC} = 0.8 V	-	49.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	6.0	9.9	13.3	4.8	14.8	16.5	ns
		V _{CC} = 1.4 V to 1.6 V	4.4	7.7	9.6	3.1	10.8	12.1	ns
		V _{CC} = 1.65 V to 1.95 V	5.1	8.7	11.1	2.8	12.4	13.8	ns
		V _{CC} = 2.3 V to 2.7 V	3.6	6.2	7.6	2.6	8.6	9.6	ns
		V _{CC} = 3.0 V to 3.6 V	5.2	8.7	10.5	2.6	10.8	13.1	ns

Table 8. Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
$C_L = 5 \text{ pF}, 10 \text{ pF}, 15 \text{ pF}$ and 30 pF									
C_{PD}	power dissipation capacitance	output enabled; $f_i = 1 \text{ MHz}$; $V_I = \text{GND to } V_{CC}$ ^[5]							
		$V_{CC} = 0.8 \text{ V}$	-	2.7	-	-	-	-	pF
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	2.8	-	-	-	-	pF
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	2.9	-	-	-	-	pF
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	3.0	-	-	-	-	pF
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	3.6	-	-	-	-	pF
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	4.2	-	-	-	-	pF

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

[2] t_{pd} is the same as t_{PLH} and t_{PHL} .

[3] t_{en} is the same as t_{PZH} and t_{PZL} .

[4] t_{dis} is the same as t_{PHZ} and t_{PLZ} .

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

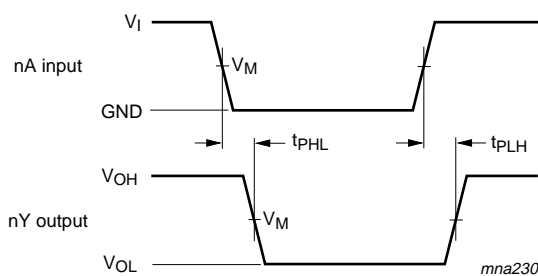
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

12. Waveforms



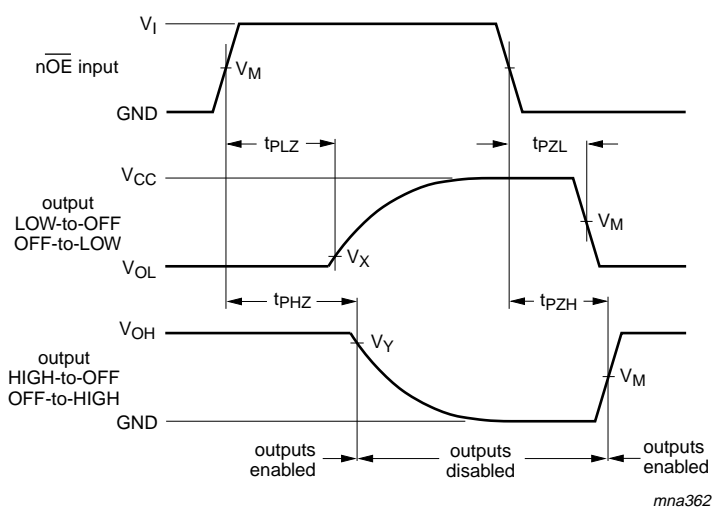
Measurement points are given in [Table 9](#).

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

Fig 6. The data input (nA) 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}	$\leq 3.0 \text{ ns}$



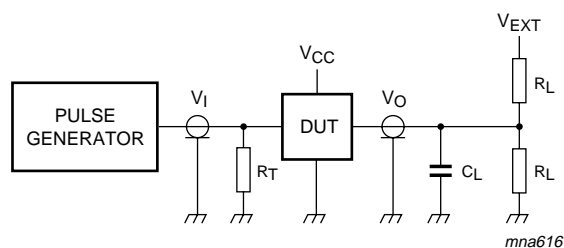
Measurement points are given in [Table 10](#).

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

Fig 7. Enable and disable times

Table 10. Measurement points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
0.8 V to 1.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 V$	$V_{OH} - 0.1 V$
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$



Test data is given in [Table 11](#).

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 8. Load circuitry for switching times

Table 11. Test data

Supply voltage	Input	Load		V_{EXT}		
	V_I	C_L	R_L	t_{PLH} , t_{PHL}	t_{PZH} , t_{PHZ}	t_{PZL} , t_{PLZ}
1.65 V to 1.95 V	V_{CC}	30 pF	1 k Ω	open	GND	$2 \times V_{CC}$
2.3 V to 2.7 V	V_{CC}	30 pF	500 Ω	open	GND	$2 \times V_{CC}$
2.7 V	2.7 V	50 pF	500 Ω	open	GND	6 V
3.0 V to 3.6 V	2.7 V	50 pF	500 Ω	open	GND	6 V
4.5 V to 5.5 V	V_{CC}	50 pF	500 Ω	open	GND	$2 \times V_{CC}$

13. Package outline

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

SOT765-1

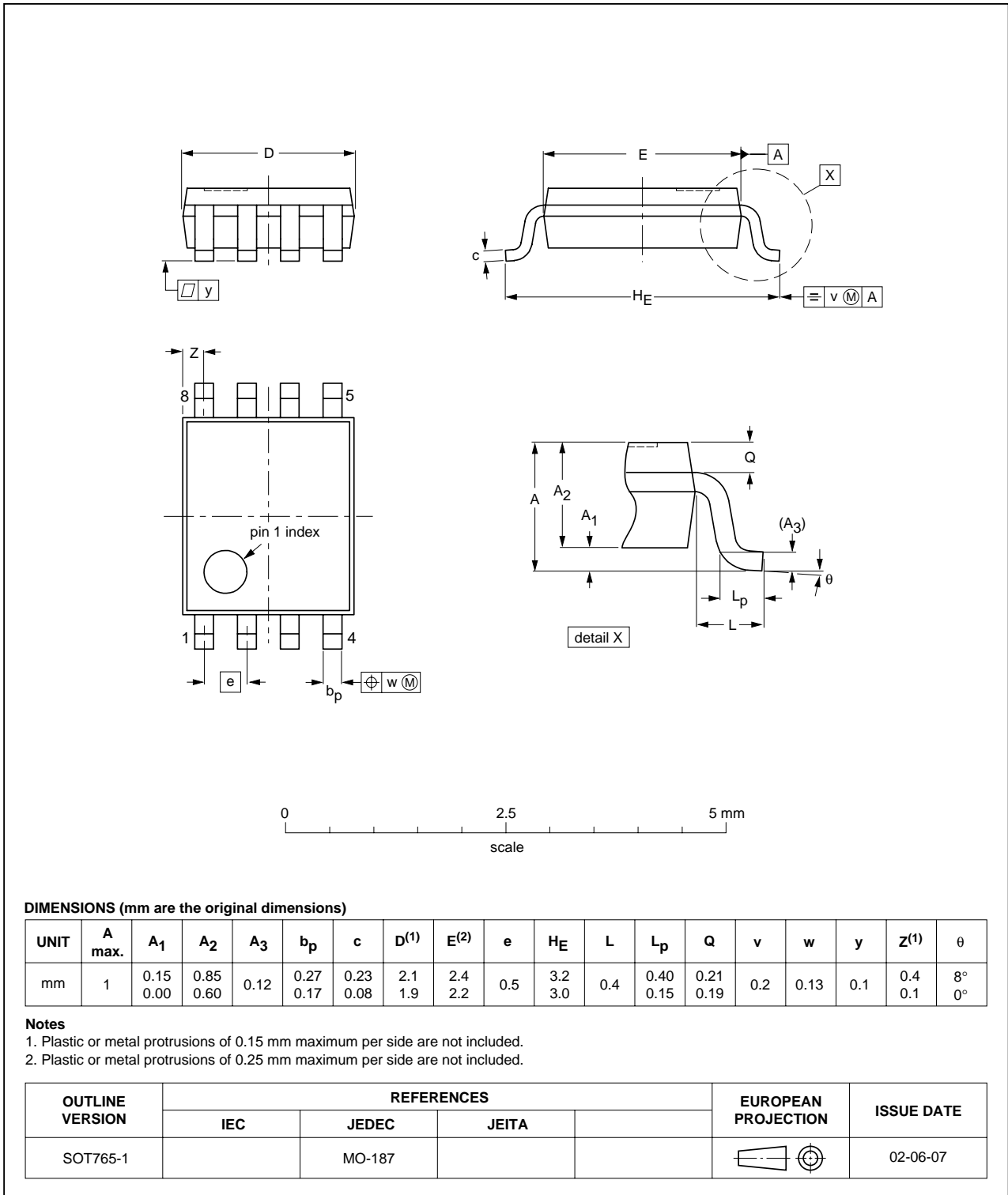


Fig 9. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

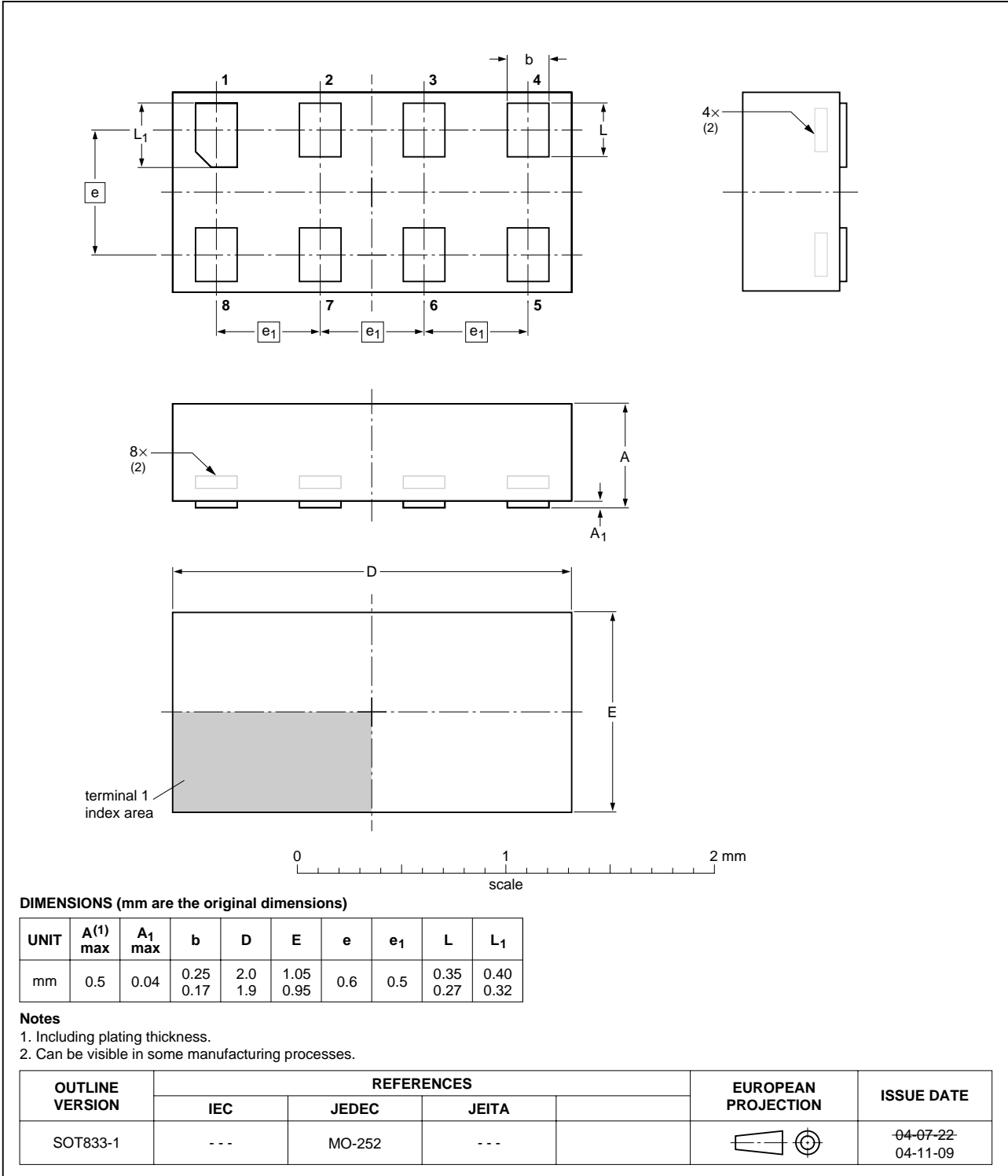


Fig 10. Package outline SOT833-1 (XSON8)

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

SOT902-1

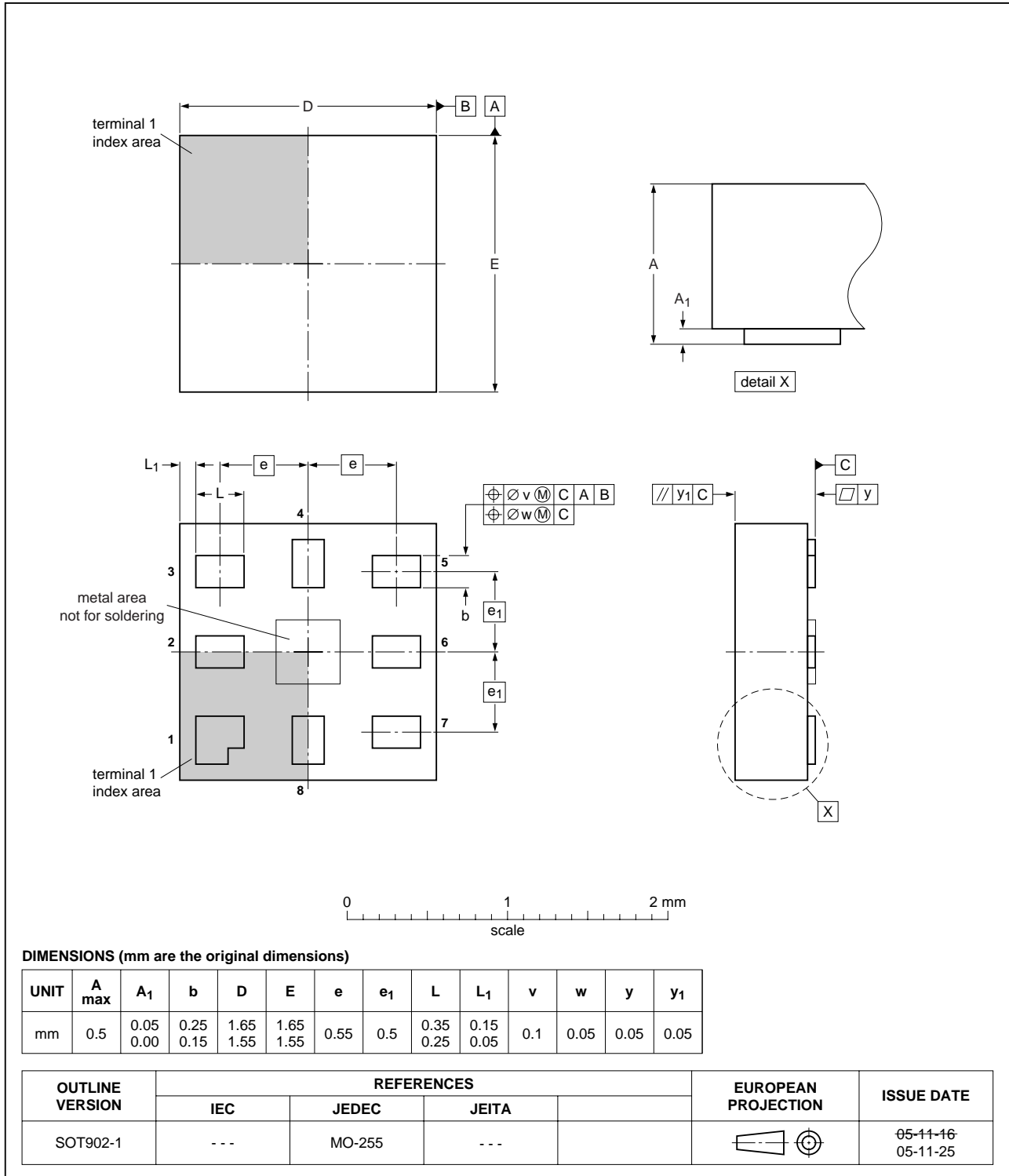


Fig 11. Package outline SOT902-1 (XQFN8)

14. 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

15. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G125_2	20070419	Product data sheet	-	74AUP2G125_1
Modifications:	• ESD HBM values modified in Section 2			
74AUP2G125_1	20061017	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".

[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>.

16.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

16.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or

malfunction of a NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

16.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

17. Contact information

For additional information, please visit: <http://www.nxp.com>

For sales office addresses, send an email to: salesaddresses@nxp.com

18. Contents

1	General description	1
2	Features	1
3	Ordering information	2
4	Marking	2
5	Functional diagram	2
6	Pinning information	3
6.1	Pinning	3
6.2	Pin description	3
7	Functional description	4
8	Limiting values	4
9	Recommended operating conditions	4
10	Static characteristics	5
11	Dynamic characteristics	8
12	Waveforms	11
13	Package outline	14
14	Abbreviations	17
15	Revision history	17
16	Legal information	18
16.1	Data sheet status	18
16.2	Definitions	18
16.3	Disclaimers	18
16.4	Trademarks	18
17	Contact information	18
18	Contents	19

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

founded by

PHILIPS

© NXP B.V. 2007.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 19 April 2007

Document identifier: 74AUP2G125_2