

74AUP2G240

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

Rev. 9 — 19 March 2019

Product data sheet

1. General description

The 74AUP2G240 provides the dual inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (\overline{nOE}). A HIGH level at pin \overline{nOE} causes the output to assume a high-impedance OFF-state.

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.

This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input \overline{nOE} is HIGH.

2. Features and benefits

- 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 JESD78 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 °C to +85 °C and -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AUP2G240DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AUP2G240GT	-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
74AUP2G240GF	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm	SOT1089
74AUP2G240GM	-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
74AUP2G240GN	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm	SOT1116
74AUP2G240GS	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm	SOT1203

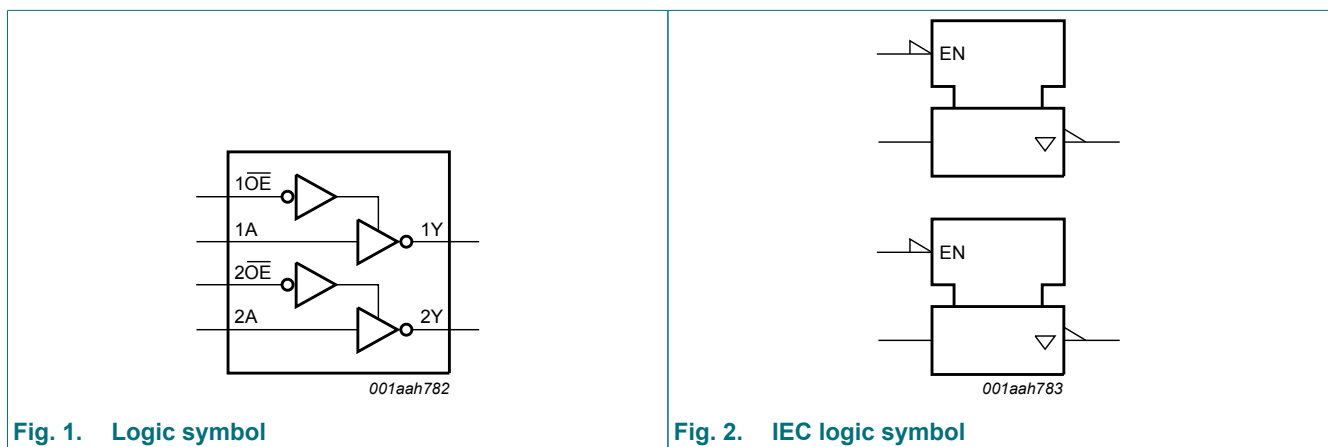
4. Marking

Table 2. Marking codes

Type number	Marking code [1]
74AUP2G240DC	p40
74AUP2G240GT	p40
74AUP2G240GF	p2
74AUP2G240GM	p40
74AUP2G240GN	p2
74AUP2G240GS	p2

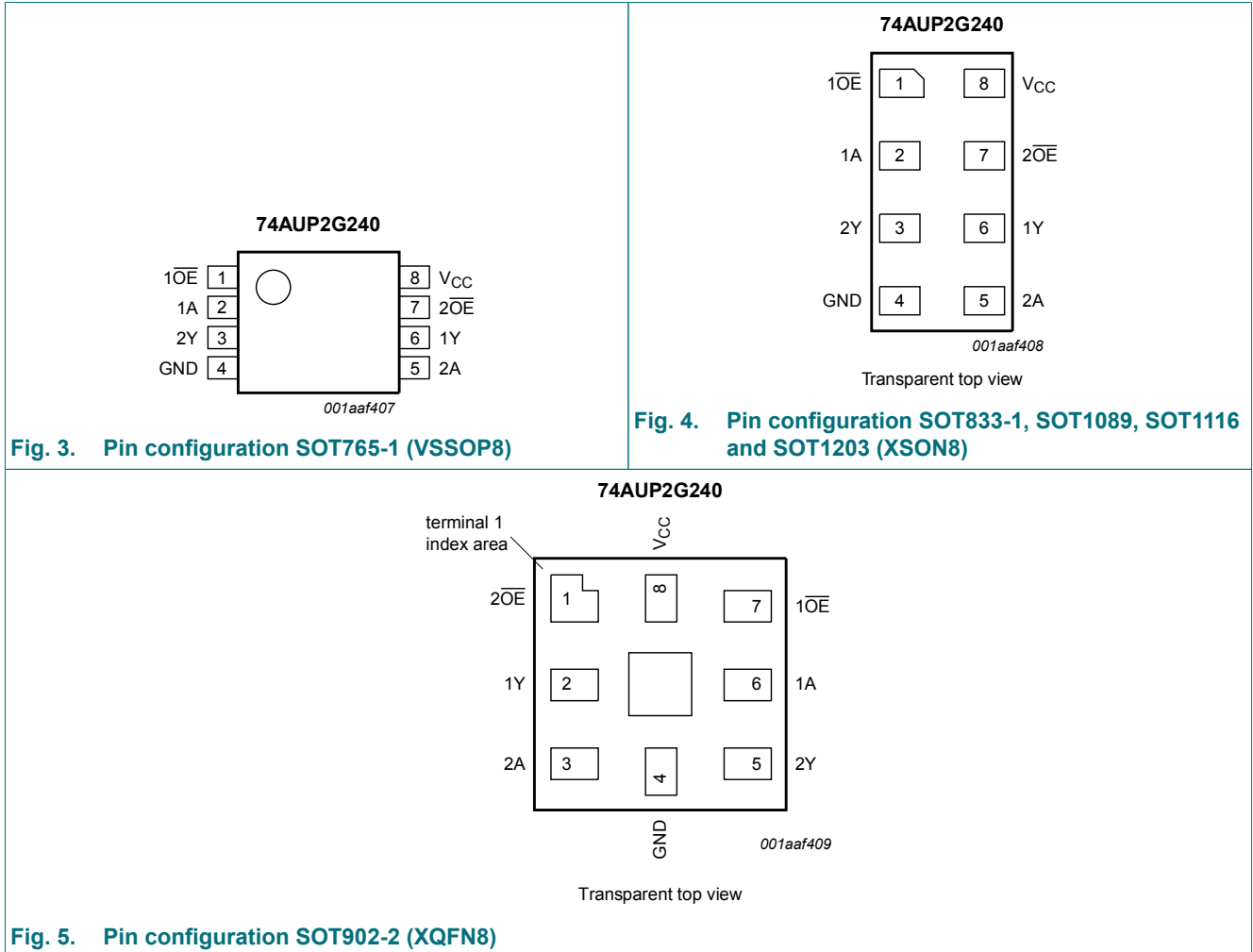
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5. Functional diagram



6. Pinning information

6.1. Pinning



6.2. Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT765-1, SOT833-1, SOT1089, SOT1116 and SOT1203	SOT902-2	
1OE, 2OE	1, 7	7, 1	output enable input (active LOW)
1A, 2A	2, 5	6, 3	data input
GND	4	4	ground (0 V)
1Y, 2Y	6, 3	2, 5	data output
VCC	8	8	supply voltage

7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

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

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 118 °C the value of P_{tot} 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
T_{amb} = 25 °C						
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 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	0.75V _{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 µA; 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 _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V	-	-	±0.1	µA
		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
		V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V	-	-	±0.2	µA
		V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V	-	-	±0.2	µA
		V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V	-	-	0.5	µA
		data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	[1]	-	40	µA
		n _{OE} input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	[1]	-	110	µA
		disabled inputs; V _I = GND to 3.6 V; n _{OE} = V _{CC} ; V _{CC} = 0.8 V to 3.6 V	-	-	1	µA

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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	output enabled; V _O = GND; V _{CC} = 0 V	-	1.7	-	pF
		output disabled; V _{CC} = 0 V to 3.6 V; V _O = GND or V _{CC}	-	1.5	-	pF
T_{amb} = -40 °C to +85 °C						
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 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	0.7V _{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 µA; 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	-	-	0.37	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	µA
		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	µA
		V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V	-	-	±0.5	µA
		V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V	-	-	±0.6	µA
		V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V	-	-	0.9	µA
		data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	[1]	-	50	µA
		n $\overline{O}E$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	[1]	-	120	µA
		disabled inputs; V _I = GND to 3.6 V; n $\overline{O}E$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V	-	-	1	µA

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	0.75V _{CC}	-	-	V
		V _{CC} = 0.9 V to 1.95 V	0.70V _{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	-	-	0.25V _{CC}	V
		V _{CC} = 0.9 V to 1.95 V	-	-	0.30V _{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	0.6V _{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
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	-	-	0.33V _{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 _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V	-	-	±0.75	µA
		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	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	data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V [1]	-	-	75	µA
		n $\overline{\text{OE}}$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V [1]	-	-	180	µA
		disabled inputs; V _I = GND to 3.6 V; n $\overline{\text{OE}}$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V	-	-	1	µA

[1] One input at V_{CC} - 0.6 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. 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 Fig. 6 [2]									
		V _{CC} = 0.8 V	-	22.3	-	-	-	-	ns		
		V _{CC} = 1.1 V to 1.3 V	3.0	5.8	12.6	2.8	14.1	15.5	ns		
		V _{CC} = 1.4 V to 1.6 V	2.3	4.0	7.3	2.1	8.5	9.4	ns		
		V _{CC} = 1.65 V to 1.95 V	2.0	3.2	5.5	1.9	6.7	7.4	ns		
		V _{CC} = 2.3 V to 2.7 V	1.8	2.6	4.1	1.5	4.8	5.3	ns		
t _{en}	enable time	n $\overline{O}E$ to nY; see Fig. 7 [3]									
		V _{CC} = 0.8 V	-	70.2	-	-	-	-	ns		
		V _{CC} = 1.1 V to 1.3 V	3.1	6.4	14.3	2.8	15.9	17.5	ns		
		V _{CC} = 1.4 V to 1.6 V	2.5	4.4	8.1	2.2	9.5	10.5	ns		
		V _{CC} = 1.65 V to 1.95 V	2.1	3.6	6.2	1.9	7.4	8.2	ns		
		V _{CC} = 2.3 V to 2.7 V	1.8	2.8	4.6	1.7	5.4	6.0	ns		
t _{dis}	disable time	n $\overline{O}E$ to nY; see Fig. 7 [4]									
		V _{CC} = 0.8 V	-	14.8	-	-	-	-	ns		
		V _{CC} = 1.1 V to 1.3 V	2.0	4.3	7.4	2.3	8.3	9.2	ns		
		V _{CC} = 1.4 V to 1.6 V	1.6	3.2	5.2	1.7	5.9	6.5	ns		
		V _{CC} = 1.65 V to 1.95 V	1.5	3.0	4.8	1.5	5.5	6.1	ns		
		V _{CC} = 2.3 V to 2.7 V	1.1	2.2	3.5	1.4	4.0	4.5	ns		
t _{dis}	disable time	V _{CC} = 3.0 V to 3.6 V	1.3	2.5	3.9	1.4	4.5	5.0	ns		
		C_L = 10 pF									
		t _{pd}	propagation delay	nA to nY; see Fig. 6 [2]							
				V _{CC} = 0.8 V	-	25.7	-	-	-	-	ns
				V _{CC} = 1.1 V to 1.3 V	3.5	6.6	14.5	3.2	16.3	18.0	ns
				V _{CC} = 1.4 V to 1.6 V	2.2	4.6	8.4	2.0	9.9	10.9	ns
V _{CC} = 1.65 V to 1.95 V	2.0			3.8	6.4	1.8	7.7	8.6	ns		
V _{CC} = 2.3 V to 2.7 V	1.8			3.1	4.8	1.7	5.7	6.4	ns		
t _{en}	enable time	n $\overline{O}E$ to nY; see Fig. 7 [3]									
		V _{CC} = 0.8 V	-	74.0	-	-	-	-	ns		
		V _{CC} = 1.1 V to 1.3 V	3.6	7.4	16.3	3.2	18.2	20.1	ns		
		V _{CC} = 1.4 V to 1.6 V	2.3	5.1	9.2	2.1	10.9	12.0	ns		
		V _{CC} = 1.65 V to 1.95 V	2.0	4.1	7.1	1.8	8.5	9.4	ns		
		V _{CC} = 2.3 V to 2.7 V	1.8	3.4	5.4	1.7	6.4	7.1	ns		
t _{en}	enable time	V _{CC} = 3.0 V to 3.6 V	1.8	3.1	4.8	1.7	5.7	6.3	ns		

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

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 Fig. 7 [4]							
		V _{CC} = 0.8 V	-	33.7	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.4	5.4	9.0	3.2	10.0	11.0	ns
		V _{CC} = 1.4 V to 1.6 V	2.1	4.1	6.3	2.1	7.1	7.9	ns
		V _{CC} = 1.65 V to 1.95 V	2.3	4.2	6.3	1.8	7.1	7.9	ns
		V _{CC} = 2.3 V to 2.7 V	1.6	3.0	4.6	1.7	5.2	5.7	ns
		V _{CC} = 3.0 V to 3.6 V	2.1	3.8	5.7	1.7	6.4	7.1	ns
C_L = 15 pF									
t _{pd}	propagation delay	nA to nY; see Fig. 6 [2]							
		V _{CC} = 0.8 V	-	29.0	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.9	7.4	16.3	3.6	18.4	20.2	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.1	9.4	2.5	11.1	12.3	ns
		V _{CC} = 1.65 V to 1.95 V	2.2	4.2	7.2	2.1	8.7	9.6	ns
		V _{CC} = 2.3 V to 2.7 V	2.0	3.5	5.4	1.9	6.5	7.2	ns
		V _{CC} = 3.0 V to 3.6 V	2.0	3.3	4.9	1.9	5.7	6.4	ns
t _{en}	enable time	n $\overline{O}E$ to nY; see Fig. 7 [3]							
		V _{CC} = 0.8 V	-	77.8	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.0	8.2	18.2	3.6	20.4	22.5	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.6	10.3	2.5	12.2	13.4	ns
		V _{CC} = 1.65 V to 1.95 V	2.3	4.6	7.9	2.1	9.5	10.5	ns
		V _{CC} = 2.3 V to 2.7 V	2.1	3.9	6.0	2.0	7.2	7.9	ns
		V _{CC} = 3.0 V to 3.6 V	2.1	3.6	5.5	1.9	6.4	7.1	ns
t _{dis}	disable time	n $\overline{O}E$ to nY; see Fig. 7 [4]							
		V _{CC} = 0.8 V	-	62.5	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.3	6.6	10.4	3.6	11.6	12.8	ns
		V _{CC} = 1.4 V to 1.6 V	3.0	5.0	7.4	2.5	8.4	9.3	ns
		V _{CC} = 1.65 V to 1.95 V	3.0	5.3	7.8	2.1	8.7	9.7	ns
		V _{CC} = 2.3 V to 2.7 V	2.1	3.8	5.7	2.0	6.4	7.1	ns
		V _{CC} = 3.0 V to 3.6 V	2.9	5.0	7.4	1.9	8.3	9.1	ns
C_L = 30 pF									
t _{pd}	propagation delay	nA to nY; see Fig. 6 [2]							
		V _{CC} = 0.8 V	-	39.1	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	5.0	9.7	21.6	4.6	24.3	26.8	ns
		V _{CC} = 1.4 V to 1.6 V	4.0	6.7	12.3	3.0	14.6	16.1	ns
		V _{CC} = 1.65 V to 1.95 V	2.9	5.5	9.5	2.7	11.5	12.6	ns
		V _{CC} = 2.3 V to 2.7 V	2.7	4.6	7.1	2.5	8.6	9.5	ns
		V _{CC} = 3.0 V to 3.6 V	2.6	4.3	6.4	2.5	7.7	8.5	ns

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ [1]	Max	Min	Max (85 °C)	Max (125 °C)	
t _{en}	enable time	n $\overline{O}E$ to nY; see Fig. 7 [3]							
		V _{CC} = 0.8 V	-	89.4	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	5.2	10.6	23.8	4.6	26.7	29.5	ns
		V _{CC} = 1.4 V to 1.6 V	4.0	7.3	13.2	3.0	15.7	17.4	ns
		V _{CC} = 1.65 V to 1.95 V	3.0	6.0	10.2	2.7	12.3	13.6	ns
		V _{CC} = 2.3 V to 2.7 V	2.8	5.0	7.8	2.6	9.3	10.3	ns
		V _{CC} = 3.0 V to 3.6 V	2.8	4.8	7.1	2.6	8.4	9.3	ns
t _{dis}	disable time	n $\overline{O}E$ to nY; see Fig. 7 [4]							
		V _{CC} = 0.8 V	-	68.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	6.0	9.3	15.0	4.6	16.5	18.2	ns
		V _{CC} = 1.4 V to 1.6 V	4.4	7.7	11.0	3.0	12.2	13.4	ns
		V _{CC} = 1.65 V to 1.95 V	5.1	8.8	12.4	2.7	13.7	15.1	ns
		V _{CC} = 2.3 V to 2.7 V	3.6	6.2	9.0	2.6	10.0	11.0	ns
		V _{CC} = 3.0 V to 3.6 V	5.2	8.8	12.7	2.6	14.0	15.4	ns
C_L = 5 pF, 10 pF, 15 pF and 30 pF									
C _{PD}	power dissipation capacitance	f = 1 MHz; V _I = GND to V _{CC} [5]							
		V _{CC} = 0.8 V	-	2.7	-	-	-	-	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	-	3.7	-	-	-	-	pF
		V _{CC} = 3.0 V to 3.6 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).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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;
 Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

11.1. Waveforms and test circuit

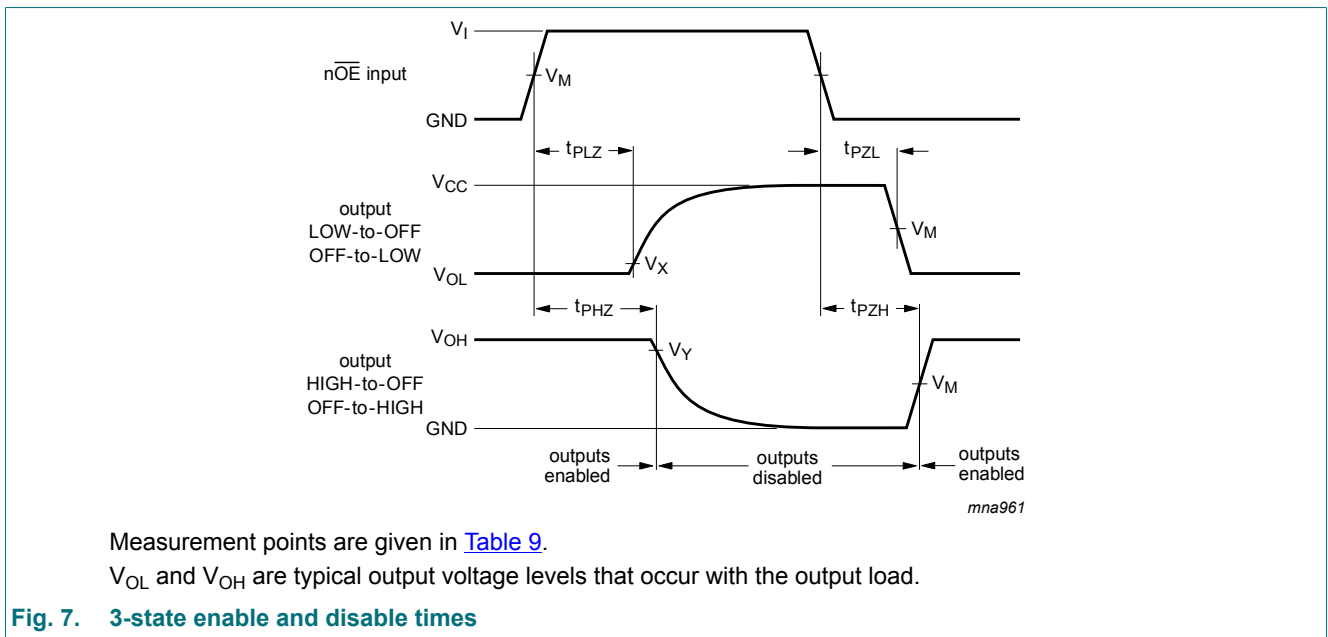
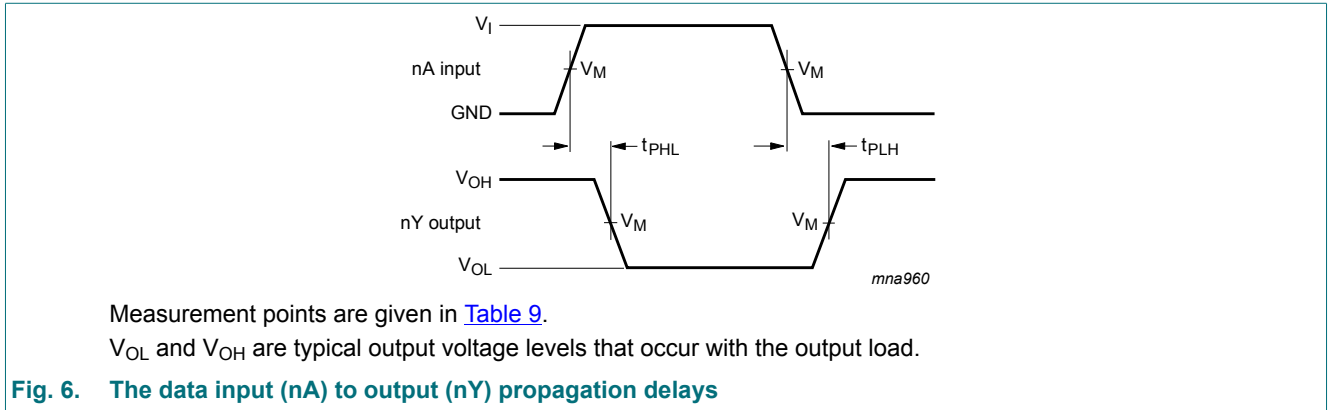
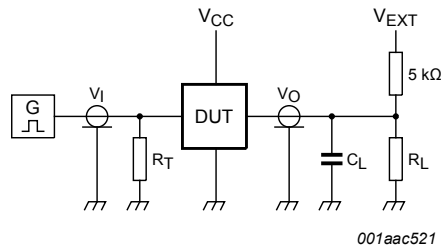


Table 9. Measurement points

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



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. 8. 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

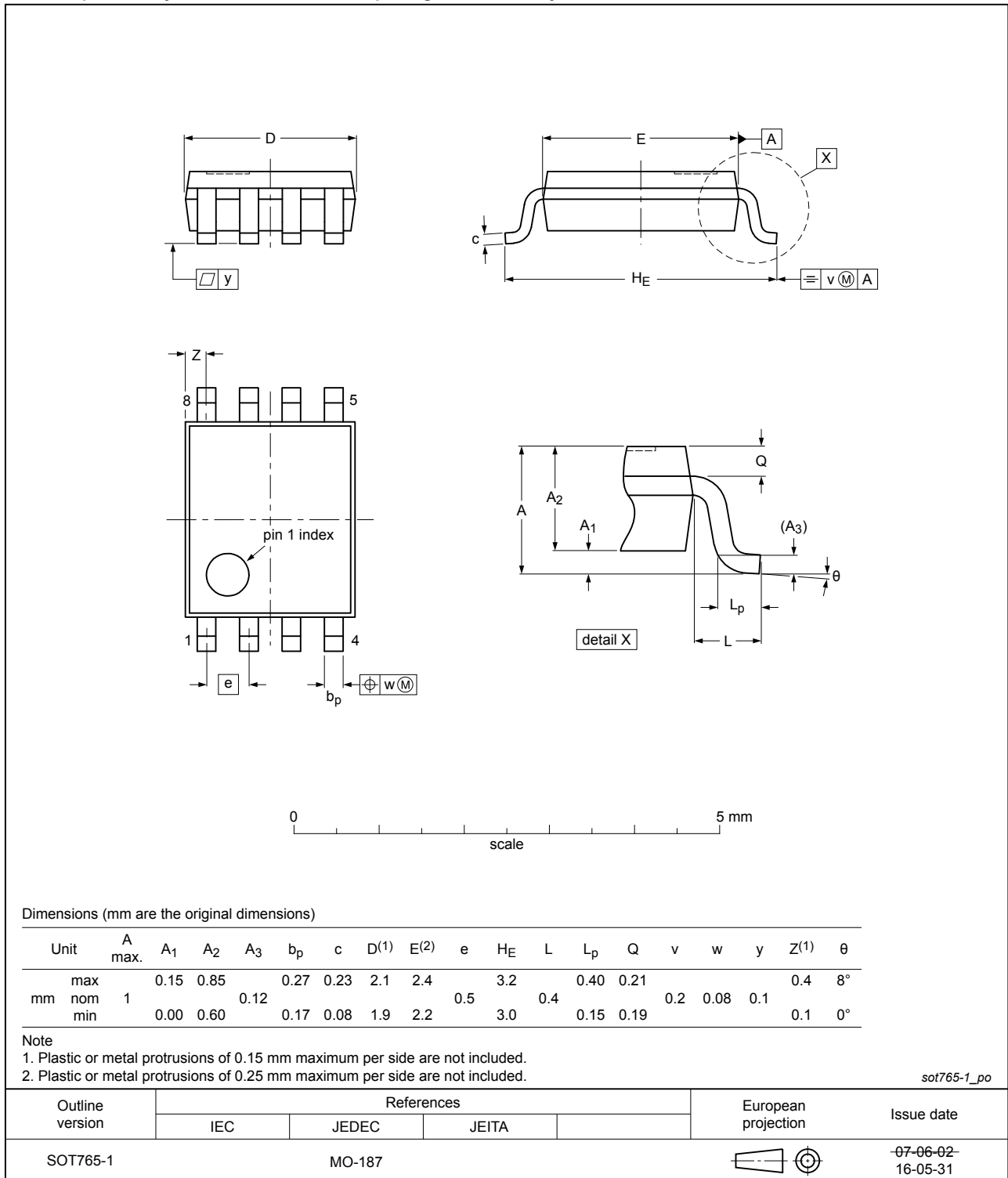


Fig. 9. Package outline SOT765-1 (VSSOP8)

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

SOT833-1

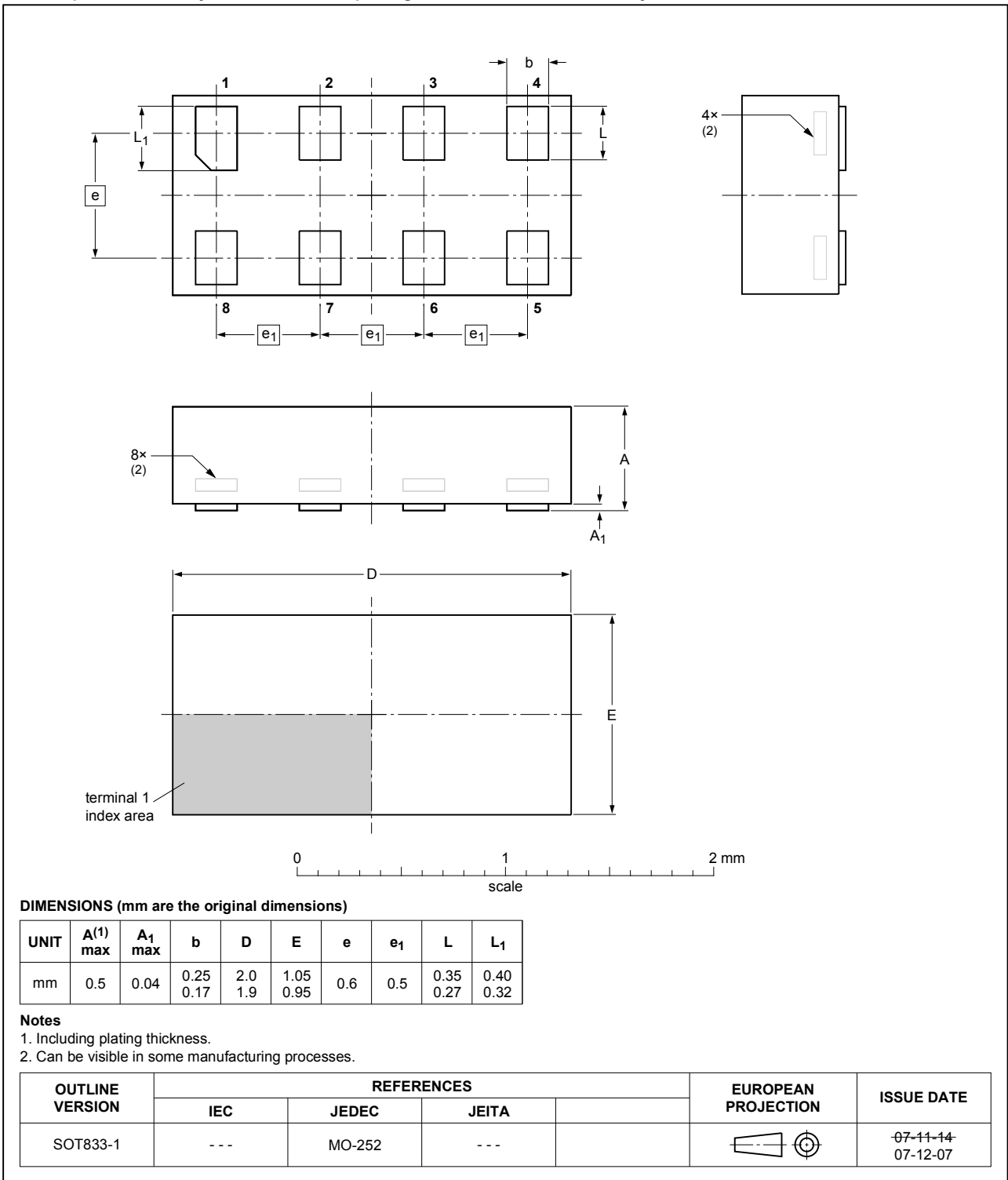


Fig. 10. Package outline SOT833-1 (XSON8)

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

SOT1089

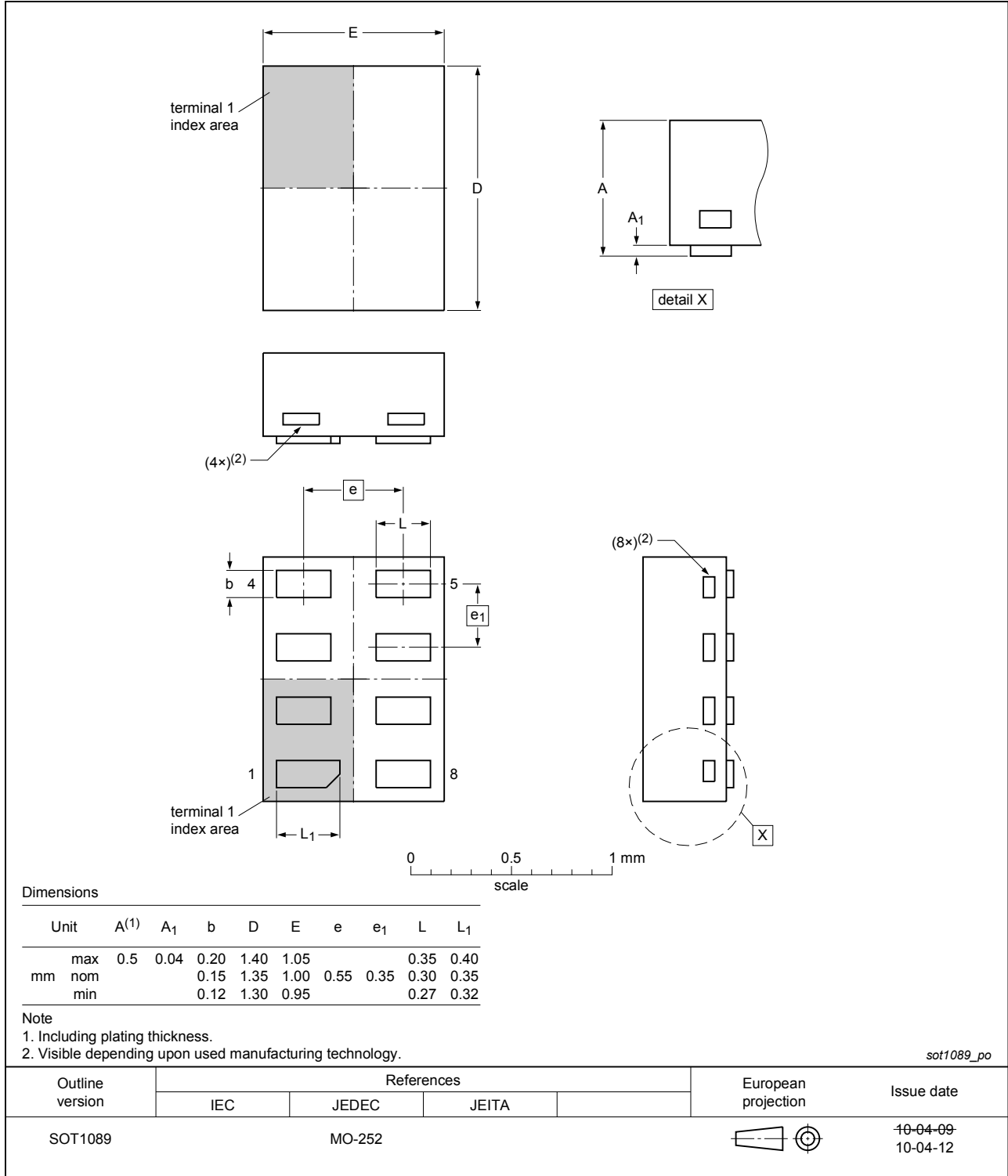


Fig. 11. Package outline SOT1089 (XSON8)

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

SOT902-2



Fig. 12. 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. 13. 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

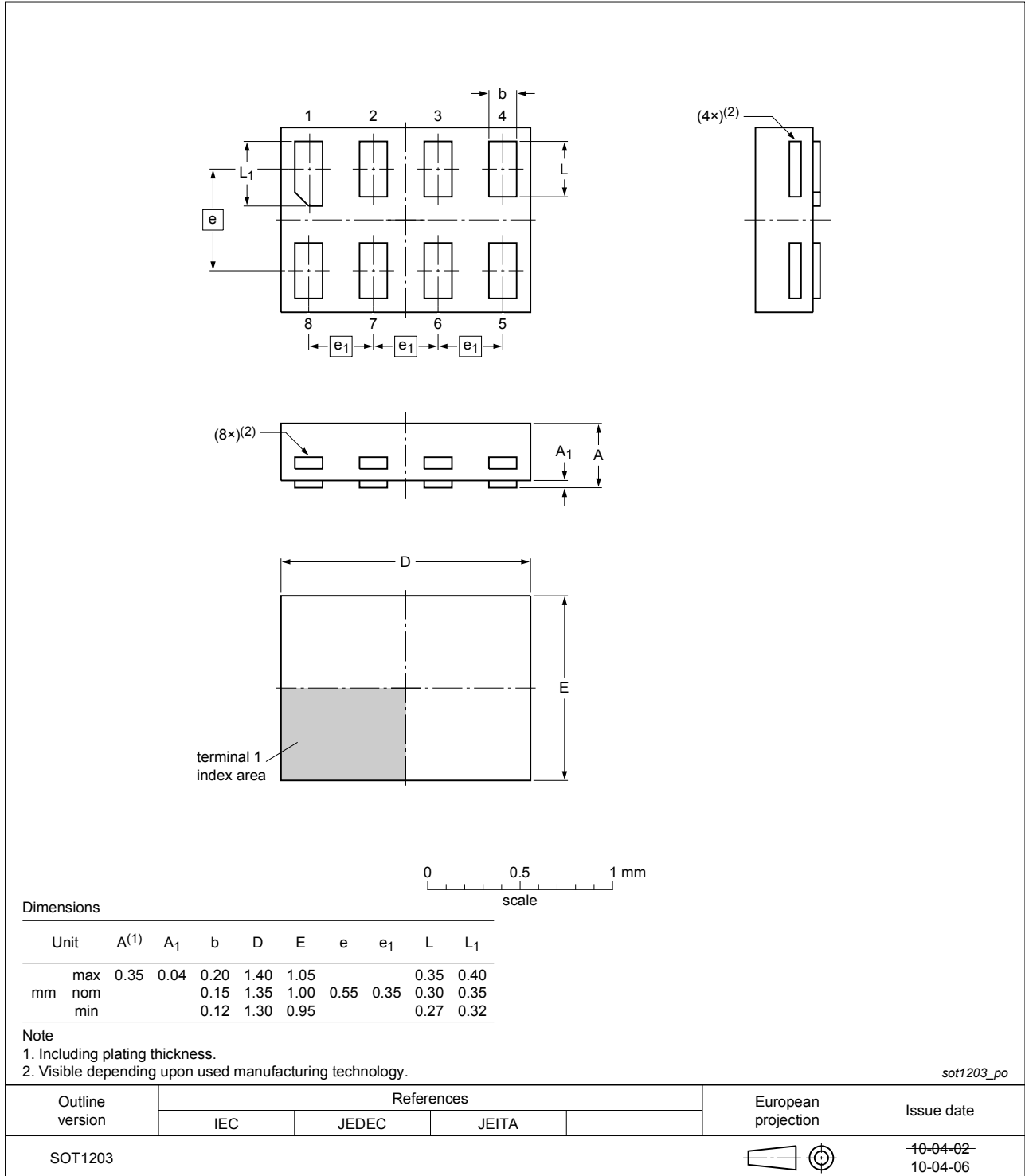


Fig. 14. Package outline SOT1203 (XSON8)

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
74AUP2G240 v.9	20190319	Product data sheet	-	74AUP2G240 v.8
Modifications:	<ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Type number 74AUP2G240GD (SOT996-2) removed. Package outline drawing SOT765-1 (VSSOP8) updated. Package outline drawing SOT902-2 (XQFN8) updated. 			
74AUP2G240 v.8	20130124	Product data sheet	-	74AUP2G240 v.7
Modifications:	<ul style="list-style-type: none"> For type number 74AUP2G240GD XSON8U has changed to XSON8. 			
74AUP2G240 v.7	20120606	Product data sheet	-	74AUP2G240 v.6
74AUP2G240 v.6	20111205	Product data sheet	-	74AUP2G240 v.5
74AUP2G240 v.5	20100913	Product data sheet	-	74AUP2G240 v.4
74AUP2G240 v.4	20090630	Product data sheet	-	74AUP2G240 v.3
74AUP2G240 v.3	20090407	Product data sheet	-	74AUP2G240 v.2
74AUP2G240 v.2	20080222	Product data sheet	-	74AUP2G240 v.1
74AUP2G240 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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