74AUP2G240

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

Rev. 10 — 1 December 2020 **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 ($n\overline{OE}$). A HIGH level at pin $n\overline{OE}$ 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 $n\overline{OE}$ 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 μA (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

nexperia

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
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
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
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

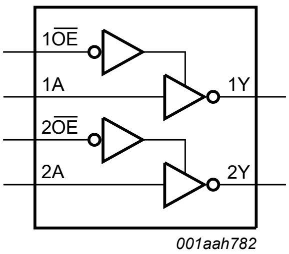


Fig. 1. Logic symbol

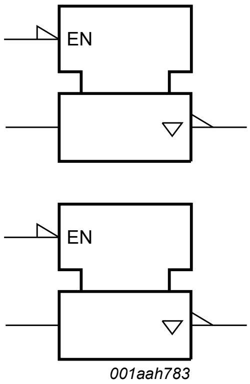


Fig. 2. IEC logic symbol

6. Pinning information

6.1. Pinning

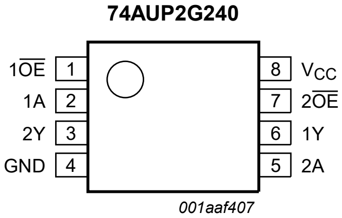


Fig. 3. Pin configuration SOT765-1 (VSSOP8)

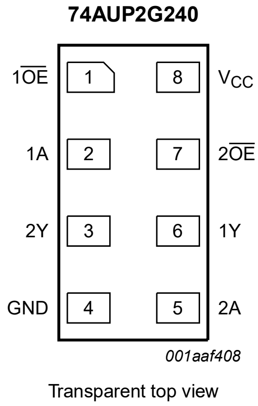


Fig. 4. Pin configuration SOT833-1, SOT1116 and SOT1203 (XSON8)

6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
$1\overline{OE}$, $2\overline{OE}$	1, 7	output enable input (active LOW)
1A, 2A	2, 5	data input
GND	4	ground (0 V)
1Y, 2Y	6, 3	data output
V_{CC}	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
$n\overline{OE}$	**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 SOT765-1 (VSSOP8) package: P_{tot} derates linearly with 4.9 mW/K above 99 °C.
For SOT833-1 (XSON8) package: P_{tot} derates linearly with 3.1 mW/K above 68 °C.
For SOT1116 (XSON8) package: P_{tot} derates linearly with 4.2 mW/K above 90 °C.
For SOT1203 (XSON8) package: P_{tot} derates linearly with 3.6 mW/K above 81 °C.

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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
		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	-	-	$0.3V_{CC}$	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
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
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	μA
		$n\overline{OE}$ 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; $n\overline{OE} = V_{CC}$; V_{CC} = 0.8 V to 3.6 V	-	-	1	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	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

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		0.70V_{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
		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		-	-	0.3V_{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_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_{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		-	-	±0.5	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	data input; V_I = V_{CC} - 0.6 V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	50	μA
		n$\overline{OE}$ 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$\overline{OE}$ = 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
		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	-	-	0.33V_{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_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_{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	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
		$n\overline{OE}$ 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; $n\overline{OE}$ = 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. 7.

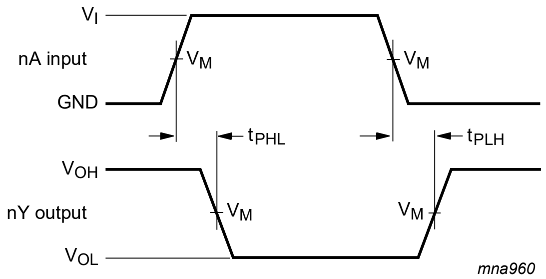
Symbol	Parameter	Conditions	T_{amb} = 25 °C			T_{amb} = -40 °C to +85 °C		T_{amb} = -40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
C_L = 5 pF										
t_{pd}	propagation delay	nA to nY; see Fig. 5 [2]								
		V_{CC} = 0.8 V	-	22.3	-	-	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.0	5.8	12.6	2.8	14.1	2.8	15.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	4.0	7.3	2.1	8.5	2.1	9.4	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	3.2	5.5	1.9	6.7	1.9	7.4	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	2.6	4.1	1.5	4.8	1.5	5.3	ns
		V_{CC} = 3.0 V to 3.6 V	1.4	2.3	3.6	1.3	4.1	1.3	4.6	ns
t_{en}	enable time	$n\overline{OE}$ to nY; see Fig. 6 [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	2.8	17.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	4.4	8.1	2.2	9.5	2.2	10.5	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	3.6	6.2	1.9	7.4	1.9	8.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	2.8	4.6	1.7	5.4	1.7	6.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	2.5	4.0	1.7	4.7	1.7	5.3	ns
t_{dis}	disable time	$n\overline{OE}$ to nY; see Fig. 6 [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	2.3	9.2	ns
		V_{CC} = 1.4 V to 1.6 V	1.6	3.2	5.2	1.7	5.9	1.7	6.5	ns
		V_{CC} = 1.65 V to 1.95 V	1.5	3.0	4.8	1.5	5.5	1.5	6.1	ns
		V_{CC} = 2.3 V to 2.7 V	1.1	2.2	3.5	1.4	4.0	1.4	4.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.3	2.5	3.9	1.4	4.5	1.4	5.0	ns
C_L = 10 pF										
t_{pd}	propagation delay	nA to nY; see Fig. 5 [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	3.2	18.0	ns
		V_{CC} = 1.4 V to 1.6 V	2.2	4.6	8.4	2.0	9.9	2.0	10.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	3.8	6.4	1.8	7.7	1.8	8.6	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	3.1	4.8	1.7	5.7	1.7	6.4	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	2.8	4.3	1.7	5.0	1.7	5.5	ns
t_{en}	enable time	$n\overline{OE}$ to nY; see Fig. 6 [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	3.2	20.1	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	5.1	9.2	2.1	10.9	2.1	12.0	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	4.1	7.1	1.8	8.5	1.8	9.4	ns
		V_{CC} = 2.3 V to 2.7 V	1.8	3.4	5.4	1.7	6.4	1.7	7.1	ns
		V_{CC} = 3.0 V to 3.6 V	1.8	3.1	4.8	1.7	5.7	1.7	6.3	ns

Symbol	Parameter	Conditions		T_{amb} = 25 °C			T_{amb} = -40 °C to +85 °C		T_{amb} = -40 °C to +125 °C		Unit
				Min	Typ[1]	Max	Min	Max	Min	Max	
t_{dis}	disable time	n$\overline{OE}$ to nY; see Fig. 6	[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	3.2	11.0	ns
		V_{CC} = 1.4 V to 1.6 V		2.1	4.1	6.3	2.1	7.1	2.1	7.9	ns
		V_{CC} = 1.65 V to 1.95 V		2.3	4.2	6.3	1.8	7.1	1.8	7.9	ns
		V_{CC} = 2.3 V to 2.7 V		1.6	3.0	4.6	1.7	5.2	1.7	5.7	ns
		V_{CC} = 3.0 V to 3.6 V		2.1	3.8	5.7	1.7	6.4	1.7	7.1	ns
C_L = 15 pF											
t_{pd}	propagation delay	nA to nY; see Fig. 5	[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	3.6	20.2	ns
		V_{CC} = 1.4 V to 1.6 V		3.0	5.1	9.4	2.5	11.1	2.5	12.3	ns
		V_{CC} = 1.65 V to 1.95 V		2.2	4.2	7.2	2.1	8.7	2.1	9.6	ns
		V_{CC} = 2.3 V to 2.7 V		2.0	3.5	5.4	1.9	6.5	1.9	7.2	ns
		V_{CC} = 3.0 V to 3.6 V		2.0	3.3	4.9	1.9	5.7	1.9	6.4	ns
t_{en}	enable time	n$\overline{OE}$ to nY; see Fig. 6	[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	3.6	22.5	ns
		V_{CC} = 1.4 V to 1.6 V		3.0	5.6	10.3	2.5	12.2	2.5	13.4	ns
		V_{CC} = 1.65 V to 1.95 V		2.3	4.6	7.9	2.1	9.5	2.1	10.5	ns
		V_{CC} = 2.3 V to 2.7 V		2.1	3.9	6.0	2.0	7.2	2.0	7.9	ns
		V_{CC} = 3.0 V to 3.6 V		2.1	3.6	5.5	1.9	6.4	1.9	7.1	ns
t_{dis}	disable time	n$\overline{OE}$ to nY; see Fig. 6	[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	3.6	12.8	ns
		V_{CC} = 1.4 V to 1.6 V		3.0	5.0	7.4	2.5	8.4	2.5	9.3	ns
		V_{CC} = 1.65 V to 1.95 V		3.0	5.3	7.8	2.1	8.7	2.1	9.7	ns
		V_{CC} = 2.3 V to 2.7 V		2.1	3.8	5.7	2.0	6.4	2.0	7.1	ns
		V_{CC} = 3.0 V to 3.6 V		2.9	5.0	7.4	1.9	8.3	1.9	9.1	ns
C_L = 30 pF											
t_{pd}	propagation delay	nA to nY; see Fig. 5	[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	4.6	26.8	ns
		V_{CC} = 1.4 V to 1.6 V		4.0	6.7	12.3	3.0	14.6	3.0	16.1	ns
		V_{CC} = 1.65 V to 1.95 V		2.9	5.5	9.5	2.7	11.5	2.7	12.6	ns
		V_{CC} = 2.3 V to 2.7 V		2.7	4.6	7.1	2.5	8.6	2.5	9.5	ns
		V_{CC} = 3.0 V to 3.6 V		2.6	4.3	6.4	2.5	7.7	2.5	8.5	ns

Symbol	Parameter	Conditions	T_{amb} = 25 °C			T_{amb} = -40 °C to +85 °C		T_{amb} = -40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t_{en}	enable time	n$\overline{OE}$ to nY; see Fig. 6 [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	4.6	29.5	ns
		V_{CC} = 1.4 V to 1.6 V	4.0	7.3	13.2	3.0	15.7	3.0	17.4	ns
		V_{CC} = 1.65 V to 1.95 V	3.0	6.0	10.2	2.7	12.3	2.7	13.6	ns
		V_{CC} = 2.3 V to 2.7 V	2.8	5.0	7.8	2.6	9.3	2.6	10.3	ns
		V_{CC} = 3.0 V to 3.6 V	2.8	4.8	7.1	2.6	8.4	2.6	9.3	ns
t_{dis}	disable time	n$\overline{OE}$ to nY; see Fig. 6 [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	4.6	18.2	ns
		V_{CC} = 1.4 V to 1.6 V	4.4	7.7	11.0	3.0	12.2	3.0	13.4	ns
		V_{CC} = 1.65 V to 1.95 V	5.1	8.8	12.4	2.7	13.7	2.7	15.1	ns
		V_{CC} = 2.3 V to 2.7 V	3.6	6.2	9.0	2.6	10.0	2.6	11.0	ns
		V_{CC} = 3.0 V to 3.6 V	5.2	8.8	12.7	2.6	14.0	2.6	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;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

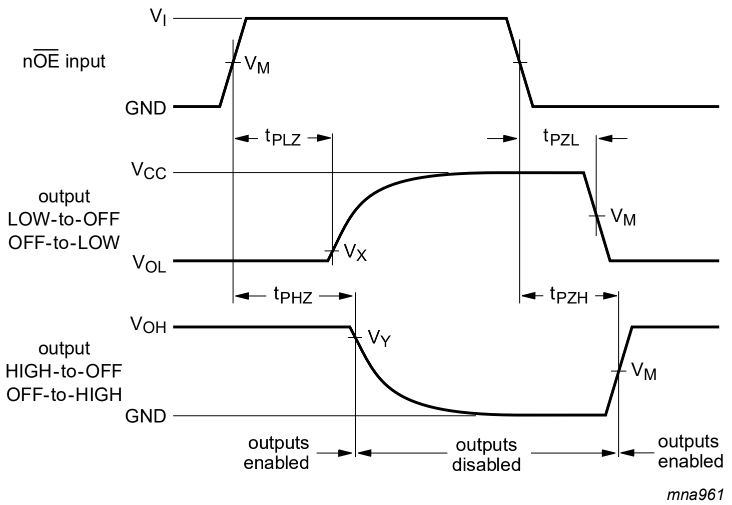
11.1. Waveforms and test circuit



Measurement points are given in Table 9.

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

Fig. 5. The data input (nA) to output (nY) propagation delays



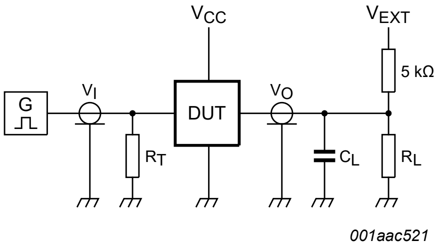
Measurement points are given in Table 9.

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

Fig. 6. 3-state enable and disable times

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 × V_{CC}	V_{CC}	≤ 3.0 ns	0.5 × V_{CC}	V_{OL} + 0.1 V	V_{OH} - 0.1 V
1.65 V to 2.7 V	0.5 × V_{CC}	V_{CC}	≤ 3.0 ns	0.5 × V_{CC}	V_{OL} + 0.15 V	V_{OH} - 0.15 V
3.0 V to 3.6 V	0.5 × V_{CC}	V_{CC}	≤ 3.0 ns	0.5 × 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. 7. Test circuit for measuring switching times

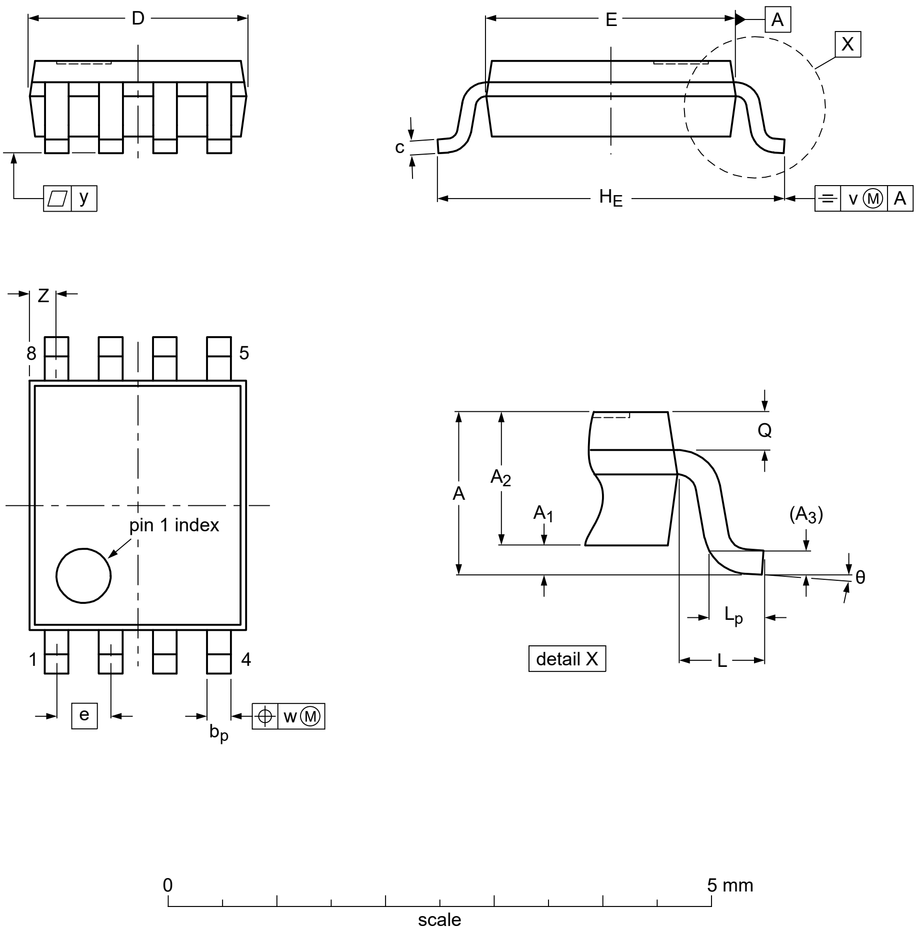
Table 10. Test data

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 × V_{CC}

[1] For measuring enable and disable times R_L = 5 kΩ.
For measuring propagation delays, setup and hold times and pulse width R_L = 1 MΩ.

12. Package outline

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



Dimensions (mm are the original dimensions)

Unit		A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	max		0.15	0.85		0.27	0.23	2.1	2.4		3.2		0.40	0.21				0.4	8°
	nom	1			0.12					0.5		0.4			0.2	0.08	0.1		
	min		0.00	0.60		0.17	0.08	1.9	2.2		3.0		0.15	0.19				0.1	0°

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

sot765-1_po

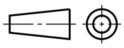
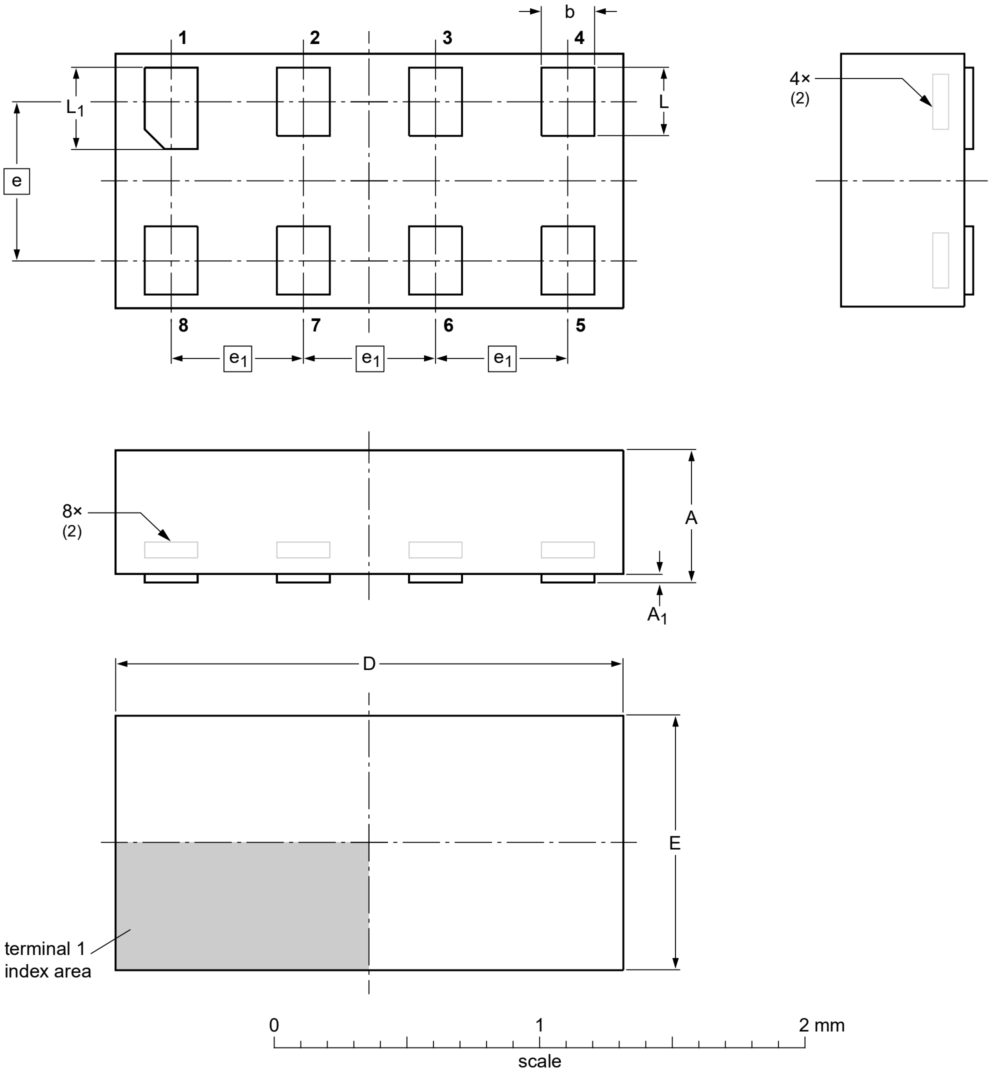
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT765-1		MO-187				~~07-06-02~~ 16-05-31

Fig. 8. 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**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.25 0.17	2.0 1.9	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

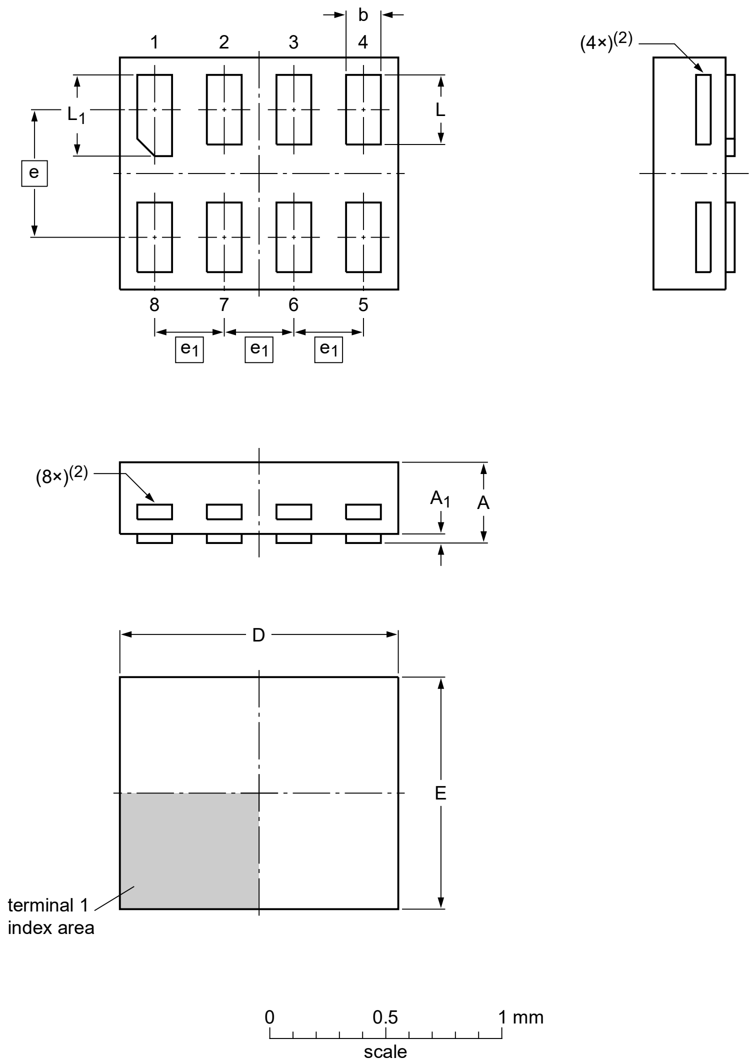
Notes

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

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

Fig. 9. Package outline SOT833-1 (XSON8)

**XSON8: extremely thin small outline package; no leads;
8 terminals; body 1.2 x 1.0 x 0.35 mm** **SOT1116**



Dimensions

Unit		$A^{(1)}$	A_1	b	D	E	e	e_1	L	L_1
	max	0.35	0.04	0.20	1.25	1.05			0.35	0.40
mm	nom			0.15	1.20	1.00	0.55	0.3	0.30	0.35
	min			0.12	1.15	0.95			0.27	0.32

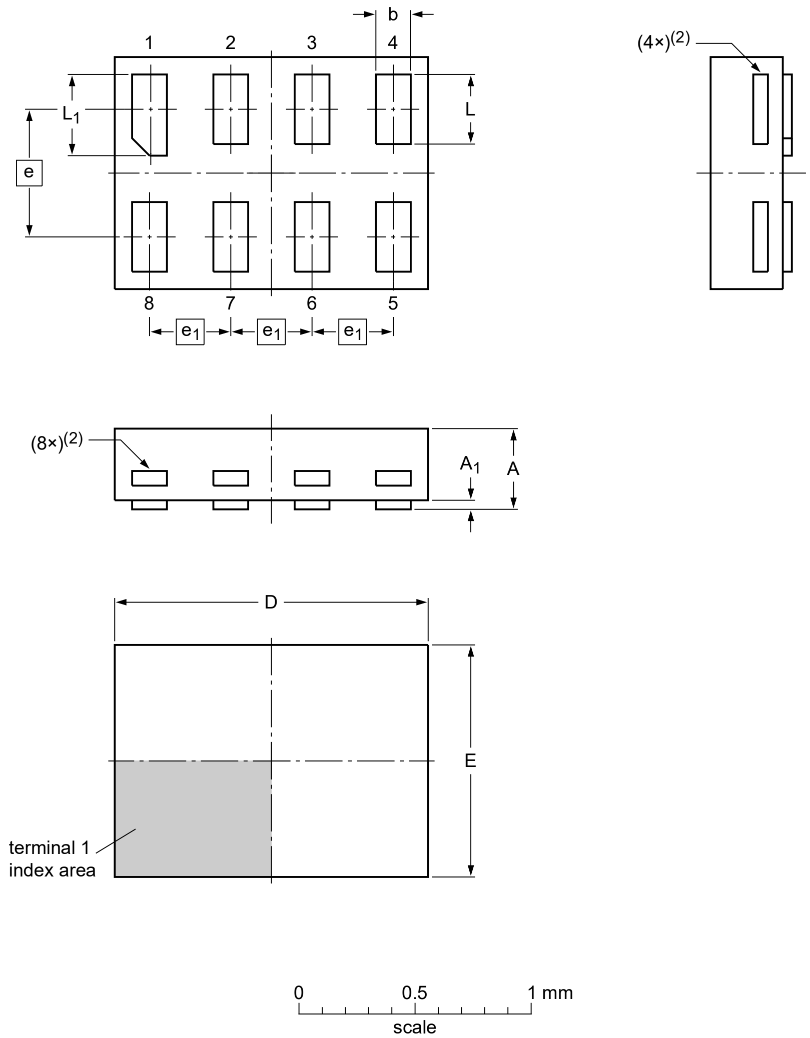
Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1116_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1116						~~10-04-02~~ 10-04-07

Fig. 10. 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**



Dimensions

Unit		A(1)	A_1	b	D	E	e	e_1	L	L_1
mm	max	0.35	0.04	0.20	1.40	1.05			0.35	0.40
	nom			0.15	1.35	1.00	0.55	0.35	0.30	0.35
	min			0.12	1.30	0.95			0.27	0.32

Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1203_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1203						~~10-04-02~~ 10-04-06

Fig. 11. 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.10	20201201	Product data sheet	-	74AUP2G240 v.9
Modifications:	• Section 8: Derating values for P_{tot} total power dissipation have been updated. • Type numbers 74AUP2G240GF (SOT1089/XSON8) and 74AUP2G240GM (SOT902-2/ XQFN8) removed.			
74AUP2G240 v.9	20190319	Product data sheet	-	74AUP2G240 v.8
Modifications:	• 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:	• 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".
[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 https://www.nexperia.com.

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. Nexperia 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 Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia 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. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia 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 — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

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

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nexperia.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

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.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

Trademarks

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

Contents

For more information, please visit: http://www.nexperia.com
For sales office addresses, please send an email to: salesaddresses@nexperia.com
Date of release: 1 December 2020