

74AUP1G240

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

Rev. 7 — 20 January 2022

Product data sheet

1. General description

The 74AUP1G240 is a 1-bit inverting buffer/line driver with 3-state outputs. The device features an output enable (\overline{OE}). A HIGH on \overline{OE} causes the output to assume a high-impedance OFF-state. Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times. This device ensures 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 potentially damaging backflow current through the device when it is powered down.

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 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
- Overvoltage tolerant inputs 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			
	Temperature range	Name	Description	Version
74AUP1G240GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G240GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G240GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115
74AUP1G240GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202
74AUP1G240GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.32 mm	SOT1226-3

4. Marking

Table 2. Marking

Type number	Marking code[1]
74AUP1G240GW	p2
74AUP1G240GM	p2
74AUP1G240GN	p2
74AUP1G240GS	p2
74AUP1G240GX	p2

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

5. Functional diagram

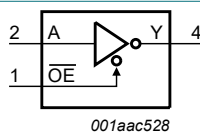


Fig. 1. Logic symbol

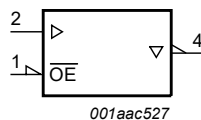


Fig. 2. IEC logic symbol

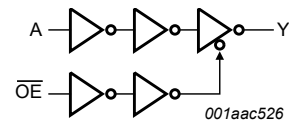
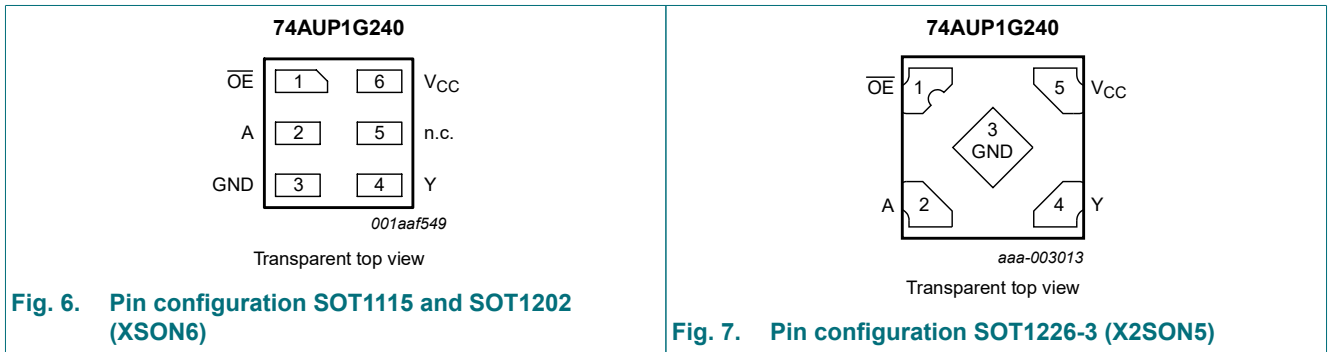
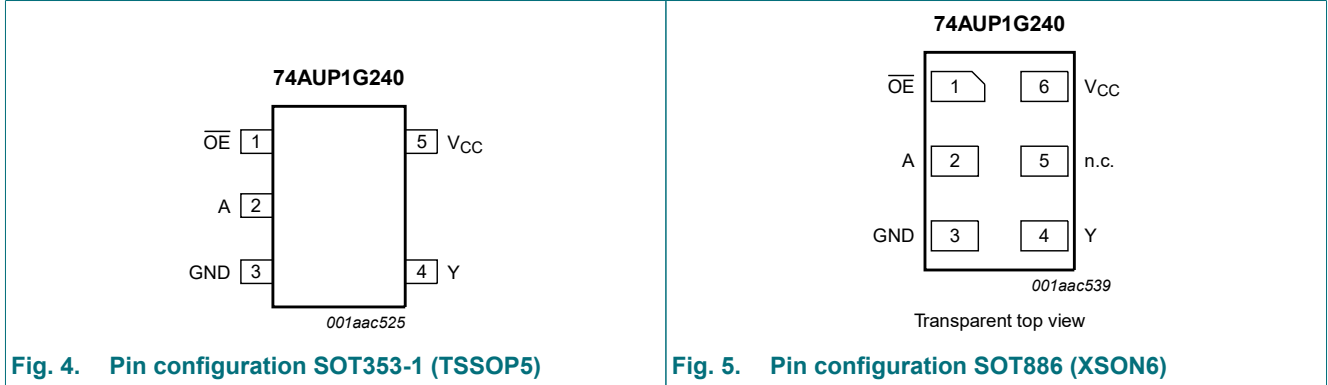


Fig. 3. Logic diagram

6. Pinning information

6.1. Pinning



6.2. Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5 and X2SON5	XSON6	
\overline{OE}	1	1	output enable input
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V_{CC}	5	6	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
\overline{OE}	A	Y
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 input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SOT353-1 (TSSOP5) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT886 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1115 (XSON6) package: P_{tot} derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package: P_{tot} derates linearly with 3.0 mW/K above 67 °C.

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
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 _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
		$\overline{\text{OE}}$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V [1]	-	-	110	μA
		all inputs; V _I = GND to 3.6 V; $\overline{\text{OE}}$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V [2]	-	-	1	μA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
C_I	input capacitance	$V_{CC} = 0\text{ V to }3.6\text{ V}$; $V_I = \text{GND or }V_{CC}$	-	0.8	-	pF	
C_O	output capacitance						
	output enabled	$V_O = \text{GND}$; $V_{CC} = 0\text{ V}$	-	1.7	-	pF	
	output disabled	$V_{CC} = 0\text{ V to }3.6\text{ V}$; $V_O = \text{GND or }V_{CC}$	-	1.5	-	pF	
$T_{\text{amb}} = -40\text{ °C to }+85\text{ °C}$							
V_{IH}	HIGH-level input voltage	$V_{CC} = 0.8\text{ V}$	$0.70 \times V_{CC}$	-	-	V	
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	-	-	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	$V_{CC} = 0.8\text{ V}$	-	-	$0.30 \times V_{CC}$	V	
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	-	-	$0.35 \times V_{CC}$	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	$V_I = V_{IH}\text{ or }V_{IL}$					
		$I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	$V_{CC} - 0.1$	-	-	V	
		$I_O = -1.1\text{ mA}$; $V_{CC} = 1.1\text{ V}$	$0.7 \times V_{CC}$	-	-	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	$V_I = V_{IH}\text{ or }V_{IL}$					
		$I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.1	V	
		$I_O = 1.1\text{ mA}$; $V_{CC} = 1.1\text{ V}$	-	-	$0.3 \times V_{CC}$	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		
I_I	input leakage current	$V_I = \text{GND to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	± 0.5	μA	
I_{OZ}	OFF-state output current	$V_I = V_{IH}\text{ or }V_{IL}$; $V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	± 0.5	μA	
I_{OFF}	power-off leakage current	$V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V}$	-	-	± 0.5	μA	
ΔI_{OFF}	additional power-off leakage current	$V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	± 0.6	μA	
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	μA	
ΔI_{CC}	additional supply current	data input; $V_I = V_{CC} - 0.6\text{ V}$; $I_O = 0\text{ A}$; $V_{CC} = 3.3\text{ V}$	[1]	-	-	50	μA
		\overline{OE} input; $V_I = V_{CC} - 0.6\text{ V}$; $I_O = 0\text{ A}$; $V_{CC} = 3.3\text{ V}$	[1]	-	-	120	μA
		all inputs; $V_I = \text{GND to }3.6\text{ V}$; $\overline{OE} = V_{CC}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	[2]	-	-	1	μA

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = -40 °C to +125 °C						
V _{IH}	HIGH-level input voltage	V _{CC} = 0.8 V	0.75 × V _{CC}	-	-	V
		V _{CC} = 0.9 V to 1.95 V	0.70 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V _{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 0.8 V	-	-	0.25 × V _{CC}	V
		V _{CC} = 0.9 V to 1.95 V	-	-	0.30 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -20 μA; V _{CC} = 0.8 V to 3.6 V	V _{CC} - 0.11	-	-	V
		I _O = -1.1 mA; V _{CC} = 1.1 V	0.6 × V _{CC}	-	-	V
		I _O = -1.7 mA; V _{CC} = 1.4 V	0.93	-	-	V
		I _O = -1.9 mA; V _{CC} = 1.65 V	1.17	-	-	V
		I _O = -2.3 mA; V _{CC} = 2.3 V	1.77	-	-	V
		I _O = -3.1 mA; V _{CC} = 2.3 V	1.67	-	-	V
		I _O = -2.7 mA; V _{CC} = 3.0 V	2.40	-	-	V
I _O = -4.0 mA; V _{CC} = 3.0 V	2.30	-	-	V		
V _{OL}	LOW-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V	-	-	0.11	V
		I _O = 1.1 mA; V _{CC} = 1.1 V	-	-	0.33 × V _{CC}	V
		I _O = 1.7 mA; V _{CC} = 1.4 V	-	-	0.41	V
		I _O = 1.9 mA; V _{CC} = 1.65 V	-	-	0.39	V
		I _O = 2.3 mA; V _{CC} = 2.3 V	-	-	0.36	V
		I _O = 3.1 mA; V _{CC} = 2.3 V	-	-	0.50	V
		I _O = 2.7 mA; V _{CC} = 3.0 V	-	-	0.36	V
I _O = 4.0 mA; V _{CC} = 3.0 V	-	-	0.50	V		
I _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V	-	-	±0.75	μA
I _{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
		$\overline{\text{OE}}$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	[1]	-	180	μA
		all inputs; V _I = GND to 3.6 V; $\overline{\text{OE}}$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V	[2]	-	1	μA

[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 characteristics

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
C_L = 5 pF										
t _{pd}	propagation delay	A to Y; see Fig. 8 [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	9.5	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	OE to Y; see Fig. 9 [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	OE to Y; see Fig. 9 [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	A to Y; see Fig. 8 [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	OE to Y; see Fig. 9 [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

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

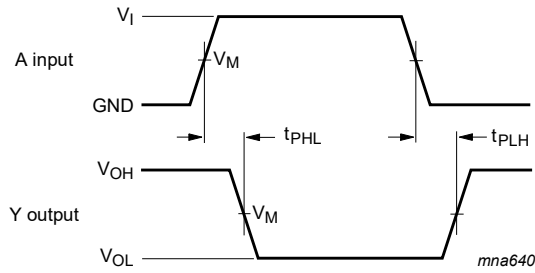
Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t _{dis}	disable time	\overline{OE} to Y; see Fig. 9 [4]								
		V _{CC} = 0.8 V	-	33.7	-	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.4	5.4	9.0	3.2	10.0	3.2	11.0	ns
		V _{CC} = 1.4 V to 1.6 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	A to Y; see Fig. 8 [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	\overline{OE} to Y; see Fig. 9 [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	\overline{OE} to Y; see Fig. 9 [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	A to Y; see Fig. 8 [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

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t _{en}	enable time	\overline{OE} to Y; see Fig. 9 [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	\overline{OE} to Y; see Fig. 9 [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 _i = 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.

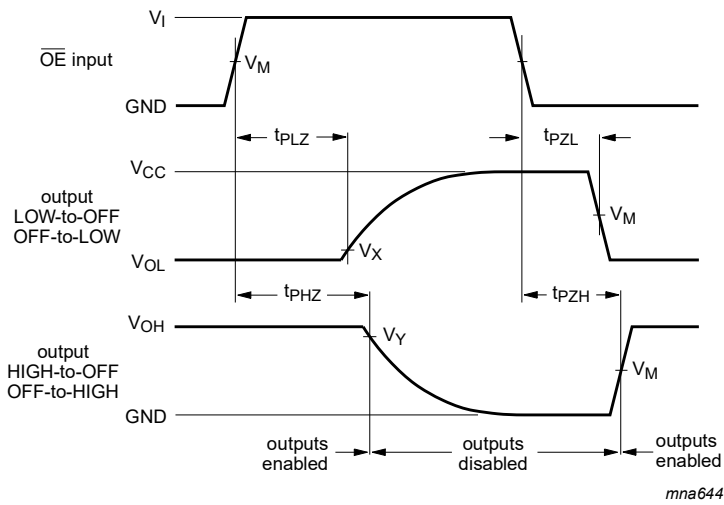
11.1. Waveforms and test circuit



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

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

Fig. 8. The data input (A) to output (Y) propagation delays



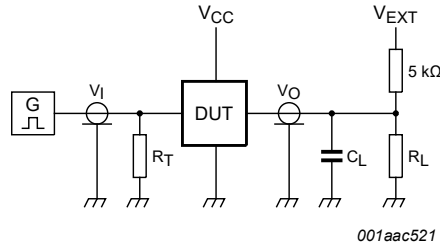
Measurement points are given in [Table 9](#).

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

Fig. 9. Enable and disable time

Table 9. Measurement points

Supply voltage	Input			Output		
	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. 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

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1

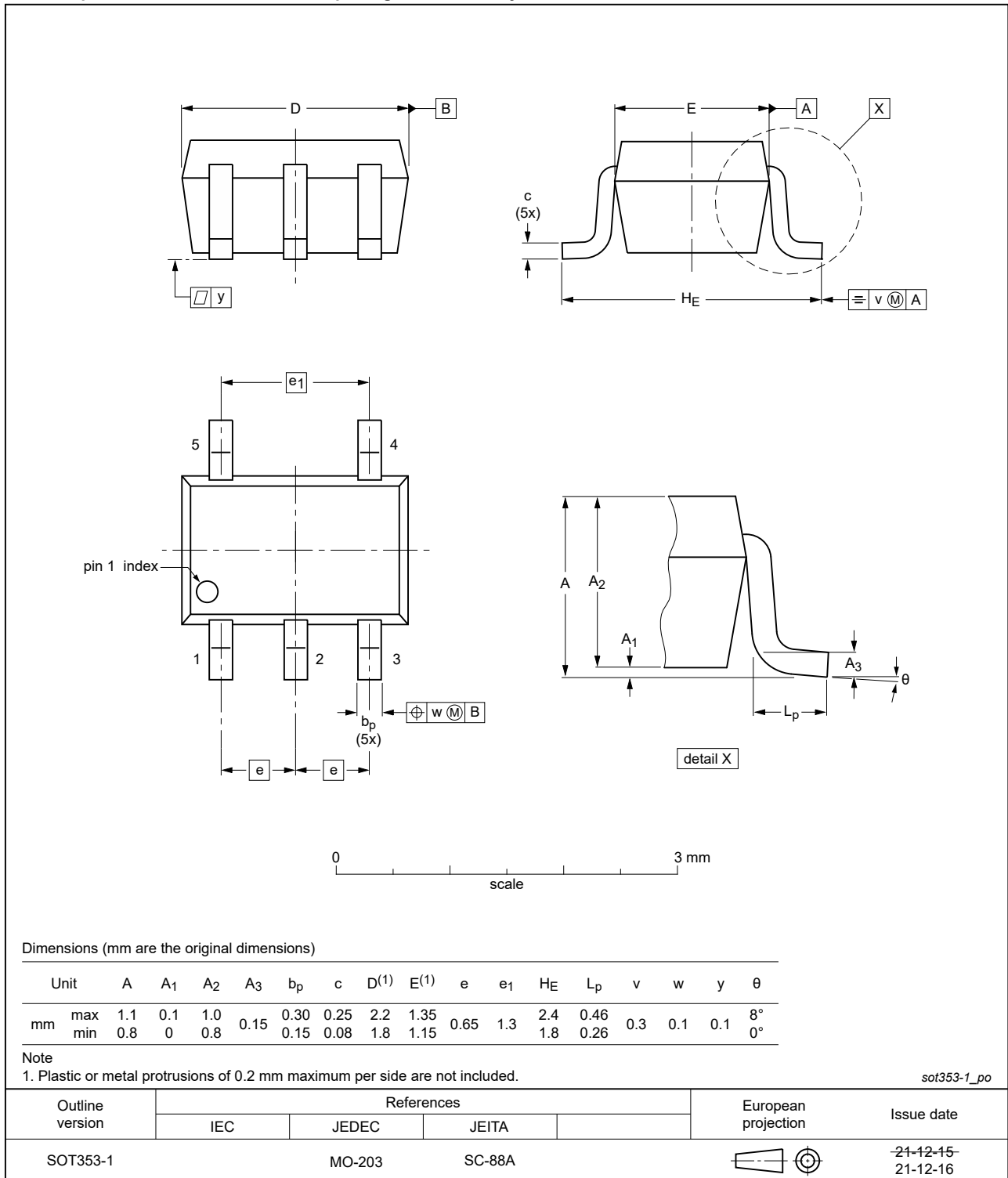


Fig. 11. Package outline SOT353-1 (TSSOP5)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm

SOT886

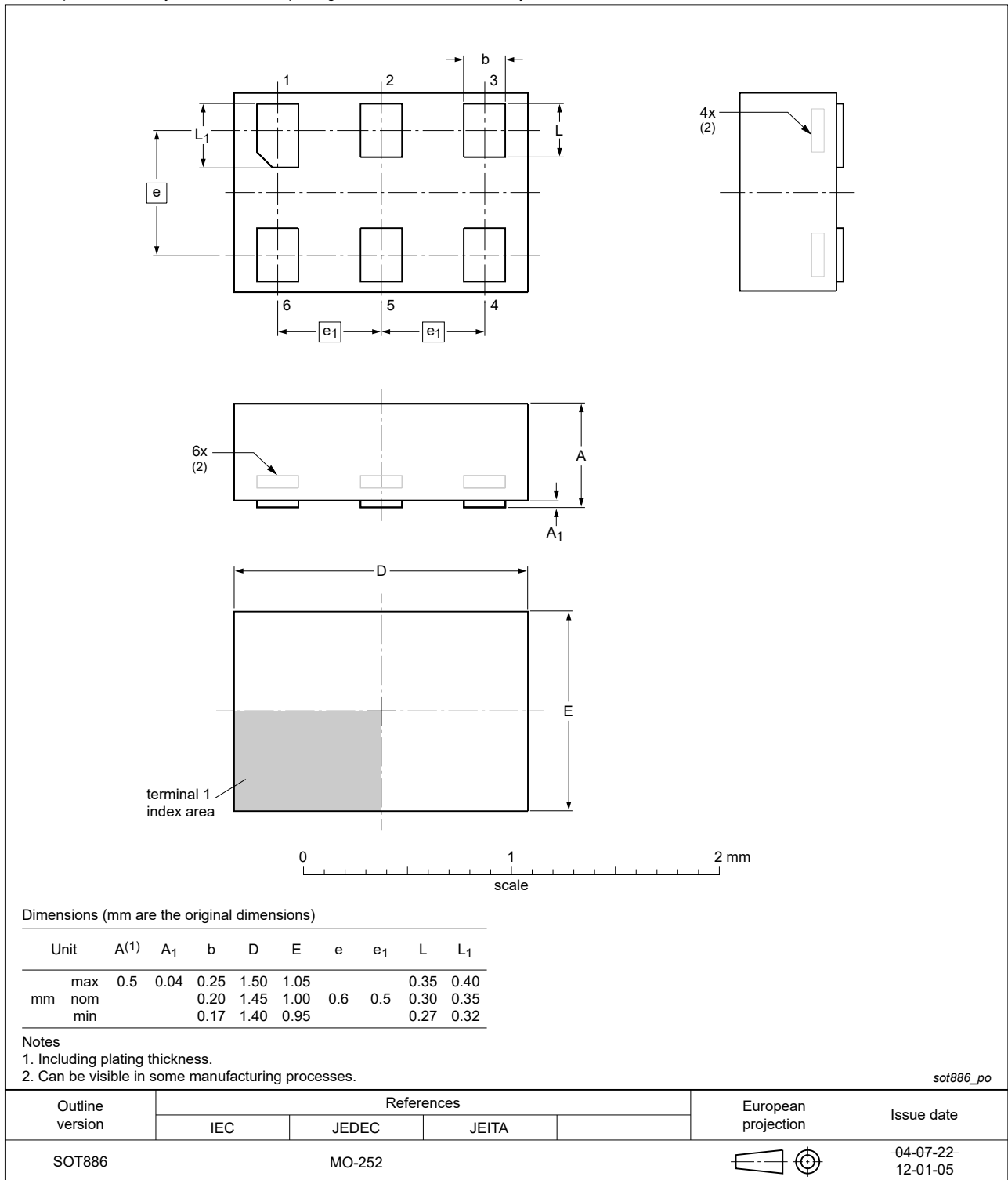


Fig. 12. Package outline SOT886 (XSON6)

XSON6: extremely thin small outline package; no leads;
6 terminals; body 0.9 x 1.0 x 0.35 mm

SOT1115

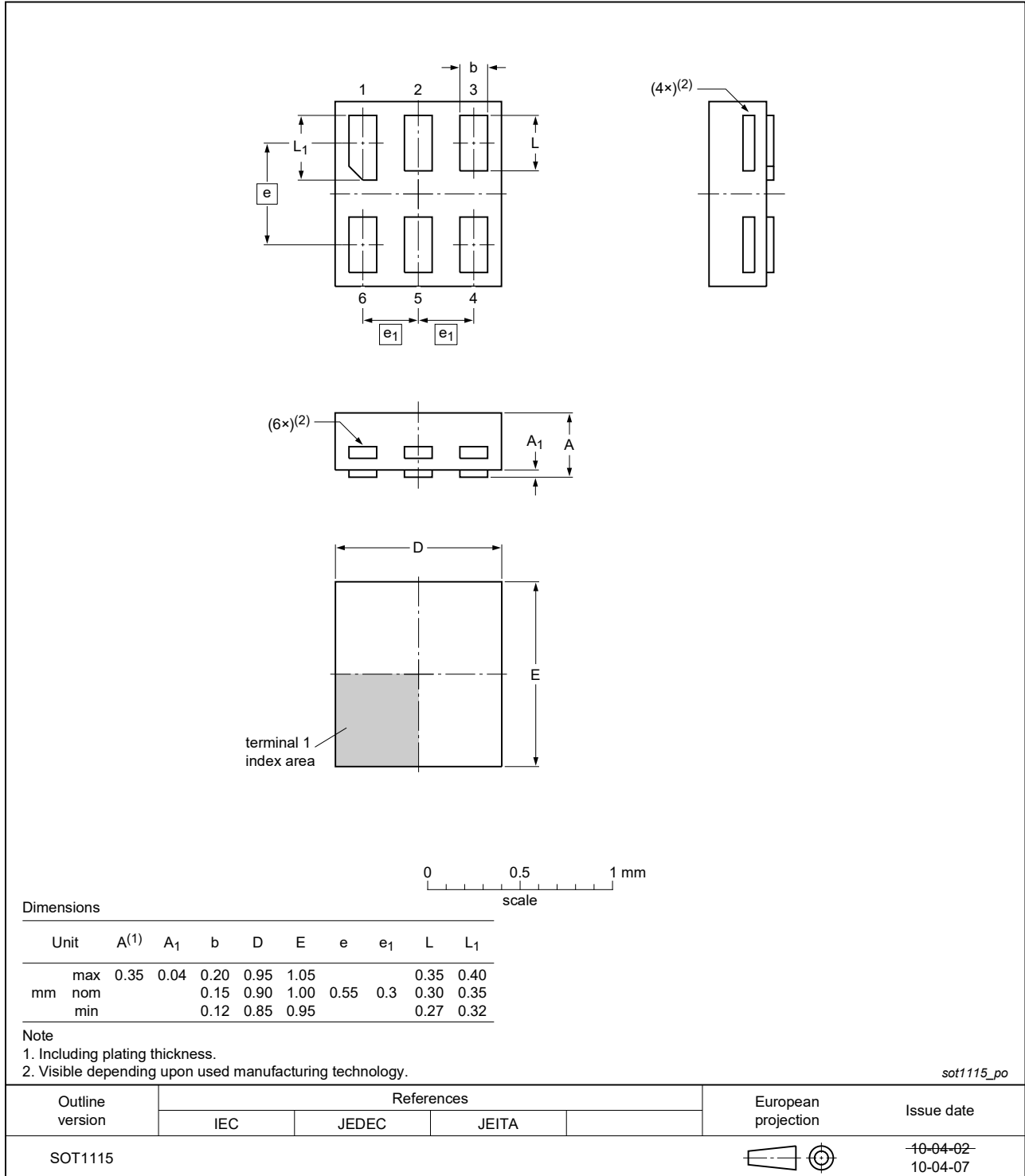


Fig. 13. Package outline SOT1115 (XSON6)

XSON6: extremely thin small outline package; no leads;
6 terminals; body 1.0 x 1.0 x 0.35 mm

SOT1202

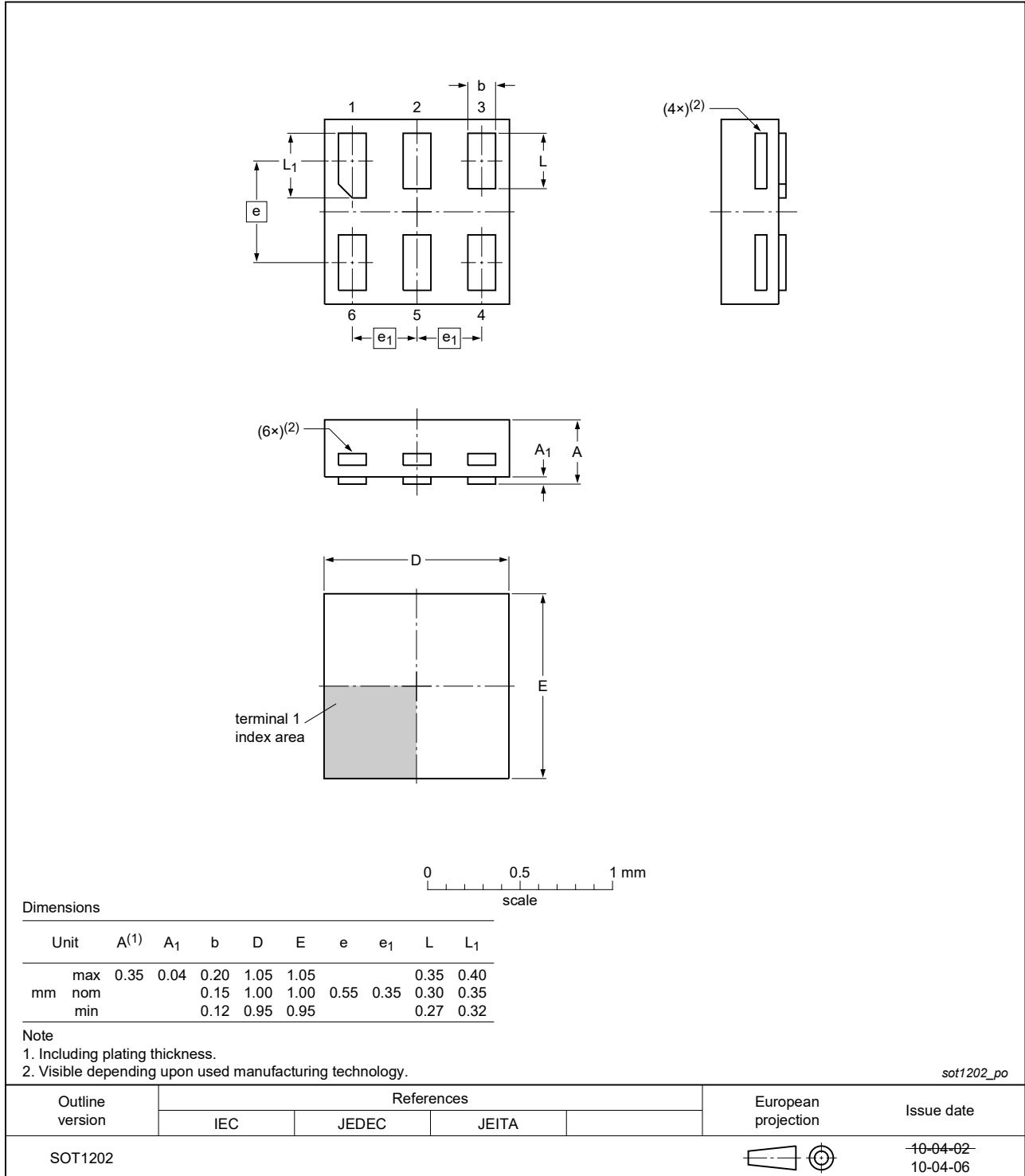


Fig. 14. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;
5 terminals; body 0.8 x 0.8 x 0.32 mm

SOT1226-3

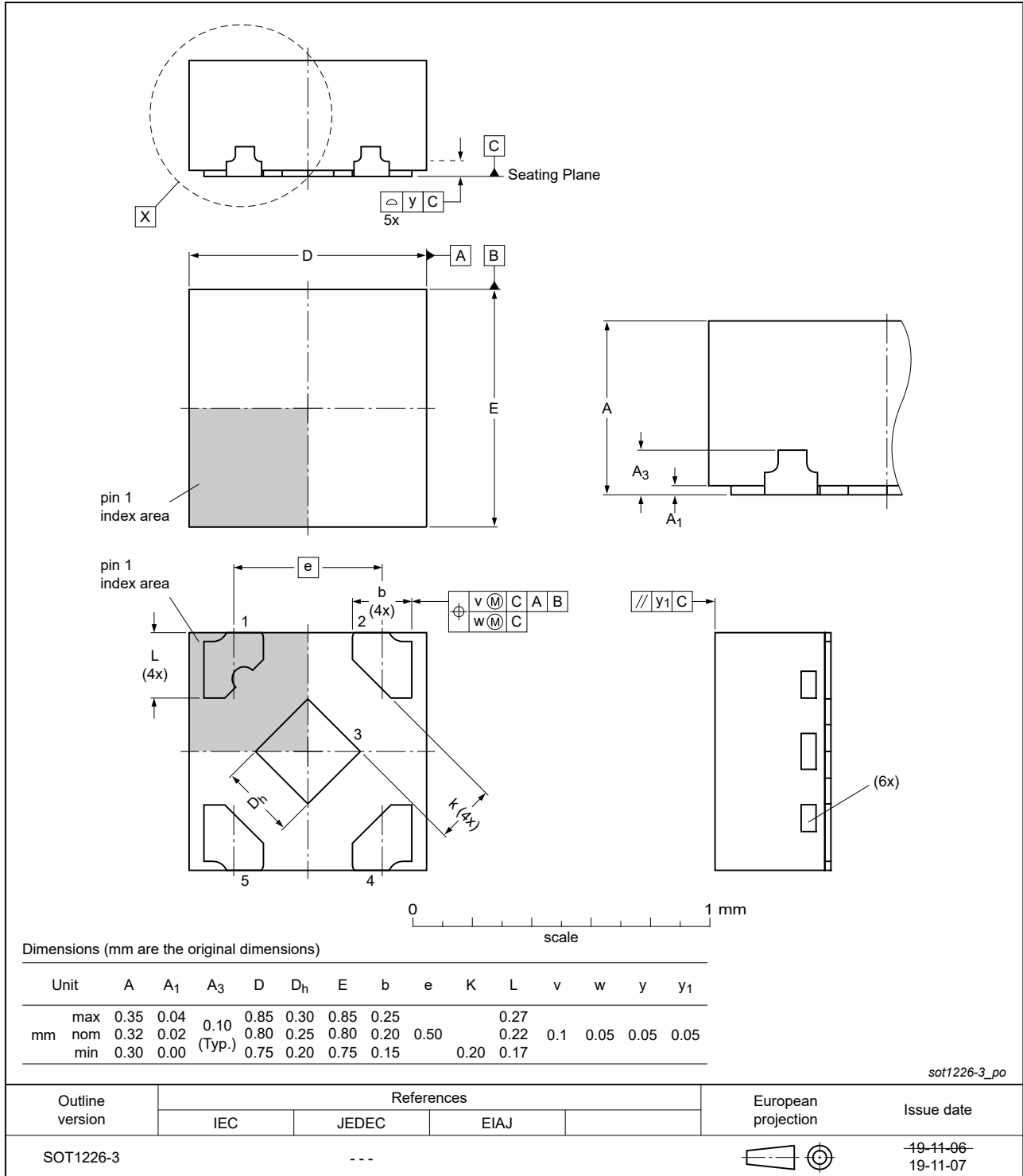


Fig. 15. Package outline SOT1226-3 (X2SON5)

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
74AUP1G240 v.7	20220120	Product data sheet	-	74AUP1G240 v.6
Modifications:	<ul style="list-style-type: none"> • Fig. 11: Package outline drawing for SOT353-1 (TSSOP5) has changed. 			
74AUP1G240 v.6	20210608	Product data sheet	-	74AUP1G240 v.5
Modifications:	<ul style="list-style-type: none"> • SOT1226 (X2SON5) package changed to SOT1226-3 (X2SON5) package. • Type number 74AUP1G240GF (SOT891) removed. • Section 1 updated. • Table 5: Derating values for P_{tot} total power dissipation updated. 			
74AUP1G240 v.5	20190315	Product data sheet	-	74AUP1G240 v.4
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. 			
74AUP1G240 v.4	20120629	Product data sheet	-	74AUP1G240 v.3
Modifications:	<ul style="list-style-type: none"> • Added type number 74AUP1G240GX (SOT1226) • Package outline drawing of SOT886 (Fig. 12) modified. 			
74AUP1G240 v.3	20111124	Product data sheet	-	74AUP1G240 v.2
Modifications:	<ul style="list-style-type: none"> • Legal pages updated. 			
74AUP1G240 v.2	20100913	Product data sheet	-	74AUP1G240 v.1
74AUP1G240 v.1	20061106	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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