

# AXP1T34

## Dual supply translating buffer

Rev. 1 — 1 December 2023

Product data sheet

## 1. General description

The AXP1T34 is a single bit, dual supply translating buffer. It features one input (A), an output (Y) and dual supply pins ( $V_{CCI}$  and  $V_{CCO}$ ). Both  $V_{CCI}$  and  $V_{CCO}$  can be supplied at any voltage between 0.9 V and 5.5 V making the device suitable for translating between any voltage nodes specified (1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V and 5.0 V). No power supply sequencing is required and output glitches during power supply transitions are prevented using patented circuitry. As a result, glitches will not appear on the outputs for supply transitions during power-up/down between 20 mV/ $\mu$ s and 5.5 V/s

The input is referenced to  $V_{CCI}$  and the output is referenced to  $V_{CCO}$ . Schmitt-trigger action at the input makes the circuit tolerant of slower input rise and fall times.

This device ensures low static and dynamic power consumption across the entire supply range and 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. In suspend mode when either  $V_{CCI}$  or  $V_{CCO}$  are at GND level the output is in the high-impedance OFF-state

## 2. Features and benefits

- Wide supply voltage range:
  - $V_{CCI}$ : 0.9 V to 5.5 V
  - $V_{CCO}$ : 0.9 V to 5.5 V
- Low input capacitance;  $C_I = 1.5$  pF (typical)
- Low output capacitance;  $C_O = 3.8$  pF (typical)
- Low dynamic power consumption;  $C_{PD} = 0.4$  pF at  $V_{CCI} = 1.2$  V (typical)
- Low dynamic power consumption;  $C_{PD} = 11$  pF at  $V_{CCO} = 5$  V (typical)
- Low static power consumption;  $I_{CCI} = 0.1$   $\mu$ A (25 °C maximum)
- Low static power consumption;  $I_{CCO} = 1.0$   $\mu$ A (25 °C maximum)
- High noise immunity
- Complies with JEDEC standard:
  - JESD8-12 (1.1 V to 1.3 V; A input)
  - JESD8-11 (1.4 V to 1.6 V)
  - JESD8-7 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8C (2.7 V to 3.6 V)
  - JESD12-6 (4.5 V to 5.5 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Latch-up performance exceeds 100 mA per JESD78D Class II
- Inputs accept voltages up to 5.5 V
- Low noise overshoot and undershoot < 10% of  $V_{CCO}$
- $I_{OFF}$  circuitry provides partial power-down mode operation
- Multiple package options
- Specified from -40 °C to +125 °C

### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
<a href="#">AXP1T34GW</a>	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	<a href="#">SOT353-1</a>
<a href="#">AXP1T34GM</a>	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	<a href="#">SOT886</a>
<a href="#">AXP1T34GS</a>	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	<a href="#">SOT1202</a>
<a href="#">AXP1T34GX</a>	-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	<a href="#">SOT1226-3</a>

### 4. Marking

Table 2. Marking

Type number	Marking code <sup>[1]</sup>
AXP1T34GW	r3
AXP1T34GM	r3
AXP1T34GS	r3
AXP1T34GX	r3

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

### 5. Functional diagram

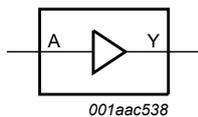


Fig. 1. Logic symbol

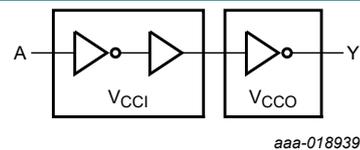
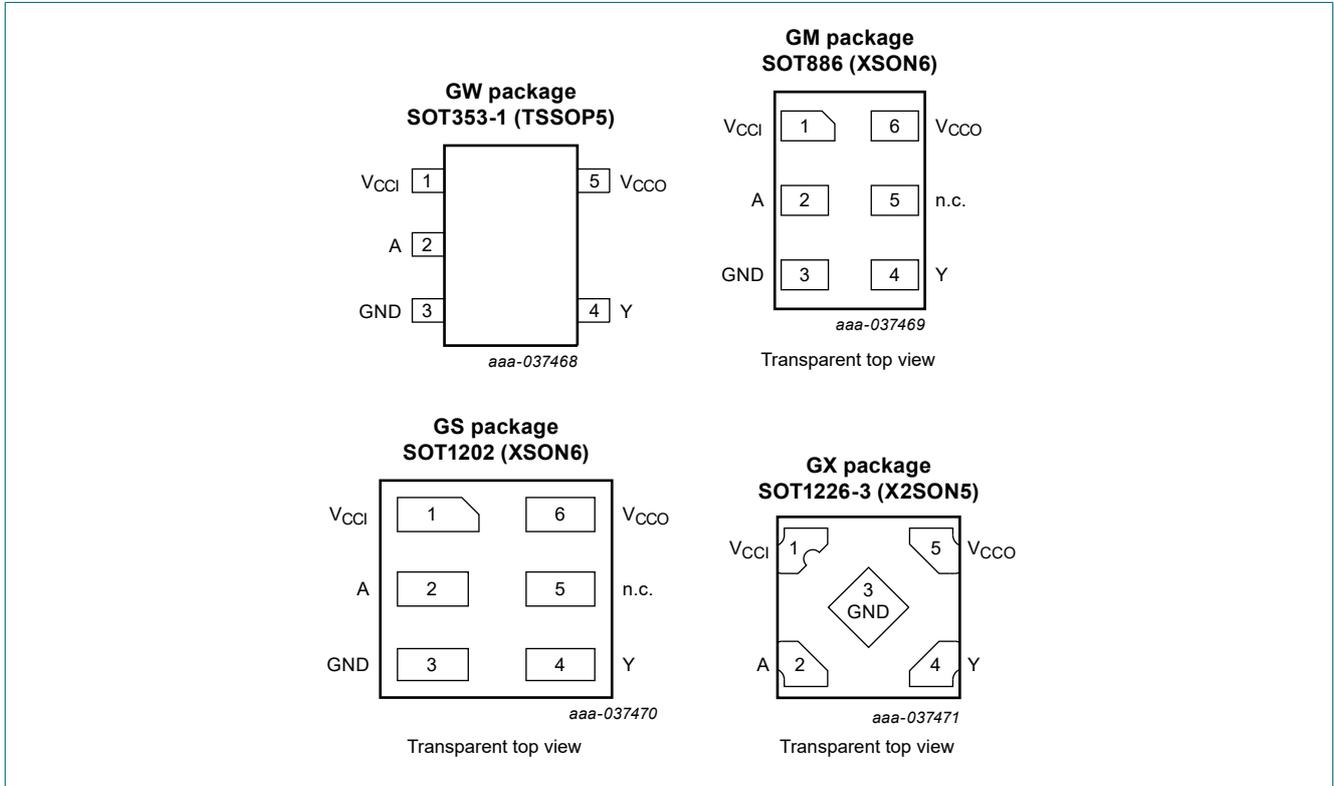


Fig. 2. Logic diagram

## 6. Pinning information

### 6.1. Pinning



### 6.2. Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5 and X2SON5	XSON6	
V <sub>CCI</sub>	1	1	input supply voltage
A	2	2	data input A
GND	3	3	ground (0 V)
Y	4	4	data output Y
n.c.	-	5	not connected
V <sub>CCO</sub>	5	6	output supply voltage

## 7. Functional description

**Table 4. Function table**

*H = HIGH voltage level; L = LOW voltage level.*

Supply voltage		Input	Output
V <sub>CCI</sub>	V <sub>CCO</sub>	A	Y
0.9 V to 5.5 V	0.9 V to 5.5 V	L	L
0.9 V to 5.5 V	0.9 V to 5.5 V	H	H
GND[1]	0.9 V to 5.5 V	X	Z
0.9 V to 5.5 V	GND[1]	X	Z
GND[1]	GND[1]	X	Z

[1] If V<sub>CCI</sub> or V<sub>CCO</sub> is at GND level, the device goes into suspend mode.

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CCI</sub>	input supply voltage		-0.5	+6.5	V
V <sub>CCO</sub>	output supply voltage		-0.5	+6.5	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	50	-	mA
V <sub>I</sub>	input voltage		-0.5	+6.5	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode	-0.5	V <sub>CCO</sub> + 0.5	V
		Suspend or 3-state mode	-0.5	+6.5	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CCO</sub>	-	±25	mA
I <sub>CC</sub>	supply current	I <sub>CCI</sub> or I <sub>CCO</sub> ; per V <sub>CC</sub> pin	-	50	mA
I <sub>GND</sub>	ground current		-50	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C	-	250	mW

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] V<sub>CCO</sub> + 0.5 V should not exceed 6.5 V.

[3] For SOT353-1 (TSSOP5) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.

For SOT886 (XSON6) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.

For SOT1202 (XSON6) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package: P<sub>tot</sub> derates linearly with 3.0 mW/K above 67 °C.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

*Voltages are referenced to GND (ground = 0 V).*

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CCI}$	input supply voltage		0.9	5.5	V
$V_{CCO}$	output supply voltage		0.9	5.5	V
$V_I$	input voltage		0	5.5	V
$V_O$	output voltage	Active mode [1]	0	$V_{CCO}$	V
		Power-down or 3-state mode	0	5.5	V
$T_{amb}$	ambient temperature		-40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CCI} = 0.9\text{ V}$ [2]	-	20	ns/V
		$V_{CCI} = 1.1\text{ V to }1.3\text{ V}$	-	20	ns/V
		$V_{CCI} = 1.4\text{ V to }1.95\text{ V}$	-	20	ns/V
		$V_{CCI} = 2.3\text{ V to }2.7\text{ V}$	-	20	ns/V
		$V_{CCI} = 3.0\text{ V to }3.6\text{ V}$	-	10	ns/V
		$V_{CCI} = 4.5\text{ V to }5.5\text{ V}$	-	8	ns/V

[1]  $V_{CCO}$  is the supply voltage associated with the output port.

[2]  $V_{CCI}$  is the supply voltage associated with the input port.

## 10. Static characteristics

**Table 7. Static characteristics**

At recommended operating conditions, unless otherwise specified; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +85 °C		T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CCI</sub> = 0.9 V	0.7V <sub>CCI</sub>	-	-	0.7V <sub>CCI</sub>	-	0.7V <sub>CCI</sub>	-	V
		V <sub>CCI</sub> = 1.1 V to 1.95 V	0.65V <sub>CCI</sub>	-	-	0.65V <sub>CCI</sub>	-	0.65V <sub>CCI</sub>	-	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	1.6	-	-	1.6	-	1.6	-	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	2	-	-	2	-	2	-	V
		V <sub>CCI</sub> = 4.5 V to 5.5 V	0.7V <sub>CCI</sub>	-	-	0.7V <sub>CCI</sub>	-	0.7V <sub>CCI</sub>	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CCI</sub> = 0.9 V	-	-	0.3V <sub>CCI</sub>	-	0.3V <sub>CCI</sub>	-	0.3V <sub>CCI</sub>	V
		V <sub>CCI</sub> = 1.1 V to 1.95 V	-	-	0.35V <sub>CCI</sub>	-	0.35V <sub>CCI</sub>	-	0.35V <sub>CCI</sub>	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	-	0.7	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	-	-	0.8	-	0.8	-	0.8	V
		V <sub>CCI</sub> = 4.5 V to 5.5 V	-	-	0.3V <sub>CCI</sub>	-	0.3V <sub>CCI</sub>	-	0.3V <sub>CCI</sub>	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> ;								
		I <sub>O</sub> = -0.1 mA; V <sub>CCO</sub> = 0.9 V to 5.5 V	[1] V <sub>CCO</sub> -0.1	0.9	-	V <sub>CCO</sub> -0.1	-	V <sub>CCO</sub> -0.1	-	V
		I <sub>O</sub> = -1.5 mA; V <sub>CCO</sub> = 1.1 V	0.825	-	-	0.825	-	0.825	-	V
		I <sub>O</sub> = -3 mA; V <sub>CCO</sub> = 1.4 V	1.05	-	-	1.05	-	1.05	-	V
		I <sub>O</sub> = -4.5 mA; V <sub>CCO</sub> = 1.65 V	1.2	-	-	1.2	-	1.2	-	V
		I <sub>O</sub> = -8 mA; V <sub>CCO</sub> = 2.3 V	1.7	-	-	1.7	-	1.7	-	V
		I <sub>O</sub> = -10 mA; V <sub>CCO</sub> = 3.0 V	2.2	-	-	2.2	-	2.2	-	V
I <sub>O</sub> = -12 mA; V <sub>CCO</sub> = 4.5 V	3.7	-	-	3.7	-	3.7	-	V		

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +85 °C		T <sub>amb</sub> = -40 °C to +125 °C		Unit	
			Min	Typ	Max	Min	Max	Min	Max		
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IL</sub> ;									
		I <sub>O</sub> = 0.1 mA; V <sub>CCO</sub> = 0.9 V to 5.5 V	[1]	0	0.1	-	0.1	-	0.1	V	
		I <sub>O</sub> = 1.5 mA; V <sub>CCO</sub> = 1.1 V		-	-	0.275	-	0.275	-	0.275	V
		I <sub>O</sub> = 3 mA; V <sub>CCO</sub> = 1.4 V		-	-	0.35	-	0.35	-	0.35	V
		I <sub>O</sub> = 4.5 mA; V <sub>CCO</sub> = 1.65 V		-	-	0.45	-	0.7	-	0.7	V
		I <sub>O</sub> = 8 mA; V <sub>CCO</sub> = 2.3 V		-	-	0.7	-	0.8	-	0.8	V
		I <sub>O</sub> = 10 mA; V <sub>CCO</sub> = 3.0 V		-	-	0.8	-	0.8	-	0.8	V
		I <sub>O</sub> = 12 mA; V <sub>CCO</sub> = 4.5 V		-	-	0.8	-	0.8	-	0.8	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = 0 V to 5.5 V; V <sub>CCI</sub> = 0.9 V to 5.5 V	-	-	±0.1	-	±0.5	-	±1	µA	
I <sub>OZ</sub>	OFF-state output current	Y output; V <sub>O</sub> = 0 V or 5.5 V; V <sub>CCO</sub> = 0.9 V to 5.5 V	-	-	±0.1	-	±0.5	-	±2	µA	
		suspend mode Y output; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CCI</sub> = 5.5 V; V <sub>CCO</sub> = 0 V	-	-	±0.1	-	±0.5	-	±2	µA	
		suspend mode Y output; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CCI</sub> = 0 V; V <sub>CCO</sub> = 5.5 V	-	-	±0.1	-	±0.5	-	±2	µA	
I <sub>OFF</sub>	power-off leakage current	A input; V <sub>I</sub> = 0 V to 5.5 V; V <sub>CCI</sub> = 0 V; V <sub>CCO</sub> = 0.9 V to 5.5 V	-	-	±0.1	-	±0.5	-	±2	µA	
		Y output; V <sub>I</sub> or V <sub>O</sub> = 0 V to 5.5 V; V <sub>CCI</sub> = 0.9 V to 5.5 V; V <sub>CCO</sub> = 0 V	-	-	±0.1	-	±0.5	-	±2	µA	
ΔI <sub>OFF</sub>	additional power-off leakage current	A input; V <sub>I</sub> = 0 V to 5.5 V; V <sub>CCI</sub> = 0 V to 0.1 V; V <sub>CCO</sub> = 0.9 V to 5.5 V	-	-	±0.1	-	±0.5	-	±2	µA	
		Y output; V <sub>I</sub> or V <sub>O</sub> = 0 V to 5.5 V; V <sub>CCI</sub> = 0.9 V to 5.5 V; V <sub>CCO</sub> = 0 V to 0.1 V	-	-	±0.1	-	±0.5	-	±2	µA	

[1] Typical values for V<sub>OL</sub> and V<sub>OH</sub> are measured at V<sub>CCO</sub> = 0.9 V

**Table 8. Static characteristics supply current**

At recommended operating conditions, unless otherwise specified; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C		T <sub>amb</sub> = -40 °C to +85 °C		T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Typ	Max	Min	Max	Min	Max	
I <sub>CCI</sub>	input supply current	V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; see <a href="#">Table 8</a>							
		V <sub>CCI</sub> , V <sub>CCO</sub> = 0.9 V to 5.5 V <a href="#">[1]</a>	0.01	0.1	-	0.5	-	1	μA
		V <sub>CCI</sub> = 5.5 V; V <sub>CCO</sub> = 0 V	0.01	0.1	-	0.2	-	1	μA
		V <sub>CCI</sub> = 0 V; V <sub>CCO</sub> = 5.5 V	0.01	0.1	-	0.1	-	0.5	μA
I <sub>CCO</sub>	output supply current	V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; I <sub>O</sub> = 0 A; see <a href="#">Table 10</a>							
		V <sub>CCI</sub> , V <sub>CCO</sub> = 0.9 V to 5.5 V <a href="#">[1]</a>	0.125	1	-	1.2	-	1.5	μA
		V <sub>CCI</sub> = 5.5 V; V <sub>CCO</sub> = 0 V	0.01	0.1	-	0.2	-	0.5	μA
		V <sub>CCI</sub> = 0 V; V <sub>CCO</sub> = 5.5 V	0.01	0.6	-	0.8	-	1	μA
ΔI <sub>CCI</sub>	additional input supply current	V <sub>I</sub> = V <sub>CCI</sub> - 0.6 V; I <sub>O</sub> = 0 A							μA
		V <sub>CCI</sub> , V <sub>CCO</sub> = 4.5 V to 5.5 V <a href="#">[2]</a>	2	100	-	150	-	200	μA

[1] Typical values are measured at V<sub>CCI</sub> = V<sub>CCO</sub> = 1.2 V

[2] Typical values for ΔI<sub>CC</sub> are measured at V<sub>CCI</sub>, V<sub>CCO</sub> = 5 V

**Table 9. Typical input supply current ( $I_{CCI}$ ) at  $T_{amb} = 25\text{ °C}$** *Voltages are referenced to GND (ground = 0 V).*

$V_{CCI}$	$V_{CCO}$								Unit
	0 V	0.9 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V	
0 V	10	10	10	10	10	10	10	10	nA
0.9 V	10	10	10	10	10	10	10	10	nA
1.2 V	10	10	10	10	10	10	10	10	nA
1.5 V	10	10	10	10	10	10	10	10	nA
1.8 V	10	10	10	10	10	10	10	10	nA
2.5 V	10	10	10	10	10	10	10	10	nA
3.3 V	10	10	10	10	10	10	10	10	nA
5 V	10	10	10	10	10	10	10	10	nA

**Table 10. Typical output supply current ( $I_{CCO}$ ) at  $T_{amb} = 25\text{ °C}$** *Voltages are referenced to GND (ground = 0 V).*

$V_{CCI}$	$V_{CCO}$								Unit
	0 V	0.9 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V	
0 V	10	10	10	10	10	10	10	10	nA
0.9 V	10	85	125	150	170	240	320	500	nA
1.2 V	10	85	125	150	170	240	320	500	nA
1.5 V	10	85	125	150	170	240	320	500	nA
1.8 V	10	85	125	150	170	240	320	500	nA
2.5 V	10	85	125	150	170	240	320	500	nA
3.3 V	10	85	125	150	170	240	320	500	nA
5 V	15	85	125	150	170	240	320	500	nA

## 11. Dynamic characteristics

**Table 11. Typical dynamic characteristics at  $V_{CCI} = 0.9\text{ V}$  and  $T_{amb} = 25\text{ °C}$**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Fig. 4](#); for waveforms see [Fig. 3](#).

Symbol	Parameter	Conditions	$V_{CCO}$							Unit
			0.9 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V	
$t_{pd}$	propagation delay	A to Y [1]	40	22	18.5	16.5	15	15	15	ns

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

**Table 12. Typical dynamic characteristics at  $V_{CCO} = 0.9\text{ V}$  and  $T_{amb} = 25\text{ °C}$**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Fig. 4](#); for waveforms see [Fig. 3](#).

Symbol	Parameter	Conditions	$V_{CCI}$							Unit
			0.9 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V	
$t_{pd}$	propagation delay	A to Y [1]	40	33	32	31	31	31	32	ns

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

Table 13. Typical dynamic characteristics at  $T_{amb} = 25\text{ °C}$ 

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 4; for waveform see Fig. 3.

Symbol	Parameter	Conditions	$V_{CCO}$						Unit		
			0.9 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V		5.0 V	
$C_{PD}$	power dissipation capacitance	$f_i = 1\text{ MHz}$ ; $V_I = \text{GND to } V_{CCI}$ ; $t_r = t_f = 1\text{ ns}$ ; $C_L = 0\text{ pF}$ ; $R_L = \infty\ \Omega$ [1]									
		input supply [2]									
	$V_{CCI} = 0.9\text{ V}$	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	pF	
	$V_{CCI} = 1.2\text{ V}$	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	pF	
	$V_{CCI} = 1.5\text{ V}$	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	pF	
	$V_{CCI} = 1.8\text{ V}$	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	pF	
	$V_{CCI} = 2.5\text{ V}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	pF	
	$V_{CCI} = 3.3\text{ V}$	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	pF	
	$V_{CCI} = 5.0\text{ V}$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	pF	
	output supply [3]										
	$V_{CCO} = 0.9\text{ V}$	9.4	9.4	9.4	9.5	9.7	10.3	12	pF		
	$V_{CCO} = 1.2\text{ V}$	9.4	9.4	9.5	9.5	9.6	9.9	10.7	pF		
	$V_{CCO} = 1.5\text{ V}$	9.4	9.4	9.5	9.5	9.7	9.9	10.4	pF		
	$V_{CCO} = 1.8\text{ V}$	9.4	9.4	9.5	9.6	9.7	9.9	10.4	pF		
	$V_{CCO} = 2.5\text{ V}$	9.5	9.5	9.6	9.6	9.8	10	10.4	pF		
$V_{CCO} = 3.3\text{ V}$	9.7	9.7	9.7	9.7	9.9	10.1	10.5	pF			
$V_{CCO} = 5.0\text{ V}$	10.1	10.1	10.1	10.2	10.3	10.4	10.8	pF			
$C_I$	input capacitance	$V_I = 0\text{ V or } V_{CCI}$ ; $V_{CCI} = 0\text{ V to } 5.5\text{ V}$	1.5	1.5	1.5	1.5	1.5	1.5	1.5	pF	
$C_O$	output capacitance	$V_O = 0\text{ V}$ ; $V_{CCO} = 0\text{ V}$	3.8						pF		

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).[2] Power dissipated from input supply ( $V_{CCI}$ )

$$P_D = C_{PD} \times V_{CCI}^2 \times f_i \times N \text{ where:}$$

 $C_{PD}$  = power dissipation capacitance of the input supply. $V_{CCI}$  = input supply voltage in V; $f_i$  = input frequency in MHz; $N$  = number of inputs switching;[3] Power dissipated from output supply ( $V_{CCO}$ )

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

 $C_L$  = load capacitance in pF; $C_{PD}$  = power dissipation capacitance of the output supply. $V_{CCO}$  = output supply voltage in V; $f_o$  = output frequency in MHz;

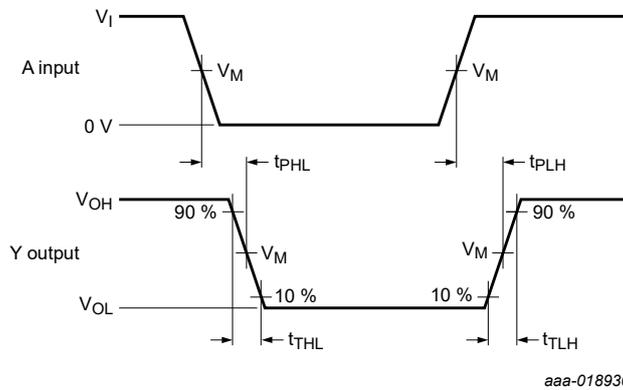
Table 14. Dynamic characteristics for temperature range -40 °C to +85 °C and -40 °C to +125 °C

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 4; for waveforms see Fig. 3.

Symbol	Parameter	Conditions	V <sub>CCO</sub>												Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		5.0 V ± 0.5 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>															
t <sub>pd</sub>	propagation delay	A to Y [1]													
		V <sub>CCI</sub> = 1.2 V ± 0.1 V	4.0	38	3.6	25	3.4	21	3.1	16	2.9	14.5	2.7	14.5	ns
		V <sub>CCI</sub> = 1.5 V ± 0.1 V	3.5	33	3.0	21	2.8	16.5	2.6	12.5	2.4	10.5	2.2	9.8	ns
		V <sub>CCI</sub> = 1.8 V ± 0.15 V	3.1	32	2.7	19	2.4	15	2.2	11	2.1	9.0	1.9	8.2	ns
		V <sub>CCI</sub> = 2.5 V ± 0.2 V	2.8	31	2.4	17.5	2.1	13.5	1.9	9.1	1.7	7.5	1.6	6.6	ns
		V <sub>CCI</sub> = 3.3 V ± 0.3 V	2.7	31	2.3	17	2.0	13	1.8	8.5	1.6	6.9	1.4	5.8	ns
		V <sub>CCI</sub> = 5.0 V ± 0.5 V	2.7	31	2.2	16.5	1.9	12.5	1.6	8.1	1.4	6.4	1.2	5.0	ns
t <sub>t</sub>	transition time	Y output													
		V <sub>CCI</sub> = 1.1 V to 5.5 V	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	ns
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>															
t <sub>pd</sub>	propagation delay	A to Y [1]													
		V <sub>CCI</sub> = 1.2 V ± 0.1 V	4.0	38	3.6	26	3.4	22	3.1	17	2.9	15	2.7	15	ns
		V <sub>CCI</sub> = 1.5 V ± 0.1 V	3.5	33	3.0	22	2.8	17.5	2.6	13.5	2.4	11.5	2.2	10.5	ns
		V <sub>CCI</sub> = 1.8 V ± 0.15 V	3.1	32	2.7	20	2.4	16	2.2	12	2.1	9.7	1.9	9.4	ns
		V <sub>CCI</sub> = 2.5 V ± 0.2 V	2.8	31	2.4	18.5	2.1	14.5	1.9	9.8	1.7	8.1	1.6	7.1	ns
		V <sub>CCI</sub> = 3.3 V ± 0.3 V	2.7	31	2.3	18	2.0	14	1.8	9.2	1.6	7.5	1.4	6.3	ns
		V <sub>CCI</sub> = 5.0 V ± 0.5 V	2.7	31	2.2	17.5	1.9	13.5	1.6	8.8	1.4	6.9	1.2	5.5	ns
t <sub>t</sub>	transition time	Y output													
		V <sub>CCI</sub> = 1.1 V to 5.5 V	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	ns

[1] t<sub>pd</sub> is the same as t<sub>pLH</sub> and t<sub>pHL</sub>.

11.1. Waveform, graphs and test circuit

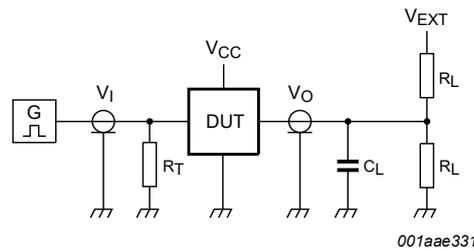
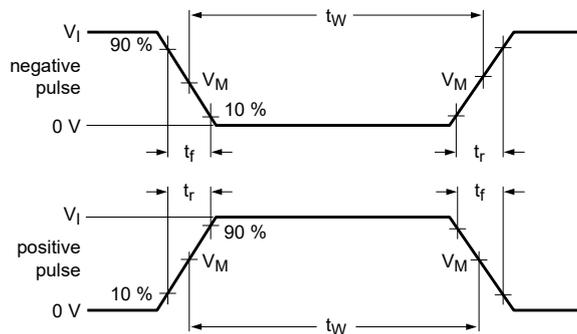


Measurement points are given in [Table 15](#).  
 $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

Fig. 3. Input A to output Y propagation delay times and output transition times

Table 15. Measurement points

Supply voltage		Output	Input	
$V_{CCI}$	$V_{CCO}$	$V_M$	$V_M$	$V_I$
0.9 V to 5.5 V	0.9 V to 5.5 V	$0.5 \times V_{CCO}$	$0.5 \times V_{CCI}$	$V_{CCI}$



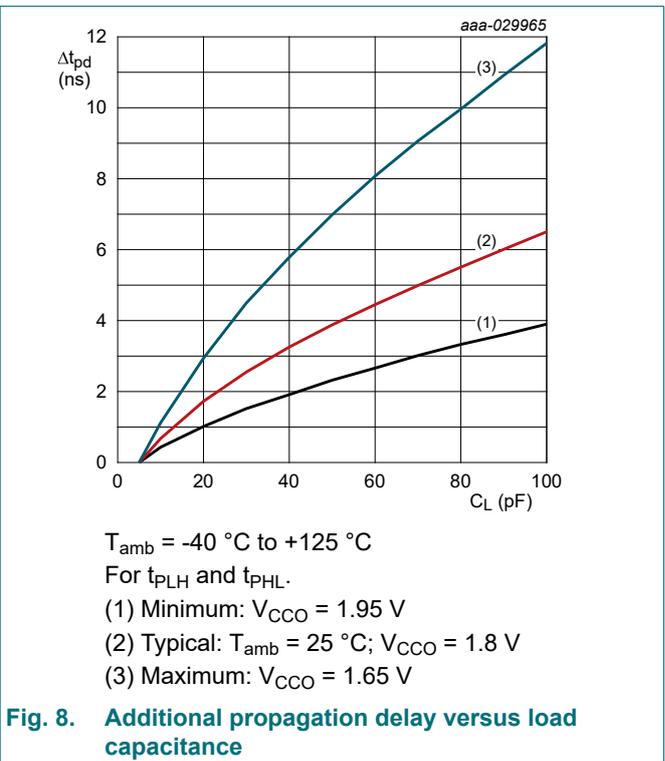
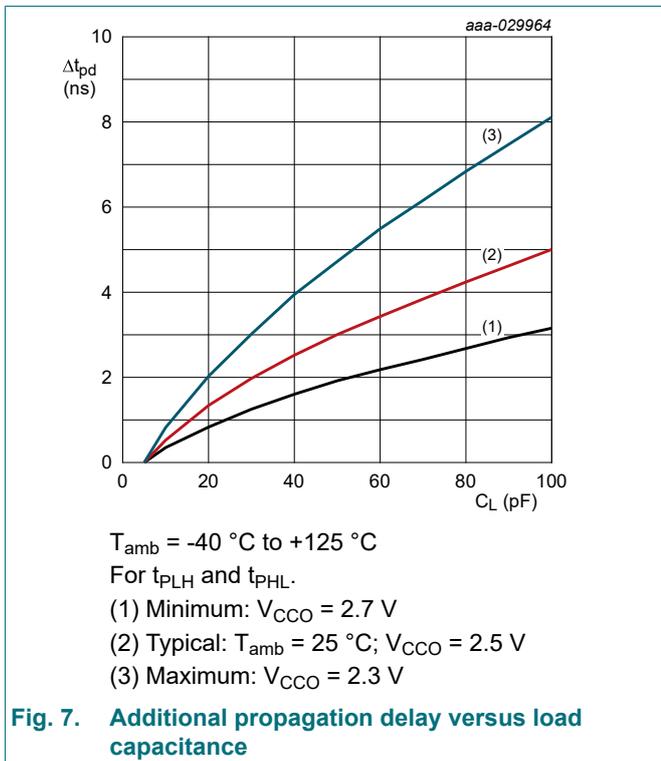
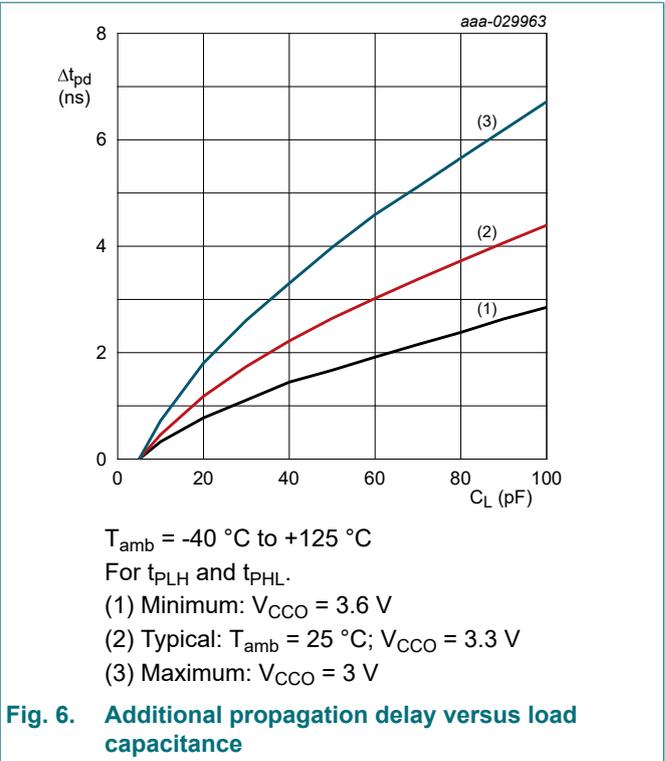
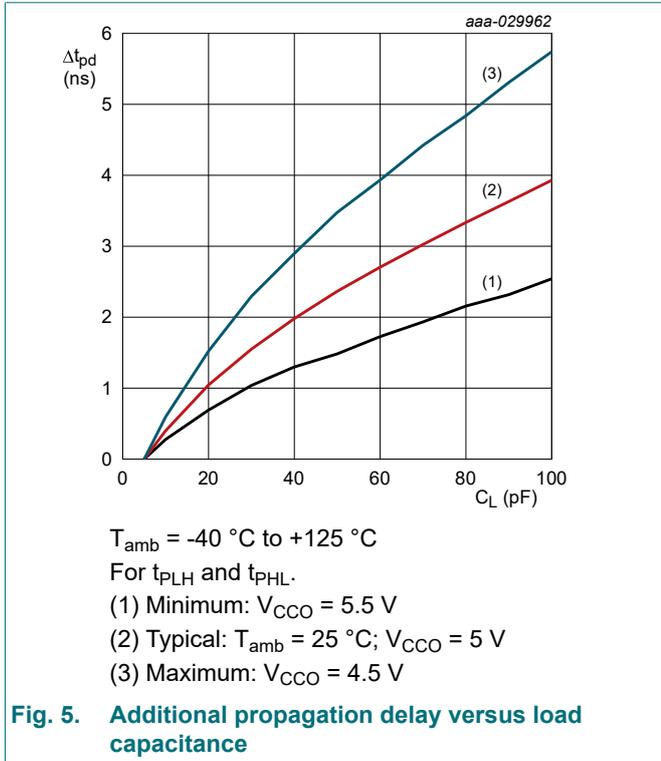
Test data is given in [Table 16](#).  
 $R_L$  = Load resistance;  
 $C_L$  = Load capacitance including jig and probe capacitance;  
 $R_T$  = Termination resistance;  
 $V_{EXT}$  = External voltage for measuring switching times.

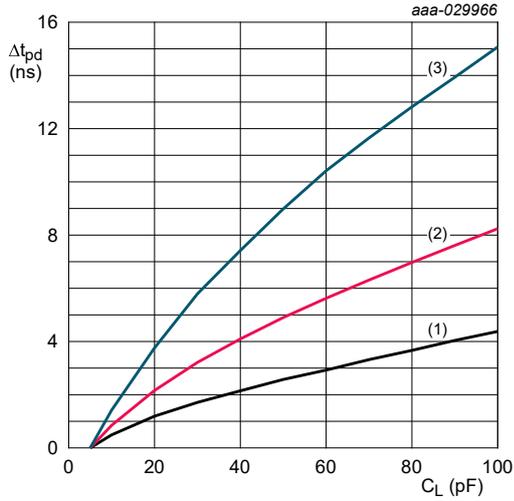
Fig. 4. Test circuit for measuring switching times

Table 16. Test data

Supply voltage	Load		Input	$V_{EXT}$
$V_{CCI}, V_{CCO}$	$C_L$	$R_L$	$t_r, t_f$	$t_{PLH}, t_{PHL}$
0.9 V to 5.5 V	5 pF	10 k $\Omega$	$\leq 3.0$ ns	$V_{CCI}$ GND

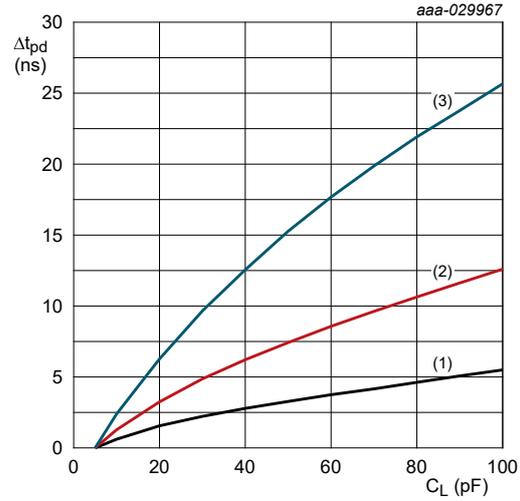
[1]  $V_{CCI}$  is the supply voltage associated with the control input or input port.





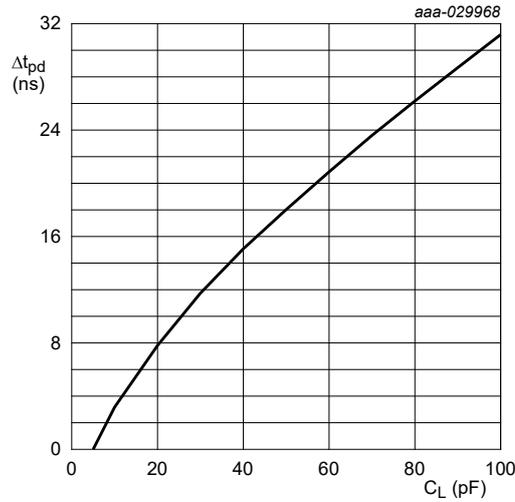
$T_{amb} = -40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$   
 For  $t_{PLH}$  and  $t_{PHL}$ .  
 (1) Minimum:  $V_{CCO} = 1.6\text{ V}$   
 (2) Typical:  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{CCO} = 1.5\text{ V}$   
 (3) Maximum:  $V_{CCO} = 1.4\text{ V}$

**Fig. 9. Additional propagation delay versus load capacitance**



$T_{amb} = -40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$   
 For  $t_{PLH}$  and  $t_{PHL}$ .  
 (1) Minimum:  $V_{CCO} = 1.3\text{ V}$   
 (2) Typical:  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{CCO} = 1.2\text{ V}$   
 (3) Maximum:  $V_{CCO} = 1.1\text{ V}$

**Fig. 10. Additional propagation delay versus load capacitance**



$T_{amb} = 25\text{ }^{\circ}\text{C}$   
 For  $t_{PLH}$ ,  $t_{PHL}$   
 $V_{CCO} = 0.9\text{ V}$

**Fig. 11. Additional propagation delay versus load capacitance**

## 12. Package outline

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

SOT353-1

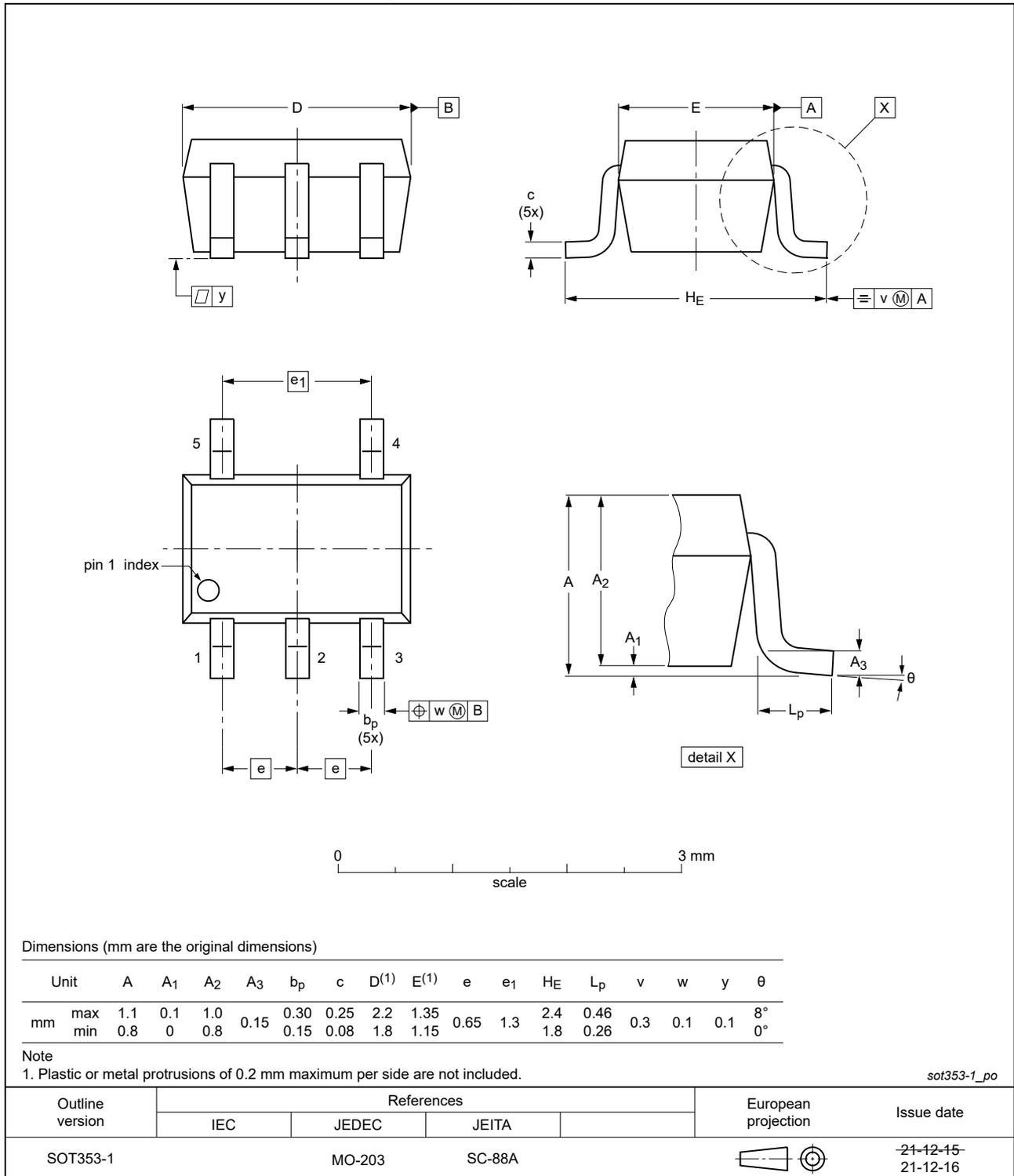


Fig. 12. Package outline SOT353-1 (TSSOP5)

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

SOT886

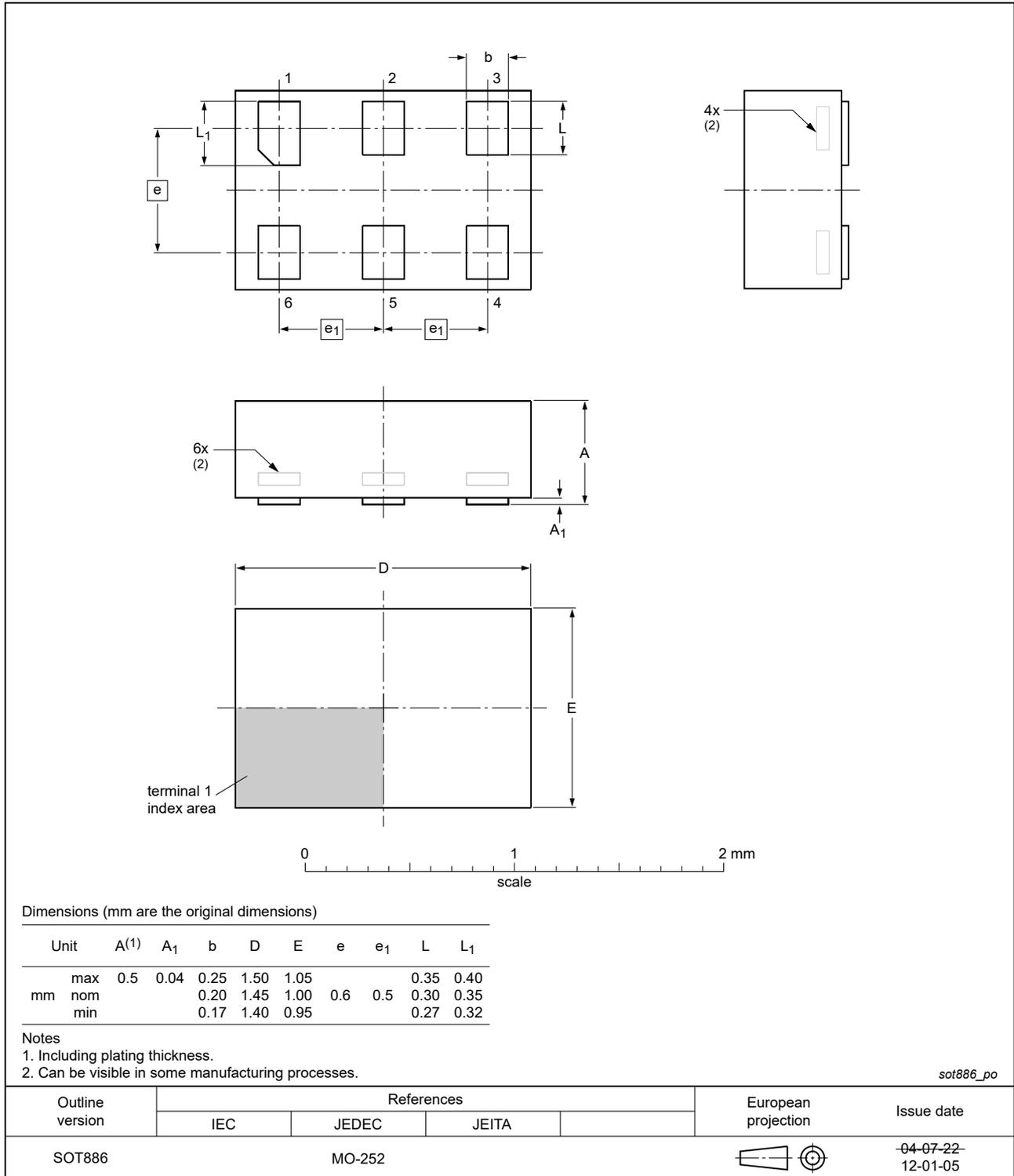


Fig. 13. Package outline SOT886 (XSON6)

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

SOT1202

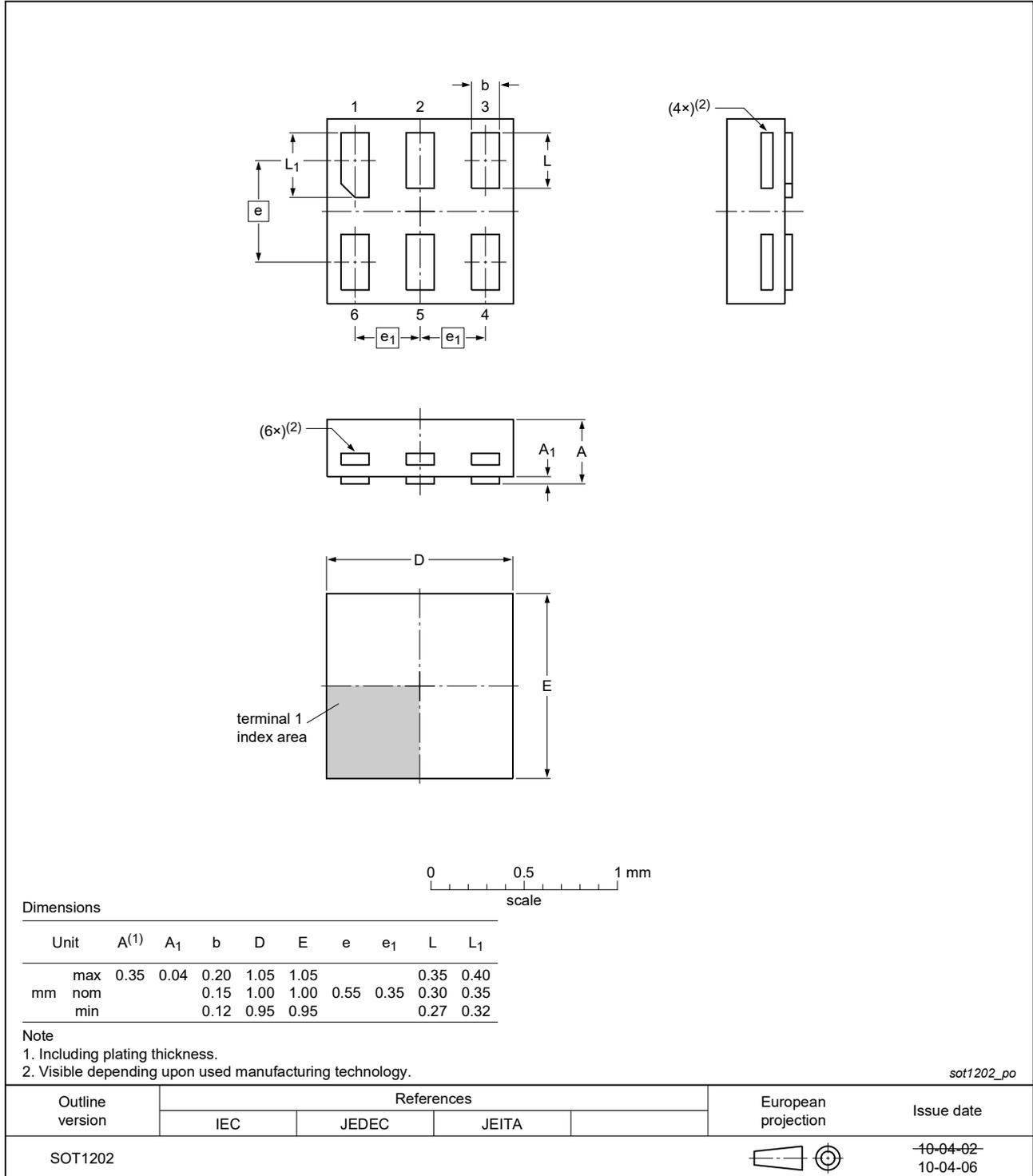


Fig. 14. Package outline SOT1202 (XSON6)

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

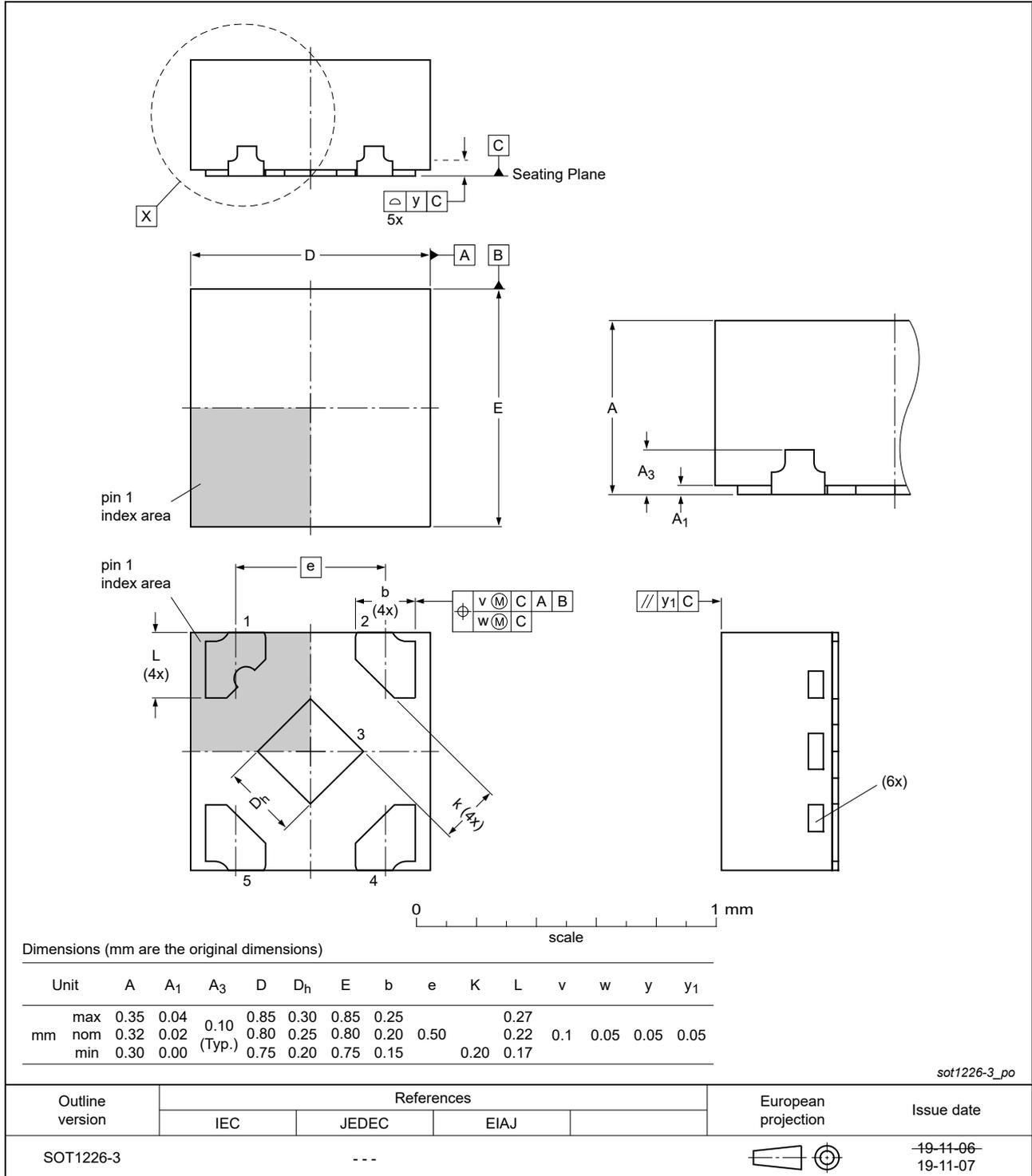


Fig. 15. Package outline SOT1226-3 (X2SON5)

## 13. Abbreviations

Table 17. Abbreviations

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

## 14. Revision history

Table 18. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
AXP1T34 v.1	20231201	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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