

# 74AXP1T14

## Dual supply Schmitt trigger inverter

Rev. 2 — 9 May 2017

Product data sheet

## 1 General description

The 74AXP1T14 is a dual supply Schmitt trigger inverter. It features one input (A), an output (Y) and dual supply pins ( $V_{CCI}$  and  $V_{CCO}$ ). The input is referenced to  $V_{CCI}$  and the output is referenced to  $V_{CCO}$ . Input A can be connected directly to  $V_{CCI}$  or GND.  $V_{CCI}$  can be supplied at any voltage between 0.7 V and 2.75 V and  $V_{CCO}$  can be supplied at any voltage between 1.2 V and 5.5 V. This feature allows voltage level translation.

This device ensures very 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.

## 2 Features and benefits

- Wide supply voltage range:
  - $V_{CCI}$ : 0.7 V to 2.75 V
  - $V_{CCO}$ : 1.2 V to 5.5 V
- Low input capacitance;  $C_I = 0.6$  pF (typical)
- Low output capacitance;  $C_O = 1.8$  pF (typical)
- Low dynamic power consumption;  $C_{PD} = 0.5$  pF at  $V_{CCI} = 1.2$  V (typical)
- Low dynamic power consumption;  $C_{PD} = 7.1$  pF at  $V_{CCO} = 3.3$  V (typical)
- Low static power consumption;  $I_{CCI} = 0.5$   $\mu$ A (85 °C maximum)
- Low static power consumption;  $I_{CCO} = 1.8$   $\mu$ A (85 °C maximum)
- High noise immunity
- Complies with JEDEC standard:
  - JESD8-12A.01 (1.1 V to 1.3 V; A input)
  - JESD8-11A.01 (1.4 V to 1.6 V)
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A.01 (2.3 V to 2.7 V)
  - JESD8-C (2.7 V to 3.6 V; Y output)
  - JESD12-6 (4.5 V to 5.5 V; Y output)
- ESD protection:
  - HBM ANSI/ESDA/JEDEC JS-001 Class 2 exceeds 2 kV
  - CDM JESD22-C101E exceeds 1000 V
- Latch-up performance exceeds 100 mA per JESD78D Class II
- Inputs accept voltages up to 2.75 V
- Low noise overshoot and undershoot < 10% of  $V_{CCO}$
- $I_{OFF}$  circuitry provides partial power-down mode operation
- Specified from -40 °C to +85 °C

### 3 Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AXP1T14GW	-40 °C to +85 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AXP1T14GX	-40 °C to +85 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm	SOT1226

### 4 Marking

Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AXP1T14GW	rL
74AXP1T14GX	rL

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

### 5 Functional diagram

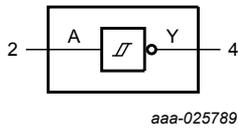


Figure 1. Logic symbol

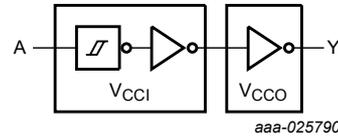


Figure 2. Logic diagram

### 6 Pinning information

#### 6.1 Pinning

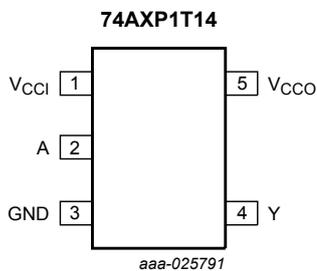


Figure 3. Pin configuration SOT353-1 (TSSOP5)

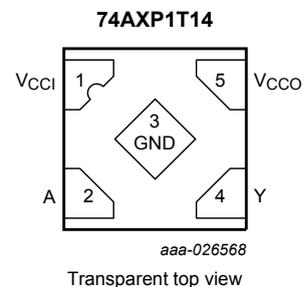


Figure 4. Pin configuration SOT1226 (X2SON5)

## 6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
V <sub>CCI</sub>	1	input supply voltage
A	2	data input A
GND	3	ground (0 V)
Y	4	data output Y
V <sub>CCO</sub>	5	output supply voltage

## 7 Functional description

Table 4. Function table <sup>[1]</sup>

Supply voltage		Input	Output
V <sub>CCI</sub>	V <sub>CCO</sub>	A	Y
0.7 V to 2.75 V	1.2 V to 5.5 V	L	H
0.7 V to 2.75 V	1.2 V to 5.5 V	H	L
GND	1.2 V to 5.5 V	X	Z
0.7 V to 2.75 V	GND	X	Z
GND	GND	X	Z

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

## 8 Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CCI</sub>	input supply voltage		-0.5	3.3	V
V <sub>CCO</sub>	output supply voltage		-0.5	6.0	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage		-0.5	3.3	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode <sup>[1] [2]</sup>	-0.5	V <sub>CCO</sub> + 0.5	V
		Power-down or 3-state mode <sup>[1]</sup>	-0.5	6.0	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CCO</sub>	-	±25	mA
I <sub>CCI</sub>	input supply current		-	50	mA
I <sub>CCO</sub>	output supply current		-	50	mA
I <sub>GND</sub>	ground current		-50	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C

Symbol	Parameter	Conditions	Min	Max	Unit
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} = -40\text{ °C to }+85\text{ °C}$	-	250	mW

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

[2]  $V_{\text{CCO}} + 0.5\text{ V}$  should not exceed 6.0 V.

## 9 Recommended operating conditions

**Table 6. Recommended operating conditions**

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{\text{CCI}}$	input supply voltage		0.7	2.75	V
$V_{\text{CCO}}$	output supply voltage		1.2	5.5	V
$V_{\text{I}}$	input voltage		0	2.75	V
$V_{\text{O}}$	output voltage	Active mode	0	$V_{\text{CCO}}$	V
		Power-down or 3-state mode	0	5.5	V
$T_{\text{amb}}$	ambient temperature		-40	+85	°C

## 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	$T_{\text{amb}} = -40\text{ °C to }+85\text{ °C}$				Unit
			Min	Typ 25 °C	Max 25 °C	Max 85 °C	
$V_{\text{T+}}$	positive-going threshold voltage	see <a href="#">Figure 5</a> and <a href="#">Figure 6</a>					
		$V_{\text{CCI}} = 0.75\text{ V to }0.85\text{ V}$	$0.3V_{\text{CCI}}$	-	$0.8V_{\text{CCI}}$	$0.8V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 1.1\text{ V to }1.95\text{ V}$	$0.4V_{\text{CCI}}$	-	$0.7V_{\text{CCI}}$	$0.7V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 2.3\text{ V to }2.7\text{ V}$	0.9	-	1.7	1.7	V
$V_{\text{T-}}$	negative-going threshold voltage	see <a href="#">Figure 5</a> and <a href="#">Figure 6</a>					
		$V_{\text{CCI}} = 0.75\text{ V to }0.85\text{ V}$	$0.2V_{\text{CCI}}$	-	$0.7V_{\text{CCI}}$	$0.7V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 1.1\text{ V to }1.95\text{ V}$	$0.3V_{\text{CCI}}$	-	$0.6V_{\text{CCI}}$	$0.6V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 2.3\text{ V to }2.7\text{ V}$	0.7	-	1.5	1.5	V
$V_{\text{H}}$	hysteresis voltage	see <a href="#">Figure 5</a> and <a href="#">Figure 6</a>					
		$V_{\text{CCI}} = 0.75\text{ V to }0.85\text{ V}$	$0.06V_{\text{CCI}}$	-	$0.5V_{\text{CCI}}$	$0.5V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 1.1\text{ V to }1.95\text{ V}$	$0.1V_{\text{CCI}}$	-	$0.4V_{\text{CCI}}$	$0.4V_{\text{CCI}}$	V
		$V_{\text{CCI}} = 2.3\text{ V to }2.7\text{ V}$	0.2	-	1.0	1.0	V
$V_{\text{OH}}$	HIGH-level output voltage	$I_{\text{O}} = -2\text{ mA}; V_{\text{CCO}} = 1.2\text{ V}$ [1]	-	1.05	-	-	V
		$I_{\text{O}} = -3\text{ mA}; V_{\text{CCO}} = 1.4\text{ V}$	1.05	-	-	-	V
		$I_{\text{O}} = -4.5\text{ mA}; V_{\text{CCO}} = 1.65\text{ V}$	1.2	-	-	-	V
		$I_{\text{O}} = -8\text{ mA}; V_{\text{CCO}} = 2.3\text{ V}$	1.7	-	-	-	V

Symbol	Parameter	Conditions	$T_{amb} = -40\text{ °C to }+85\text{ °C}$				Unit
			Min	Typ 25 °C	Max 25 °C	Max 85 °C	
		$I_O = -10\text{ mA}; V_{CCO} = 3.0\text{ V}$	2.2	-	-	-	V
		$I_O = -12\text{ mA}; V_{CCO} = 4.5\text{ V}$	3.7	-	-	-	V
$V_{OL}$	LOW-level output voltage	$I_O = 2\text{ mA}; V_{CCO} = 1.2\text{ V}$ [1]	-	0.18	-	-	V
		$I_O = 3\text{ mA}; V_{CCO} = 1.4\text{ V}$	-	-	0.35	0.35	V
		$I_O = 4.5\text{ mA}; V_{CCO} = 1.65\text{ V}$	-	-	0.45	0.45	V
		$I_O = 8\text{ mA}; V_{CCO} = 2.3\text{ V}$	-	-	0.7	0.7	V
		$I_O = 10\text{ mA}; V_{CCO} = 3.0\text{ V}$	-	-	0.8	0.8	V
		$I_O = 12\text{ mA}; V_{CCO} = 4.5\text{ V}$	-	-	0.8	0.8	V
$I_I$	input leakage current	$V_I = 0\text{ V to }2.75\text{ V};$ $V_{CCI} = 0\text{ V to }2.75\text{ V}$ [1]	-	$\pm 0.001$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_O = 0\text{ V to }5.5\text{ V};$ $V_{CCO} = 1.2\text{ V to }5.5\text{ V}$	-	$\pm 0.001$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	inputs; $V_I = 0\text{ V to }2.75\text{ V};$ $V_{CCI} = 0\text{ V};$ $V_{CCO} = 0\text{ V to }5.5\text{ V}$ [1]	-	$\pm 0.01$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$
		output; $V_O = 0\text{ V to }5.5\text{ V};$ $V_{CCO} = 0\text{ V};$ $V_{CCI} = 0\text{ V to }2.75\text{ V};$ $V_I = 0\text{ V to }2.75\text{ V}$ [1]	-	$\pm 0.01$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	inputs; $V_I = 0\text{ V or }2.75\text{ V};$ $V_{CCI} = 0\text{ V to }0.1\text{ V};$ $V_{CCO} = 0\text{ V to }5.5\text{ V}$ [1]	-	$\pm 0.02$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$
		output; $V_O = 0\text{ V or }5.5\text{ V};$ $V_{CCO} = 0\text{ V to }0.1\text{ V};$ $V_{CCI} = 0\text{ V to }2.75\text{ V};$ $V_I = 0\text{ V or }2.75\text{ V}$ [1]	-	$\pm 0.02$	$\pm 0.1$	$\pm 0.5$	$\mu\text{A}$

[1] Typical values are measured at  $V_{CCI} = V_{CCO} = 1.2\text{ V}$  unless otherwise specified.

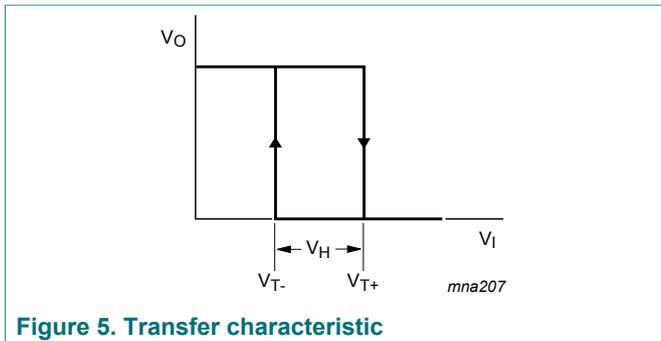


Figure 5. Transfer characteristic

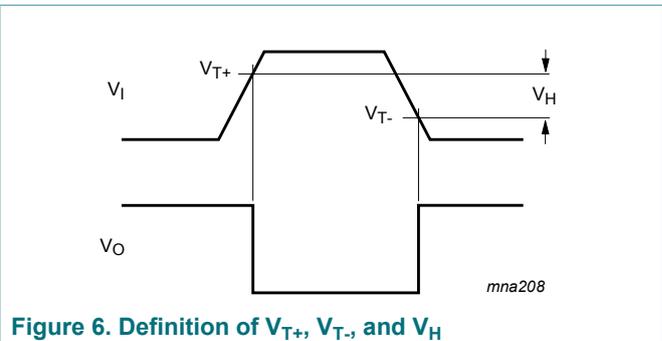


Figure 6. Definition of  $V_{T+}$ ,  $V_{T-}$ , and  $V_H$

**Table 8. Static characteristics supply current**

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

Symbol	Parameter	Conditions	$T_{amb} = -40\text{ °C to }+85\text{ °C}$				Unit
			Typ 25 °C	Max 25 °C	Typ 85 °C	Max 85 °C	
$I_{CCI}$	input supply current	$V_I = 0\text{ V or }V_{CCI}$ ;					
		$V_{CCI} = 0.7\text{ V to }1.3\text{ V}$ <sup>[1]</sup>	1	100	10	300	nA
		$V_{CCI} = 1.3\text{ V to }2.75\text{ V}$ <sup>[2]</sup>	1	100	20	500	nA
		$V_{CCI} = 2.75\text{ V; }V_{CCO} = 0\text{ V}$	1	100	20	500	nA
		$V_{CCI} = 0\text{ V; }V_{CCO} = 5.5\text{ V}$	1	100	1	100	nA
$I_{CCO}$	output supply current	$V_I = 0\text{ V or }V_{CCI}$ ; $I_O = 0\text{ A}$ ; see <a href="#">Table 9</a>					
		$V_{CCO} = 1.2\text{ V to }3.6\text{ V}$ <sup>[1]</sup>	0.001	1.0	0.01	1.2	μA
		$V_{CCO} = 3.6\text{ V to }5.5\text{ V}$ <sup>[3]</sup>	0.8	1.5	1.0	1.8	μA
		$V_{CCI} = 2.75\text{ V; }V_{CCO} = 0\text{ V}$	0.001	0.1	0.003	0.2	μA
		$V_{CCI} = 0\text{ V; }V_{CCO} = 3.6\text{ V}$	0.2	0.6	0.3	0.8	μA
		$V_{CCI} = 0\text{ V; }V_{CCO} = 5.5\text{ V}$	0.4	0.8	0.5	1.0	μA
$\Delta I_{CCI}$	additional input supply current	$V_I = V_{CCI} - 0.5\text{ V; }V_{CCI} = 2.5\text{ V}$	2	100	14	150	μA

[1] Typical values are measured at  $V_{CCI} = V_{CCO} = 1.2\text{ V}$  unless otherwise specified.[2] Typical values are measured at  $V_{CCI} = V_{CCO} = 2.5\text{ V}$ .[3] Typical values are measured at  $V_{CCI} = 1.2\text{ V}$  and  $V_{CCO} = 5.0\text{ V}$ .**Table 9. Typical output supply current ( $I_{CCO}$ )**

$V_{CCI}$	$V_{CCO}$							Unit
	0 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V	
0 V	0	1	5	20	100	200	400	nA
0.8 V	1	10	150	200	300	500	800	nA
1.2 V	1	1	5	200	300	500	800	nA
1.5 V	1	1	5	100	300	500	800	nA
1.8 V	1	1	5	100	300	500	800	nA
2.5 V	1	1	5	100	100	500	800	nA

## 11 Dynamic characteristics

**Table 10. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#) ; for wave form see [Figure 7](#).

Symbol	Parameter	Conditions	$V_{CCO}$						Unit		
			1.2 V	1.5 V $\pm$ 0.1 V		1.8 V $\pm$ 0.15 V					
			Typ <sup>[1]</sup>	Min	Typ <sup>[1]</sup>	Max	Min	Typ <sup>[1]</sup>		Max	
$T_{amb} = 25\text{ }^{\circ}\text{C}$											
$t_{pd}$	propagation delay	A to Y <sup>[2]</sup>									
		$V_{CCI} = 0.75\text{ V to }0.85\text{ V}$	23	3	18	73	3	16	69	ns	
		$V_{CCI} = 1.1\text{ V to }1.3\text{ V}$	16.9	3.1	10.8	20.1	2.8	8.7	16.1	ns	
		$V_{CCI} = 1.4\text{ V to }1.6\text{ V}$	16.0	2.8	9.9	18.5	2.5	7.8	13.5	ns	
		$V_{CCI} = 1.65\text{ V to }1.95\text{ V}$	15.6	2.7	9.5	17.7	2.4	7.3	12.2	ns	
		$V_{CCI} = 2.3\text{ V to }2.7\text{ V}$	15.2	2.5	9.0	17.3	2.2	6.9	11.5	ns	
$T_{amb} = -40\text{ }^{\circ}\text{C to }+85\text{ }^{\circ}\text{C}$											
$t_{pd}$	propagation delay	A to Y <sup>[2]</sup>									
		$V_{CCI} = 0.75\text{ V to }0.85\text{ V}$	23	3	18	148	3	16	145	ns	
		$V_{CCI} = 1.1\text{ V to }1.3\text{ V}$	16.9	3.1	10.8	20.1	2.8	8.7	16.1	ns	
		$V_{CCI} = 1.4\text{ V to }1.6\text{ V}$	16.0	2.8	9.9	18.5	2.5	7.8	13.5	ns	
		$V_{CCI} = 1.65\text{ V to }1.95\text{ V}$	15.6	2.7	9.5	17.7	2.4	7.3	12.2	ns	
		$V_{CCI} = 2.3\text{ V to }2.7\text{ V}$	15.2	2.5	9.0	17.3	2.2	6.9	11.5	ns	
$t_t$	transition time	$V_{CCI} = 0.75\text{ V to }2.7\text{ V}$ <sup>[3]</sup>	-	1.0	-	-	1.0	-	-	ns	

[1] Typical values are measured at nominal supply voltages and  $T_{amb} = +25\text{ }^{\circ}\text{C}$ .

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

[3]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .

Table 11. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#) ; for wave form see [Figure 7](#).

Symbol	Parameter	Conditions	V <sub>CC0</sub>									Unit
			2.5 V ± 0.2 V			3.3 V ± 0.3 V			5.0 V ± 0.5 V			
			Min	Typ [1]	Max	Min	Typ [1]	Max	Min	Typ [1]	Max	
T <sub>amb</sub> = 25 °C												
t <sub>pd</sub>	propagation delay	A to Y [2]										
		V <sub>CCI</sub> = 0.75 V to 0.85 V	2	14	69	2	14	77	2	15	89	ns
		V <sub>CCI</sub> = 1.1 V to 1.3 V	2.4	6.9	11.1	2.2	6.3	9.8	2.1	6.0	9.3	ns
		V <sub>CCI</sub> = 1.4 V to 1.6 V	2.1	6.0	9.4	2.0	5.4	8.5	1.9	5.0	8.0	ns
		V <sub>CCI</sub> = 1.65 V to 1.95 V	2.0	5.6	9.0	1.8	4.9	8.0	1.8	4.6	7.6	ns
		V <sub>CCI</sub> = 2.3 V to 2.7 V	1.9	5.1	8.5	1.7	4.5	7.5	1.6	4.1	7.0	ns
T <sub>amb</sub> = -40 °C to +85 °C												
t <sub>pd</sub>	propagation delay	A to Y [2]										
		V <sub>CCI</sub> = 0.75 V to 0.85 V	2	14	164	2	14	191	2	15	222	ns
		V <sub>CCI</sub> = 1.1 V to 1.3 V	2.4	6.9	11.1	2.2	6.3	9.8	2.1	6.0	9.3	ns
		V <sub>CCI</sub> = 1.4 V to 1.6 V	2.1	6.0	9.4	2.0	5.4	8.5	1.9	5.0	8.0	ns
		V <sub>CCI</sub> = 1.65 V to 1.95 V	2.0	5.6	9.0	1.8	4.9	8.0	1.8	4.6	7.6	ns
		V <sub>CCI</sub> = 2.3 V to 2.7 V	1.9	5.1	8.5	1.7	4.5	7.5	1.6	4.1	7.0	ns
t <sub>t</sub>	transition time	V <sub>CCI</sub> = 0.75 V to 2.7 V [3]	1.0	-	-	1.0	-	-	1.0	-	-	ns

[1] Typical values are measured at nominal supply voltages and t<sub>amb</sub> = +25 °C.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[3] t<sub>t</sub> is the same as t<sub>THL</sub> and t<sub>TLH</sub>.

**Table 12. Typical dynamic characteristics at  $T_{amb} = 25\text{ °C}$**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 11](#); for wave form see [Figure 7](#).

Symbol	Parameter	Conditions	$V_{CCO}$						Unit	
			1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	5.0 V		
$C_{PD}$	power dissipation capacitance	$f_i = 1\text{ MHz}; R_L = \infty\ \Omega;$ [1]								
		$V_I = 0\text{ V to }V_{CCI}$								
		input supply [2]								
		$V_{CCI} = 0.8\text{ V}$	0.5	0.5	0.5	0.5	0.5	0.5	pF	
		$V_{CCI} = 1.2\text{ V}$	0.6	0.6	0.6	0.6	0.6	0.6	pF	
		$V_{CCI} = 1.5\text{ V}$	0.7	0.7	0.7	0.7	0.7	0.7	pF	
		$V_{CCI} = 1.8\text{ V}$	0.8	0.8	0.8	0.8	0.8	0.8	pF	
		$V_{CCI} = 2.5\text{ V}$	1.0	1.0	1.0	1.0	1.0	1.0	pF	
		output supply [3]								
		$V_{CCI} = 0.8\text{ V}$	6.7	6.8	6.8	6.9	7.5	9.5	pF	
		$V_{CCI} = 1.2\text{ V}$	6.8	6.9	7.0	7.0	7.1	7.6	pF	
		$V_{CCI} = 1.5\text{ V}$	6.9	6.9	6.9	7.0	7.1	7.6	pF	
	$V_{CCI} = 1.8\text{ V}$	6.9	6.9	6.9	7.0	7.2	7.6	pF		
	$V_{CCI} = 2.5\text{ V}$	6.9	7.0	7.0	7.0	7.2	7.6	pF		
$C_I$	input capacitance	$V_I = 0\text{ V or }V_{CCI};$ $V_{CCI} = 0\text{ V to }2.7\text{ V}$	0.6	0.6	0.6	0.6	0.6	0.6	pF	
$C_O$	output capacitance	$V_O = 0\text{ V}; V_{CCO} = 0\text{ V}$	1.8	1.8	1.8	1.8	1.8	1.8	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;

## 11.1 Waveforms and graphs

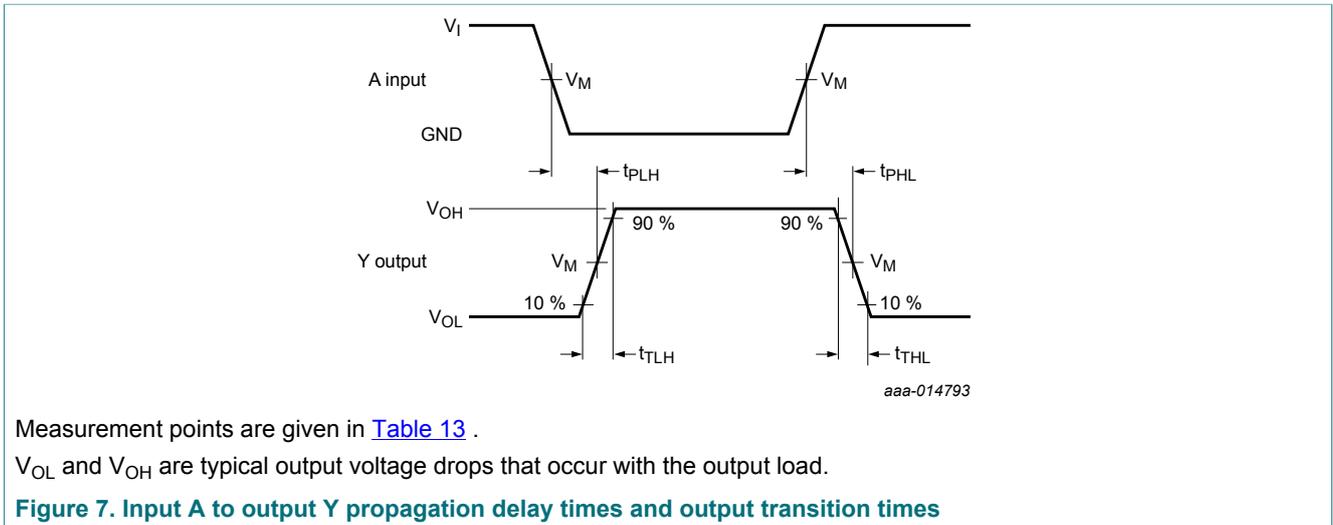
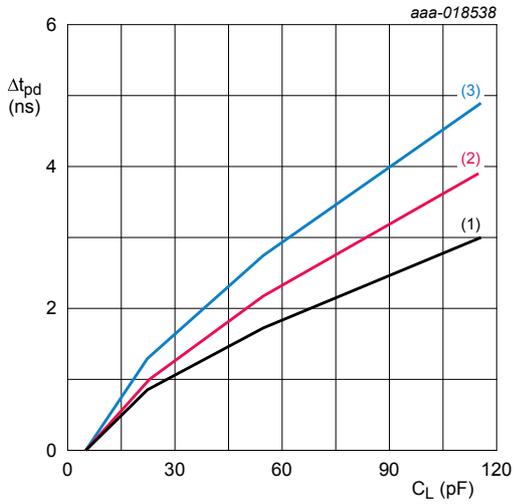


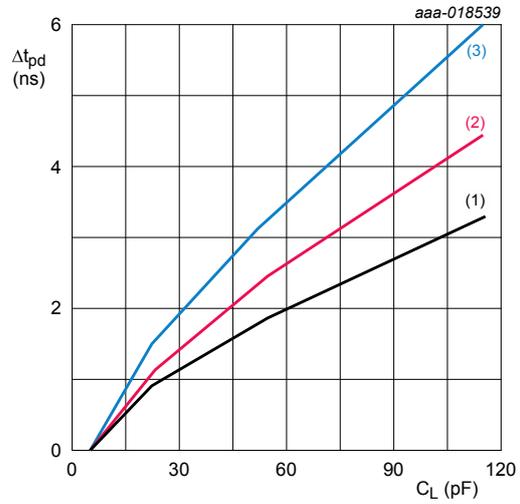
Table 13. Measurement points

Supply voltage		Output	Input	
$V_{CCI}$	$V_{CCO}$	$V_M$	$V_M$	$V_I$
0.75 V to 2.7 V	1.2 V to 5.5 V	$0.5V_{CCO}$	$0.5V_{CCI}$	$V_{CCI}$



$T_{amb} = -40$  °C to  $+85$  °C unless otherwise specified.

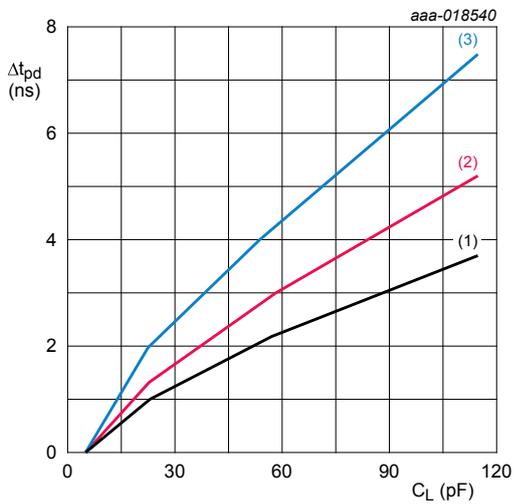
- (1) Minimum:  $V_{CCO} = 5.5$  V
- (2) Typical:  $T_{amb} = 25$  °C;  $V_{CCO} = 5$  V
- (3) Maximum:  $V_{CCO} = 4.5$  V



$T_{amb} = -40$  °C to  $+85$  °C unless otherwise specified.

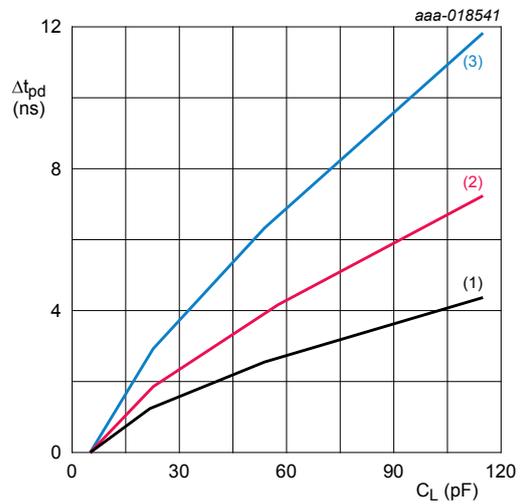
- (1) Minimum:  $V_{CCO} = 3.6$  V
- (2) Typical:  $T_{amb} = 25$  °C;  $V_{CCO} = 3.3$  V
- (3) Maximum:  $V_{CCO} = 3$  V

Figure 8. Additional propagation delay versus load capacitance



$T_{amb} = -40$  °C to  $+85$  °C unless otherwise specified.

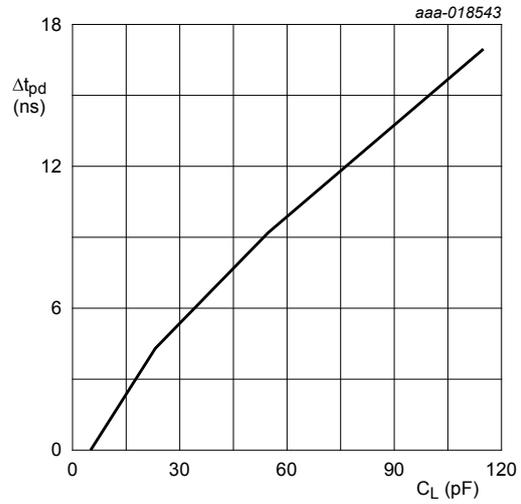
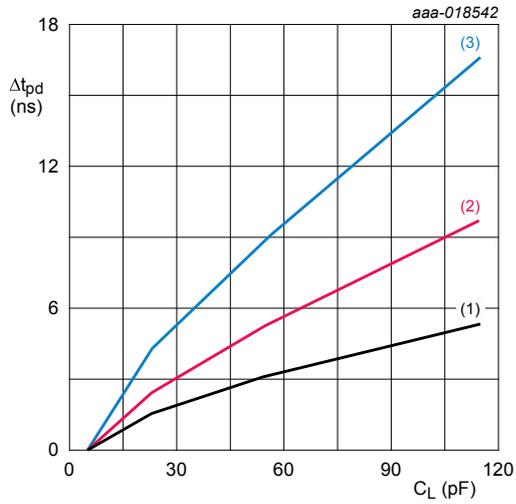
- (1) Minimum:  $V_{CCO} = 2.7$  V
- (2) Typical:  $T_{amb} = 25$  °C;  $V_{CCO} = 2.5$  V
- (3) Maximum:  $V_{CCO} = 2.3$  V



$T_{amb} = -40$  °C to  $+85$  °C unless otherwise specified.

- (1) Minimum:  $V_{CCO} = 1.95$  V
- (2) Typical:  $T_{amb} = 25$  °C;  $V_{CCO} = 1.8$  V
- (3) Maximum:  $V_{CCO} = 1.65$  V

Figure 9. Additional propagation delay versus load capacitance



$T_{amb} = -40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  unless otherwise specified.

$T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{CC0} = 1.2\text{ V}$ .

(1) Minimum:  $V_{CC0} = 1.6\text{ V}$

(2) Typical:  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $V_{CC0} = 1.5\text{ V}$

(3) Maximum:  $V_{CC0} = 1.4\text{ V}$

Figure 10. Additional propagation delay versus load capacitance

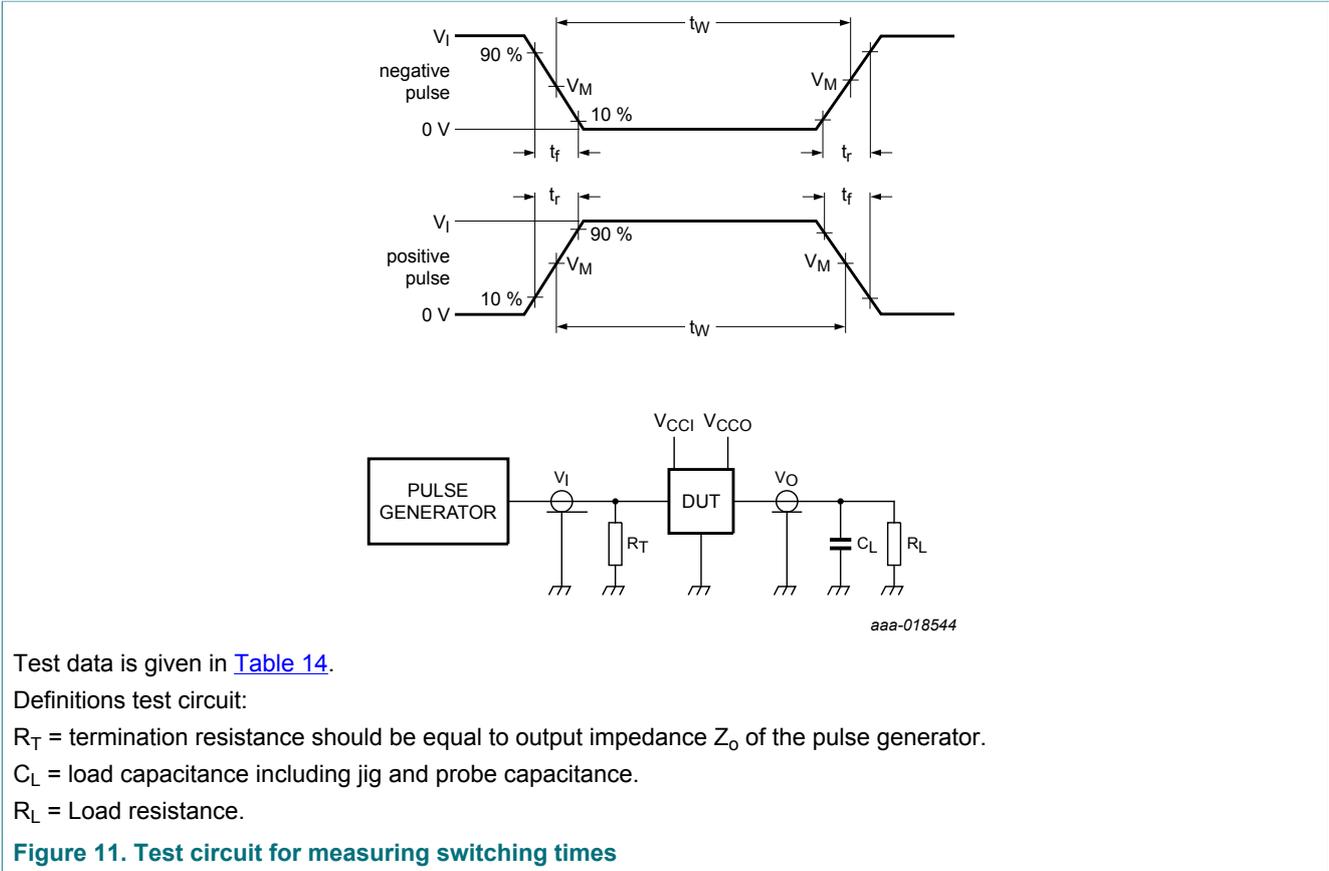


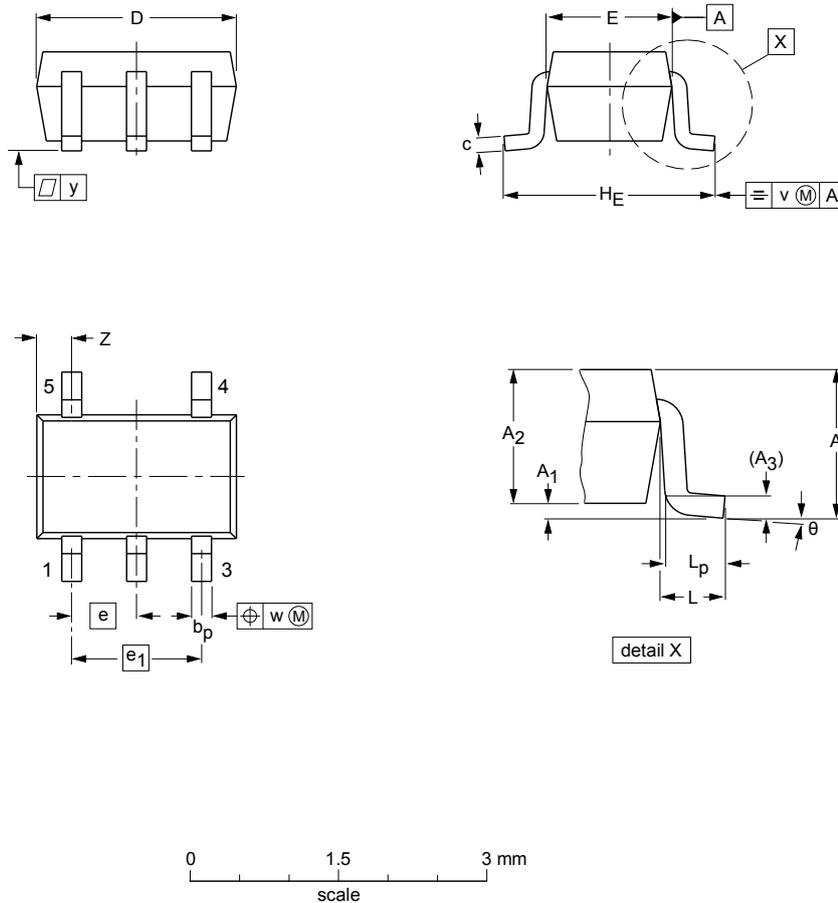
Table 14. Test data

Supply voltage		Load		Input	
$V_{CCI}$	$V_{CCO}$	$C_L$	$R_L$	$t_r, t_f$	$V_I$
0.75 V to 2.7 V	1.2 V to 5.5 V	5 pF	5 kΩ	≤3.0 ns	$V_{CCI}$

12 Package outline

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

SOT353-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	H <sub>E</sub>	L	L <sub>p</sub>	v	w	y	Z <sup>(1)</sup>	θ
mm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

Note

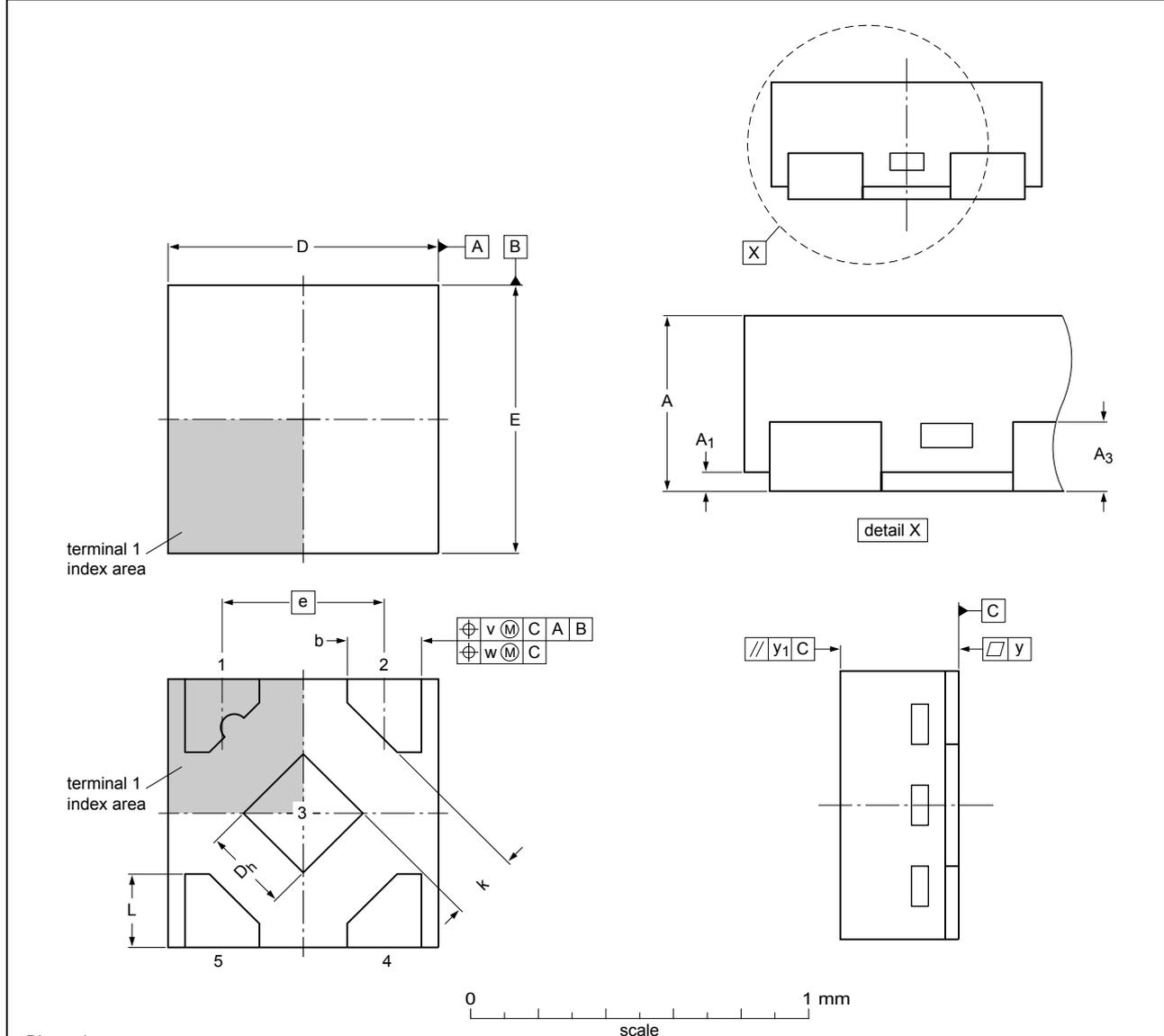
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT353-1		MO-203	SC-88A		00-09-01 03-02-19

Figure 12. Package outline SOT353-1 (TSSOP5)

**X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;**  
**5 terminals; body 0.8 x 0.8 x 0.35 mm**

SOT1226



Dimensions

Unit	A <sup>(1)</sup>	A <sub>1</sub>	A <sub>3</sub>	D	D <sub>h</sub>	E	b	e	k	L	v	w	y	y <sub>1</sub>
max	0.35	0.04	0.128	0.85	0.30	0.85	0.27			0.27				
mm nom				0.80	0.25	0.80	0.22	0.48		0.22	0.1	0.05	0.05	0.05
min			0.040	0.75	0.20	0.75	0.17		0.20	0.17				

Note

1. Dimension A is including plating thickness.
2. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

sot1226\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	EIAJ			
SOT1226						12-04-10 12-04-25

Figure 13. Package outline SOT1226 (X2SON5)

## 13 Abbreviations

Table 15. Abbreviations

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

## 14 Revision history

Table 16. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AXP1T14 v.2	20170509	Product data sheet	-	74AXP1T14 v.1
Modifications:	• Added type number 74AXP1T14GX (SOT1226/X2SON5).			
74AXP1T14 v.1	20161121	Product data sheet	-	-

## Contents

1	General description .....	1
2	Features and benefits .....	1
3	Ordering information .....	2
4	Marking .....	2
5	Functional diagram .....	2
6	Pinning information .....	2
6.1	Pinning .....	2
6.2	Pin description .....	3
7	Functional description .....	3
8	Limiting values .....	3
9	Recommended operating conditions .....	4
10	Static characteristics .....	4
11	Dynamic characteristics .....	7
11.1	Waveforms and graphs .....	9
12	Package outline .....	14
13	Abbreviations .....	16
14	Revision history .....	16

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