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74AUP1T34-Q100

Low-power dual supply translating buffer

Rev. 1 — 5 June 2013 | Product data sheet

1. General description

The 74AUP1T34-Q100 provides a single buffer with two separate supply voltages. Input A is designed to track $V_{CC(A)}$. Output Y is designed to track $V_{CC(Y)}$. Both, $V_{CC(A)}$ and $V_{CC(Y)}$ accepts any supply voltage from 1.1 V to 3.6 V. This feature allows universal low voltage interfacing between any of the 1.2 V, 1.5 V, 1.8 V, 2.5 V, and 3.3 V voltage nodes.

Schmitt trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 1.1 V to 3.6 V. This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 1.1 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 product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from −40 °C to +85 °C and from −40 °C to +125 °C
- Wide supply voltage range from 1.1 V to 3.6 V
- High noise immunity
- Complies with JEDEC standards:
  - 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:
  - MIL-STD-883, method 3015 Class 3A. Exceeds 5000 V
  - HBM JESD22-A114F Class 3A. Exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V (C = 200 pF, R = 0 Ω)
- Wide supply voltage range:
  - $V_{CC(A)}$: 1.1 V to 3.6 V
  - $V_{CC(Y)}$: 1.1 V to 3.6 V
- Low static power consumption; I_{CC} = 0.9 μA (maximum)
- Each port operates over the full 1.1 V to 3.6 V power supply range
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AUP1T34GW-Q100	–40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1

4. Marking

Table 2. Marking

Type number	Marking code[1]
74AUP1T34GW-Q100	pQ

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

5. Functional diagram

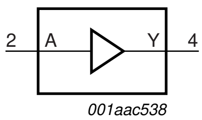


Fig 1. Logic symbol

Fig 2. IEC logic symbol

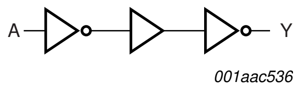


Fig 3. Logic diagram

6. Pinning information

6.1 Pinning

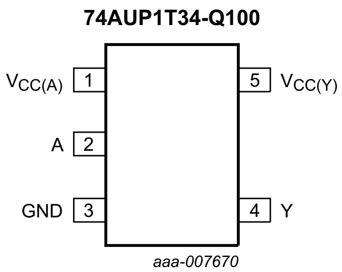


Fig 4. Pin configuration SOT353-1

6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
$V_{CC(A)}$	1	supply voltage port A
A	2	data input A
GND	3	ground (0 V)
Y	4	data output Y
$V_{CC(Y)}$	5	supply voltage port Y

7. Functional description

Table 4. Function table[1]

Input	Output
A	**Y**
L	L
H	H

[1] H = HIGH voltage level; L = LOW voltage level.

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
$V_{CC(A)}$	supply voltage A			−0.5	+4.6	V
$V_{CC(Y)}$	supply voltage Y			−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 $V_{CC(Y)}$		-	±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 TSSOP5 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(A)}$	supply voltage A		1.1	3.6	V
$V_{CC(Y)}$	supply voltage Y		1.1	3.6	V
V_I	input voltage		0	3.6	V
V_O	output voltage		0	$V_{CC(Y)}$	V
T_{amb}	ambient temperature		−40	+125	°C
Δt/ΔV	input transition rise and fall rate	control and data inputs; $V_{CC(A)}$ = 1.1 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	$V_{CC(A)}$ = 1.1 V to 1.95 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	0.65 × $V_{CC(A)}$	-	-	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	1.6	-	-	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC(A)}$ = 1.1 V to 1.95 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.35 × $V_{CC(A)}$	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.7	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.9	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$				
		I_O = −20 μA; $V_{CC(A)} = V_{CC(Y)}$ = 1.1 V to 3.6 V	$V_{CC(Y)}$ − 0.1	-	-	V
		I_O = −1.1 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.1 V	0.75 × $V_{CC(Y)}$	-	-	V
		I_O = −1.7 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.4 V	1.11	-	-	V
		I_O = −1.9 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.65 V	1.32	-	-	V
		I_O = −2.3 mA; $V_{CC(A)} = V_{CC(Y)}$ = 2.3 V	2.05	-	-	V
		I_O = −3.1 mA; $V_{CC(A)} = V_{CC(Y)}$ = 2.3 V	1.9	-	-	V
		I_O = −2.7 mA; $V_{CC(A)} = V_{CC(Y)}$ = 3.0 V	2.72	-	-	V
		I_O = −4.0 mA; $V_{CC(A)} = V_{CC(Y)}$ = 3.0 V	2.6	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IL}$				
		I_O = 20 μA; $V_{CC(A)} = V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.1	V
		I_O = 1.1 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.1 V	-	-	0.3 × $V_{CC(Y)}$	V
		I_O = 1.7 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.4 V	-	-	0.31	V
		I_O = 1.9 mA; $V_{CC(A)} = V_{CC(Y)}$ = 1.65 V	-	-	0.31	V
		I_O = 2.3 mA; $V_{CC(A)} = V_{CC(Y)}$ = 2.3 V	-	-	0.31	V
		I_O = 3.1 mA; $V_{CC(A)} = V_{CC(Y)}$ = 2.3 V	-	-	0.44	V
		I_O = 2.7 mA; $V_{CC(A)} = V_{CC(Y)}$ = 3.0 V	-	-	0.31	V
		I_O = 4.0 mA; $V_{CC(A)} = V_{CC(Y)}$ = 3.0 V	-	-	0.44	V
I_I	input leakage current	V_I = 0 V to 3.6 V; $V_{CC(A)} = V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	±0.1	μA

Table 7. Static characteristics *...continued*
At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{OFF}	power-off leakage current	Input A; V_I = 0 V to 3.6 V; $V_{CC(A)}$ = 0 V; $V_{CC(Y)}$ = 0 V to 3.6 V	-	-	±0.2	μA
		Output Y; V_O = 0 V to 3.6 V; $V_{CC(A)}$ = 0 V to 3.6 V; V_I = 0 V or 3.6 V; $V_{CC(Y)}$ = 0 V	-	-	±0.2	μA
ΔI_{OFF}	additional power-off leakage current	Input A; V_I = 0 V to 3.6 V; $V_{CC(A)}$ = 0 V to 0.2 V; $V_{CC(Y)}$ = 0 V to 3.6 V	-	-	±0.2	μA
		Output Y; V_O = 0 V to 3.6 V; $V_{CC(A)}$ = 0 V to 3.6 V; V_I = 0 V or 3.6 V; $V_{CC(Y)}$ = 0 V to 0.2 V	-	-	±0.2	μA
I_{CC}	supply current	port A; V_I = GND or $V_{CC(A)}$; I_O = 0 A				
		$V_{CC(A)}$ = $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.5	μA
		$V_{CC(A)}$ = 3.6 V; $V_{CC(Y)}$ = 0 V	-	-	0.5	μA
		$V_{CC(A)}$ = 0 V; $V_{CC(Y)}$ = 3.6 V	-	0.0	-	μA
		port Y; V_I = GND or $V_{CC(A)}$; I_O = 0 A				
		$V_{CC(A)}$ = $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.5	μA
		$V_{CC(A)}$ = 3.6 V; $V_{CC(Y)}$ = 0 V	-	0.0	-	μA
		$V_{CC(A)}$ = 0 V; $V_{CC(Y)}$ = 3.6 V	-	-	0.5	μA
		port A and port Y; V_I = GND or $V_{CC(A)}$; I_O = 0 A; $V_{CC(A)}$ = $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.5	μA
ΔI_{CC}	additional supply current	Input A; $V_{CC(A)}$ = 3.3 V; $V_{CC(Y)}$ = 0 V to 3.6 V; V_I = $V_{CC(A)}$ − 0.6 V	-	-	40	μA
C_I	input capacitance	Input A; $V_{CC(A)}$ = $V_{CC(Y)}$ = 0 V to 3.6 V; V_I = GND or $V_{CC(A)}$	-	1.0	-	pF
C_O	output capacitance	Output Y; V_O = GND; $V_{CC(Y)}$ = 0 V; $V_{CC(A)}$ = 0 V to 3.6 V	-	1.8	-	pF
T_{amb} = −40 °C to +85 °C						
V_{IH}	HIGH-level input voltage	$V_{CC(A)}$ = 1.1 V to 1.95 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	0.65 × $V_{CC(A)}$	-	-	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	1.6	-	-	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC(A)}$ = 1.1 V to 1.95 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.35 × $V_{CC(A)}$	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.7	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V; $V_{CC(Y)}$ = 1.1 V to 3.6 V	-	-	0.9	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH}				
		I_O = −20 μA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 1.1 V to 3.6 V	$V_{CC(Y)}$ − 0.1	-	-	V
		I_O = −1.1 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 1.1 V	0.7 × $V_{CC(Y)}$	-	-	V
		I_O = −1.7 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 1.4 V	1.03	-	-	V
		I_O = −1.9 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 1.65 V	1.30	-	-	V
		I_O = −2.3 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 2.3 V	1.97	-	-	V
		I_O = −3.1 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 2.3 V	1.85	-	-	V
		I_O = −2.7 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 3.0 V	2.67	-	-	V
		I_O = −4.0 mA; $V_{CC(A)}$ = $V_{CC(Y)}$ = 3.0 V	2.55	-	-	V

Table 7. Static characteristics *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OL}	LOW-level output voltage	$V_I = V_{IL}$				
		$I_O = 20$ μA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.1	V
		$I_O = 1.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V	-	-	$0.3 \times V_{CC(Y)}$	V
		$I_O = 1.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.4$ V	-	-	0.37	V
		$I_O = 1.9$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.65$ V	-	-	0.35	V
		$I_O = 2.3$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	-	-	0.33	V
		$I_O = 3.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	-	-	0.45	V
		$I_O = 2.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	-	-	0.33	V
		$I_O = 4.0$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	-	-	0.45	V
I_I	input leakage current	$V_I = 0$ V to 3.6 V; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	±0.5	μA
I_{OFF}	power-off leakage current	Input A; $V_I = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V; $V_{CC(Y)} = 0$ V to 3.6 V	-	-	±0.5	μA
		Output Y; $V_O = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 3.6 V; $V_I = 0$ V or 3.6 V; $V_{CC(Y)} = 0$ V	-	-	±0.5	μA
ΔI_{OFF}	additional power-off leakage current	Input A; $V_I = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 0.2 V; $V_{CC(Y)} = 0$ V to 3.6 V	-	-	±0.6	μA
		Output Y; $V_O = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 3.6 V; $V_I = 0$ V or 3.6 V; $V_{CC(Y)} = 0$ V to 0.2 V	-	-	±0.6	μA
I_{CC}	supply current	port A; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A				
		$V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.9	μA
		$V_{CC(A)} = 3.6$ V; $V_{CC(Y)} = 0$ V	-	-	0.9	μA
		$V_{CC(A)} = 0$ V; $V_{CC(Y)} = 3.6$ V	-	0.0	-	μA
		port Y; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A				
		$V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.9	μA
		$V_{CC(A)} = 3.6$ V; $V_{CC(Y)} = 0$ V	-	0.0	-	μA
		$V_{CC(A)} = 0$ V; $V_{CC(Y)} = 3.6$ V	-	-	0.9	μA
		port A and port Y; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.9	μA
ΔI_{CC}	additional supply current	Input A; $V_{CC(A)} = 3.3$ V; $V_{CC(Y)} = 0$ V to 3.6 V; $V_I = V_{CC(A)} - 0.6$ V	-	-	50	μA
$T_{amb} = -40$ °C to +125 °C						
V_{IH}	HIGH-level input voltage	$V_{CC(A)} = 1.1$ V to 1.95 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	$0.7 \times V_{CC(A)}$	-	-	V
		$V_{CC(A)} = 2.3$ V to 2.7 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	1.6	-	-	V
		$V_{CC(A)} = 3.0$ V to 3.6 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC(A)} = 1.1$ V to 1.95 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	$0.3 \times V_{CC(A)}$	V
		$V_{CC(A)} = 2.3$ V to 2.7 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.7	V
		$V_{CC(A)} = 3.0$ V to 3.6 V; $V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.9	V

Table 7. Static characteristics *...continued*
At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$				
		$I_O = -20$ µA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	$V_{CC(Y)} - 0.11$	-	-	V
		$I_O = -1.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V	$0.6 \times V_{CC(Y)}$	-	-	V
		$I_O = -1.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.4$ V	0.93	-	-	V
		$I_O = -1.9$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.65$ V	1.17	-	-	V
		$I_O = -2.3$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	1.77	-	-	V
		$I_O = -3.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	1.67	-	-	V
		$I_O = -2.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	2.40	-	-	V
		$I_O = -4.0$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	2.30	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IL}$				
		$I_O = 20$ µA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	0.11	V
		$I_O = 1.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V	-	-	$0.33 \times V_{CC(Y)}$	V
		$I_O = 1.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.4$ V	-	-	0.41	V
		$I_O = 1.9$ mA; $V_{CC(A)} = V_{CC(Y)} = 1.65$ V	-	-	0.39	V
		$I_O = 2.3$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	-	-	0.36	V
		$I_O = 3.1$ mA; $V_{CC(A)} = V_{CC(Y)} = 2.3$ V	-	-	0.50	V
		$I_O = 2.7$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	-	-	0.36	V
		$I_O = 4.0$ mA; $V_{CC(A)} = V_{CC(Y)} = 3.0$ V	-	-	0.50	V
I_I	input leakage current	$V_I = 0$ V to 3.6 V; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	±0.75	µA
I_{OFF}	power-off leakage current	Input A; $V_I = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V; $V_{CC(Y)} = 0$ V to 3.6 V	-	-	±0.75	µA
		Output Y; $V_O = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 3.6 V; $V_I = 0$ V or 3.6 V; $V_{CC(Y)} = 0$ V	-	-	±0.75	µA
ΔI_{OFF}	additional power-off leakage current	Input A; $V_I = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 0.2 V; $V_{CC(Y)} = 0$ V to 3.6 V	-	-	±0.75	µA
		Output Y; $V_O = 0$ V to 3.6 V; $V_{CC(A)} = 0$ V to 3.6 V; $V_I = 0$ V or 3.6 V; $V_{CC(Y)} = 0$ V to 0.2 V	-	-	±0.75	µA
I_{CC}	supply current	port A; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A				
		$V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	1.4	µA
		$V_{CC(A)} = 3.6$ V; $V_{CC(Y)} = 0$ V	-	-	1.4	µA
		$V_{CC(A)} = 0$ V; $V_{CC(Y)} = 3.6$ V	-	0.0	-	µA
		port Y; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A				
		$V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	1.4	µA
		$V_{CC(A)} = 3.6$ V; $V_{CC(Y)} = 0$ V	-	0.0	-	µA
		$V_{CC(A)} = 0$ V; $V_{CC(Y)} = 3.6$ V	-	-	1.4	µA
		port A and port Y; V_I = GND or $V_{CC(A)}$; $I_O = 0$ A; $V_{CC(A)} = V_{CC(Y)} = 1.1$ V to 3.6 V	-	-	1.4	µA
ΔI_{CC}	additional supply current	Input A; $V_{CC(A)} = 3.3$ V; $V_{CC(Y)} = 0$ V to 3.6 V; $V_I = V_{CC(A)} - 0.6$ V	-	-	75	µA

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 6.

Symbol	Parameter	Conditions		25 °C			−40 °C to +125 °C			Unit
				Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 5 pF; $V_{CC(A)}$ = 1.1 V to 1.3 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.6	9.8	25.4	2.3	25.9	25.9	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.4	7.1	15.3	2.2	16.3	16.7	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.1	6.0	12.7	1.9	13.8	14.3	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.0	5.1	9.8	2.0	10.5	10.9	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.1	4.7	8.8	1.9	9.1	9.3	ns
C_L = 5 pF; $V_{CC(A)}$ = 1.4 V to 1.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.3	9.1	23.9	2.0	24.5	24.5	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.1	6.4	13.6	1.9	14.7	15.2	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		1.8	5.3	10.9	1.6	12.1	12.6	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.7	4.3	7.8	1.6	8.7	9.2	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		1.8	3.9	6.6	1.6	7.1	7.5	ns
C_L = 5 pF; $V_{CC(A)}$ = 1.65 V to 1.95 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.2	8.8	23.2	1.9	23.9	24.0	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.0	6.0	13.0	1.8	14.1	14.6	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		1.8	4.9	10.3	1.5	11.4	12.0	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.6	3.9	7.2	1.5	8.0	8.5	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		1.7	3.5	5.9	1.5	6.4	6.8	ns
C_L = 5 pF; $V_{CC(A)}$ = 2.3 V to 2.7 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.2	8.4	22.8	1.9	23.4	23.4	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		1.9	5.7	12.3	1.8	13.4	14.0	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		1.7	4.6	9.6	1.5	10.7	11.2	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.5	3.5	6.3	1.5	7.2	7.7	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		1.6	3.1	5.1	1.4	5.6	6.0	ns
C_L = 5 pF; $V_{CC(A)}$ = 3.0 V to 3.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.2	8.1	22.5	1.9	22.9	22.9	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		1.9	5.4	12.0	1.8	12.9	13.4	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		1.7	4.3	9.2	1.5	10.2	10.7	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.5	3.3	6.0	1.5	6.7	7.2	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		1.6	2.9	4.8	1.4	5.2	5.5	ns

Table 8. Dynamic characteristics *...continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 6.

Symbol	Parameter	Conditions		25 °C			−40 °C to +125 °C			Unit
				Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 10 pF; $V_{CC(A)}$ = 1.1 V to 1.3 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.6	10.7	27.1	2.5	27.6	27.6	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.6	7.7	16.7	2.3	17.5	17.6	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.7	6.6	13.4	2.4	14.2	14.7	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.2	5.6	10.3	2.2	11.0	11.4	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.5	5.3	9.5	2.2	9.7	10.0	ns
C_L = 10 pF; $V_{CC(A)}$ = 1.4 V to 1.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.4	10.0	25.6	2.2	26.1	26.1	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.4	7.0	15.0	2.0	15.8	16.4	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.4	5.9	11.6	2.1	12.5	13.1	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.0	4.8	8.4	1.9	9.2	9.7	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.2	4.4	7.4	1.9	7.7	8.1	ns
C_L = 10 pF; $V_{CC(A)}$ = 1.65 V to 1.95 V										
t_{pd}	propagation delay	A to Y; see Figure 5								
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.3	9.7	24.8	2.1	25.5	25.7	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.3	6.6	14.3	2.0	15.3	15.8	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.3	5.5	11.0	2.0	11.9	12.5	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.9	4.4	7.7	1.8	8.6	9.0	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.1	4.0	6.6	1.8	7.1	7.4	ns
C_L = 10 pF; $V_{CC(A)}$ = 2.3 V to 2.7 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.3	9.3	24.4	2.1	25.1	25.1	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.2	6.3	13.6	1.9	14.6	15.1	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.2	5.1	10.3	2.0	11.2	11.7	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.8	4.1	6.9	1.8	7.7	8.2	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.0	3.6	5.8	1.7	6.3	6.6	ns
C_L = 10 pF; $V_{CC(A)}$ = 3.0 V to 3.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.3	9.0	24.2	2.1	24.6	24.6	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.2	6.0	13.3	1.9	14.1	14.6	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.2	4.9	9.9	2.0	10.6	11.2	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		1.8	3.9	6.5	1.8	7.3	7.7	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.0	3.5	5.4	1.7	5.8	6.2	ns

Table 8. Dynamic characteristics *...continued*
Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 6.

Symbol	Parameter	Conditions		25 °C			−40 °C to +125 °C			Unit
				Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 15 pF; $V_{CC(A)}$ = 1.1 V to 1.3 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.0	11.5	28.6	2.8	29.2	29.2	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.1	8.3	17.3	2.7	18.6	19.1	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.8	7.1	14.1	2.7	15.2	15.8	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.6	6.1	11.1	2.7	11.6	12.1	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.9	5.7	9.9	2.6	10.3	10.6	ns
C_L = 15 pF; $V_{CC(A)}$ = 1.4 V to 1.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.8	10.8	27.1	2.6	27.7	27.7	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.8	7.6	15.7	2.4	17.0	17.6	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.5	6.3	12.3	2.4	13.5	14.1	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.3	5.3	9.2	2.4	9.9	10.3	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.6	4.9	7.8	2.3	8.3	8.7	ns
C_L = 15 pF; $V_{CC(A)}$ = 1.65 V to 1.95 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.7	10.5	26.4	2.5	27.1	27.3	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.7	7.2	15.0	2.3	16.4	17.0	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.4	6.0	11.7	2.3	12.8	13.5	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.2	4.9	8.5	2.2	9.2	9.7	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.5	4.5	7.1	2.2	7.7	8.0	ns
C_L = 15 pF; $V_{CC(A)}$ = 2.3 V to 2.7 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.6	10.1	26.0	2.4	26.7	26.7	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.7	6.9	14.3	2.3	15.7	16.3	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.4	5.6	10.9	2.2	12.1	12.7	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.1	4.5	7.6	2.2	8.4	8.9	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.4	4.1	6.2	2.1	6.8	7.2	ns
C_L = 15 pF; $V_{CC(A)}$ = 3.0 V to 3.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		2.6	9.8	25.7	2.4	26.2	26.2	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		2.7	6.6	14.0	2.3	15.2	15.7	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		2.4	5.4	10.5	2.2	11.6	12.1	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.1	4.3	7.3	2.2	7.9	8.4	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		2.4	3.9	5.9	2.1	6.4	6.8	ns

Table 8. Dynamic characteristics *...continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 6.

Symbol	Parameter	Conditions		25 °C			−40 °C to +125 °C			Unit
				Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 30 pF; $V_{CC(A)}$ = 1.1 V to 1.3 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.7	13.7	32.9	3.5	33.5	33.5	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.6	9.8	19.5	3.6	20.9	21.4	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		3.7	8.4	15.9	3.5	17.0	17.7	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		3.0	7.2	12.2	3.4	12.7	13.2	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		3.8	6.8	10.9	3.4	12.2	12.5	ns
C_L = 30 pF; $V_{CC(A)}$ = 1.4 V to 1.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.5	13.1	31.5	3.2	32.0	32.0	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.3	9.1	17.8	3.3	19.2	19.9	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		3.4	7.6	14.2	3.2	15.4	16.0	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.8	6.4	10.3	3.1	11.0	11.5	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		3.5	5.9	8.9	3.1	10.1	10.5	ns
C_L = 30 pF; $V_{CC(A)}$ = 1.65 V to 1.95 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.4	12.7	30.7	3.1	31.5	31.5	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.2	8.8	17.2	3.2	18.7	19.3	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		3.3	7.3	13.5	3.1	14.7	15.4	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.7	6.0	9.6	3.0	10.4	10.9	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		3.4	5.6	8.2	2.9	9.4	9.8	ns
C_L = 30 pF; $V_{CC(A)}$ = 2.3 V to 2.7 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.3	12.4	30.3	3.1	31.0	31.0	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.2	8.4	16.5	3.1	18.0	18.7	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		3.2	6.9	12.8	3.0	14.0	14.6	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.6	5.6	8.8	2.9	9.6	10.1	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		3.3	5.2	7.3	2.9	8.5	9.0	ns
C_L = 30 pF; $V_{CC(A)}$ = 3.0 V to 3.6 V										
t_{pd}	propagation delay	A to Y; see Figure 5	[2]							
		$V_{CC(Y)}$ = 1.1 V to 1.3 V		3.3	12.0	30.0	3.1	30.5	30.5	ns
		$V_{CC(Y)}$ = 1.4 V to 1.6 V		3.2	8.1	16.2	3.1	17.5	18.1	ns
		$V_{CC(Y)}$ = 1.65 V to 1.95 V		3.2	6.7	12.4	3.0	13.4	14.1	ns
		$V_{CC(Y)}$ = 2.3 V to 2.7 V		2.6	5.5	8.5	2.9	9.1	9.6	ns
		$V_{CC(Y)}$ = 3.0 V to 3.6 V		3.2	5.0	7.0	2.9	8.1	8.5	ns

Table 8. Dynamic characteristics *...continued*

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 6.

Symbol	Parameter	Conditions	25 °C			−40 °C to +125 °C			Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 5 pF, 10 pF, 15 pF and 30 pF									
C_{PD}	power dissipation capacitance	f_i = 1 MHz; V_I = GND to $V_{CC(A)}$ [3][4]							
		$V_{CC(A)} = V_{CC(Y)}$ = 1.2 V	-	3.8	-	-	-	-	pF
		$V_{CC(A)} = V_{CC(Y)}$ = 1.5 V	-	3.8	-	-	-	-	pF
		$V_{CC(A)} = V_{CC(Y)}$ = 1.8 V	-	4.1	-	-	-	-	pF
		$V_{CC(A)} = V_{CC(Y)}$ = 2.5 V	-	4.2	-	-	-	-	pF
		$V_{CC(A)} = V_{CC(Y)}$ = 3.3 V	-	4.6	-	-	-	-	pF

[1] All typical values are measured at nominal V_{CC}.

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

[3] All specified values are the average typical values over all stated loads.

[4] 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;

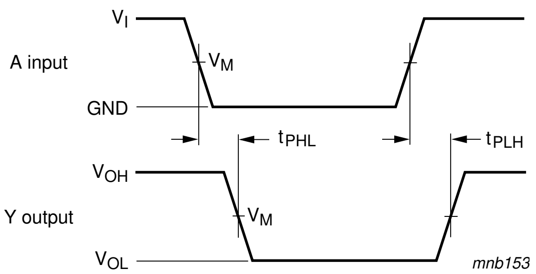
C_L = output load capacitance in pF;

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.

12. Waveforms



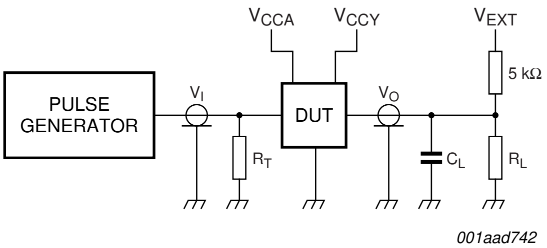
Measurement points are given in Table 9.

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

Fig 5. The data input (A) to output (Y) propagation delays

Table 9. Measurement points

Supply voltage	Output	Input		
$V_{CC(A)}/V_{CC(Y)}$	V_M	V_M	V_I	$t_r = t_f$
1.1 V to 3.6 V	$0.5 \times V_{CC(Y)}$	$0.5 \times V_{CC(A)}$	$V_{CC(A)}$	≤ 3.0 ns



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 6. Test circuit for measuring switching times

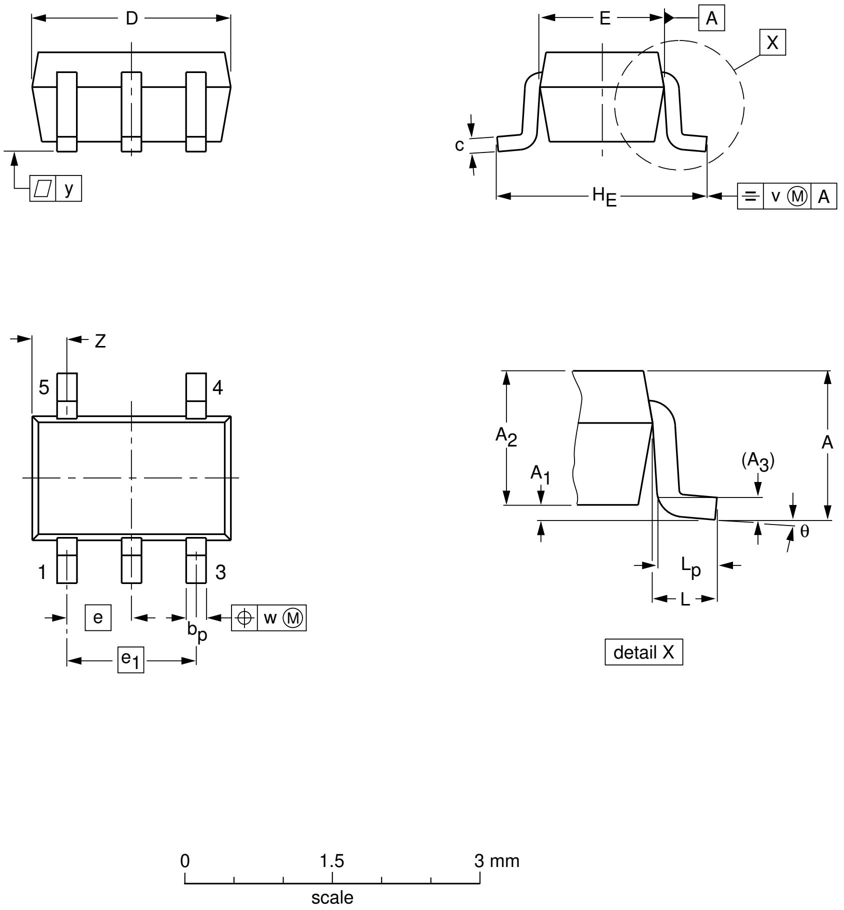
Table 10. Test data

Supply voltage	Load		V_{EXT}
$V_{CC(A)}/V_{CC(Y)}$	C_L	R_L [1]	t_{PLH}, t_{PHL}
1.1 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open

[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.

13. 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_1	A_2	A_3	b_p	c	D(1)	E(1)	e	e_1	H_E	L	L_p	v	w	y	Z(1)	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

Fig 7. Package outline SOT353-1 (TSSOP5)

14. Abbreviations

Table 11. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MIL	Military
MM	Machine Model

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1T34_Q100 v.1	20130605	Product data sheet	-	-

16. Legal information

16.1 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 URL http://www.nxp.com.

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18. Contents

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