

# 74AUP1G86-Q100

Low-power 2-input EXCLUSIVE-OR gate

Rev. 2 — 7 September 2018

Product data sheet

## 1. General description

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The 74AUP1G86-Q100 provides the single 2-input EXCLUSIVE-OR function.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8 V to 3.6 V.

This device is fully specified for partial power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

This 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

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- 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 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:
  - 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)
- Low static power consumption;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- 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			Version
	Temperature range	Name	Description	
74AUP1G86GW-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]
74AUP1G86GW-Q100	pH

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

### 5. Functional diagram

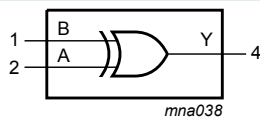


Fig. 1. Logic symbol

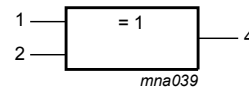


Fig. 2. IEC logic symbol

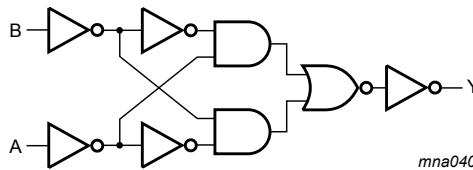


Fig. 3. Logic diagram

### 6. Pinning information

#### 6.1. Pinning

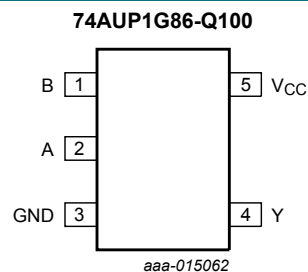


Fig. 4. Pin configuration SOT353-1 (TSSOP5)

## 6.2. Pin description

Table 3. Pin description

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

## 7. Functional description

Table 4. Function table

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

Input		Output
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

## 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>CC</sub>	supply voltage		-0.5	+4.6	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage	[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode and Power-down mode [1]	-0.5	+4.6	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±20	mA
I <sub>CC</sub>	supply current		-	+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 [2]	-	250	mW

[1] The 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<sub>tot</sub> derates linearly with 4.0 mW/K.

## 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
<b><math>T_{amb} = 25</math> °C</b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8$ V	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V	$0.65 \times V_{CC}$	-	-	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	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V	-	-	$0.35 \times V_{CC}$	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 $V_{IL}$				
		$I_O = -20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.75 \times V_{CC}$	-	-	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 $V_{IL}$				
		$I_O = 20$ $\mu$ A; $V_{CC} = 0.8$ V to 3.6 V	-	-	0.1	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V	-	-	$0.3 \times V_{CC}$	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	-	-	$\pm 0.1$	$\mu$ A

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I$ or $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or }V_{CC}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.5	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$	[1]	-	40	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0\text{ V to }3.6\text{ V}$ ; $V_I = \text{GND or }V_{CC}$	-	0.8	-	$\text{pF}$
$C_O$	output capacitance	$V_O = \text{GND}$ ; $V_{CC} = 0\text{ V}$	-	1.7	-	$\text{pF}$
<b><math>T_{amb} = -40\text{ }^\circ\text{C to }+85\text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8\text{ V}$	$0.70 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.6	-	-	$\text{V}$
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.0	-	-	$\text{V}$
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8\text{ V}$	-	-	$0.30 \times V_{CC}$	$\text{V}$
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	-	-	$0.35 \times V_{CC}$	$\text{V}$
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	$\text{V}$
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	0.9	$\text{V}$
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	$V_{CC} - 0.1$	-	-	$\text{V}$
		$I_O = -1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	$0.7 \times V_{CC}$	-	-	$\text{V}$
		$I_O = -1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	1.03	-	-	$\text{V}$
		$I_O = -1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	1.30	-	-	$\text{V}$
		$I_O = -2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.97	-	-	$\text{V}$
		$I_O = -3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	1.85	-	-	$\text{V}$
		$I_O = -2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.67	-	-	$\text{V}$
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.1	$\text{V}$
		$I_O = 1.1\text{ mA}$ ; $V_{CC} = 1.1\text{ V}$	-	-	$0.3 \times V_{CC}$	$\text{V}$
		$I_O = 1.7\text{ mA}$ ; $V_{CC} = 1.4\text{ V}$	-	-	0.37	$\text{V}$
		$I_O = 1.9\text{ mA}$ ; $V_{CC} = 1.65\text{ V}$	-	-	0.35	$\text{V}$
		$I_O = 2.3\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.33	$\text{V}$
		$I_O = 3.1\text{ mA}$ ; $V_{CC} = 2.3\text{ V}$	-	-	0.45	$\text{V}$
		$I_O = 2.7\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.33	$\text{V}$
	$I_O = 4.0\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.45	$\text{V}$	
$I_I$	input leakage current	$V_I = \text{GND to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I$ or $V_O = 0\text{ V to }3.6\text{ V}$ ; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC}$	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	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$ ; $V_{CC} = 3.3\text{ V}$	[1]	-	50	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.75 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.70 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 0.8 V	-	-	0.25 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.30 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.11	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.6 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	0.93	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.17	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.77	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.67	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.40	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.41	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.39	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.75	µA
		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.75	µA
ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.75	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	1.4	µA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]	-	-	75	µA

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

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

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 5 pF</b>						
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [2]				
		V <sub>CC</sub> = 0.8 V	-	21.2	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.3	5.9	13.1	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.8	4.1	7.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.5	3.3	5.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.2	2.6	4.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.3	4.0	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 10 pF</b>						
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [2]				
		V <sub>CC</sub> = 0.8 V	-	24.7	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	6.8	14.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	4.8	8.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.8	3.9	6.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	3.1	5.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.9	4.8	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 15 pF</b>						
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [2]				
		V <sub>CC</sub> = 0.8 V	-	28.2	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.0	7.6	16.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.4	5.3	9.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	4.4	7.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.8	3.6	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.6	3.3	5.4	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 30 pF</b>						
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [2]				
		V <sub>CC</sub> = 0.8 V	-	38.5	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.9	9.9	21.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.2	6.9	12.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	5.7	9.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.4	4.7	7.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.2	4.4	7.1	ns

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
C <sub>PD</sub>	power dissipation capacitance	f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3]				
		V <sub>CC</sub> = 0.8 V	-	2.7	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.9	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	3.0	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.1	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.6	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.2	-	pF

[1] All typical values are measured at nominal V<sub>CC</sub>.

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

[3] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

**Table 9. Dynamic characteristics**

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

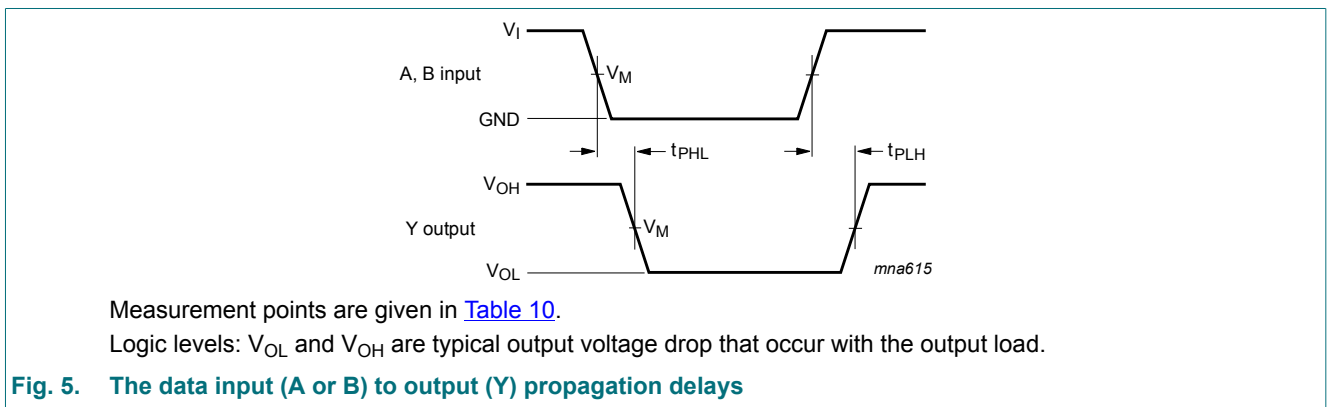
Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b>C<sub>L</sub> = 5 pF</b>							
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.1	14.3	2.1	15.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.6	8.8	1.6	9.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.4	6.9	1.4	7.6	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.1	5.3	1.1	5.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	0.9	4.7	0.9	5.2	ns
<b>C<sub>L</sub> = 10 pF</b>							
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.4	16.2	2.4	17.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	10.0	1.9	11.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	8.0	1.7	8.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	6.2	1.4	6.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	5.6	1.3	6.2	ns
<b>C<sub>L</sub> = 15 pF</b>							
t <sub>pd</sub>	propagation delay	A or B to Y; see Fig. 5 [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.7	18.1	2.7	20.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.2	11.3	2.2	12.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	9.0	1.9	9.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	7.0	1.6	7.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	6.4	1.5	7.1	ns



Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b>C<sub>L</sub> = 30 pF</b>							
t <sub>pd</sub>	propagation delay	A or B to Y; see <a href="#">Fig. 5</a> [1]					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.5	24.1	3.5	26.6	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.8	14.8	2.8	16.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.5	11.7	2.5	12.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.2	9.1	2.2	10.1	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	8.3	2.1	9.2	ns

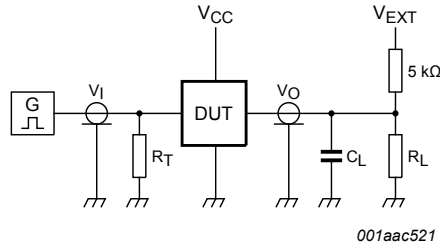
[1] t<sub>pd</sub> is the same as t<sub>PHL</sub> and t<sub>PLH</sub>.

### 11.1. Waveforms and test circuit



**Table 10. Measurement points**

Supply voltage	Output	Input		
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>
0.8 V to 3.6 V	0.5 × V <sub>CC</sub>	0.5 × V <sub>CC</sub>	V <sub>CC</sub>	≤ 3.0 ns



Test data is given in [Table 11](#).

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 11. 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	$2 \times V_{CC}$

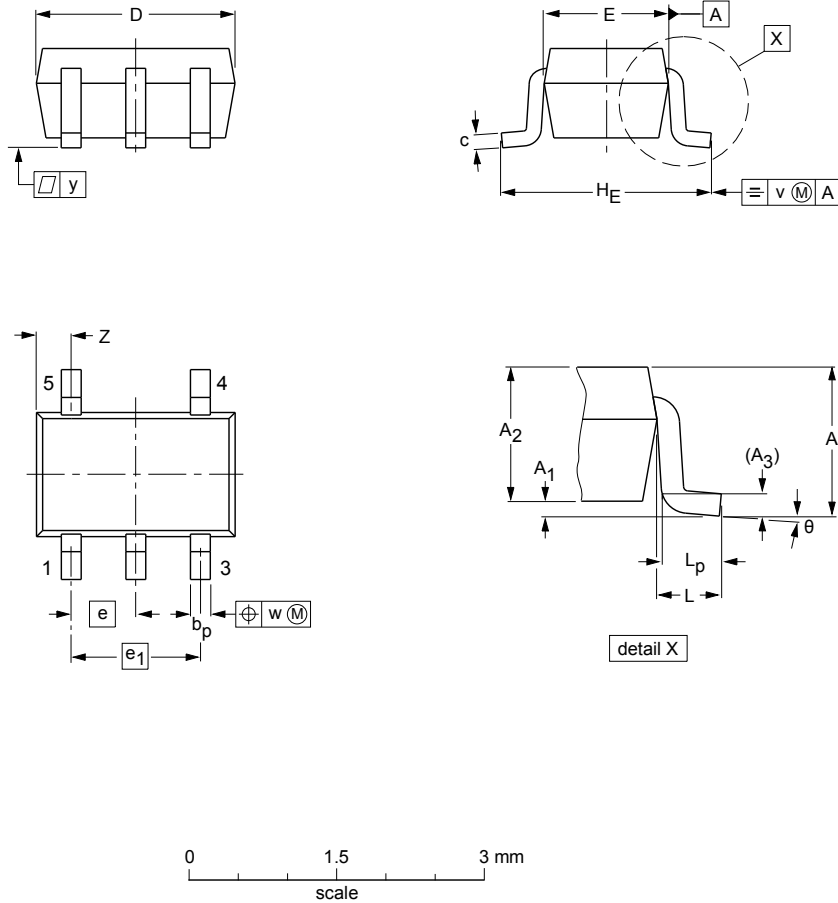
[1] For measuring enable and disable times  $R_L = 5 \text{ k}\Omega$ .

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



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

Fig. 7. Package outline SOT353-1 (TSSOP5)

## 13. Abbreviations

Table 12. Abbreviations

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

## 14. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G86_Q100 v.2	20180907	Product data sheet	-	74AUP1G86_Q100 v.1
Modifications:	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
74AUP1G86_Q100 v.1	20141020	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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