Low-power dual PCB configurable multiple function gate Rev. 3 — 11 December 2020 Product data sheet

## 1. General description

The 74AUP2G98 is a dual configurable multiple function gate with Schmitt-trigger inputs. Each gate within the device can be configured as any of the following logic functions MUX, AND, OR, NAND, NOR, inverter and buffer; using the 3-bit input. All inputs can be connected directly to  $V_{CC}$  or GND.

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

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

## 2. Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- ESD protection:
  - HBM JESD22-A114F exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Low static power consumption;  $I_{CC} = 0.9 \ \mu A$  (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<sub>CC</sub>
- I<sub>OFF</sub> circuitry provides partial power-down mode operation
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

# ne<mark>x</mark>peria

# 3. Ordering information

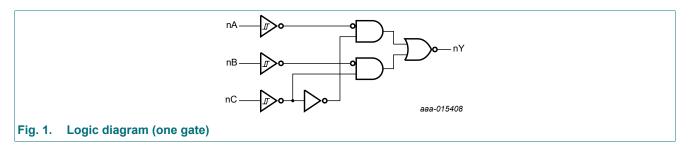
Type number	Package							
	Temperature range	Name	Description	Version				
74AUP2G98DP	-40 °C to +125 °C	TSSOP10	plastic thin shrink small outline package; 10 leads; body width 3 mm	SOT552-1				
74AUP2G98GU	-40 °C to +125 °C	XQFN10	plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 × 1.80 × 0.50 mm	SOT1160-1				

## 4. Marking

Table 2. Marking					
Type number	Marking code[1]				
74AUP2G98DP	a9				
74AUP2G98GU	a9				

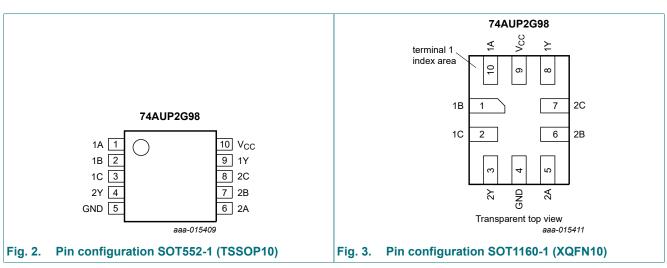
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram



## 6. Pinning information

## 6.1. Pinning



## 6.2. Pin description

Symbol	Pin	Pin			
	SOT552-1	SOT1160-1			
1A, 2A	1, 6	10, 5	data input		
1B, 2B	2, 7	1, 6	data input		
1C, 2C	3, 8	2, 7	data input		
1Y, 2Y	9, 4	8, 3	data output		
GND	5	4	ground (0 V)		
V <sub>CC</sub>	10	9	supply voltage		

## 7. Functional description

#### Table 4. Function table

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

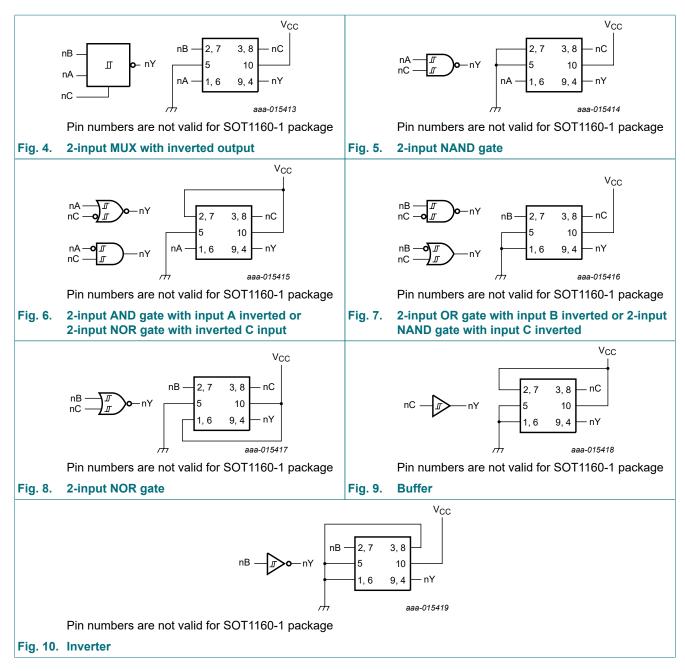
Input			Output
nC	nB	nA	nY
L	L	L	Н
L	L	Н	Н
L	Н	L	L
L	Н	Н	L
Н	L	L	Н
Н	L	Н	L
Н	Н	L	Н
Н	Н	Н	L

## 7.1. Logic configurations

#### Table 5. Function selection table

Logic function	Figure
2-input MUX with inverted output	see <u>Fig. 4</u>
2-input NAND	see <u>Fig. 5</u>
2-input NOR with one input inverted	see <u>Fig. 6</u>
2-input AND with one input inverted	see <u>Fig. 6</u>
2-input NAND with one input inverted	see <u>Fig. 7</u>
2-input OR with one input inverted	see <u>Fig. 7</u>
2-input NOR	see <u>Fig. 8</u>
Buffer	see <u>Fig. 9</u>
Inverter	see <u>Fig. 10</u>

## Low-power dual PCB configurable multiple function gate



© Nexperia B.V. 2020. All rights reserved

## 8. Limiting values

#### Table 6. 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>1</sub> < 0 V		-50	-	mA
VI	input voltage	[1	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 [1 mode	1]	-0.5	+4.6	V
lo	output current	$V_{O} = 0 V \text{ to } V_{CC}$		-	±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	$T_{amb} = -40 \text{ °C to } +125 \text{ °C}$ [2	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 SOT552-1 (TSSOP10) packages: Ptot derates linearly with 8.3 mW/K above 120 °C.

For SOT1160-1 (XQFN10) package: Ptot derates linearly with 7.1 mW/K above 115 °C.

## 9. Recommended operating conditions

#### Table 7. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Мах	Unit	
V <sub>CC</sub>	supply voltage		0.8	3.6	V	
VI	input voltage		0	3.6	V	
Vo	output voltage	Active mode	0	V <sub>CC</sub>	V V	
		Power-down mode; V <sub>CC</sub> = 0 V	0	3.6	V	
T <sub>amb</sub>	ambient temperature		-40	+125	°C	

# **10. Static characteristics**

#### Table 8. Static characteristics

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> = 2	5 °C	·			-	
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_{O}$ = -20 µA; $V_{CC}$ = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.75 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.11	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.32	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	2.05	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.9	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.72	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.6	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_{I} = V_{T+}$ or $V_{T-}$				
		$I_{O}$ = 20 µA; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.31	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.31	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.31	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.44	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.31	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.44	V
lį –	input leakage current	$V_1$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.1	μA
I <sub>OFF</sub>	power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	±0.2	μA
Δl <sub>OFF</sub>	additional power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	±0.2	μA
I <sub>CC</sub>	supply current	$V_I$ = GND or $V_{CC}$ ; $I_O$ = 0 A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.5	μA
ΔI <sub>CC</sub>	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ [1] $V_{CC} = 3.3 \text{ V}$	-	-	40	μA
CI	input capacitance	$V_{CC}$ = 0 V to 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub>	-	1.1	-	pF
Co	output capacitance	V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V	-	1.7	-	pF

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> = -	40 °C to +85 °C	·	· ·			1
V <sub>OH</sub>	HIGH-level output voltage	$V_{I} = V_{T+}$ or $V_{T-}$				
		$I_{O}$ = -20 µA; $V_{CC}$ = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.7 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.03	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.30	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.97	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.85	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.67	-	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.55	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_{I} = V_{T+} \text{ or } V_{T-}$				
		$I_{O}$ = 20 µA; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.37	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.35	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.33	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.33	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.45	V
l <sub>l</sub>	input leakage current	$V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.5	μA
I <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V	-	-	±0.5	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	±0.6	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	-	-	0.9	μA
ΔI <sub>CC</sub>	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ [1] $V_{CC} = 3.3 \text{ V}$	-	-	50	μA

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> = -4	40 °C to +125 °C					1
V <sub>OH</sub>	HIGH-level output voltage	$V_{I} = V_{T+}$ or $V_{T-}$				
		$I_{O}$ = -20 µA; $V_{CC}$ = 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
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.30	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_{O}$ = 20 µA; $V_{CC}$ = 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>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.50	V
l <sub>l</sub>	input leakage current	$V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.75	μA
I <sub>OFF</sub>	power-off leakage current	$V_{I}$ or $V_{O}$ = 0 V to 3.6 V; $V_{CC}$ = 0 V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	±0.75	μA
I <sub>CC</sub>	supply current	$V_I = GND \text{ or } V_{CC}; I_O = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	1.4	μA
ΔI <sub>CC</sub>	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ [1] $V_{CC} = 3.3 \text{ V}$	-	-	75	μA

[1] One input at  $V_{CC}$  - 0.6 V, other inputs at  $V_{CC}$  or GND.

# **11. Dynamic characteristics**

## Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit, see Fig. 12.

Symbol	Parameter	Conditions	T,	<sub>amb</sub> = 25	°C	T <sub>an</sub> -40 °C te	<sub>ոb</sub> = o +85 °C	T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Мах	Min	Max	
C <sub>L</sub> = 5 p	F									
t <sub>pd</sub>	propagation delay	nA, nB, nC to nY; see [2] Fig. 11								
		V <sub>CC</sub> = 0.8 V	-	23.3	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.9	6.7	12.9	2.7	13.2	2.7	13.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.4	4.8	7.7	2.4	8.3	2.4	8.7	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.2	4.0	6.3	1.9	7.0	1.9	7.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.0	3.2	4.6	1.8	5.2	1.8	5.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.9	2.9	4.0	1.6	4.2	1.6	4.4	ns
C <sub>L</sub> = 10	pF								1	
t <sub>pd</sub>	propagation delay	nA, nB, nC to nY; see [2] Fig. 11								
		V <sub>CC</sub> = 0.8 V	-	27.1	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.3	7.6	14.5	3.0	15.1	3.0	15.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.7	5.4	8.8	2.8	9.5	2.8	9.9	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.5	4.6	7.2	2.3	8.0	2.3	8.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.4	3.8	5.3	2.2	5.9	2.2	6.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.3	3.5	4.7	2.0	4.9	2.0	5.2	ns
C <sub>L</sub> = 15	pF								1	
t <sub>pd</sub>	propagation delay	nA, nB, nC to nY; see [2] Fig. 11								
		V <sub>CC</sub> = 0.8 V	-	30.6	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.6	8.4	16.1	3.3	16.9	3.3	17.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.0	6.0	9.7	3.1	10.5	3.1	11.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.8	5.1	7.9	2.5	8.9	2.5	9.3	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.7	4.2	5.9	2.5	6.6	2.5	7.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.5	3.9	5.2	2.2	5.5	2.2	5.8	ns
C <sub>L</sub> = 30	pF	· · · · ·								
t <sub>pd</sub>	propagation delay	nA, nB, nC to nY; see [2] Fig. 11								
		V <sub>CC</sub> = 0.8 V	-	38.7	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.5	10.7	21.1	4.1	22.0	4.1	22.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.8	7.6	12.3	3.8	13.5	3.8	14.2	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	3.5	6.3	10.1	3.1	11.3	3.1	11.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	3.4	5.3	7.5	3.2	8.4	3.2	8.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	3.2	5.0	6.7	2.9	7.1	2.9	7.5	ns

Symbol	Parameter	arameter 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[1]	Мах	Min	Max	Min	Max	
C <sub>L</sub> = 5 p	F, 10 pF, 15 p	F and 30 pF		· · · · ·		-				
C <sub>PD</sub>	dissipation	$      f_i = 1 \text{ MHz}; $ [3] $      V_I = \text{GND to } V_{\text{CC}} $								
	capacitance	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	-	3.2	-	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.8	-	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.4	-	-	-	-	-	pF

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

[2]

 $t_{Pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu$ W). [3]

 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma (C_L \times V_{CC}^2 \times f_o)$  where:

f<sub>i</sub> = input frequency in MHz;

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

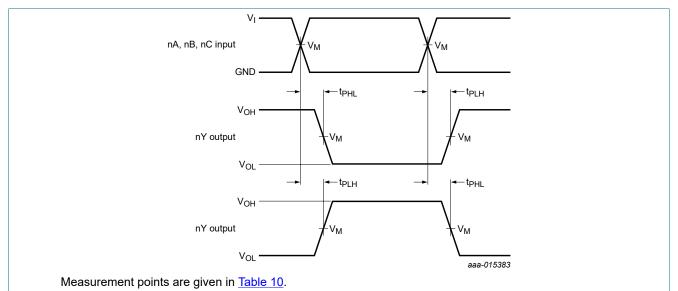
C<sub>L</sub> = output load capacitance in pF;

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

N = number of inputs switching;

 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

## 11.1. Waveforms and test circuit



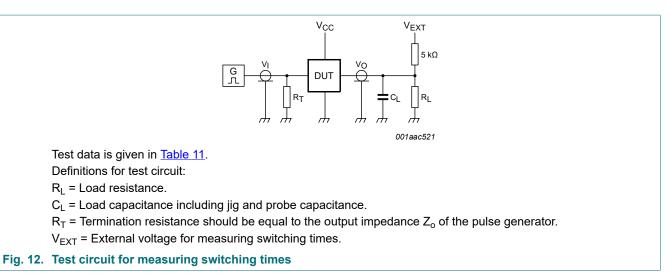
 $V_{\text{OL}}$  and  $V_{\text{OH}}$  are typical output voltage levels that occur with the output load.

#### Fig. 11. Input nA, nB and nC to output nY propagation delay times

#### Table 10. Measurement points

Tuble Tel medeurement per	110			
Supply voltage	Output	Input		
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	VI	t <sub>r</sub> = t <sub>f</sub>
0.8 V to 3.6 V	0.5V <sub>CC</sub>	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	≤ 3.0 ns

74AUP2G98



#### Table 11. Test data

Supply voltage	Load	V <sub>EXT</sub>			
V <sub>cc</sub>	CL	R <sub>L</sub> [1]	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	$5 \text{ k}\Omega$ or $1 \text{ M}\Omega$	open	GND	2V <sub>CC</sub>

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

For measuring propagation delays, setup and hold times and pulse width  $R_L$  = 1 M $\Omega$ .

## 12. Transfer characteristics

#### Table 12. Transfer characteristics

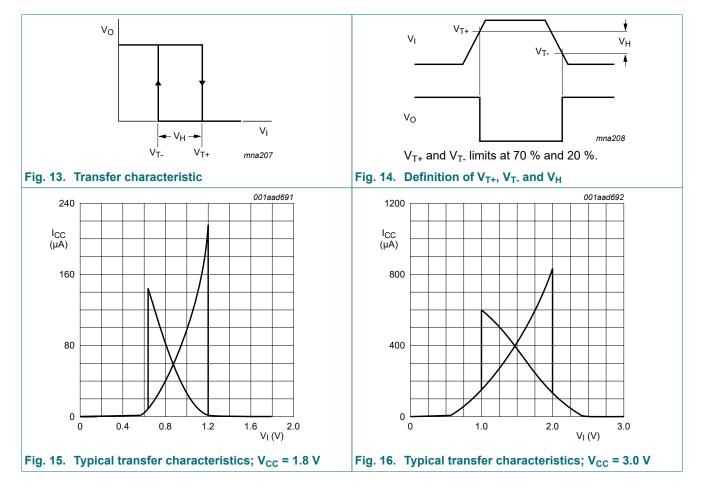
Voltages are referenced to GND (ground = 0 V; for test circuit, see Fig. 12.

Symbol	Parameter	Conditions	Ta	<sub>mb</sub> = 25	°C		<sub>nb</sub> = o +85 °C		<sub>nb</sub> = • +125 °C	Unit
			Min	Тур	Max	Min	Мах	Min	Max	
V <sub>T+</sub>	positive-going	see Fig. 13 and Fig. 14				•				
	threshold voltage	V <sub>CC</sub> = 0.8 V	0.30	-	0.60	0.30	0.60	0.30	0.62	V
		V <sub>CC</sub> = 1.1 V	0.53	-	0.90	0.53	0.90	0.53	0.92	V
		V <sub>CC</sub> = 1.4 V	0.74	-	1.11	0.74	1.11	0.74	1.13	V
		V <sub>CC</sub> = 1.65 V	0.91	-	1.29	0.91	1.29	0.91	1.31	V
		V <sub>CC</sub> = 2.3 V	1.37	-	1.77	1.37	1.77	1.37	1.80	V
		V <sub>CC</sub> = 3.0 V	1.88	-	2.29	1.88	2.29	1.88	2.32	V
V <sub>T-</sub>	negative-going	see Fig. 13 and Fig. 14								
	threshold voltage	V <sub>CC</sub> = 0.8 V	0.10	-	0.60	0.10	0.60	0.10	0.60	V
		V <sub>CC</sub> = 1.1 V	0.26	-	0.65	0.26	0.65	0.26	0.65	V
		V <sub>CC</sub> = 1.4 V	0.39	-	0.75	0.39	0.75	0.39	0.75	V
		V <sub>CC</sub> = 1.65 V	0.47	-	0.84	0.47	0.84	0.47	0.84	V
		V <sub>CC</sub> = 2.3 V	0.69	-	1.04	0.69	1.04	0.69	1.04	V
		V <sub>CC</sub> = 3.0 V	0.88	-	1.24	0.88	1.24	0.88	1.24	V

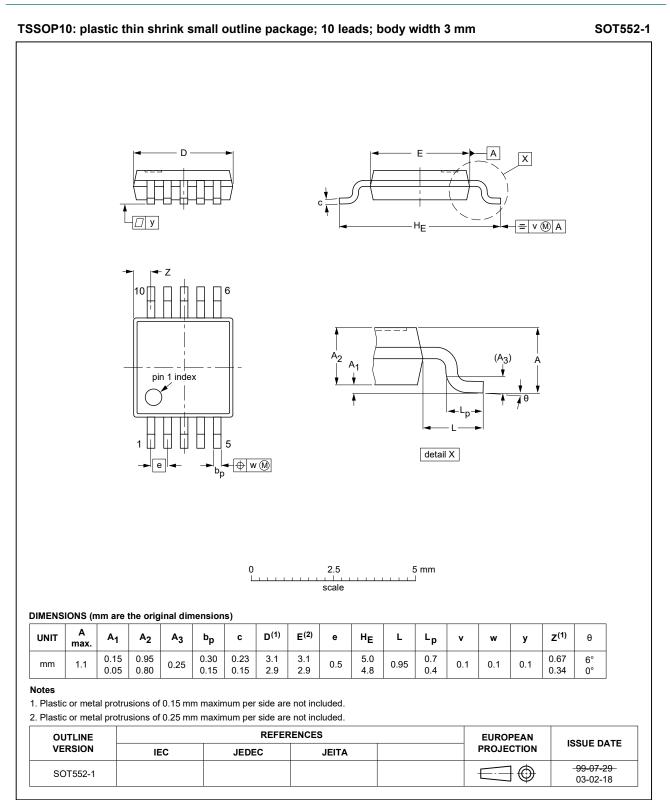
## Low-power dual PCB configurable multiple function gate

Symbol	Parameter	Conditions	Ta	<sub>mb</sub> = 25	°C		<sub>nb</sub> = o +85 °C		<sub>nb</sub> = • +125 °C	Unit
			Min	Тур	Мах	Min	Max	Min	Мах	
V <sub>H</sub>	hysteresis	(V <sub>T+</sub> - V <sub>T-</sub> ); see <u>Fig. 13</u> , F	Fig. 14, F	<u>ig. 15</u> ar	nd <u>Fig. 16</u>	<u>5</u>				
	voltage	V <sub>CC</sub> = 0.8 V	0.07	-	0.50	0.07	0.50	0.07	0.50	V
		V <sub>CC</sub> = 1.1 V	0.08	-	0.46	0.08	0.46	0.08	0.46	V
		V <sub>CC</sub> = 1.4 V	0.18	-	0.56	0.18	0.56	0.18	0.56	V
		V <sub>CC</sub> = 1.65 V	0.27	-	0.66	0.27	0.66	0.27	0.66	V
		V <sub>CC</sub> = 2.3 V	0.53	-	0.92	0.53	0.92	0.53	0.92	V
		V <sub>CC</sub> = 3.0 V	0.79	-	1.31	0.79	1.31	0.79	1.31	V

12.1. Waveforms transfer characteristics



# 13. Package outline



#### Fig. 17. Package outline SOT552-1 (TSSOP8)

74AUP2G98

## Low-power dual PCB configurable multiple function gate

#### XQFN10: plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 x 1.80 x 0.50 mm

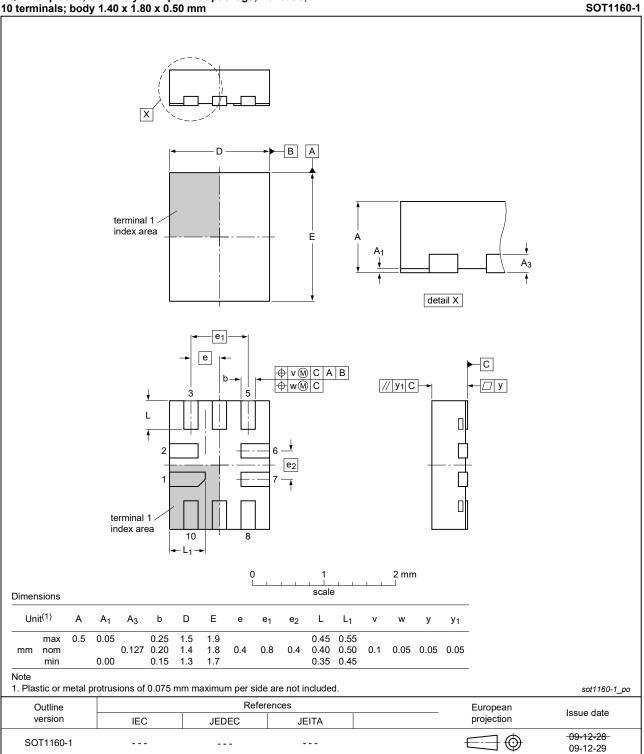


Fig. 18. Package outline SOT1160-1 (XQFN10)

# 14. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model
PCB	Printed-Circuit Board

# 15. Revision history

Table 14. Revision h	istory			
Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G98 v.3	20201211	Product data sheet	-	74AUP2G98 v.2
Modifications:		ng values for P <sub>tot</sub> total power dissi AUP2G98GF (SOT1081-2/XSON <sup>2</sup>		d.
74AUP2G98 v.2	20151202	Product data sheet	-	74AUP2G98 v.1
Modifications:		emperature range TSSOP10 (74/ 2G98GM (SOT1049-3).	AUP2G98DP) changed fr	om 85 °C to 125 °C.
74AUP2G98 v.1	20141104	Product data sheet	-	-

74AUP2G98

# 16. 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.

 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 <u>https://www.nexperia.com</u>.

#### **Definitions**

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification** — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

#### **Disclaimers**

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

**Right to make changes** — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

**Suitability for use** — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal

injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Quick reference data** — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at <u>http://www.nexperia.com/profile/terms</u>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

#### **Trademarks**

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

# Contents

	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
7.1. Logic configurations	3
8. Limiting values	5
	-
9. Recommended operating conditions	5
9. Recommended operating conditions	
	6
10. Static characteristics	6 9
10. Static characteristics         11. Dynamic characteristics	6 9 10
<ul> <li>10. Static characteristics</li></ul>	6 9 10 11
<ul> <li>10. Static characteristics</li></ul>	6 9 10 11 12
<ul> <li>10. Static characteristics</li></ul>	6 
<ol> <li>Static characteristics</li></ol>	6 
<ol> <li>Static characteristics</li></ol>	6 

© Nexperia B.V. 2020. All rights reserved

For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 11 December 2020

# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Logic Gates category:

Click to view products by Nexperia manufacturer:

Other Similar products are found below :

74HC85N NLU1G32AMUTCG NLVHC1G08DFT1G CD4068BE NL17SG32P5T5G NL17SG86DFT2G NLV14001UBDR2G NLX1G11AMUTCG NLX1G97MUTCG 74LS38 74LVC32ADTR2G MC74HCT20ADTR2G NLV17SZ00DFT2G NLV17SZ02DFT2G NLV74HC02ADR2G 74HC32S14-13 74LS133 M38510/30402BDA 74LVC1G86Z-7 74LVC2G08RA3-7 NLV74HC08ADTR2G NLV74HC14ADR2G NLV74HC20ADR2G NLX2G86MUTCG 5962-8973601DA 74LVC2G02HD4-7 NLU1G00AMUTCG 74LVC2G32RA3-7 74LVC2G00HD4-7 NL17SG02P5T5G 74LVC2G00HK3-7 74LVC2G86HK3-7 NLX1G99DMUTWG NLV74HC1G00DFT2G NLVHC1G08DFT2G NLV7SZ57DFT2G NLV74VHC04DTR2G NLV27WZ86USG NLV27WZ00USG NLU1G86CMUTCG NLU1G08CMUTCG NL17SZ32P5T5G NL17SZ00P5T5G NL17SH02P5T5G 74AUP2G00RA3-7 NLV74HC02ADTR2G NLX1G332CMUTCG NL17SG86P5T5G NL17SZ05P5T5G NLV74VHC00DTR2G