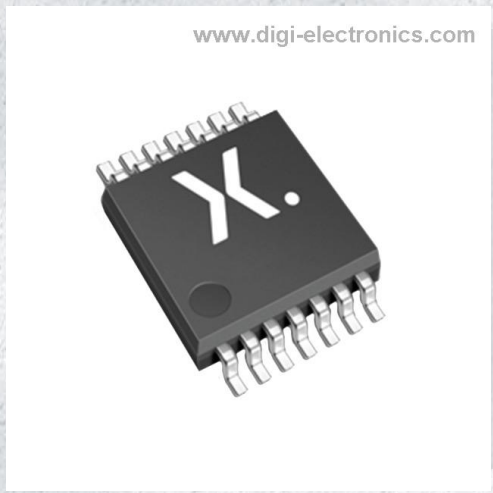
# 74ABT08PW,118 Datasheet




https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | 74ABT08PW,118-DG |
| Manufacturer | Nexperia USA Inc. |
| Manufacturer Product Number | 74ABT08PW,118 |
| Description | IC GATE AND 4CH 2-INP 14TSSOP |
| Detailed Description | AND Gate IC 4 Channel 14-TSSOP |

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| 74ABT08PW,118 | Nexperia USA Inc. |
| Series: | Product Status: |
| 74ABT | Active |
| Logic Type: | Number of Circuits: |
| AND Gate | 4 |
| Number of Inputs: | Features: |
| 2 | - |
| Voltage - Supply: | Current - Quiescent (Max): |
| 4.5V ~ 5.5V | 50 µA |
| Current - Output High, Low: | Input Logic Level - Low: |
| 15mA, 20mA | 0.8V |
| Input Logic Level - High: | Max Propagation Delay @ V, Max CL: |
| 2V | 3.4ns @ 5V, 50pF |
| Operating Temperature: | Mounting Type: |
| -40°C ~ 85°C | Surface Mount |
| Supplier Device Package: | Package / Case: |
| 14-TSSOP | 14-TSSOP (0.173", 4.40mm Width) |
| Base Product Number: | |
| 74ABT08 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8542.39.0001 | |

# 74ABT08

## Quad 2-input AND gate

Rev. 5.1 — 18 January 2024 Product data sheet

## 1. General description

The 74ABT08 is a quad 2-input AND gate. 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

- Supply voltage range from 4.5 V to 5.5 V
- BiCMOS high speed and output drive
- Direct interface with TTL levels
- $I_{OFF}$ circuitry provides partial Power-down mode operation
- Latch-up protection exceeds 500 mA per JESD78B class II level A
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C

## 3. Ordering information

**Table 1. Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74ABT08D | -40 °C to +85 °C | SO14 | plastic small outline package; 14 leads; body width 3.9 mm | SOT108-1 |
| 74ABT08PW | -40 °C to +85 °C | TSSOP14 | plastic thin shrink small outline package; 14 leads; body width 4.4 mm | SOT402-1 |

# 4. Functional diagram

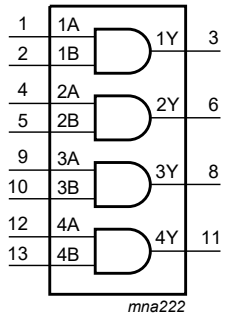



Fig. 1. Logic symbol

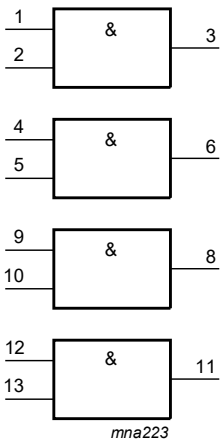



Fig. 2. IEC logic symbol

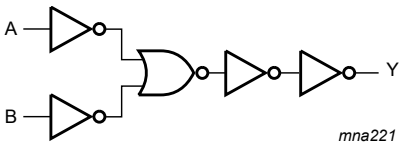
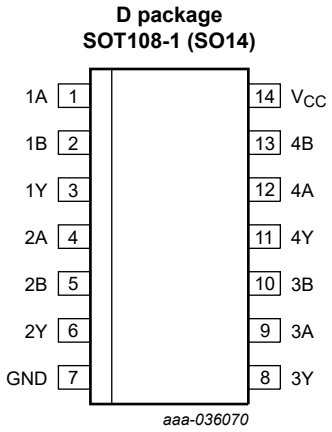
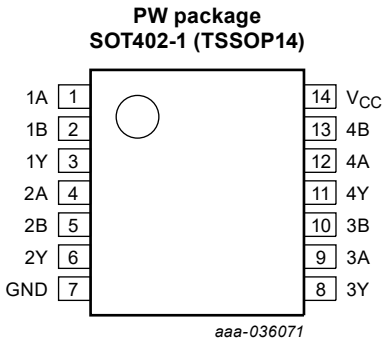



Fig. 3. Logic diagram (one gate)

# 5. Pinning information

## 5.1. Pinning




## 5.2. Pin description

**Table 2. Pin description**

| Symbol | Pin | Description |
|---|---|---|
| 1A, 2A, 3A, 4A | 1, 4, 9, 12 | data input |
| 1B, 2B, 3B, 4B | 2, 5, 10, 13 | data input |
| 1Y, 2Y, 3Y, 4Y | 3, 6, 8, 11 | data output |
| GND | 7 | ground (0 V) |
| $V_{CC}$ | 14 | supply voltage |

# 6. Functional description

**Table 3. Function table**

*H = HIGH voltage level; L = LOW voltage level; X = don't care.*

| Input | | Output |
|---|---|---|
| **nA** | **nB** | **nY** |
| L | X | L |
| X | L | L |
| H | H | H |

# 7. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | -0.5 | +7.0 | V |
| $V_I$ | input voltage | [1] | -1.2 | +7.0 | V |
| $V_O$ | output voltage | output HIGH or LOW [1] | -0.5 | +5.5 | V |
| $I_{IK}$ | input clamping current | $V_I < 0$ V | -18 | - | mA |
| $I_{OK}$ | output clamping current | $V_O < 0$ V | -50 | - | mA |
| $I_O$ | output current | output in LOW-state | - | 40 | mA |
| $T_j$ | junction temperature | | - | 150 | °C |
| $T_{stg}$ | storage temperature | | -65 | +150 | °C |

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

# 8. Recommended operating conditions

**Table 5. Operating conditions**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | 4.5 | - | 5.5 | V |
| $V_I$ | input voltage | | 0 | - | $V_{CC}$ | V |
| $V_{IH}$ | HIGH-level input voltage | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | | - | - | 0.8 | V |
| $I_{OH}$ | HIGH-level output current | | -15 | - | - | mA |
| $I_{OL}$ | LOW-level output current | | - | - | 20 | mA |
| $\Delta t/\Delta V$ | input transition rise and fall rate | | 0 | - | 5 | ns/V |
| $T_{amb}$ | ambient temperature | in free air | -40 | - | +85 | °C |

# 9. Static characteristics

**Table 6. Static characteristics**

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Max | |
| $V_{IK}$ | input clamping voltage | $V_{CC}$ = 4.5 V; $I_{IK}$ = -18 mA | -1.2 | -0.9 | - | -1.2 | - | V |
| $V_{OH}$ | HIGH-level output voltage | $V_{CC}$ = 4.5 V; $I_{OH}$ = -15 mA; $V_I$ = $V_{IL}$ or $V_{IH}$ | 2.5 | 2.9 | - | 2.5 | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_{CC}$ = 4.5 V; $I_{OL}$ = 20 mA; $V_I$ = $V_{IL}$ or $V_{IH}$ | - | 0.35 | 0.5 | - | 0.5 | V |
| $I_I$ | input leakage current | $V_{CC}$ = 5.5 V; $V_I$ = GND or 5.5 V | - | ±0.01 | ±1.0 | - | ±1.0 | µA |
| $I_{OFF}$ | power-off leakage current | $V_{CC}$ = 0 V; $V_I$ or $V_O$ ≤ 4.5 V | - | ±5.0 | ±100 | - | ±100 | µA |
| $I_{CEX}$ | output high leakage current | HIGH-state; $V_O$ = 5.5 V; $V_{CC}$ = 5.5 V; $V_I$ = GND or $V_{CC}$ | - | 5.0 | 50 | - | 50 | µA |
| $I_O$ | output current | $V_{CC}$ = 5.5 V; $V_O$ = 2.5 V [1] | -50 | -75 | -180 | -50 | -180 | mA |
| $I_{CC}$ | supply current | $V_{CC}$ = 5.5 V; $V_I$ = GND or $V_{CC}$ | - | 2 | 50 | - | 50 | µA |
| $\Delta I_{CC}$ | additional supply current | per input pin; $V_{CC}$ = 5.5 V; one input at 3.4 V; other inputs at $V_{CC}$ or GND [2] | - | 0.25 | 500 | - | 500 | µA |
| $C_I$ | input capacitance | $V_I$ = 0 V or $V_{CC}$ | - | 3 | - | - | - | pF |

[1] Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
[2] This is the increase in supply current for each input at 3.4 V.

# 10. Dynamic characteristics

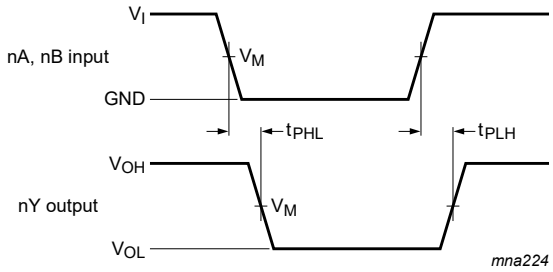
**Table 7. Dynamic characteristics**

*GND = 0 V; for test circuit, see Fig. 5.*

| Symbol | Parameter | Conditions | 25 °C; $V_{CC}$ = 5.0 V | | | -40 °C to +85 °C; $V_{CC}$ = 5.0 V ± 0.5 V | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Max | |
| $t_{PLH}$ | LOW to HIGH propagation delay | nA, nB to nY; see Fig. 4 | 1.0 | 2.4 | 3.4 | 1.0 | 4.0 | ns |
| $t_{PHL}$ | HIGH to LOW propagation delay | nA, nB to nY; see Fig. 4 | 1.0 | 1.9 | 2.8 | 1.0 | 3.0 | ns |
| $t_{sk(o)}$ | output skew time | [1] | - | 0.4 | 0.5 | - | 0.5 | ns |

[1] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

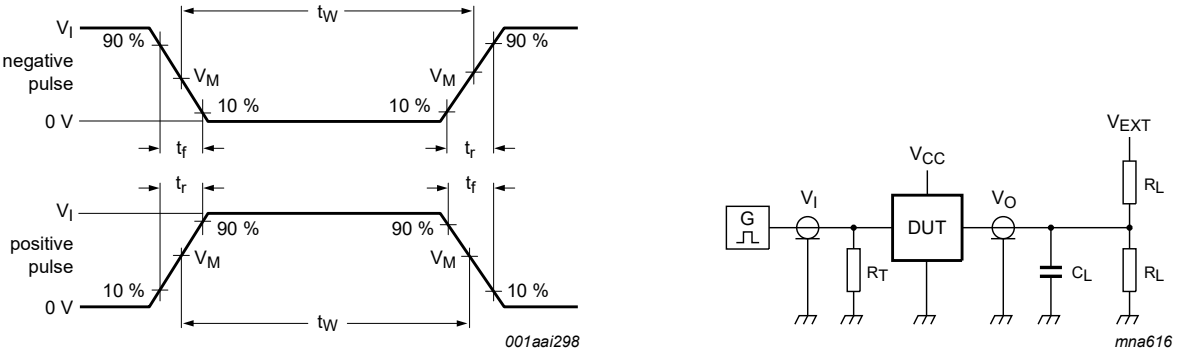
## 10.1. Waveforms and test circuit




$V_M$ = 1.5 V

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

**Fig. 4. Propagation delay input (nA, nB) to output (nY) and output skew time**




a. Input pulse definition

b. Test circuit

Test data is given in Table 8.

$R_L$ = Load resistance.

$C_L$ = Load capacitance including jig and probe capacitance.

$R_T$ = Termination resistance should be equal to output impedance $Z_o$ of the pulse generator.

$V_{EXT}$ = External voltage for measuring switching times.

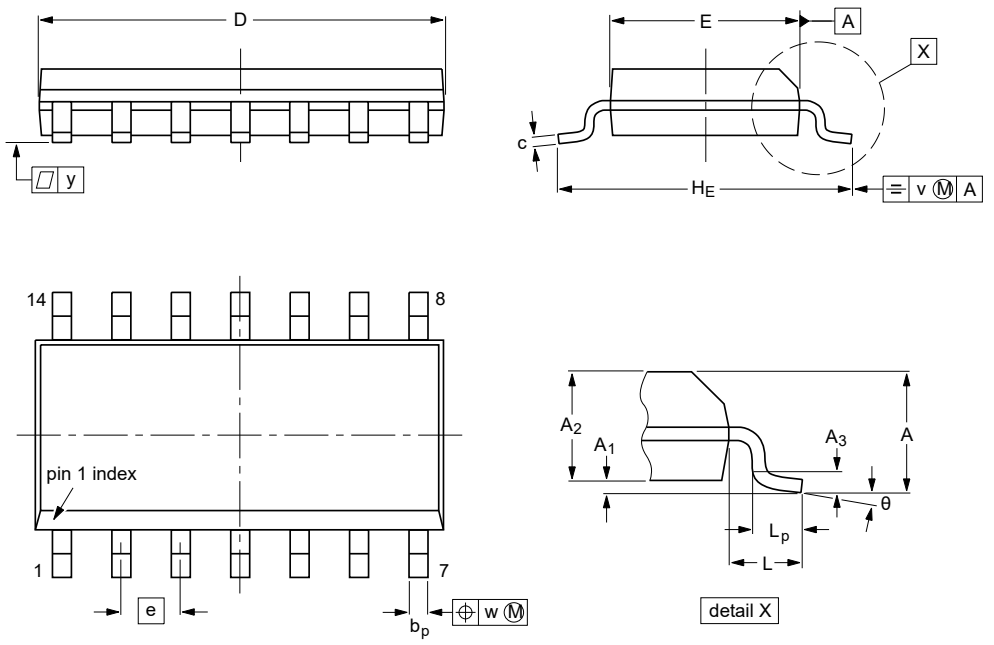
**Fig. 5. Test circuit for measuring switching times**

**Table 8. Test data**

| Input | | | | Load | | $V_{EXT}$ |
|---|---|---|---|---|---|---|
| $V_I$ | $f_i$ | $t_W$ | $t_r$, $t_f$ | $C_L$ | $R_L$ | $t_{PHL}$, $t_{PLH}$ |
| 3.0 V | 1 MHz | 500 ns | ≤ 2.5 ns | 50 pF | 500 Ω | open |

# 11. Package outline

**SO14: plastic small outline package; 14 leads; body width 3.9 mm** **SOT108-1**




Dimensions (inch dimensions are derived from the original mm dimensions)

| Unit | | A | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_E$ | L | $L_p$ | v | w | y | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 1.75 | 0.25 | | | 0.51 | 0.25 | 8.75 | 4.0 | | 6.2 | | 1.27 | | | | 8° |
| | nom | | | | 0.25 | | | | | 1.27 | | 1.05 | | 0.2 | 0.25 | 0.1 | |
| | min | | 0.10 | 1.25 | | 0.31 | 0.10 | 8.55 | 3.8 | | 5.8 | | 0.4 | | | | 0° |
| inches | max | 0.069 | 0.010 | | | 0.020 | 0.010 | 0.344 | 0.16 | | 0.244 | | 0.05 | | | | 8° |
| | nom | | | | 0.01 | | | | | 0.05 | | 0.041 | | 0.008 | 0.01 | 0.004 | |
| | min | | 0.004 | 0.049 | | 0.012 | 0.004 | 0.337 | 0.15 | | 0.228 | | 0.016 | | | | 0° |

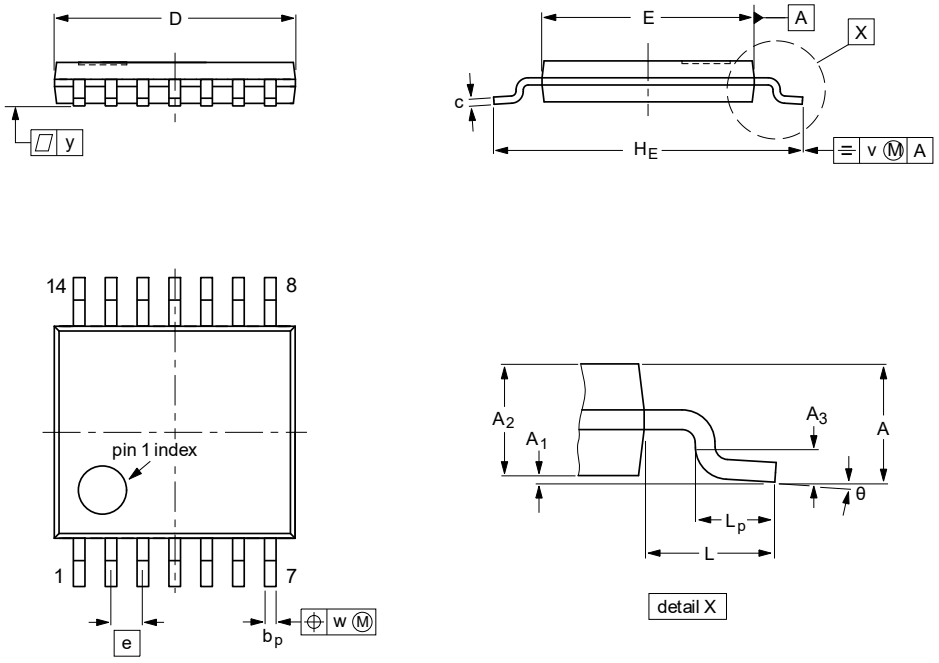
Note
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

*sot108-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT108-1 | | MS-012 | | | | ~~03-02-19~~ 23-10-27 |

**Fig. 6. Package outline SOT108-1 (SO14)**

**TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm** **SOT402-1**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | $D^{(1)}$ | $E^{(2)}$ | e | $H_E$ | L | $L_p$ | v | w | y | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 1.20 | 0.15 | 1.05 | | 0.30 | 0.2 | 5.1 | 4.5 | | 6.6 | | 0.75 | | | | 8° |
| | nom | | | | 0.25 | | | | | 0.65 | | 1 | | 0.2 | 0.1 | 0.1 | |
| | min | | 0.05 | 0.80 | | 0.19 | 0.09 | 4.9 | 4.3 | | 6.2 | | 0.45 | | | | 0° |

Note
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

*sot402-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT402-1 | | MO-153 | | | | ~~03-02-18~~ 23-10-27 |

**Fig. 7. Package outline SOT402-1 (TSSOP14)**

## 12. Abbreviations

**Table 9. Abbreviations**

| Acronym | Description |
|---|---|
| BiCMOS | Bipolar Complementary Metal-Oxide Semiconductor |
| CDM | Charged Device Model |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| TTL | Transistor-Transistor Logic |

## 13. Revision history

**Table 10. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74ABT08 v.5.1 | 20240118 | Product data sheet | - | 74ABT08 v.4 |
| Modifications: | • Section 2: ESD specification updated according to the latest JEDEC standard.<br>• Fig. 6, Fig. 7: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153. | | | |
| 74ABT08 v.4 | 20201007 | Product data sheet | - | 74ABT08 v.3 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Section 1 and Section 2 updated.<br>• Type number 74ABT08DB (SOT337-1 / SSOP14) removed. | | | |
| 74ABT08 v.3 | 20151120 | Product data sheet | - | 74ABT08 v.2 |
| Modifications: | • Type number 74ABT08N (SOT27-1) removed. | | | |
| 74ABT08 v.2 | 20140314 | Product data sheet | - | 74ABT08 v.1 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate. | | | |
| 74ABT08 v.1 | 19950918 | Product specification | - | - |

# 14. 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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**Date of release: 18 January 2024**

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