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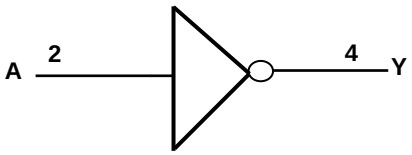
## Pin Descriptions

| Pin Name | Pin NO. | Description |
|---|---|---|
| NC | 1 | No Connection |
| A | 2 | Data Input |
| GND | 3 | Ground |
| Y | 4 | Data Output |
| $V_{CC}$ | 5 | Supply Voltage |

## Logic Diagram




## Function Table

| Inputs | Output |
|---|---|
| **A** | **Y** |
| H | L |
| L | H |

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## Absolute Maximum Ratings (Note 2)

| Symbol | Description | Rating | Unit |
|---|---|---|---|
| ESD HBM | Human Body Model ESD Protection | 2 | KV |
| ESD MM | Machine Model ESD Protection | 200 | V |
| $V_{CC}$ | Supply Voltage Range | -0.5 to 6.5 | V |
| $V_I$ | Input Voltage Range | -0.5 to 6.5 | V |
| $V_O$ | Voltage applied to output in high or low state | -0.5 to $V_{CC}$ +0.5 | V |
| $I_{IK}$ | Input Clamp Current $V_I$<0 | -20 | mA |
| $I_{OK}$ | Output Clamp Current ($V_O$ < 0 or $V_O$ > $V_{CC}$) | ±20 | mA |
| $I_O$ | Continuous output current ($V_O$ = 0 to $V_{CC}$) | ±25 | mA |
| $I_{CC}$ | Continuous current through $V_{CC}$ | 50 | mA |
| $I_{GND}$ | Continuous current through GND | -50 | mA |
| $T_J$ | Operating Junction Temperature | -40 to 150 | °C |
| $T_{STG}$ | Storage Temperature | -65 to 150 | °C |

Notes: 2. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

## Recommended Operating Conditions (Note 3)

| Symbol | Parameter | | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | Operating Voltage | | 2 | 5.5 | V |
| $V_{IH}$ | High-level Input Voltage | $V_{CC}$ = 2V | 1.7 | | V |
| | | $V_{CC}$ = 3V | 2.4 | | |
| | | $V_{CC}$ = 5.5V | 4.4 | | |
| $V_{IL}$ | Low-level input voltage | $V_{CC}$ = 2V | | 0.3 | V |
| | | $V_{CC}$ = 3V | | 0.6 | |
| | | $V_{CC}$ = 5.5V | | 1.1 | |
| $V_I$ | Input Voltage | | 0 | 5.5 | V |
| $V_O$ | Output Voltage | | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | $V_{CC}$ = 2V | | -50 | uA |
| | | $V_{CC}$ = 3.3V ± 0.3V | | -3 | mA |
| | | $V_{CC}$ = 5V ± 0.5V | | -6 | |
| $I_{OL}$ | Low-level output current | $V_{CC}$ = 2V | | 50 | uA |
| | | $V_{CC}$ = 5V ± 0.5V | | 3 | mA |
| | | $V_{CC}$ = 3V | | 6 | |
| $T_A$ | Operating free-air temperature | | -40 | 85 | ºC |

Notes: 3. Unused inputs should be held at $V_{CC}$ or Ground.

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## Electrical Characteristics

| Symbol | Parameter | Test Conditions | $V_{CC}$ | 25°C | | | -40°C to 85°C | | -40°C to 125°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ. | Max | Min | Max | Min | Max | |
| $V_{OH}$ | High Level Output Voltage | $I_{OH}$ = -50μA | 2V | 1.8 | 2 | | 1.75 | | 1.75 | | V |
| | | | 3V | 2.7 | 3 | | 2.65 | | 2.65 | | |
| | | | 4.5V | 4.0 | 4.5 | | 3.9 | | 3.9 | | |
| | | $I_{OH}$ = -3mA | 3V | 2.58 | | | 2.5 | | 2.5 | | |
| | | $I_{OH}$ = -6mA | 4.5V | 3.94 | | | 3.8 | | 3.8 | | |
| $V_{OL}$ | Low Level Output Voltage | $I_{OL}$ = 50μA | 2V | | | 0.2 | | 0.2 | | 0.2 | V |
| | | | 3V | | | 0.3 | | 0.3 | | 0.3 | |
| | | | 4.5V | | | 0.5 | | 0.5 | | 0.5 | |
| | | $I_{OL}$ = 3mA | 3V | | | 0.36 | | 0.44 | | 0.55 | |
| | | $I_{OL}$ = 6mA | 4.5V | | | 0.36 | | 0.44 | | 0.55 | |
| $I_I$ | Input Current | $V_I$ = 5.5V or GND | 0 to 5.5V | | | ± 0.1 | | ± 1 | | ± 2 | μA |
| $I_{CC}$ | Supply Current | $V_I$ = 5.5V or GND $I_O$=0 | 5.5V | | | 1 | | 10 | | 40 | μA |
| $C_I$ | Input Capacitance | $V_I$ = $V_{CC}$ – or GND | 5.5V | | 2.0 | 10 | | 10 | | 10 | pF |
| $\theta_{JA}$ | Thermal Resistance Junction-to-Ambient | SOT25 | (Note 4) | | 195 | | | | | | °C/W |
| | | SOT353 | | | 430 | | | | | | |
| $\theta_{JC}$ | Thermal Resistance Junction-to-Case | SOT25 | (Note 4) | | 58 | | | | | | °C/W |
| | | SOT353 | | | 155 | | | | | | |

Note: 4. Test conditions for SOT25, and SOT353: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout

## Switching Characteristics

**$V_{CC}$ = 3.3V ± 0.3** (see Figure 1)

| Parameter | From (Input) | TO (OUTPUT) | | 25°C | | | -40°C to 85°C | | -40°C to 125°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ. | Max | Min | Max | Min | Max | |
| $t_{pd}$ | A | Y | $C_L$=15pF | 0.6 | 3.4 | 7.1 | 0.6 | 8.5 | 0.6 | 10.0 | ns |
| | | | $C_L$=50pF | 0.6 | 4.9 | 10.6 | 0.6 | 12.0 | 0.6 | 13.0 | ns |

**$V_{CC}$ = 5V ± 0.5V** (see Figure 1)

| Parameter | From (Input) | TO (OUTPUT) | | 25°C | | | -40°C to 85°C | | -40°C to 125°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ. | Max | Min | Max | Min | Max | |
| $t_{pd}$ | A | Y | $C_L$=15pF | 0.6 | 2.6 | 5.5 | 0.6 | 6.0 | 0.6 | 7.0 | ns |
| | | | $C_L$=50pF | 0.6 | 3.6 | 7.0 | 0.6 | 8.0 | 0.6 | 9.0 | ns |

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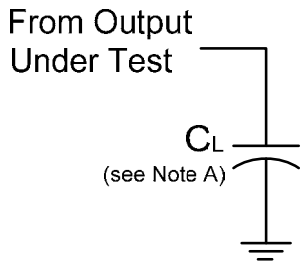
## Operating Characteristics

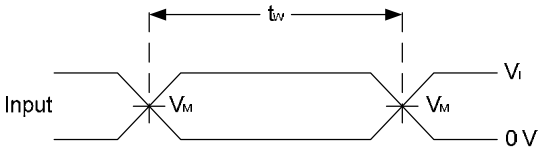
$T_A$ = 25 ºC

| Parameter | | Test Conditions | $V_{CC}$ = 5V | Unit |
|---|---|---|---|---|
| | | | Typ. | |
| $C_{pd}$ | Power dissipation capacitance | f = 1 MHz<br>No Load | 8 | pF |

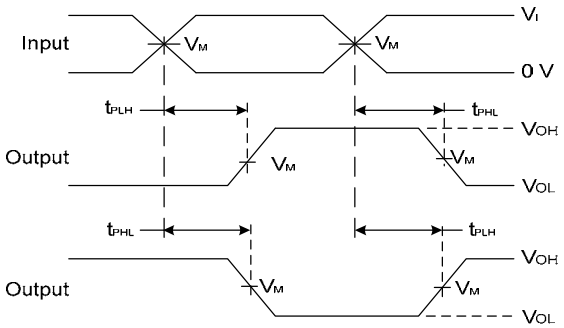
## Parameter Measurement Information




| $V_{CC}$ | Inputs | | $V_M$ | $C_L$ |
|---|---|---|---|---|
| | $V_I$ | $t_r/t_f$ | | |
| 3.3V±0.3V | $V_{CC}$ | ≤3ns | $V_{CC}/2$ | 15pF |
| 5V±0.5V | $V_{CC}$ | ≤3ns | $V_{CC}/2$ | 15pF |
| 3.3V±0.3V | $V_{CC}$ | ≤3ns | $V_{CC}/2$ | 50pF |
| 5V±0.5V | $V_{CC}$ | ≤3ns | $V_{CC}/2$ | 50pF |




**Voltage Waveform Pulse Duration**




**Voltage Waveform Propagation Delay Times**
**Inverting and Non Inverting Outputs**

**Figure 1. Load Circuit and Voltage Waveforms**

Notes: A. Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 1 MHz.
C. Inputs are measured separately one transition per measurement.
D. $t_{PLH}$ and $t_{PHL}$ are the same as $t_{PD}$.

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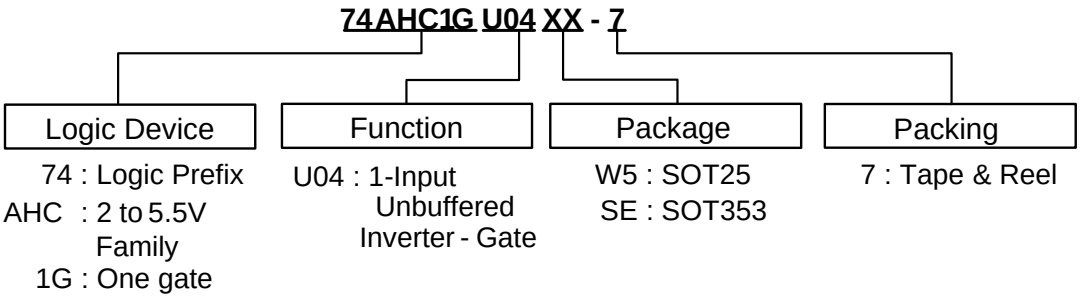
## Ordering Information

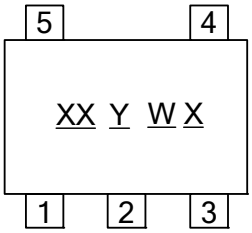



| Device | Package Code | Packaging (Note 5) | 7" Tape and Reel | |
|---|---|---|---|---|
| | | | Quantity | Part Number Suffix |
| 74AHC1GU04W5-7 | W5 | SOT25 | 3000/Tape & Reel | -7 |
| 74AHC1GU04SE-7 | SE | SOT353 | 3000/Tape & Reel | -7 |

Notes: 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

## Marking Information

(Top View)




XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week; a~z : 27~52 week; z represents 52 and 53 week
X : A~Z : Internal code

| Part Number | Package | Identification Code |
|---|---|---|
| 74AHC1GU04W5 | SOT25 | YP |
| 74AHC1GU04SE | SOT353 | YP |

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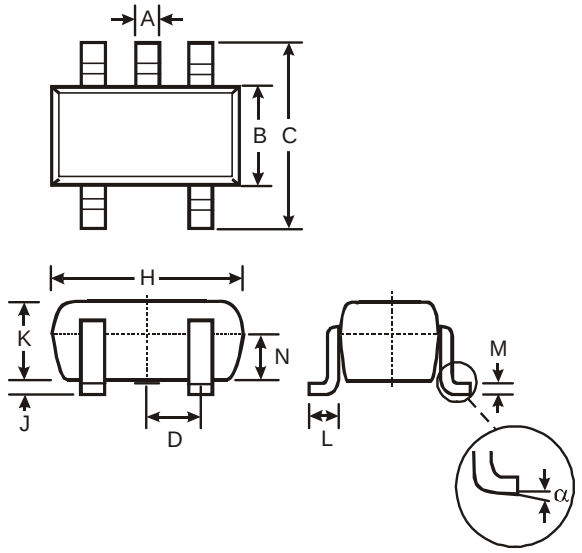
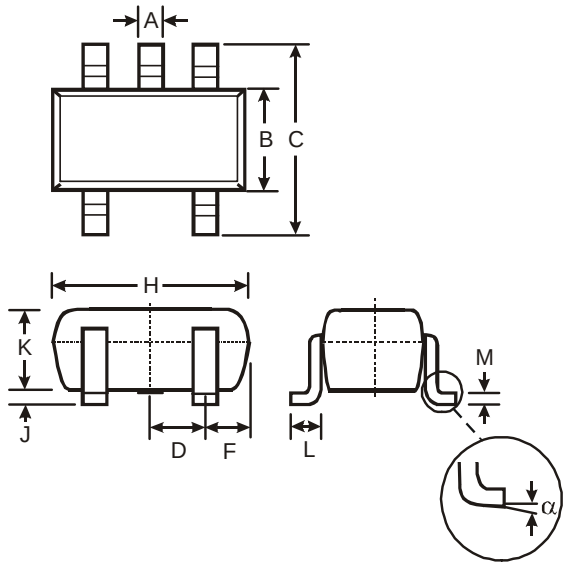
## Package Outline Dimensions (All Dimensions in mm)

### (1) Package Type: SOT25




| SOT25 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ. |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | — | — | 0.95 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| N | 0.70 | 0.80 | 0.75 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

### (2) Package Type: SOT353




| SOT353 | | |
|---|---|---|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Typ | |
| F | 0.40 | 0.45 |
| H | 1.80 | 2.20 |
| J | 0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.22 |
| α | 0° | 8° |
| All Dimensions in mm | | |

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