

Dual 4-input NAND buffer

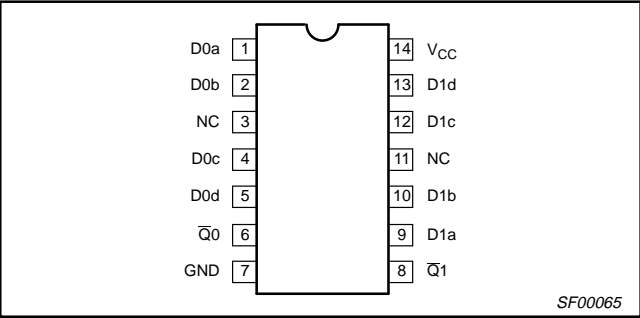
74F40

| TYPE | TYPICAL PROPAGATION DELAY | TYPICAL SUPPLY CURRENT (TOTAL) |
|-------|---------------------------|--------------------------------|
| 74F40 | 3.5ns | 6mA |

ORDERING INFORMATION

| DESCRIPTION | COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$ |
|--------------------|---|
| 14-pin plastic DIP | N74F40N |
| 14-pin plastic SO | N74F40D |

PIN CONFIGURATION

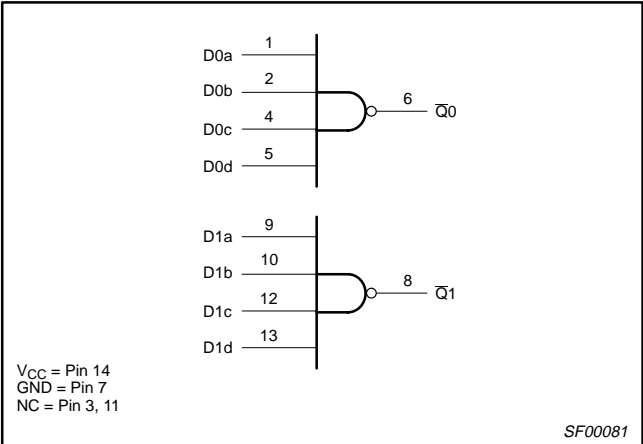


INPUT AND OUTPUT LOADING AND FAN OUT TABLE

| PINS | DESCRIPTION | 74F (U.L.) HIGH/LOW | LOAD VALUE HIGH/LOW |
|--------------------------------|--------------|---------------------|---------------------|
| Dna, Dnb, Dnc, Dnd | Data inputs | 1.0/2.0 | 20μA/1.2mA |
| $\overline{Q}0, \overline{Q}1$ | Data outputs | 750/106.7 | 15mA/64mA |

NOTE: One (1.0) FAST unit load is defined as: 20μA in the High state and 0.6mA in the Low state.

LOGIC DIAGRAM

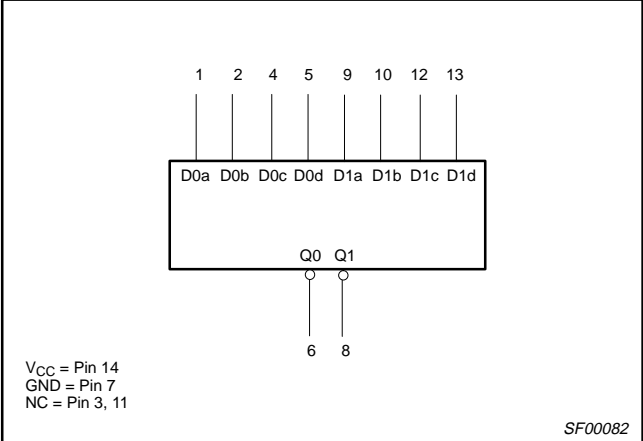


FUNCTION TABLE

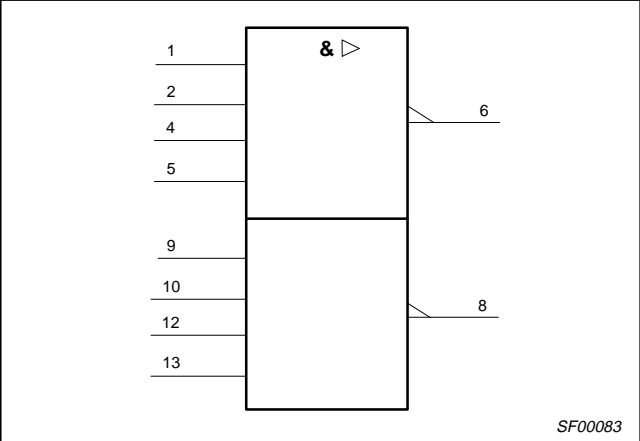
| INPUTS | | | | OUTPUT |
|--------|-----|-----|-----|-----------------|
| Dna | Dnb | Dnc | Dnd | $\overline{Q}n$ |
| L | X | X | X | H |
| X | L | X | X | H |
| X | X | L | X | H |
| X | X | X | X | H |
| H | H | H | H | L |

- NOTES:
- 1. H = High voltage level
 - 2. L = Low voltage level
 - 3. X = Don't care

LOGIC SYMBOL



IEC/IEEE SYMBOL



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ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limits set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.)

| SYMBOL | PARAMETER | RATING | UNIT |
|-----------|--|------------------|------|
| V_{CC} | Supply voltage | −0.5 to +7.0 | V |
| V_{IN} | Input voltage | −0.5 to +7.0 | V |
| I_{IN} | Input current | −30 to +5 | mA |
| V_{OUT} | Voltage applied to output in High output state | −0.5 to V_{CC} | V |
| I_{OUT} | Current applied to output in Low output state | 128 | mA |
| T_{amb} | Operating free-air temperature range | 0 to +70 | °C |
| T_{stg} | Storage temperature range | −65 to +150 | °C |

RECOMMENDED OPERATING CONDITIONS

| SYMBOL | PARAMETER | LIMITS | | | UNIT |
|-----------|--------------------------------------|--------|-----|-----|------|
| | | MIN | NOM | MAX | |
| V_{CC} | Supply voltage | 4.5 | 5.0 | 5.5 | V |
| V_{IH} | High-level input voltage | 2.0 | | | V |
| V_{IL} | Low-level input voltage | | | 0.8 | V |
| I_{IK} | Input clamp current | | | −18 | mA |
| I_{OH} | High-level output current | | | −15 | mA |
| I_{OL} | Low-level output current | | | 64 | mA |
| T_{amb} | Operating free-air temperature range | 0 | | +70 | °C |

DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

| SYMBOL | PARAMETER | | TEST CONDITIONS ¹ | | | LIMITS | | | UNIT |
|-----------------|---|------------------|---|-------------------------|------------------------|--------|------------------|------|------|
| | | | | | | MIN | TYP ² | MAX | |
| V _{OH} | High-level output voltage | | V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN | I _{OH} = −1mA | ±10%V _{CC} | 2.5 | | | V |
| | | | | | ±5%V _{CC} | 2.7 | 3.4 | | |
| | | | | I _{OH} = −15mA | ±10%V _{CC} | 2.0 | | | V |
| | | | | | ±5%V _{CC} | 2.0 | | | |
| V _{OL} | Low-level output voltage | | V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN | I _{OL} = MAX | ±10%V _{CC} | | | 0.55 | V |
| | | | | | ±5%V _{CC} | | 0.42 | 0.55 | |
| V _{IK} | Input clamp voltage | | V _{CC} = MIN, I _I = I _{IK} | | | | −0.73 | −1.2 | V |
| I _I | Input current at maximum input voltage | | V _{CC} = MAX, V _I = 7.0V | | | | | 100 | μA |
| I _{IH} | High-level input current | | V _{CC} = MAX, V _I = 2.7V | | | | | 20 | μA |
| I _{IL} | Low-level input current | | V _{CC} = MAX, V _I = 0.5V | | | | | −0.6 | mA |
| I _{OS} | Short-circuit output current ³ | | V _{CC} = MAX | | | −100 | | −225 | mA |
| I _{CC} | Supply current (total) | I _{CCH} | V _{CC} = MAX | | V _{IN} = GND | | 1.75 | 4.0 | mA |
| | | I _{CCL} | | | V _{IN} = 4.5V | | 11 | 17 | |

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}$, $T_{amb} = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

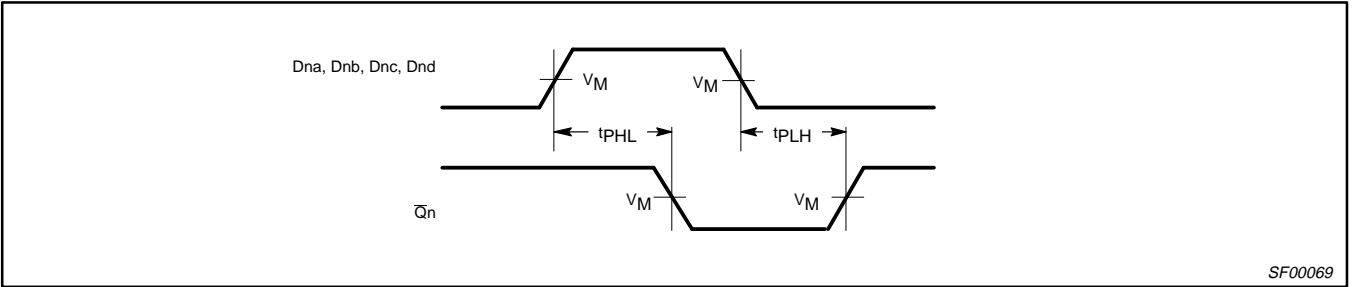
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AC ELECTRICAL CHARACTERISTICS

| SYMBOL | PARAMETER | TEST CONDITION | LIMITS | | | | | UNIT |
|--------------------------------------|--|-------------------|---|------------|------------|--|------------|------|
| | | | V _{CC} = +5.0V T _{amb} = +25°C C _L = 50pF, R _L = 500Ω | | | V _{CC} = +5.0V ± 10% T _{amb} = 0°C to +70°C C _L = 50pF, R _L = 500Ω | | |
| | | | MIN | TYP | MAX | MIN | MAX | |
| t _{PLH} t _{PHL} | Propagation delay Dna, Dnb, Dnc, Dnd to Q̄n | Waveform 1 | 2.0 1.5 | 4.0 3.0 | 6.0 5.0 | 1.5 1.0 | 7.0 5.5 | ns |

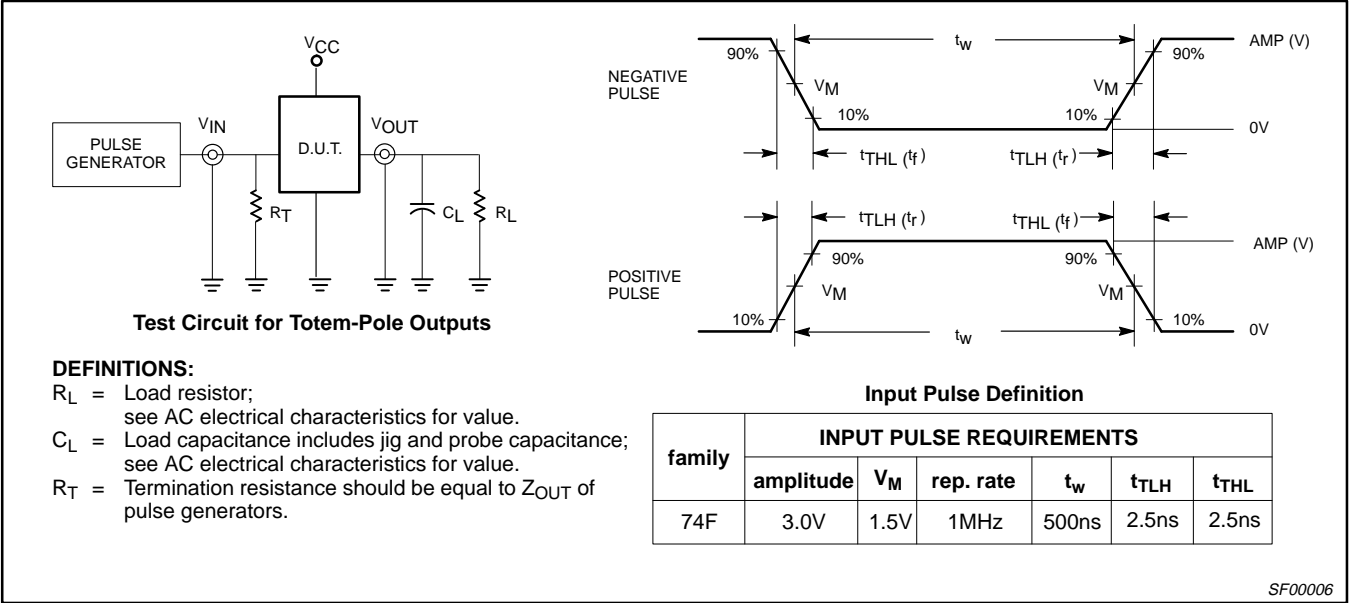
AC WAVEFORMS



Waveform 1. Propagation Delay for Inverting Outputs

NOTE:
For all waveforms, $V_M = 1.5V$.

TEST CIRCUIT AND WAVEFORMS



This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.