

Quad 2-input NAND gate

74F00

FEATURE

- Industrial temperature range available (−40°C to +85°C)

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F00	3.4ns	4.4mA

ORDERING INFORMATION

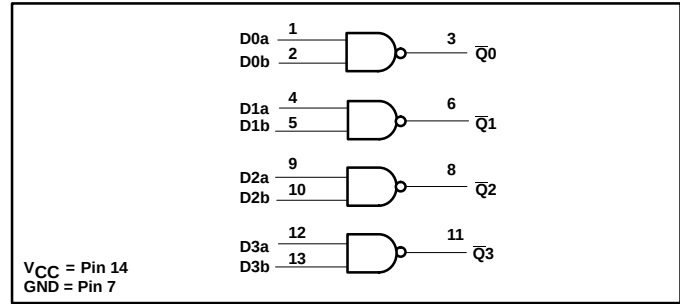
DESCRIPTION	ORDER CODE	
	COMMERCIAL RANGE V _{CC} = 5V ±10%, T _{amb} = 0°C to +70°C	INDUSTRIAL RANGE V _{CC} = 5V ±10%, T _{amb} = −40°C to +85°C
14-pin plastic DIP	N74F00N	I74F00N
14-pin plastic SO	N74F00D	I74F00D

INPUT AND OUTPUT LOADNG AND FAN OUT TABLE

PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/ LOW
Dna, Dnb	Data inputs	1.0/1.0	20µA/0.6mA
$\overline{Q}n$	Data output	50/33	1.0mA/20mA

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

LOGIC DIAGRAM

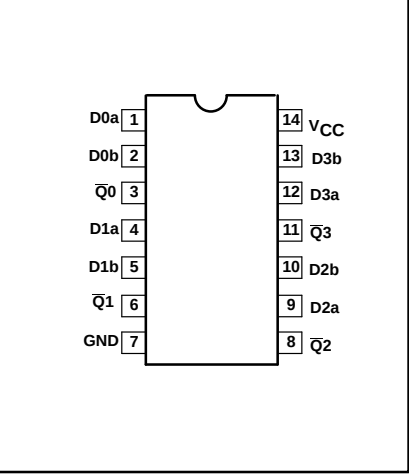


FUNCTION TABLE

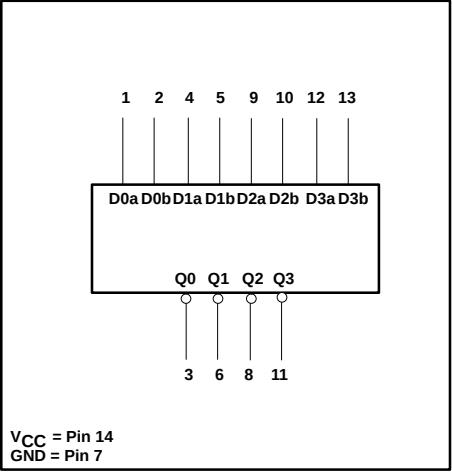
INPUTS		OUTPUT
Dna	Dnb	$\overline{Q}n$
L	L	H
L	H	H
H	L	H
H	H	L

- NOTES:
- H = High voltage level
 - L = Low voltage level

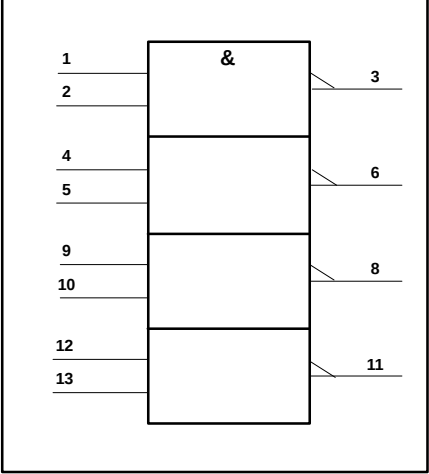
PIN CONFIGURATION



LOGIC SYMBOL



IEC/IEEE SYMBOL



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ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limit 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		40	mA
T_{amb}	Operating free air temperature range	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°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				-1	mA
I_{OL}	Low-level output current				20	mA
T_{amb}	Operating free air temperature range	Commercial range	0		+70	°C
		Industrial range	-40		+85	°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		$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}, I_{OH} = \text{MAX}$	$\pm 10\%V_{CC}$	2.5			V
				$\pm 5\%V_{CC}$	2.7	3.4		V
V_{OL}	Low-level output voltage		$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}, I_{OI} = \text{MAX}$	$\pm 10\%V_{CC}$		0.30	0.50	V
				$\pm 5\%V_{CC}$		0.30	0.50	V
V_{IK}	Input clamp voltage		$V_{CC} = \text{MIN}, I_I = I_{IK}$			-0.73	-1.2	V
I_I	Input current at maximum input voltage		$V_{CC} = \text{MAX}, V_I = 7.0\text{V}$				100	μA
I_{IH}	High-level input current		$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$				20	μA
I_{IL}	Low-level input current		$V_{CC} = \text{MAX}, V_I = 0.5\text{V}$				-0.6	mA
I_{OS}	Short-circuit output current ³		$V_{CC} = \text{MAX}$		-60		-150	mA
I_{CC}	Supply current (total)	I_{CCH}	$V_{CC} = \text{MAX}$	$V_{IN} = \text{GND}$		1.9	2.8	mA
		I_{CCL}	$V_{CC} = \text{MAX}$	$V_{IN} = 4.5\text{V}$		6.8	10.2	mA

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.

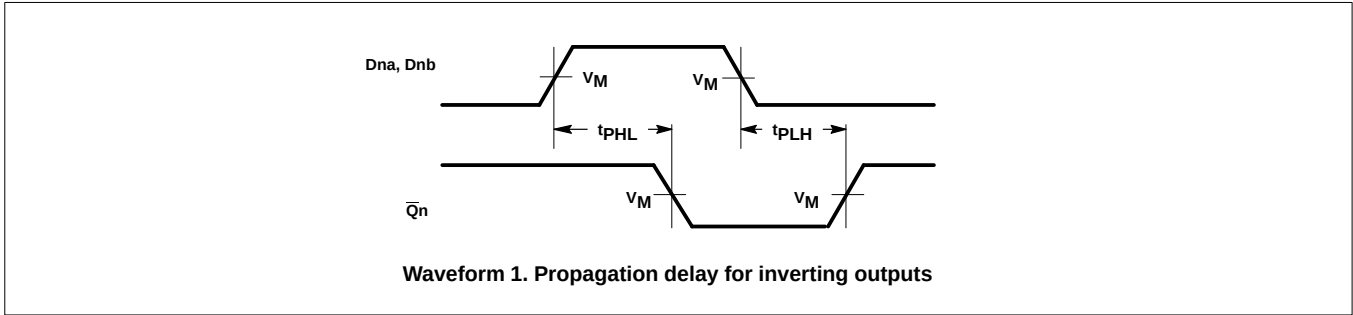
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AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS								UNIT
			T _{amb} = +25°C			T _{amb} = 0°C to +70°C		T _{amb} = -40°C to +85°C			
			V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω			
			MIN	TYP	MAX	MIN	MAX	MIN	MAX		
t _{PLH} t _{PHL}	Propagation delay D _{na} , D _{nb} to Q _n	Waveform 1	2.4 2.0	3.7 3.2	5.0 4.3	2.4 2.0	6.0 5.3	2.0 1.5	6.5 6.0	ns	

AC WAVEFORMS



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

TEST CIRCUIT AND WAVEFORM

