

Quad 2-input NAND 30Ω driver

74F3037

FEATURES

- 30Ω line driver
- 67mA output drive capability in the high state
- High speed
- Facilitates incident wave switching
- 3nh lead inductance each on V_{CC} and GND when both side pins are used
- 160mA output drive capability in the low state
- Industrial temperature range available (-40°C to $+85^{\circ}\text{C}$)

DESCRIPTION

The 74F3037 is a high current line driver composed of four 2-input NAND gates. It has been designed to deal with the transmission line effects of PC boards which appear when fast edge rates are used.

The drive capability of the 74F3037 is 67mA source and 160mA sink with a V_{CC} as low as 4.5V. This guarantees incident wave switching with V_{OH} not less than 2.0V and V_{OL} not more than

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT(TOTAL)
74F3037	2.0ns	16mA

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	
	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$	INDUSTRIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
16-pin plastic DIP	N74F3037N	I74F3037N
16-pin plastic SOL ¹	N74F3037D	I74F3037D

Note to ordering information

1. Thermal mounting techniques are recommended. See SMD Applications (page 17) for a discussion for surface mounted devices. If driving impedances 42 ohms or greater then thermal mounting is not necessary.

INPUT AND OUTPUT LOADING AND FAN OUT TABLE

PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D_{na}, D_{nb}	Data inputs	1.0/1.0	20μA/0.6mA
$\bar{Q}_n$	Data output	3350/266	67mA/160mA

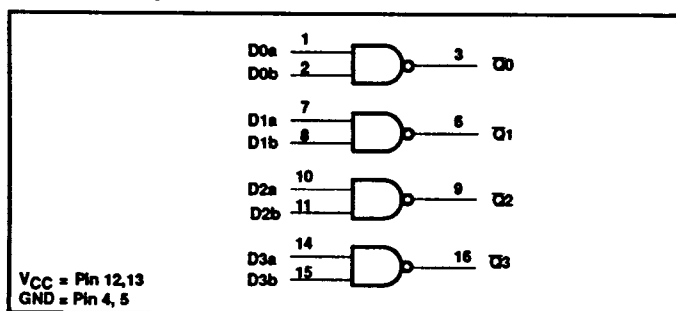
Note to input and output loading and fan out table

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

0.8mA while driving impedances as low as 30 ohms. This is applicable with any combination of outputs using continuous duty. The propagation delay of the part is minimally affected by reflections when

terminated only by the TTL inputs of other devices. Performances may be improved by full or partial line termination.

LOGIC DIAGRAM



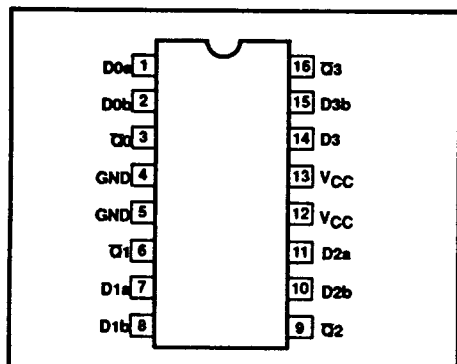
FUNCTION TABLE

INPUTS		OUTPUT
D_{na}	D_{nb}	$\bar{Q}_n$
L	L	H
L	H	H
H	L	H
H	H	L

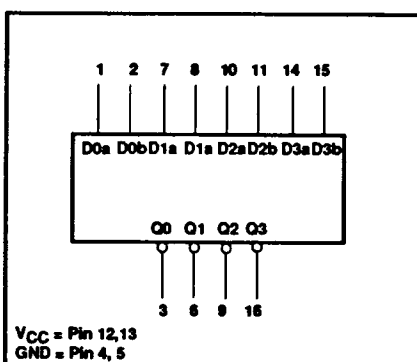
Notes to function table

1. H = High voltage level
2. L = Low voltage level

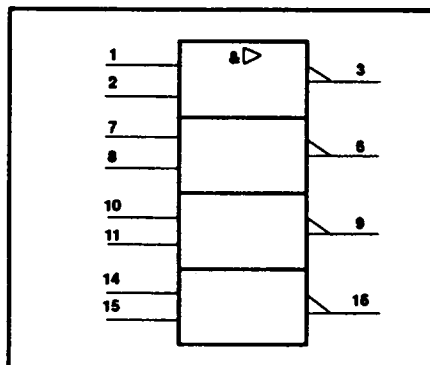
PIN CONFIGURATION



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		320	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	2.4			V
V _{IL}	Low-level input voltage			0.8	V
I _{IK}	Input clamp current			-18	mA
I _{OH}	High-level output current			-67	mA
I _{OL}	Low-level output current			160	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} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OH} = -45mA	±10%V _{CC}	2.5			V
				±5%V _{CC}	2.7			V
			I _{OH1} = -67mA ³	±10%V _{CC}	2.0			V
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OL} = 100mA	±10%V _{CC}		0.30	0.50	V
			I _{OL1} = 160mA ⁴	±5%V _{CC}		0.30	0.50	V
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 _O	Output current ⁵	V _{CC} = MAX, V _O = 2.25V			-100		-200	mA
I _{CC}	Supply current (total)	I _{CC} H	V _{CC} = MAX			6.0	9.0	mA
		I _{CC} L				30	40	mA

Notes to DC electrical characteristics

- 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} = 5V, T_{amb} = 25°C.
- I_{OH1} is the current necessary to guarantee the low to high transition in a 30 ohm transmission line on the incident wave.
- I_{OL1} is the current necessary to guarantee the high to low transition in a 30 ohm transmission line on the incident wave.

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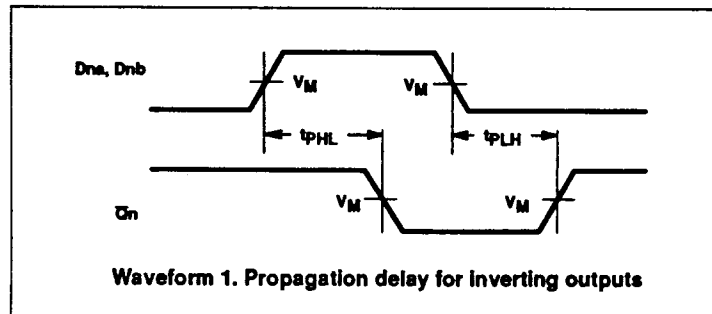
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5. I_O is tested under conditions that produce current approximately one half of the true short-circuit current (I_{OS}).

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS								UNIT
			$T_{amb} = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_{amb} = 0^{\circ}\text{C to } +70^{\circ}\text{C}$ $V_{CC} = +5.0\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		$T_{amb} = -40^{\circ}\text{C to } +85^{\circ}\text{C}$ $V_{CC} = +5.0\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			
			MIN	TYP	MAX	MIN	MAX	MIN	MAX		
t_{PLH} t_{PHL}	Propagation delay D_{na}, D_{nb} to Q_n	Waveform 1	1.0 1.0	2.0 2.0	5.0 4.5	1.0 1.0	5.5 5.0	1.0 1.0	5.5 5.0	ns	

AC WAVEFORMS



Note to AC waveforms

1. For all waveforms, $V_M = 1.5\text{V}$.

TEST CIRCUIT AND WAVEFORMS

