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FAST Products	

# FAST 74F30

## Gate

### 8-Input NAND Gate

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F30	3.2 ns	1.7 mA

#### ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ ; $T_A = 0^\circ C$ to $+70^\circ C$
14-Pin Plastic DIP	N74F30N
14-Pin Plastic SO	N74F30D

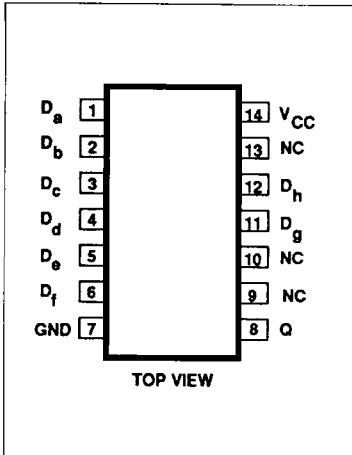
#### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$D_n$	Data inputs	1.0/1.0	20 $\mu$ A/0.6mA
$\bar{Q}$	Data output	50/33	1.0mA/20mA

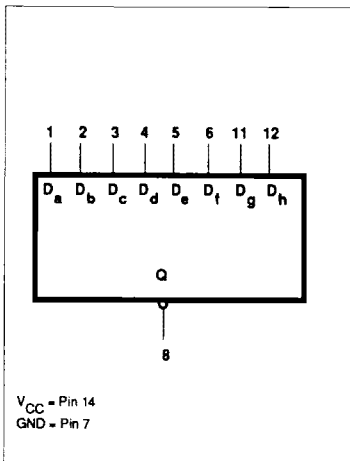
**NOTE:**

One (1.0) FAST Unit Load is defined as: 20 $\mu$ A in the High state and 0.6mA in the Low state.

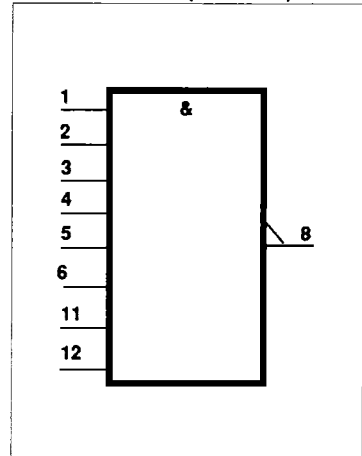
#### PIN CONFIGURATION



#### LOGIC SYMBOL



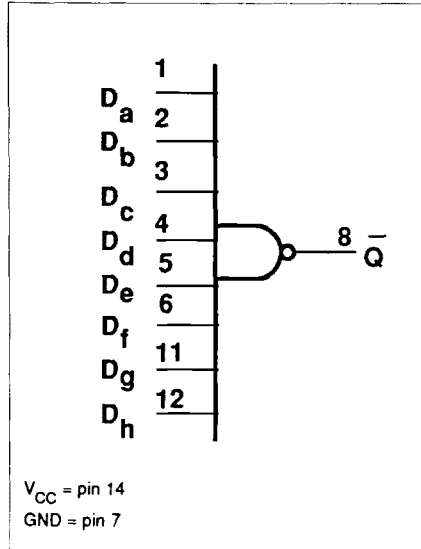
#### LOGIC SYMBOL (IEEE/IEC)



Gate

FAST 74F30

LOGIC DIAGRAM



FUNCTION TABLE

INPUTS								OUTPUT
$D_a$	$D_b$	$D_c$	$D_d$	$D_e$	$D_f$	$D_g$	$D_h$	$\bar{Q}$
L	X	X	X	X	X	X	X	H
X	L	X	X	X	X	X	X	H
X	X	L	X	X	X	X	X	H
X	X	X	L	X	X	X	X	H
X	X	X	X	L	X	X	X	H
X	X	X	X	X	L	X	X	H
X	X	X	X	X	X	L	X	H
X	X	X	X	X	X	X	L	H
H	H	H	H	H	H	H	H	L

H = High voltage level  
 L = Low voltage level  
 X = Don't care

**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	40	mA
$T_A$	Operating free-air temperature range	0 to +70	°C
$T_{STG}$	Storage temperature	-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
$V_H$	High-level input voltage	2.0			V
$V_L$	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
$T_A$	Operating free-air temperature range	0		70	°C

Gate

FAST 74F30

**DC ELECTRICAL CHARACTERISTICS** (Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>	LIMITS			UNIT	
			Min	Typ <sup>2</sup>	Max		
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX	±10%V <sub>CC</sub>		2.5	V	
		V <sub>IH</sub> = MIN, I <sub>OH</sub> = MAX	±5%V <sub>CC</sub>		2.7	3.4	
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX	±10%V <sub>CC</sub>		0.30	0.50	
		V <sub>IH</sub> = MIN, I <sub>OL</sub> = MAX	±5%V <sub>CC</sub>		0.30	0.50	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>		-0.73	-1.2	V	
I <sub>I</sub>	Input current at maximum input voltage	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7.0V			100	μA	
I <sub>IH</sub>	High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V			20	μA	
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V			-0.6	mA	
I <sub>OS</sub>	Short circuit output current <sup>3</sup>	V <sub>CC</sub> = MAX		-60	-150	mA	
I <sub>CC</sub>	Supply current (total)	I <sub>CCH</sub> I <sub>CCL</sub>	V <sub>CC</sub> = MAX	V <sub>IN</sub> =GND	0.6	1.5	mA
				V <sub>IN</sub> =4.5V	2.8	4.0	mA

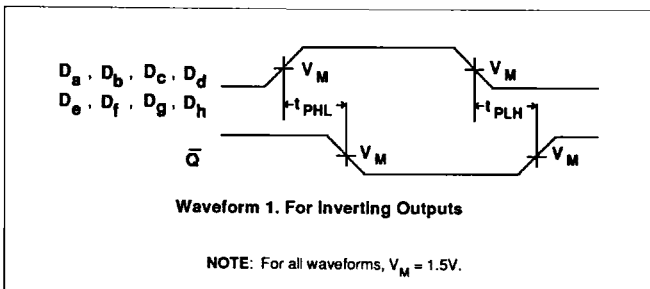
**NOTES:**

- 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<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.
- Not more than one output should be shorted at a time. For testing I<sub>OS</sub>, 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<sub>OS</sub> tests should be performed last.

**AC ELECTRICAL CHARACTERISTICS**

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T <sub>A</sub> = +25°C			T <sub>A</sub> = 0°C to +70°C		
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay D <sub>a</sub> , D <sub>b</sub> , D <sub>c</sub> , D <sub>d</sub> , D <sub>e</sub> , D <sub>f</sub> , D <sub>g</sub> , D <sub>h</sub> to $\bar{Q}$	Waveform 1	1.5 1.0	3.5 3.0	5.0 4.5	1.5 1.0	5.5 5.0	ns

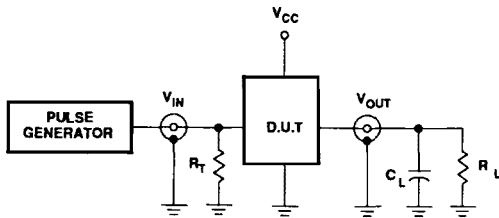
**AC WAVEFORMS**



Gate

FAST 74F30

TEST CIRCUIT AND WAVEFORMS



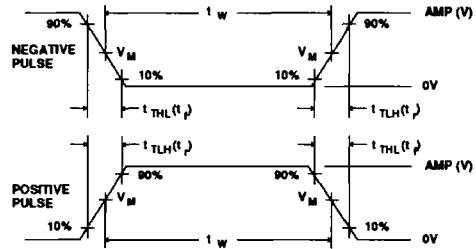
Test Circuit For Totem-Pole Outputs

DEFINITIONS

$R_L$  = Load resistor; see AC CHARACTERISTICS for value.

$C_L$  = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

$R_T$  = Termination resistance should be equal to  $Z_{OUT}$  of pulse generators.



$V_M = 1.5V$

Input Pulse Definition

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	$t_W$	$t_{TLH}$	$t_{THL}$
74F	3.0V	1MHz	500ns	2.5ns	2.5ns