

FAST 74F10, 74F11 Gates

FAST Products

74F10 Triple 3-Input NAND Gate
74F11 Triple 3-Input AND Gate

Product Specification

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F10	3.5ns	3.3mA
74F11	4.2ns	5.3mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
14-Pin Plastic DIP	N74F10N, N74F11N
14-Pin Plastic SO	N74F10D, N74F11D

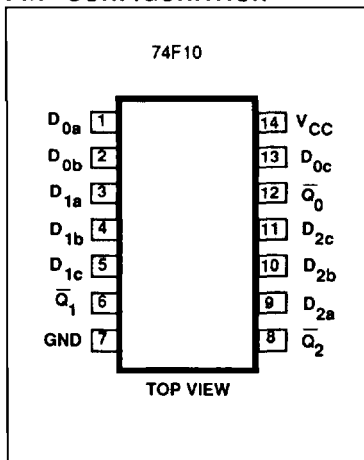
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D_{na} , D_{nb} , D_{nc}	Data inputs	1.0/1.0	20 μ A/0.6mA
\bar{Q}_n	Data output ('F10)	50/33	1.0mA/20mA
Q_n	Data output ('F11)	50/33	1.0mA/20mA

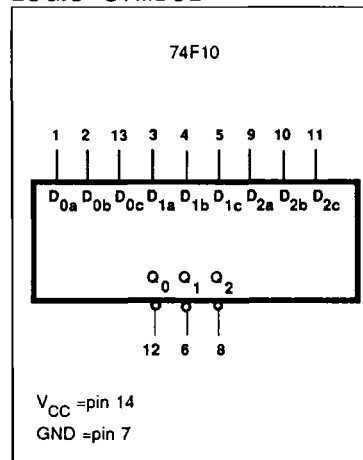
NOTE:

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

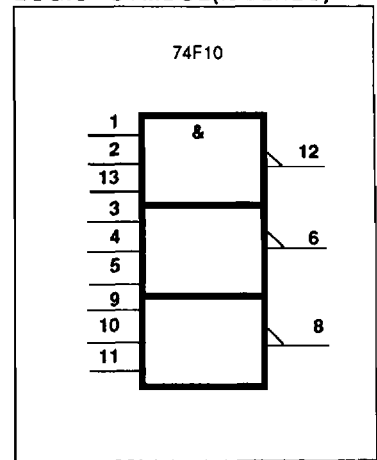
PIN CONFIGURATION



LOGIC SYMBOL



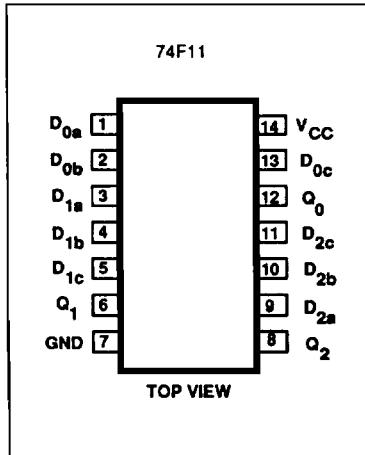
LOGIC SYMBOL (IEEE/IEC)



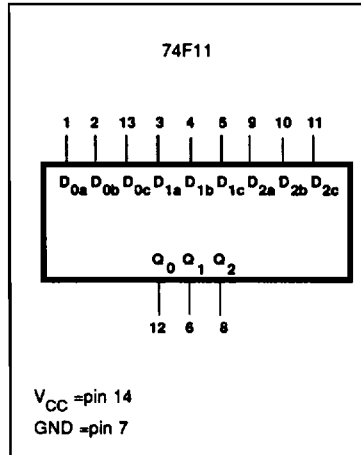
Gates

74F10, 74F11

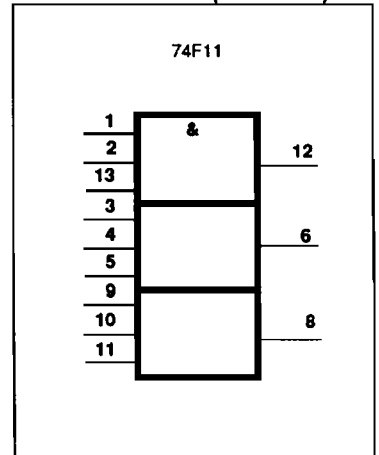
PIN CONFIGURATION



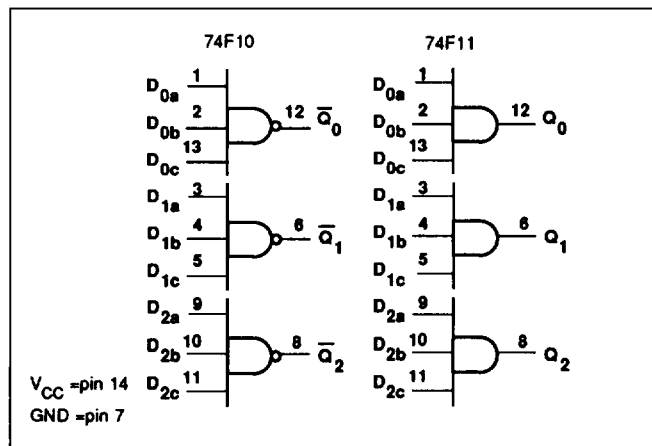
LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



LOGIC DIAGRAM



FUNCTION TABLE

INPUTS			OUTPUTS	
			74F10	74F11
D _{na}	D _{nb}	D _{nc}	Q̄ _n	Q _n
L	L	L	H	L
L	L	H	H	L
L	H	L	H	L
L	H	H	H	L
H	L	L	H	L
H	L	H	H	L
H	H	L	H	L
H	H	H	L	H

H = High voltage level
 L = Low voltage level

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

Gates

74F10, 74F11

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_A	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	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$	2.5		V		
		$V_{IH} = \text{MIN}, I_{OH} = \text{MAX}$	$\pm 5\%V_{CC}$	2.7	3.4	V		
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$		0.35	0.50	V	
		$V_{IH} = \text{MIN}, I_{OL} = \text{MAX}$	$\pm 5\%V_{CC}$		0.35	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	$V_{CC} = \text{MAX}$		-60	-150	mA		
I_{CC}	Supply current (total)	'F10	I_{CCH}	$V_{IN} = \text{GND}$		1.8	2.1	mA
			I_{CCL}	$V_{IN} = 4.5\text{V}$		6.0	7.7	mA
		'F11	I_{CCH}	$V_{IN} = 4.5\text{V}$		4.7	6.2	mA
			I_{CCL}	$V_{IN} = \text{GND}$		7.2	9.7	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 $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.
- 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 test, I_{OS} tests should be performed last.

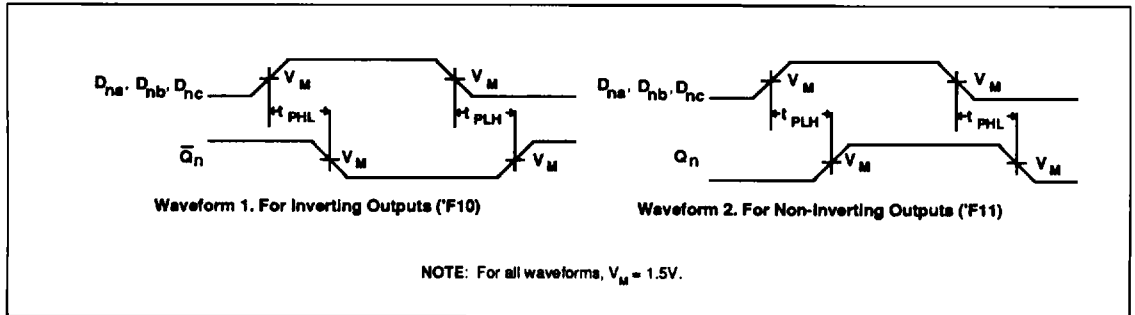
Gates

74F10, 74F11

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT	
			$T_A = +25^\circ\text{C}$ $V_{CC} = 5\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			
			Min	Typ	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation delay D_{na}, D_{nb}, D_{nc} to \bar{Q}_n	74F10	Waveform 1	2.4 1.5	3.7 3.2	5.0 4.3	2.4 1.5	6.0 5.3	ns
t_{PLH} t_{PHL}	Propagation delay D_{na}, D_{nb}, D_{nc} to Q_n	74F11	Waveform 2	3.0 2.5	4.2 4.1	5.6 5.5	3.0 2.5	6.6 6.5	ns

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

