

# FAST 74F32

## Gate

Quad Two-Input OR Gate

### FAST Products

### Product Specification

### FUNCTION TABLE

INPUTS		OUTPUT
D <sub>na</sub>	D <sub>nb</sub>	Q <sub>n</sub>
L	L	L
L	H	H
H	L	H
H	H	H

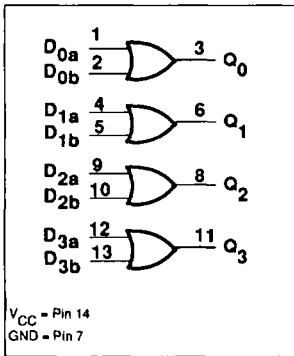
H = High voltage level  
L = Low voltage level

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F32	4.1 ns	8.2 mA

### ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE V <sub>CC</sub> = 5V±10%; T <sub>A</sub> = 0°C to +70°C
14-Pin Plastic DIP	N74F32N
14-Pin Plastic SO	N74F32D

### LOGIC DIAGRAM



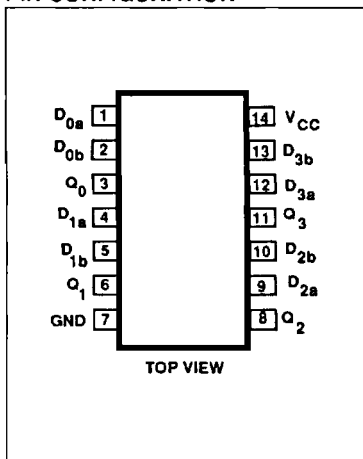
### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D <sub>na</sub> , D <sub>nb</sub>	Data inputs	1.0/1.0	20µA/0.6mA
Q <sub>n</sub>	Data output	50/33	1.0mA/20mA

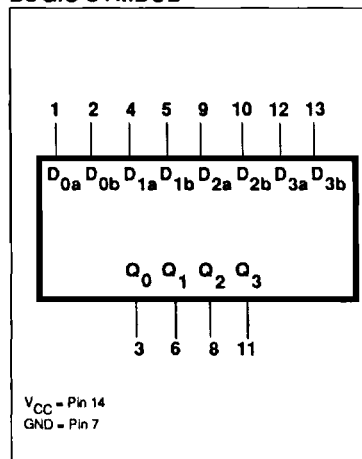
#### NOTE:

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

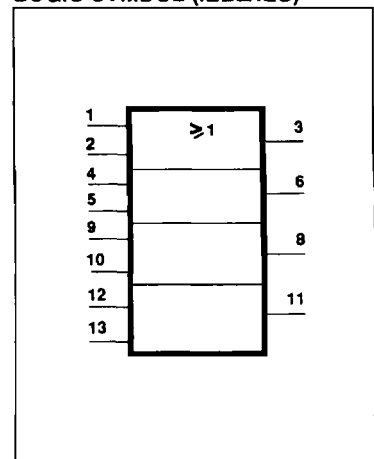
### PIN CONFIGURATION



### LOGIC SYMBOL



### LOGIC SYMBOL (IEEE/IEC)



## Gate

## FAST 74F32

**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
$V_{IH}$	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 <sup>1</sup>	LIMITS			UNIT
			Min	Typ <sup>2</sup>	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	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}, I_{OL} = \text{MAX}$	$\pm 10\%V_{CC}$		0.35 0.50	V
			$\pm 5\%V_{CC}$		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	$V_{CC} = \text{MAX}, V_I = 7.0V$			100	$\mu A$
$I_{IH}$	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7V$			20	$\mu A$
$I_{IL}$	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.5V$			-0.6	mA
$I_{OS}$	Short circuit output current <sup>3</sup>	$V_{CC} = \text{MAX}$		-60	-150	mA
$I_{CC}$	Supply current (total)	$V_{CC} = \text{MAX}$	$V_{IN} = 4.5V$		6.1 9.2	mA
			$V_{IN} = \text{GND}$		10.3 15.5	mA

**NOTES:**

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.

2. All typical values are at  $V_{CC} = 5V, T_A = 25^\circ C$ .

3. 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.

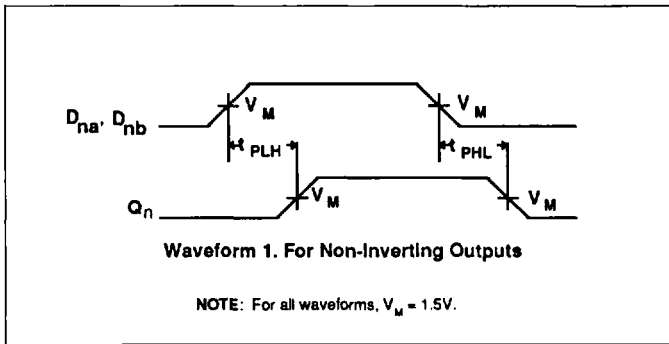
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AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			$T_A = +25^\circ\text{C}$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$		
			Min	Typ	Max	Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation delay $D_{na}, D_{nb}$ to $Q_n$	Waveform 1	3.0	4.2	5.6	3.0	6.6	ns
			3.0	4.0	5.3	3.0	6.3	

AC WAVEFORMS



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