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Status	Product Specification
FAST Products	

FAST 74F86

Gate

Quad 2-Input Exclusive-OR Gate

FEATURE

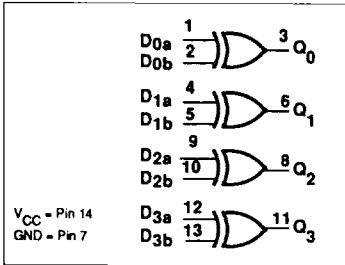
- Industrial temperature range available (-40°C to +85°C)

FUNCTION TABLE

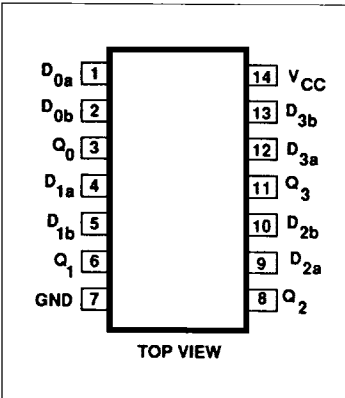
INPUTS		OUTPUT
D _{na}	D _{nb}	Q _n
L	L	L
L	H	H
H	L	H
H	H	L

H = High voltage level
L = Low voltage level

LOGIC DIAGRAM



PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F86	4.3 ns	16.5 mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE V _{CC} = 5V±10% T _A = 0°C to +70°C	INDUSTRIAL RANGE V _{CC} = 5V±10% T _A = -40°C to +85°C
14-Pin Plastic DIP	N74F86N	I74F86N
14-Pin Plastic SO	N74F86D	I74F86D

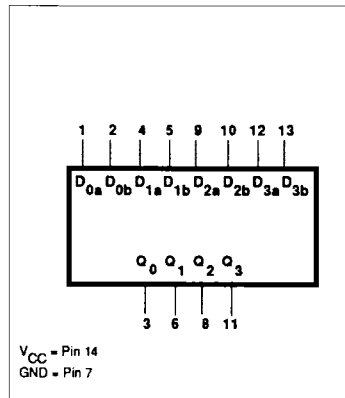
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D _{na} , D _{nb}	Data inputs	1.0/1.0	20µA/0.6mA
Q _n	Data output	50/33	1.0mA/20mA

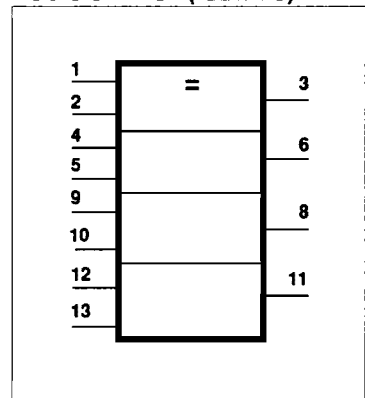
NOTE:

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

LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Gate

FAST 74F86

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	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°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	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	±10%V _{CC}	2.5		V		
		V _{IH} = MIN, I _{OH} = MAX	±5%V _{CC}	2.7	3.4	V		
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IL} = MAX	±10%V _{CC}		0.30	0.50	V	
		V _{IH} = MIN, I _{OL} = MAX	±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 _{ILL}	Low-level input current	V _{CC} = MAX, V _I = 0.5V				-0.6	mA	
I _{OS}	Short-circuit output current ³	V _{CC} = MAX				-60	-150	mA
I _{CC}	Supply current (total)	I _{CCH} I _{CCL}	V _{CC} = MAX	D _{0a} = GND, D _{0b} = 4.5V		15	23	mA
						V _{IN} = 4.5V	18	28

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable typ5
- All typical values are at V_{CC} = 5V, T_A = 25°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.

Gate

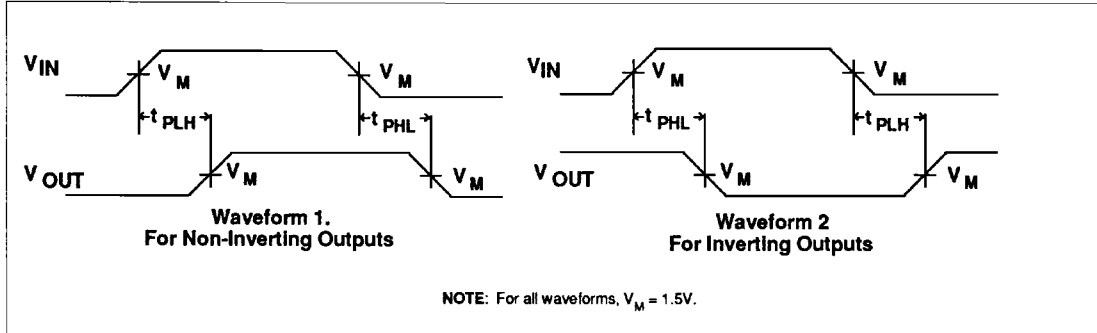
FAST 74F86

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT	
			$T_A = +25^\circ\text{C}$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Typ	Max	Min	Max	Min		Max
t_{PLH} t_{PHL}	Propagation delay D_{na} or D_{nb} to Q_n (Other input Low)	Waveform 1	3.0	4.0	5.5	3.0	6.5	3.0	7.0	ns
t_{PLH} t_{PHL}	Propagation delay D_{na} or D_{nb} to Q_n (Other input High)	Waveform 2	3.5	5.3	7.0	3.5	8.0	3.5	10.0	

$V_{CC} = 5V$
 $C_L = 50pF$
 $R_L = 500\Omega$

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

