

FAST 74F521

8-Bit Identity Comparator

FAST Products

Comparator

FEATURES

- Compares two 8-bit words in 6.5ns typical
- Expandable to any word length
- High speed version of ALS688

Product Specification

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F521	7.0ns	24mA

DESCRIPTION

The 74F521 is an expandable 8-bit comparator. It compares two words of up to 8 bits each and provides a Low output when the two words match bit for bit. The expansion input $\bar{T}_{A=B}$ also serves as an active-Low enable input.

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
20-Pin Plastic DIP	N74F521N
20-Pin Plastic SO	N74F521D

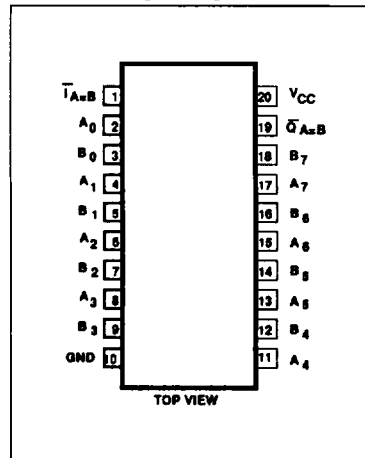
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$A_0 - A_7$	Word A inputs	1.0/1.0	20 μ A/0.6mA
$B_0 - B_7$	Word B inputs	1.0/1.0	20 μ A/0.6mA
$\bar{T}_{A=B}$	Expansion or Enable input (active Low)	1.0/1.0	20 μ A/0.6mA
$\bar{Q}_{A=B}$	Identity output (active Low)	50/33	1.0mA/20mA

NOTE:

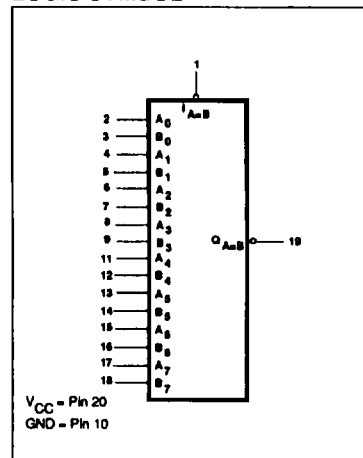
One (1.0) FAST Unit Load is defined as: 20 μ A in the High state and 0.6mA in the Low state.

PIN CONFIGURATION



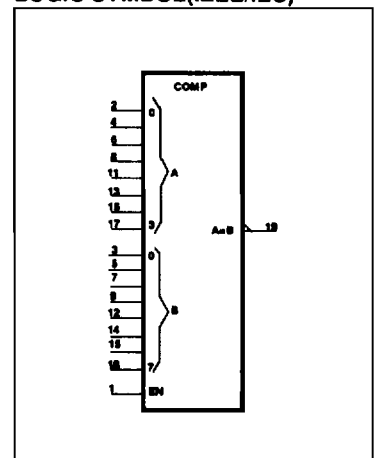
September 19, 1988

LOGIC SYMBOL



6-460

LOGIC SYMBOL (IEEE/IEC)

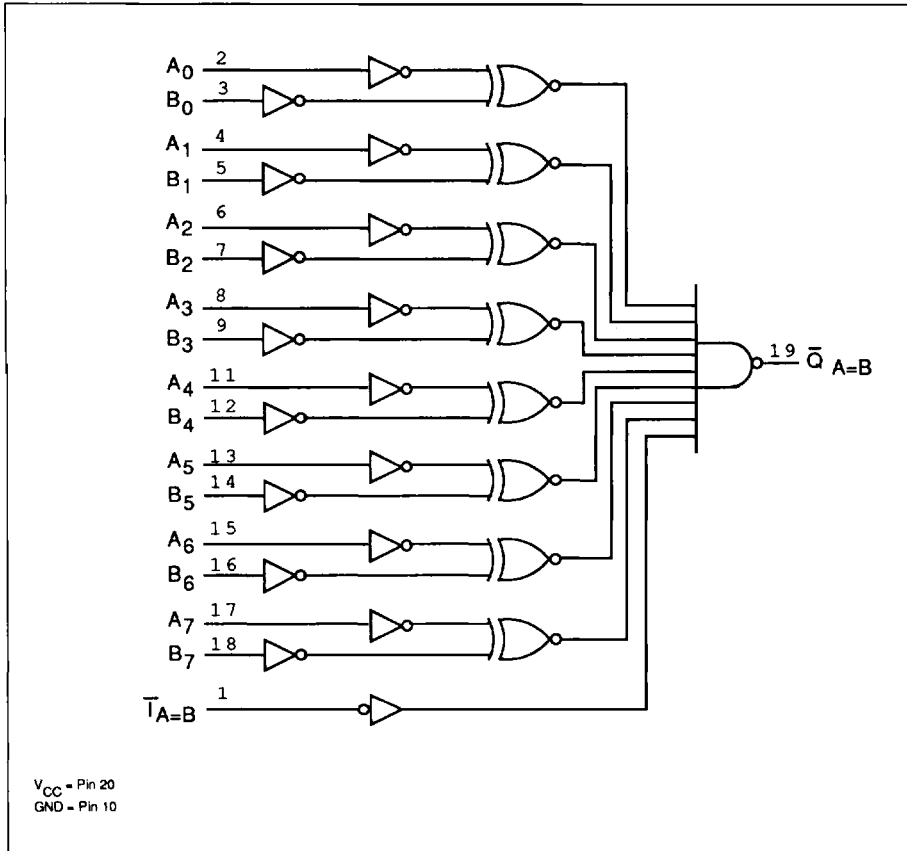


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Comparator

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LOGIC DIAGRAM



FUNCTION TABLE

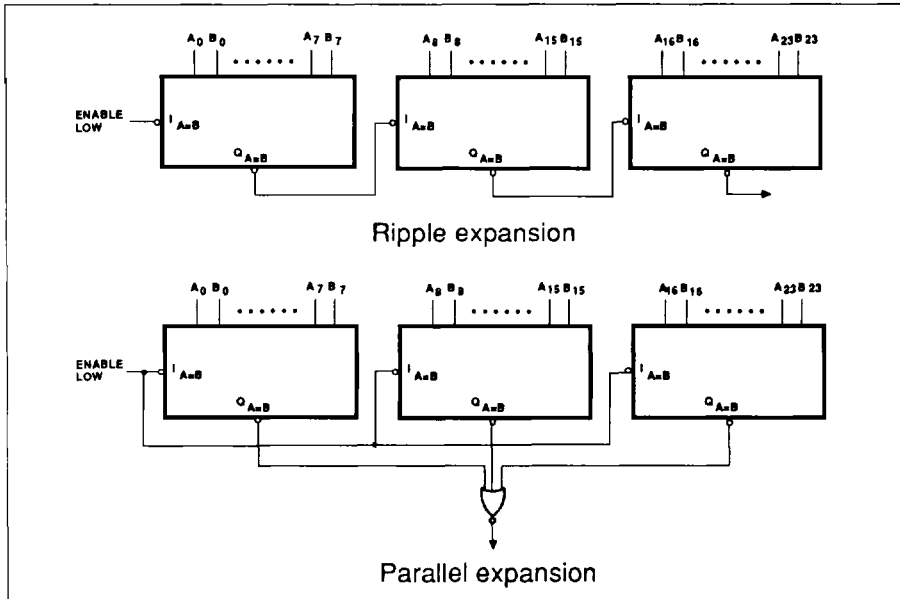
INPUTS		OUTPUT
$\bar{T}_{A=B}$	A, B	$\bar{Q}_{A=B}$
L	$A=B^*$	L
L	$A \neq B$	H
H	$A=B^*$	H
H	$A \neq B$	H

H = High voltage level
 L = Low voltage level
 X = Don't care
 * $A_0=B_0, A_1=B_1, A_2=B_2, \text{ etc.}$

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APPLICATIONS



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

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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} = MAX	±10%V _{CC}	2.5		V	
			±5%V _{CC}	2.7	3.4	V	
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IL} = MAX V _{IH} = MIN, I _{OL} = MAX	±10%V _{CC}		0.30	0.50	V
			±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 _{OS}	Short circuit output current ³	V _{CC} = MAX		-60	-150	mA	
I _{CC}	Supply current (total)	I _{CCH} I _{CCL}	V _{CC} = MAX		24	36	mA
					24	36	mA

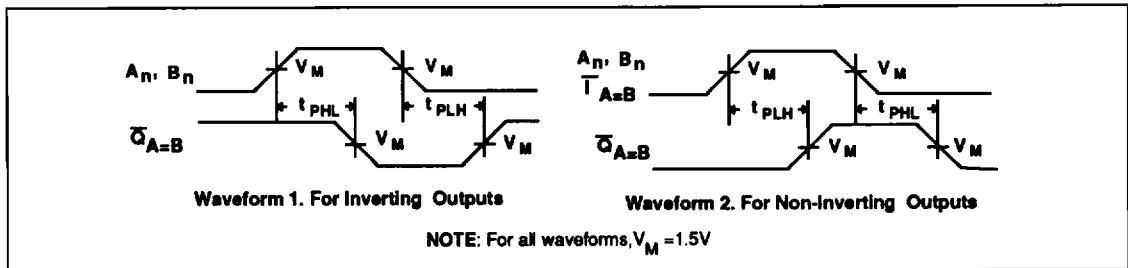
NOTES:

- 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} = 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.

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			T _A = +25°C V _{CC} = 5V C _L = 50pF R _L = 500Ω			T _A = 0°C to +70°C V _{CC} = 5V ±10% C _L = 50pF R _L = 500Ω			
			Min	Typ	Max	Min	Max		
t _{PLH} t _{PHL}	Propagation delay A _n or B _n to \bar{Q}_{A-B}	Waveform 1,2	3.5 3.0	8.0 8.0	9.5 9.0	3.5 2.5	11.0 10.5	ns	
t _{PLH} t _{PHL}	Propagation delay A _n to \bar{Q}_{A-B}	Waveform 2	3.0 3.5	5.0 6.5	6.5 7.0	3.0 3.5	7.5 8.0	ns	

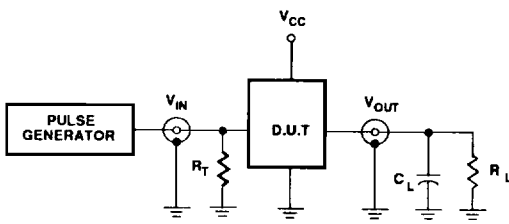
AC WAVEFORMS



Comparator

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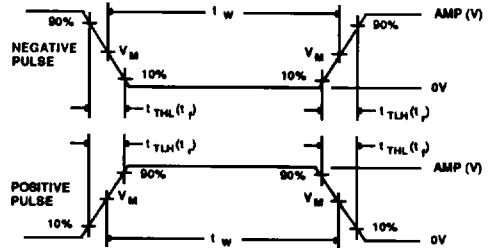
TEST CIRCUIT AND WAVEFORMS



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	$t_{TLH}(t_p)$	t_{THL}
74F	3.0V	1MHz	500ns	2.5ns	2.5ns