

April 1988 Revised October 2000

# 74F5218-Bit Identity Comparator

## **General Description**

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

#### **Features**

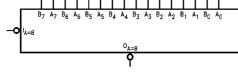
- Compares two 8-bit words in 6.5 ns typ
- Expandable to any word length
- 20-pin package

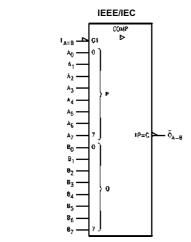
## **Ordering Code:**

Order Number	Package Number	Package Description
74F521SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
74F521SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F521MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide
74F521PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

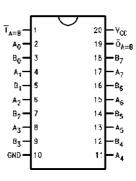
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

#### **Logic Symbols**





#### **Connection Diagram**



# **Unit Loading/Fan Out**

Pin Names	Decement	U.L.	Input I <sub>IH</sub> /I <sub>IL</sub>	
	Description	HIGH/LOW	Output I <sub>OH</sub> /I <sub>OL</sub>	
A <sub>0</sub> -A <sub>7</sub>	Word A Inputs	1.0/1.0	20 μA/ <del>-</del> 0.6 mA	
B <sub>0</sub> –B <sub>7</sub>	Word B Inputs	1.0/1.0	20 μA/ <del>-</del> 0.6 mA	
Ī <sub>A≔B</sub>	Expansion or Enable Input (Active LOW)	1.0/1.0	20 μA/ <b>–</b> 0.6 mA	
$\overline{O}_{A=B}$	Identity Output (Active LOW)	50/33.3	-1 mA/20 mA	

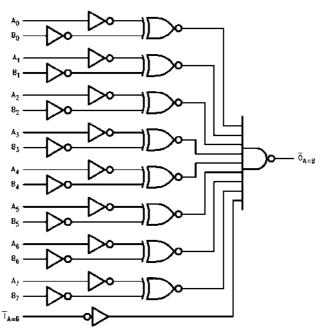
### **Truth Table**

Ir	Output			
Ī <sub>A = B</sub>	A, B	O <sub>A = B</sub>		
L	A = B (Note 1)	L		
L	A≠B	Н		
Н	A = B (Note 1)	Н		
Н	A≠B	Н		

H = HIGH Voltage Level L = LOW Voltage Level

**Note 1:**  $A_0 = B_0$ ,  $A_1 = B_1$ ,  $A_2 = B_2$ , etc.

# **Logic Diagram**



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

#### **Absolute Maximum Ratings**(Note 2)

Storage Temperature -65°C to +150°C Ambient Temperature under Bias -55°C to +125°C Junction Temperature under Bias -55°C to +150°C V<sub>CC</sub> Pin Potential to Ground Pin -0.5V to +7.0V Input Voltage (Note 3) -0.5V to +7.0V

Input Current (Note 3) -30 mA to +5.0 mA

Voltage Applied to Output

in HIGH State (with  $V_{CC} = 0V$ )

Standard Output 3-STATE Output

Current Applied to Output

in LOW State (Max) twice the rated I<sub>OL</sub> (mA)

#### **Recommended Operating Conditions**

Free Air Ambient Temperature 0°C to +70°C Supply Voltage +4.5V to +5.5V

Note 2: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

-0.5V to +5.5V Note 3: Either voltage limit or current limit is sufficient to protect inputs.

#### **DC Electrical Characteristics**

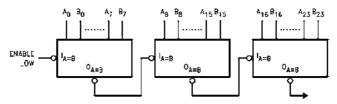
Symbol	Parameter	Min	Тур	Max	Units	V <sub>cc</sub>	Conditions	
V <sub>IH</sub>	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal	
V <sub>IL</sub>	Input LOW Voltage			0.8	V		Recognized as a LOW Signal	
V <sub>CD</sub>	Input Clamp Diode Voltage			-1.2	V	Min	I <sub>IN</sub> = -18 mA	
V <sub>OH</sub>	Output HIGH 10% V <sub>CC</sub>	2.5			V	Min	I <sub>OH</sub> = -1 mA	
	Voltage 5% V <sub>CC</sub>	2.7			V	IVIIII	$I_{OH} = -1 \text{ mA}$	
V <sub>OL</sub>	Output LOW 10% V <sub>CC</sub>			0.5	V	Min	I <sub>OI</sub> = 20 mA	
	Voltage			0.5	V	IVIIII	10L = 20 IIIA	
I <sub>IH</sub>	Input HIGH Current			5.0	μΑ	Max	$V_{IN} = 2.7V$	
I <sub>BVI</sub>	Input HIGH Current			7.0	μΑ	Max	V <sub>IN</sub> = 7.0V	
	Breakdown Test						VIN = 7.0V	
I <sub>CEX</sub>	Output HIGH			50		Max	V -V	
	Leakage Current			50	μΑ	IVIAX	$V_{OUT} = V_{CC}$	
V <sub>ID</sub>	Input Leakage	4.75			V	0.0	$I_{ID} = 1.9 \mu A$	
	Test	4.75					All Other Pins Grounded	
I <sub>OD</sub>	Output Leakage			3.75	μА	0.0	V <sub>IOD</sub> = 150 mV	
	Circuit Current						All Other Pins Grounded	
I <sub>IL</sub>	Input LOW Current			-0.6	mA	Max	$V_{IN} = 0.5V$	
Ios	Output Short-Circuit Current	-60		-150	mA	Max	$V_{OUT} = 0V$	
I <sub>CCH</sub>	Power Supply Current		21	32	mA	Max	V <sub>O</sub> = HIGH	

# **AC Electrical Characteristics**

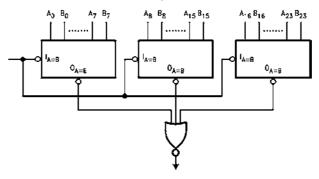
	Parameter	T <sub>A</sub> =+25°C			T <sub>A</sub> = -55°C to +125°C		T <sub>A</sub> = 0°C to +70°C		Units
Symbol		$V_{CC} = +5.0V$ $C_L = 50 \text{ pF}$			$V_{CC} = +5.0V$ $C_L = 50 \text{ pF}$		$V_{CC} = +5.0V$ $C_L = 50 \text{ pF}$		
		Min	Тур	Max	Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay	3.0	7.0	10.0	3.0	14.0	3.0	11.0	ns
t <sub>PHL</sub>	$A_n$ or $B_n$ to $\overline{O}_{A=B}$	4.5	7.0	10.0	4.0	15.0	4.0	11.0	
t <sub>PLH</sub>	Propagation Delay	3.0	5.0	6.5	3.0	8.5	3.0	7.5	
t <sub>PHL</sub>	$\overline{I}_{A=B}$ to $\overline{O}_{A=B}$	3.5	6.5	9.0	3.5	13.5	3.5	10.0	ns

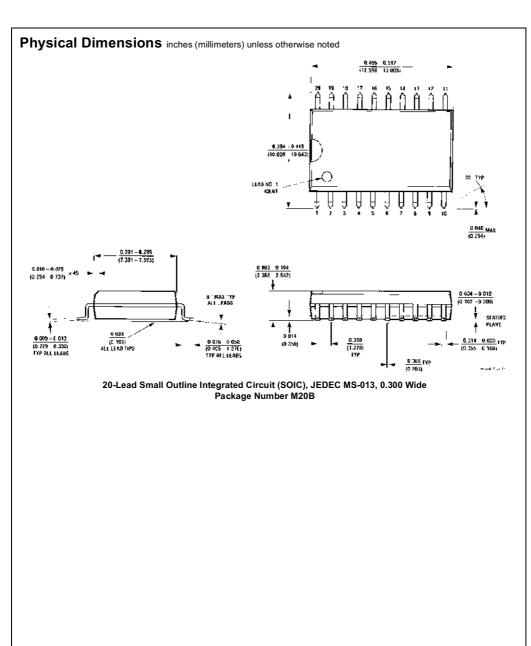
# **Applications**

#### Ripple Expansion



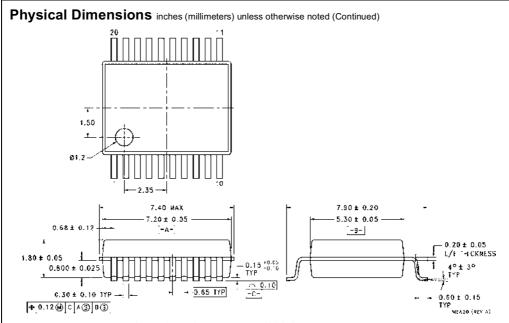
#### **Parallel Expansion**



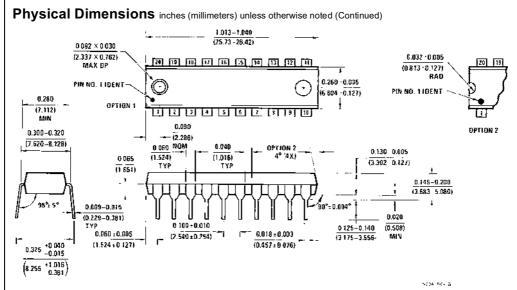


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# $\textbf{Physical Dimensions} \ \ \text{inches (millimeters) unless otherwise noted (Continued)}$ 9.21 39 ALLEADIPS 10 1.27 (YO ---J AND PATTERN RECOMMENDATION AL 11 AO 13°5 SET DETAL A 1.8+0.1 0.15 0.25 0.15+0.05 -0.35 0.51 ◆ 0.12 **⋈** ○ ∧ > 7.1∀P DIMENSIONS ARE IN VIOLENS NOTES A CONTOBAS TO HALLT DB 7320 PF CIST-PATION, F STABLISH D IN DECENSER, 1998. B. DIMENSIONS AFF DAME, WETERS. C. DIMENSIONS ARE DAME, WETERS, VOLD FLASH, AND THE BAH EXTHUSIONS. [ <u>0.7</u>6] 0.60+0.16 SEATING PLANE 1.25 → M20DRevB1 DETAIL A 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D



20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide Package Number MSA20



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N20A

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