

## 74F521 8-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  $\bar{I}_{A=B}$  also serves as an active LOW enable input.

### Features

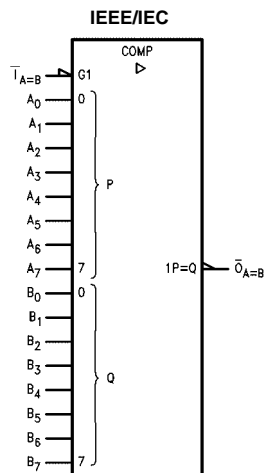
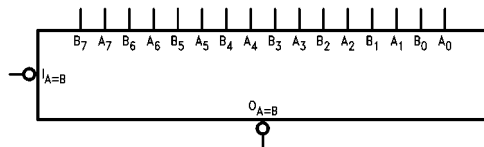
- Compares two 8-bit words in 6.5 ns typ
- Expandable to any word length
- 20-pin package

### Ordering Code:

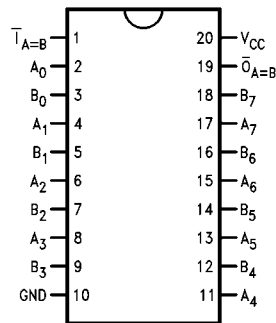
| Order Number | Package Number | Package Description   |
|--------------|----------------|---|
| 74F521SC     | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F521SJ     | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| 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       | Description                            | U.L.     |   |
|-----------------|--|----------|---|
|                 |  | HIGH/LOW | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
| $A_0$ – $A_7$   | Word A Inputs                          | 1.0/1.0  | $20 \mu A$ / $-0.6 \text{ mA}$                  |
| $B_0$ – $B_7$   | Word B Inputs                          | 1.0/1.0  | $20 \mu A$ / $-0.6 \text{ mA}$                  |
| $\bar{I}_{A=B}$ | Expansion or Enable Input (Active LOW) | 1.0/1.0  | $20 \mu A$ / $-0.6 \text{ mA}$                  |
| $\bar{O}_{A=B}$ | Identity Output (Active LOW)           | 50/33.3  | $-1 \text{ mA}$ / $20 \text{ mA}$               |

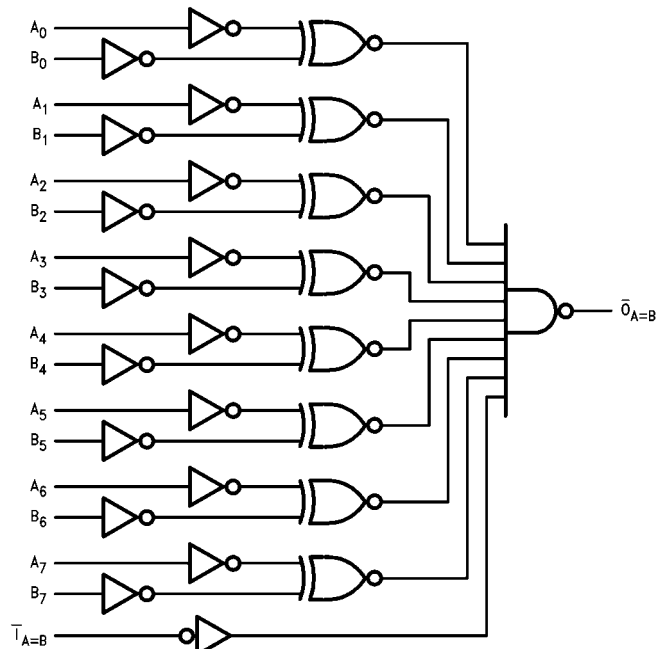
## Truth Table

| Inputs          |                | Output          |
|-----------------|----------------|-----------------|
| $\bar{I}_{A=B}$ | A, B           | $\bar{O}_{A=B}$ |
| L               | A = B (Note 1) | L               |
| L               | A $\neq$ B     | H               |
| H               | A = B (Note 1) | H               |
| H               | A $\neq$ B     | H               |

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<br>in HIGH State (with V <sub>CC</sub> = 0V) |                                      |
| Standard Output  | -0.5V to V <sub>CC</sub>             |
| 3-STATE Output   | -0.5V to +5.5V                       |
| Current Applied to Output<br>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.

**Note 3:** Either voltage limit or current limit is sufficient to protect inputs.

**DC Electrical Characteristics**

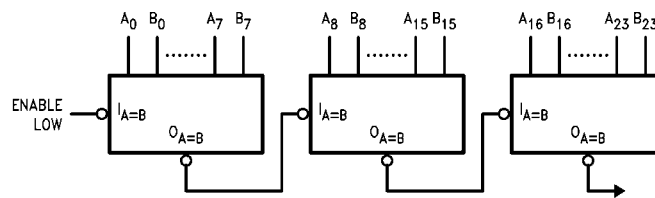
| Symbol           | Parameter                         | Min                 | Typ | Max  | Units | V <sub>CC</sub> | Conditions   |
|------------------|-----------------------------------|---------------------|-----|------|-------|-----------------|--|
| V <sub>IH</sub>  | Input HIGH Voltage                | 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 Voltage               | 10% V <sub>CC</sub> | 2.5 |      | V     | Min             | I <sub>OH</sub> = -1 mA                              |
|                  |                                   | 5% V <sub>CC</sub>  | 2.7 |      |       |                 | I <sub>OH</sub> = -1 mA                              |
| V <sub>OL</sub>  | Output LOW Voltage                |                     |     | 0.5  | V     | Min             | I <sub>OL</sub> = 20 mA                              |
| I <sub>IH</sub>  | Input HIGH Current                |                     |     | 5.0  | μA    | Max             | V <sub>IN</sub> = 2.7V                               |
| I <sub>BVI</sub> | Input HIGH Current Breakdown Test |                     |     | 7.0  | μA    | Max             | V <sub>IN</sub> = 7.0V                               |
| I <sub>CEX</sub> | Output HIGH Leakage Current       |                     |     | 50   | μA    | Max             | V <sub>OUT</sub> = V <sub>CC</sub>                   |
| V <sub>ID</sub>  | Input Leakage Test                | 4.75                |     |      | V     | 0.0             | I <sub>ID</sub> = 1.9 μA<br>All Other Pins Grounded  |
| I <sub>OD</sub>  | Output Leakage Circuit Current    |                     |     | 3.75 | μA    | 0.0             | V <sub>IOD</sub> = 150 mV<br>All Other Pins Grounded |
| I <sub>IL</sub>  | Input LOW Current                 |                     |     | -0.6 | mA    | Max             | V <sub>IN</sub> = 0.5V                               |
| I <sub>OS</sub>  | Output Short-Circuit Current      | -60                 |     | -150 | mA    | Max             | V <sub>OUT</sub> = 0V                                |
| I <sub>CCH</sub> | Power Supply Current              |                     | 21  | 32   | mA    | Max             | V <sub>O</sub> = HIGH                                |

## AC Electrical Characteristics

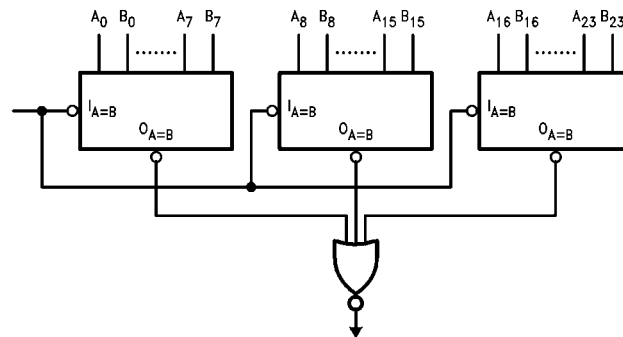
| Symbol    | Parameter                                    | $T_A = +25^\circ\text{C}$ |     |      | $T_A = -55^\circ\text{C to } +125^\circ\text{C}$ |      | $T_A = 0^\circ\text{C to } +70^\circ\text{C}$ |      | Units |
|-----------|--|---------------------------|-----|------|--|------|---|------|-------|
|           |  | $V_{CC} = +5.0\text{V}$   |     |      | $V_{CC} = +5.0\text{V}$                          |      | $V_{CC} = +5.0\text{V}$                       |      |       |
|           |  | $C_L = 50\text{ pF}$      |     |      | $C_L = 50\text{ pF}$                             |      | $C_L = 50\text{ pF}$                          |      |       |
|           |  | Min                       | Typ | Max  | Min  | Max  | Min   | Max  |       |
| $t_{PLH}$ | Propagation Delay                            | 3.0                       | 7.0 | 10.0 | 3.0  | 14.0 | 3.0   | 11.0 | ns    |
| $t_{PHL}$ | $A_n$ or $B_n$ to $\overline{O}_{A=B}$       | 4.5                       | 7.0 | 10.0 | 4.0  | 15.0 | 4.0   | 11.0 |       |
| $t_{PLH}$ | Propagation Delay                            | 3.0                       | 5.0 | 6.5  | 3.0  | 8.5  | 3.0   | 7.5  | ns    |
| $t_{PHL}$ | $\overline{I}_{A=B}$ to $\overline{O}_{A=B}$ | 3.5                       | 6.5 | 9.0  | 3.5  | 13.5 | 3.5   | 10.0 |       |

## Applications

## Ripple Expansion



## Parallel Expansion

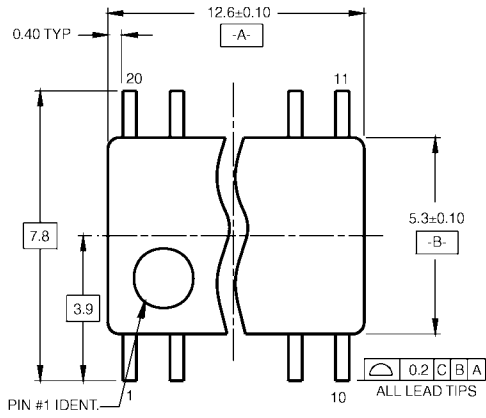


**Physical Dimensions** inches (millimeters) unless otherwise noted

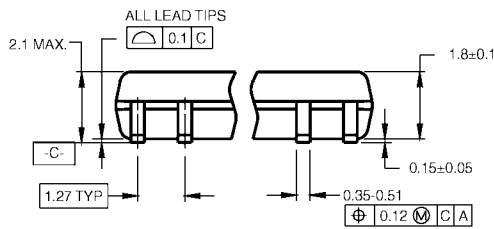


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide Package Number M20B**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



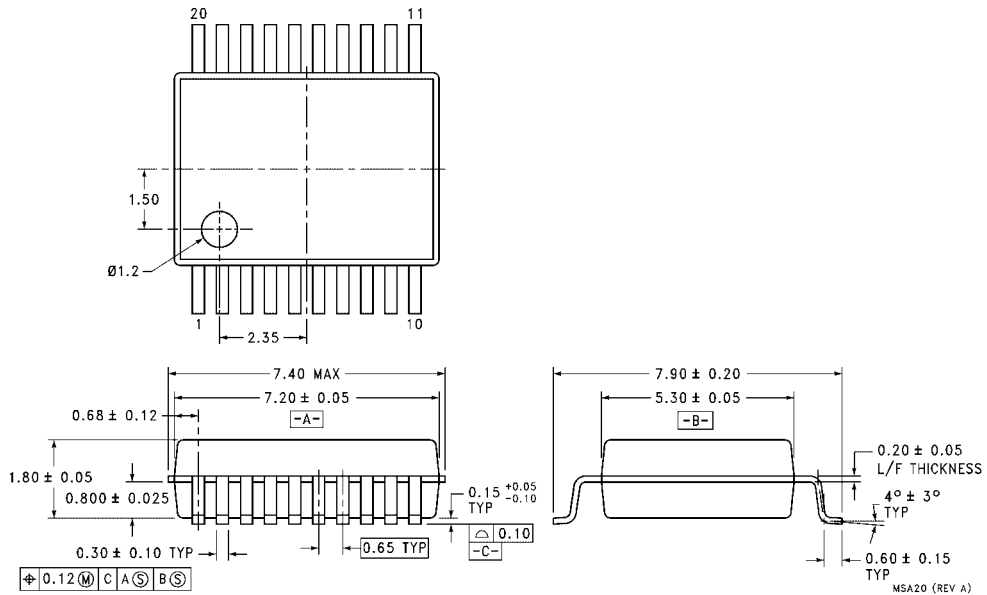
DETAIL A

- NOTES:
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
  - B. DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M20DRevB1

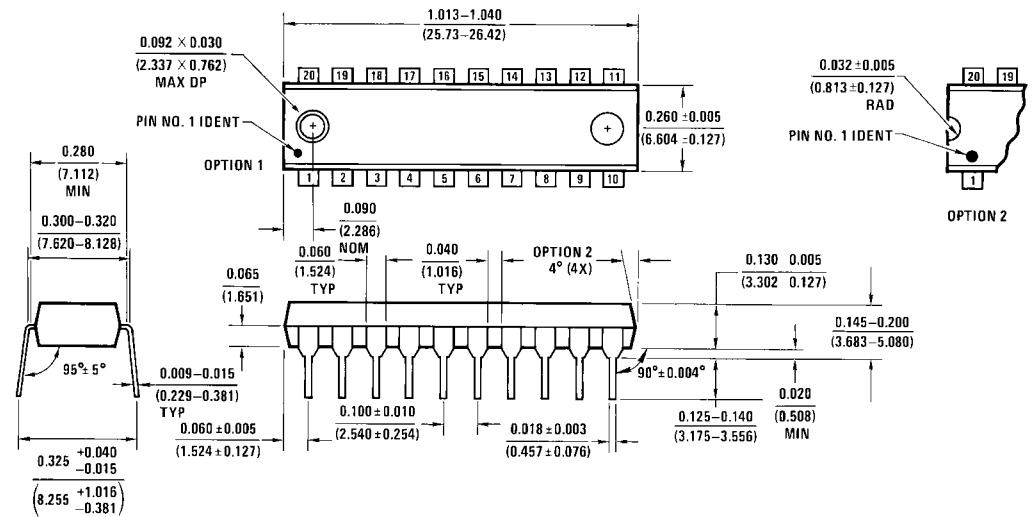
**20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M20D**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



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

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



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

N20A (REV G)

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