

## 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  $\overline{I}_{A=B}$  also serves as an active LOW enable input.

### Features

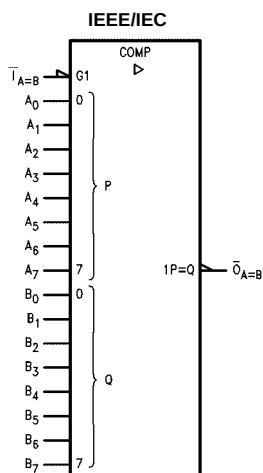
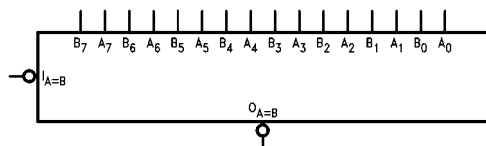
- Compares two 8-bit words in 6.5 ns typ
- Expandable to any word length
- 20-pin package

### Ordering Code:

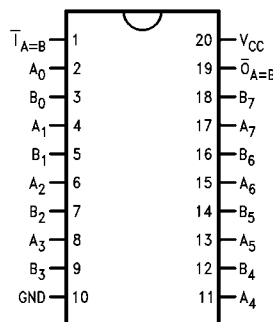
| Order Number | Package Number | Package Description                                                       |
|--------------|----------------|---------------------------------------------------------------------------|
| 74F521SC     | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), 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

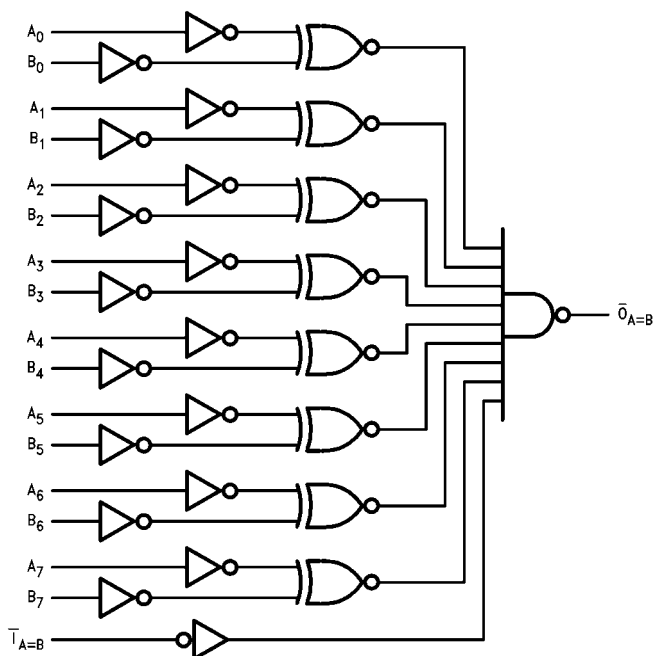
| Pin Names       | Description                            | U.L.<br>HIGH/LOW | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
|-----------------|----------------------------------------|------------------|-------------------------------------------------|
| $A_0$ – $A_7$   | Word A Inputs                          | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| $B_0$ – $B_7$   | Word B Inputs                          | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| $\bar{I}_{A=B}$ | Expansion or Enable Input (Active LOW) | 1.0/1.0          | 20 $\mu$ A/–0.6 mA                              |
| $\bar{O}_{A=B}$ | Identity Output (Active LOW)           | 50/33.3          | –1 mA/20 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.

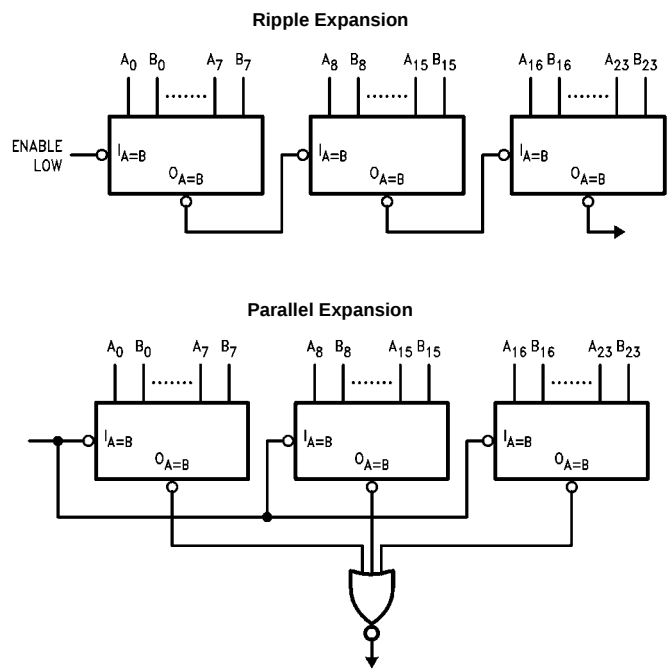
**Note 3:** Either voltage limit or current limit is sufficient to protect inputs.

**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<br>Voltage               | 10% V <sub>CC</sub><br>5% V <sub>CC</sub> | 2.5<br>2.7 |      | V     | Min             | I <sub>OH</sub> = –1 mA<br>I <sub>OH</sub> = –1 mA   |
| V <sub>OL</sub>  | Output LOW<br>Voltage                | 10% V <sub>CC</sub>                       |            | 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<br>Breakdown Test |                                           |            | 7.0  | μA    | Max             | V <sub>IN</sub> = 7.0V                               |
| I <sub>CEX</sub> | Output HIGH<br>Leakage Current       |                                           |            | 50   | μA    | Max             | V <sub>OUT</sub> = V <sub>CC</sub>                   |
| V <sub>ID</sub>  | Input Leakage<br>Test                | 4.75                                      |            |      | V     | 0.0             | I <sub>ID</sub> = 1.9 μA<br>All Other Pins Grounded  |
| I <sub>OD</sub>  | Output Leakage<br>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                                |

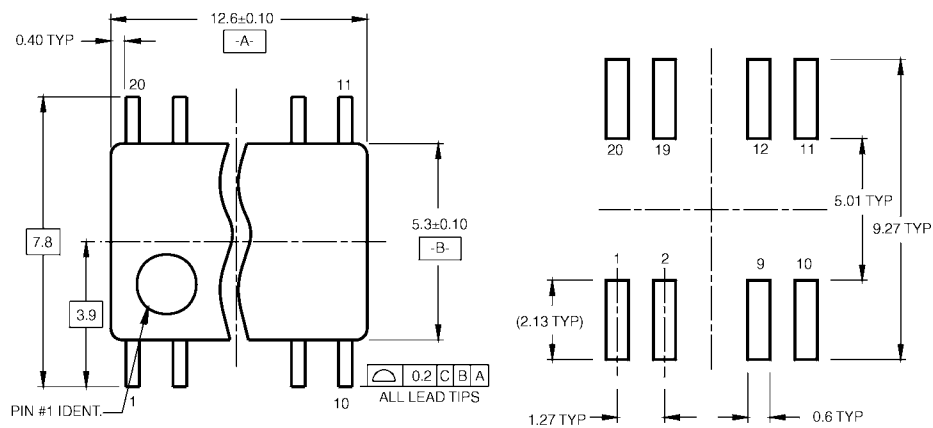
| AC Electrical Characteristics |                                                          |                                                                             |     |      |                                                                                       |      |                                                                                    |      |       |
|-------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------|-----|------|---------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|------|-------|
| Symbol                        | Parameter                                                | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     |      | T <sub>A</sub> = -55°C to +125°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |      | T <sub>A</sub> = 0°C to +70°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |      | Units |
|                               |                                                          | Min                                                                         | Typ | 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 <sub>n</sub> or B <sub>n</sub> 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  | ns    |
| 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 |       |

## Applications



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


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



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS

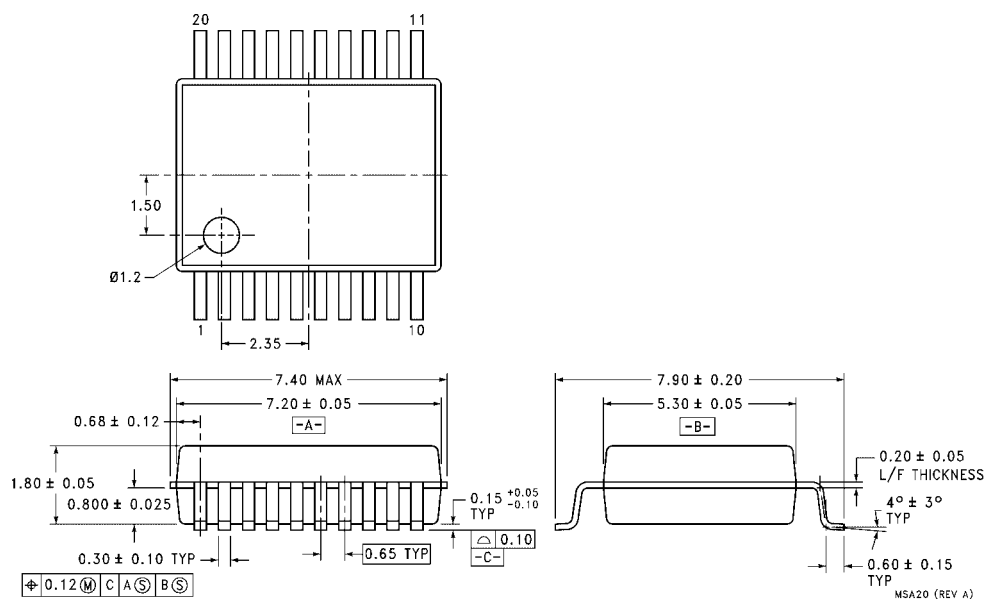


DETAIL A

- 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**



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

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



N20A (REV G)

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

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