


**National  
Semiconductor**

## DM7200/DM8200 4-Bit Magnitude Comparators

### General Description

These devices compare two binary words of four bits in length; and the outputs indicate 1) word A > word B, 2) word A < word B, or 3) word A = word B. A strobe input overrides all other inputs, and when taken to a high logic level, places both outputs in the low state. Comparison of words longer than four bits each may be accomplished through the use of additional DM7200/DM8200 devices.

### Features

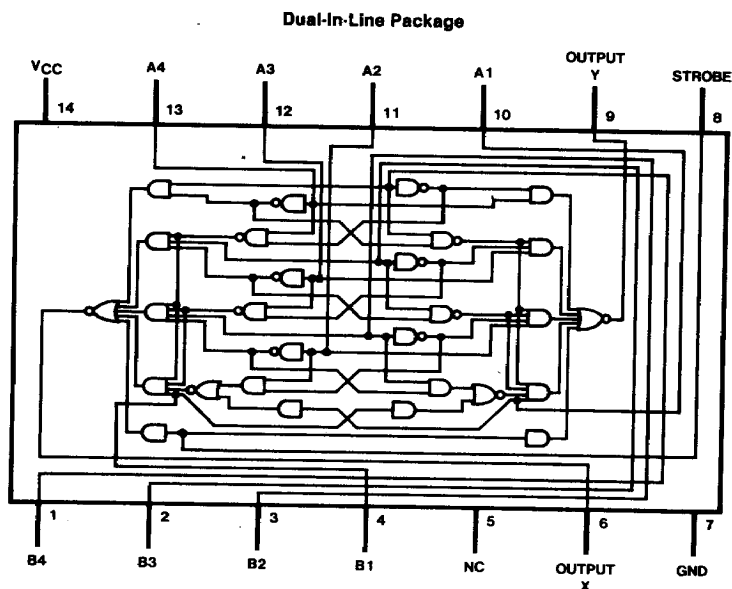
- Typical power dissipation 175 mW
- Typical propagation delay 20 ns

### Absolute Maximum Ratings (Note 1)

|                           |                 |
|---------------------------|-----------------|
| Supply Voltage            | 7V              |
| Input Voltage             | 5.5V            |
| Storage Temperature Range | - 65°C to 150°C |

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

### Connection Diagram



A4, B4 are most significant bits.

TLIF/6579-1

7200 (J)    8200 (N)

### Function Table

| Inputs     |        | Outputs |   |
|------------|--------|---------|---|
| Condition  | Strobe | X       | Y |
| Don't Care | H      | L       | L |
| A > B      | L      | H       | L |
| A < B      | L      | L       | H |
| A = B      | L      | H       | H |

## Recommended Operating Conditions

| Symbol   | Parameter                      | DM7200 |      |       | DM8200 |      |       | Units |
|----------|--------------------------------|--------|------|-------|--------|------|-------|-------|
|          |                                | Min    | Nom  | Max   | Min    | Nom  | Max   |       |
| $V_{CC}$ | Supply Voltage                 | 4.5    | 5    | 5.5   | 4.75   | 5    | 5.25  | V     |
| $V_{IH}$ | High Level Input Voltage       | 2      |      |       | 2      |      |       | V     |
| $V_{IL}$ | Low Level Input Voltage        |        |      | 0.8   |        |      | 0.8   | V     |
| $I_{OH}$ | High Level Output Current      |        |      | - 0.4 |        |      | - 0.4 | mA    |
| $I_{OL}$ | Low Level Output Current       |        |      | 16    |        |      | 16    | mA    |
| $t_{SU}$ | Setup Time                     | 10     | 0    |       | 10     | 0    |       | ns    |
| $t_H$    | Hold Time                      | 0      | - 10 |       | 0      | - 10 |       | ns    |
| $T_A$    | Free Air Operating Temperature | - 55   |      | 125   | 0      |      | 70    | °C    |

## Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

| Symbol   | Parameter                        | Conditions                                                                               | Min                          | Typ<br>(Note 1) | Max          | Units         |
|----------|----------------------------------|------------------------------------------------------------------------------------------|------------------------------|-----------------|--------------|---------------|
| $V_I$    | Input Clamp Voltage              | $V_{CC} = \text{Min}, I_I = -12 \text{ mA}$                                              |                              |                 | - 1.5        | V             |
| $V_{OH}$ | High Level Output Voltage        | $V_{CC} = \text{Min}, I_{OH} = \text{Max}$<br>$V_{IL} = \text{Max}, V_{IH} = \text{Min}$ | 2.4                          |                 |              | V             |
| $V_{OL}$ | Low Level Output Voltage         | $V_{CC} = \text{Min}, I_{OL} = \text{Max}$<br>$V_{IH} = \text{Min}, V_{IL} = \text{Max}$ |                              |                 | 0.4          | V             |
| $I_I$    | Input Current@ Max Input Voltage | $V_{CC} = \text{Max}, V_I = 5.5 \text{ V}$                                               |                              |                 | 1            | mA            |
| $I_{IH}$ | High Level Input Current         | $V_{CC} = \text{Max}, V_I = 2.4 \text{ V}$                                               |                              |                 | 80           | $\mu\text{A}$ |
| $I_{IL}$ | Low Level Input Current          | $V_{CC} = \text{Max}, V_I = 0.4 \text{ V}$                                               |                              |                 | - 3.2        | mA            |
| $I_{OS}$ | Short Circuit Output Current     | $V_{CC} = \text{Max}$<br>(Note 2)                                                        | DM72<br>- 18<br>DM82<br>- 18 |                 | - 55<br>- 55 | mA            |
| $I_{CC}$ | Supply Current                   | $V_{CC} = \text{Max}$                                                                    |                              | 35              | 53           | mA            |

**Note 1:** All typicals are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

**Note 2:** Not more than one output should be shorted at a time.

**Switching Characteristics** at  $V_{CC} = 5V$  and  $T_A = 25^\circ C$  (See Section 1 for Test Waveforms and Output Load)

| Parameter                                                       | From<br>(Input)<br>To<br>(Output) | $R_L = 400\Omega$<br>$C_L = 15\text{ pF}$ |     |     | Units |
|-----------------------------------------------------------------|-----------------------------------|-------------------------------------------|-----|-----|-------|
|                                                                 |                                   | Min                                       | Typ | Max |       |
| $t_{PLH}$ Propagation Delay<br>Time Low to High<br>Level Output | Data<br>to<br>Output              |                                           | 24  | 40  | ns    |
| $t_{PHL}$ Propagation Delay<br>Time High to Low<br>Level Output | Data<br>to<br>Output              |                                           | 17  | 30  | ns    |
| $t_{PLH}$ Propagation Delay<br>Time Low to High<br>Level Output | Strobe<br>to<br>Output            |                                           | 15  | 27  | ns    |
| $t_{PHL}$ Propagation Delay<br>Time High to Low<br>Level Output | Strobe<br>to<br>Output            |                                           | 8   | 18  | ns    |