

DM74ALS520 • DM74ALS521 8-Bit Comparator

General Description

These comparators perform an "equal to" comparison of two 8-bit words with provision for expansion or external enabling. The matching of the two 8-bit input plus a logic LOW on the \overline{EN} input produces the output $\overline{A = B}$ on the DM74ALS520 and DM74ALS521. The DM74ALS520 and DM74ALS521 have totem pole outputs for wire AND cascading. Additionally, the DM74ALS520 is provided with B input pull up termination resistors for analog or switch data.

Features

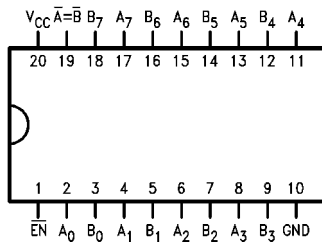
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with LS family counterpart
- Improved output transient handling capability

Ordering Code:

| Ordering Code | Package Number | Package Description |
|---------------|----------------|---|
| DM74ALS520WM | M20B | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| DM74ALS520N | N20A | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |
| DM74ALS521WM | M20B | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| DM74ALS521N | 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.

Connection Diagram

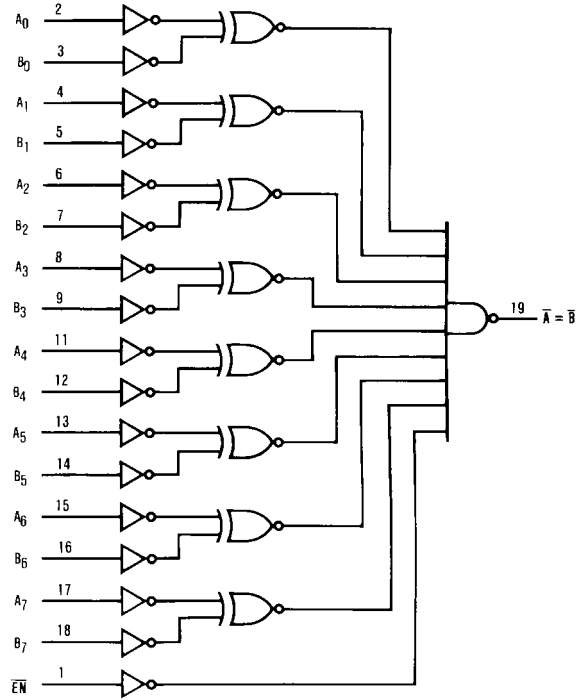


Function Table

| Inputs | | Output |
|-----------------|-------|--------------------|
| \overline{EN} | Data | $\overline{A = B}$ |
| L | A = B | L |
| L | A ≠ B | H |
| H | X | H |

H = HIGH Logic Level
L = LOW Logic Level
X = Don't Care

Logic Diagram



Absolute Maximum Ratings(Note 1)

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 7V |
| Operating Free Air Temperature Range | 0°C to +70°C |
| Storage Temperature Range | -65°C to +150°C |
| Typical θ_{JA} | |
| N Package | 62.0°C/W |
| M Package | 82.0°C/W |

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

Recommended Operating Conditions

| Symbol | Parameter | Min | Nom | Max | Units |
|----------|--------------------------------|-----|-----|------|-------|
| V_{CC} | Supply Voltage | 4.5 | 5 | 5.5 | V |
| V_{IH} | HIGH Level Input Voltage | 2 | | | V |
| V_{IL} | LOW Level Input Voltage | | | 0.8 | V |
| I_{OH} | HIGH Level Output Current | | | -2.6 | mA |
| I_{OL} | LOW Level Output Current | | | 24 | mA |
| T_A | Free Air Operating Temperature | 0 | | 70 | °C |

Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|----------|---------------------------|--|---------------------------------------|------|------|---------|
| V_{IK} | Input Clamp Voltage | $V_{CC} = 4.5V$, $I_I = -18$ mA | | | -1.5 | V |
| V_{OH} | HIGH Level Output Voltage | $V_{CC} = 4.5V$ to $5.5V$ $I_{OH} = -400$ μA | $V_{CC} - 2$ | | | V |
| | | $V_{CC} = 4.5V$ $I_{OH} = \text{Max}$ | 2.4 | 3.2 | | V |
| V_{OL} | LOW Level Output Voltage | $V_{CC} = 4.5V$ | $I_{OL} = 24$ mA | 0.35 | 0.5 | V |
| I_I | Max HIGH Input Current | $V_{CC} = 5.5V$ | $V_{IH} = 5.5V$ B Input DM74ALS520 | | 0.1 | mA |
| | | | $V_{IH} = 7V$, All Others | | | |
| I_{IH} | HIGH Level Input Current | $V_{CC} = 5.5V$, $V_{IH} = 2.7V$ | All Others | | 20 | μA |
| | | | B Input DM74ALS520 | | | -200 |
| I_{IL} | Low Level Input Current | $V_{CC} = 5.5V$, $V_{IL} = 0.4V$ | B Input DM74ALS520 | | -0.6 | mA |
| | | | All Others | | | -0.1 |
| I_O | Output Drive Current | $V_{CC} = 5.5V$ | $V_O = 2.25V$ | -30 | -112 | mA |
| I_{CC} | Supply Current | $V_{CC} = 5.5V$ (Note 2) | | 12 | 19 | mA |

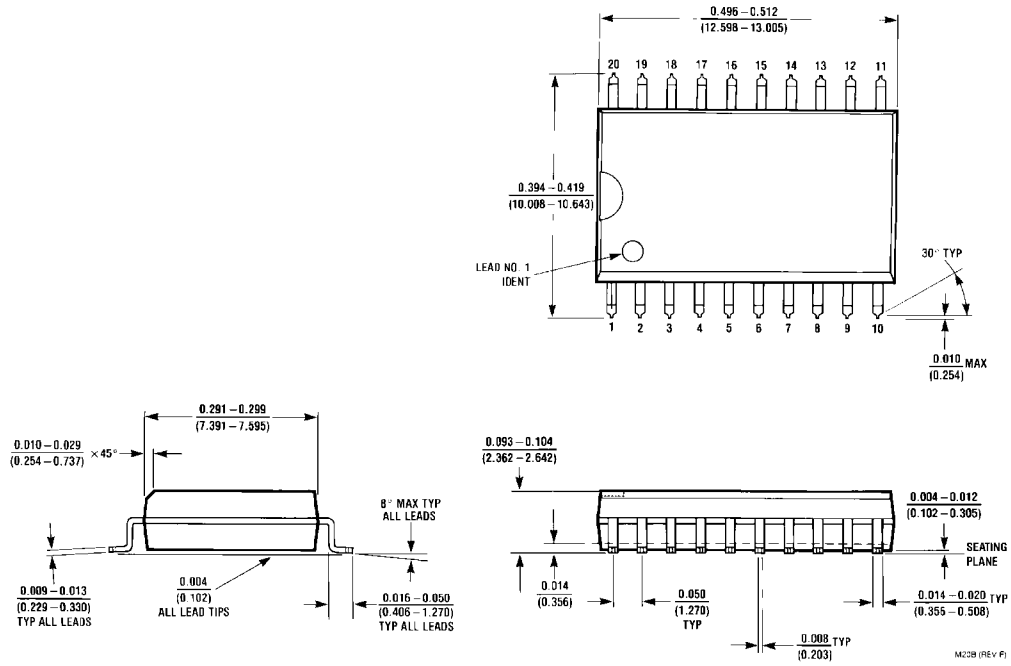
Note 2: I_{CC} is measured with EN grounded, A and B inputs at 4.5V and outputs OPEN.

Switching Characteristics

over recommended operating free air temperature range

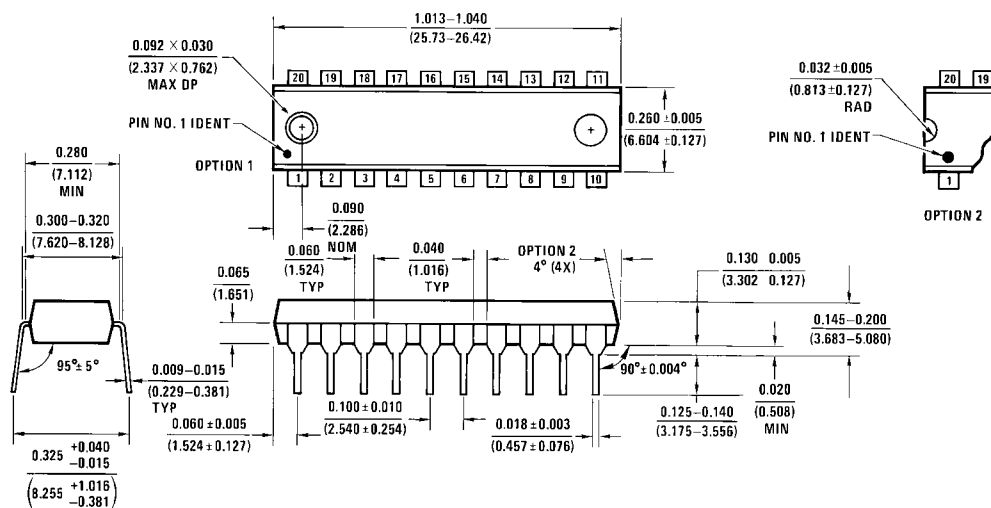
| Symbol | Parameter | Conditions | From Input | To Output | Min | Max | Units |
|-----------|--|---|----------------|---------------------|-----|-----|-------|
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | $V_{CC} = 4.5V$ to $5.5V$ $C_L = 50$ pF $R_L = 500\Omega$ | A or B Data | $\bar{A} = \bar{B}$ | 3 | 12 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | | A or B Data | $\bar{A} = \bar{B}$ | 5 | 20 | ns |
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | | $\bar{E}N$ | $\bar{A} = \bar{B}$ | 2 | 12 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | | $\bar{E}N$ | $\bar{A} = \bar{B}$ | 5 | 22 | ns |

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)



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

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