

DM74ALS520/521 8-Bit Comparator

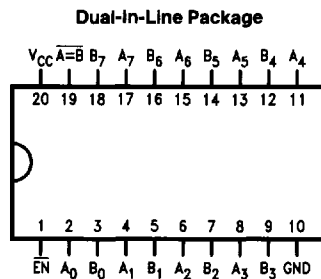
General Description

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 ALS520 and 521. The ALS520 and 521 have totem pole outputs for wire AND cascading. Additionally, the ALS520 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

Connection Diagram



**Order Number DM74ALS520WM, DM74ALS521WM,
DM74ALS520N or DM74ALS521N
See NS Package Number M20B or N20A**

Function Table

ALS520, 521

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

H = High Logic Level; L = Low Logic Level; X = Don't Care

Absolute Maximum Ratings

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 7V |
| Operating Free Air Temperature Range | |
| DM74ALS | 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: 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" table 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 | DM74ALS520, 521 | | | Units |
|----------|--|-----------------|-----|------|-------|
| | | Min | Nom | Max | |
| 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 (ALS520, 521) | | | -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 | $V_{CC} = 4.5V$, $I_I = -18\text{ mA}$ | | | | -1.5 | V |
| V_{OH} | High Level Output Voltage | $V_{CC} = 4.5V$ to $5.5V$ $I_{OH} = -400\ \mu A$ | ALS520, 521 | $V_{CC} - 2$ | | | V |
| | | $V_{CC} = 4.5V$ $I_{OH} = \text{Max}$ | | 2.4 | 3.2 | | V |
| V_{OL} | Low Level Output Voltage | $V_{CC} = 4.5V$ | 74ALS $I_{OL} = 24\text{ mA}$ | | 0.35 | 0.5 | V |
| I_I | Max High Input Current | $V_{CC} = 5.5V$ | $V_{IH} = 5.5V$ B Input ALS520 | | | 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 ALS520 | | | -200 | |
| I_{IL} | Low Level Input Current | $V_{CC} = 5.5V$, $V_{IL} = 0.4V$ | B Input ALS520 | | | -0.6 | mA |
| | | | All Others | | | -0.1 | mA |
| I_O | Output Drive Current | $V_{CC} = 5.5V$ | $V_O = 2.25V$ ALS520, 521 | -30 | | -112 | mA |
| I_{CC} | Supply Current | $V_{CC} = 5.5V$ (Note 1) | ALS520, 521 | | 12 | 19 | mA |

Note 1: I_{CC} is measured with \overline{EN} grounded, A and B inputs at 4.5V and outputs open.

Switching Characteristics

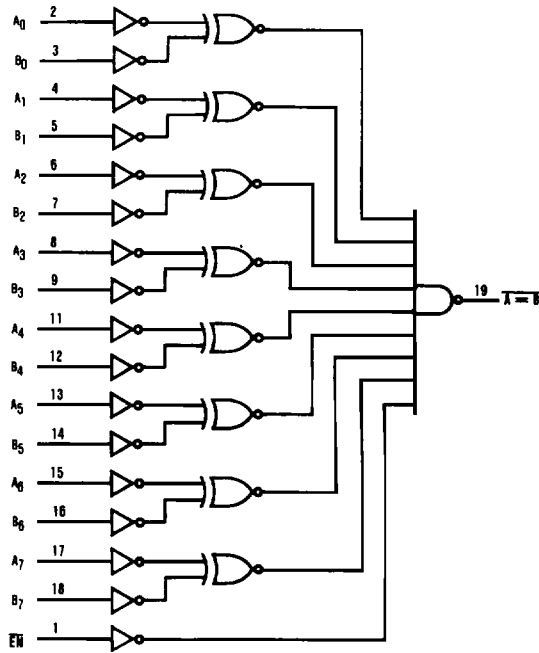
over recommended operating free air temperature range (Note 1)

| Symbol | Parameter | Conditions | From Input | To Output | DM74ALS 520, 521 | | Units |
|-----------|--|---|-----------------|-------------------------------|---------------------|-----|-------|
| | | | | | Min | Max | |
| 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 | $\overline{A} = \overline{B}$ | 3 | 12 | ns |
| t_{PHL} | Propagation Delay Time High to Low Level Output | | A or B Data | $\overline{A} = \overline{B}$ | 5 | 20 | ns |
| t_{PLH} | Propagation Delay Time Low to High Level Output | | \overline{EN} | $\overline{A} = \overline{B}$ | 2 | 12 | ns |
| t_{PHL} | Propagation Delay Time High to Low Level Output | | \overline{EN} | $\overline{A} = \overline{B}$ | 5 | 22 | ns |

Note 1: See Section 5 for test waveforms and output load.

Logic Diagrams

ALS520/521



TL/F/8114-4