FAIRCHILD SEMICONDUCTOR™

September 1986
Revised April 2000

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 $\overline{A} = \overline{B}$ 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

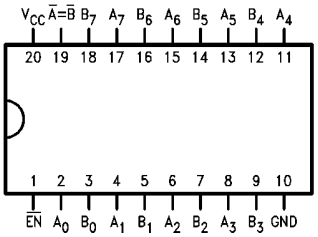
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with LS family counterpart
- Improved output transient handling capability

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
SM74ALS521N	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

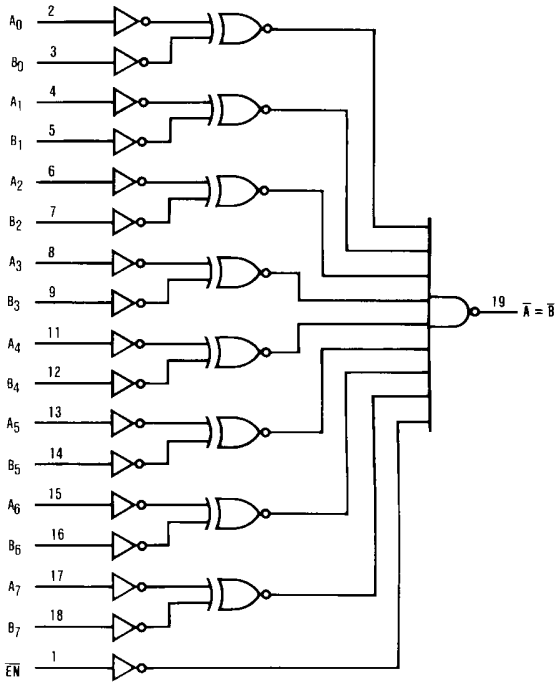


Function Table

Inputs		Output
$\overline{EN}$	Data	$\overline{A} = \overline{B}$
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°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} = 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	mA
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

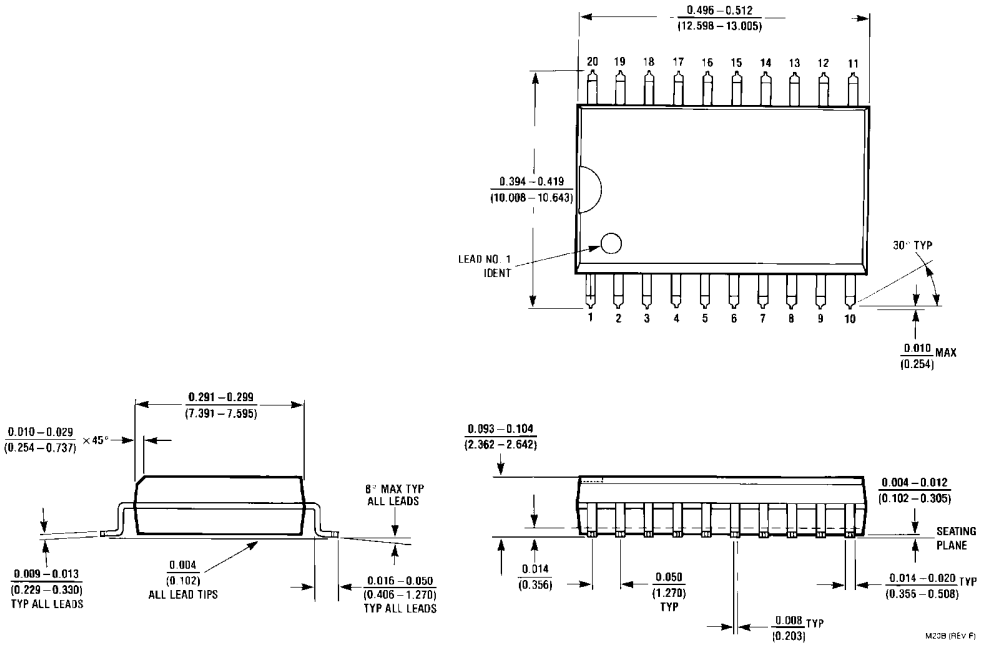
Note 2: I_{CC} is measured with $\overline{EN}$ grounded, A and B inputs at 4.5V and outputs OPEN.

Switching Characteristics

over recommended operating free air temperature range

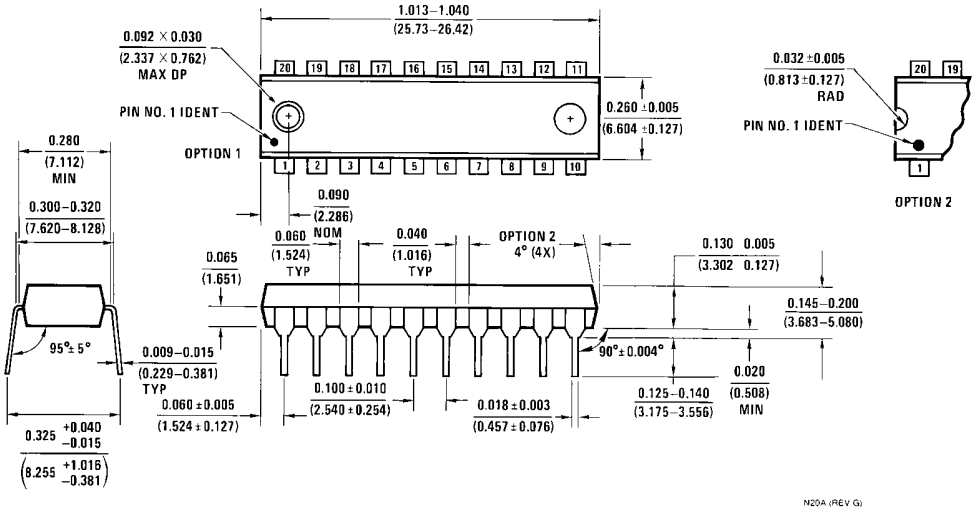
Symbol	Parameter	Conditions	From Input	To Output	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R_L = 500Ω	A or B Data	$\overline{A} = \overline{B}$	3	12	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		A or B Data	$\overline{A} = \overline{B}$	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

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