



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  $\overline{\text{EN}}$  input produces the output  $\overline{\text{A}} = \overline{\text{B}}$  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

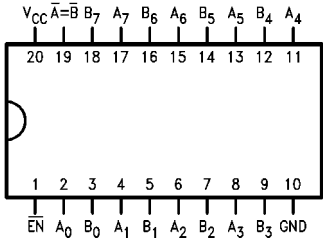
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{\text{CC}}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with LS family counterpart
- Improved output transient handling capability

## 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



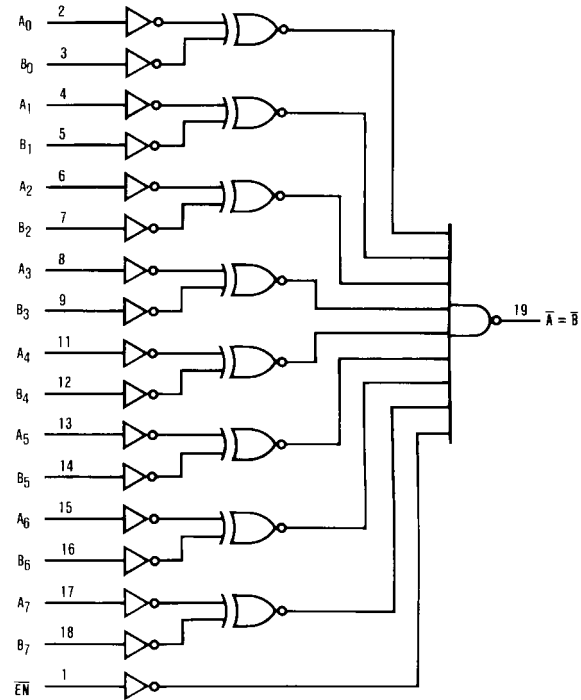
## Function Table

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

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

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## 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 $\theta_{JA}$	
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	$V_{CC} = 4.5V$ , $I_I = -18\text{ mA}$			−1.5	V
$V_{OH}$	HIGH Level Output Voltage	$V_{CC} = 4.5V$ to $5.5V$ $I_{OH} = -400\text{ }\mu A$	$V_{CC} - 2$			V
		$V_{CC} = 4.5V$ $I_{OH} = \text{Max}$	2.4	3.2		V
$V_{OL}$	LOW Level Output Voltage	$V_{CC} = 4.5V$	$I_{OL} = 24\text{ mA}$	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	$\mu A$
			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

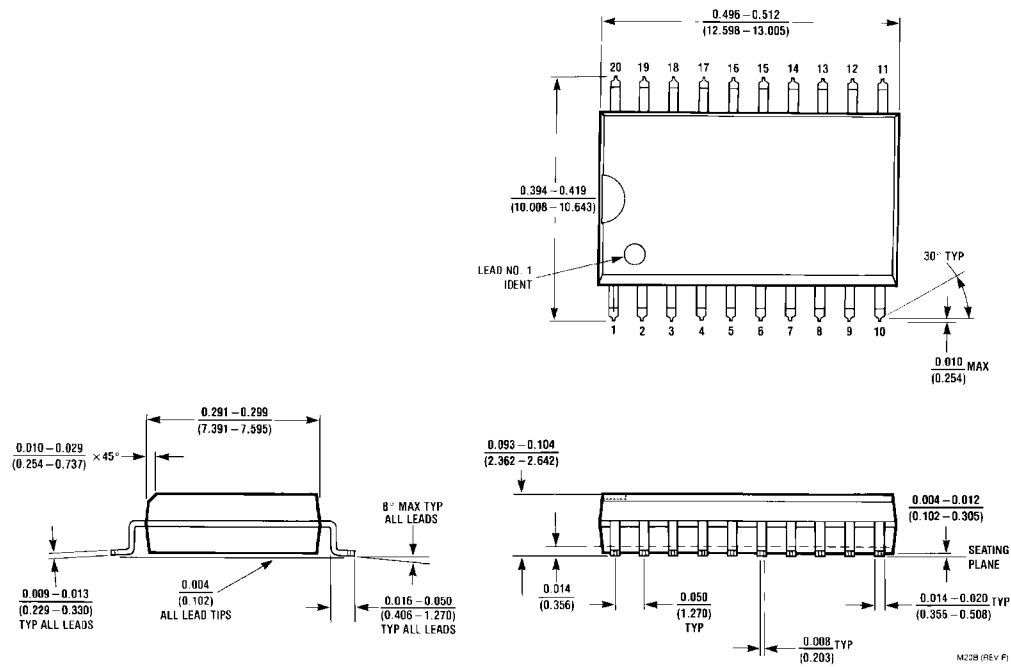
**Note 2:**  $I_{CC}$  is measured with EN grounded, A and B inputs at 4.5V and outputs OPEN.

**Switching Characteristics**

over recommended operating free air temperature range

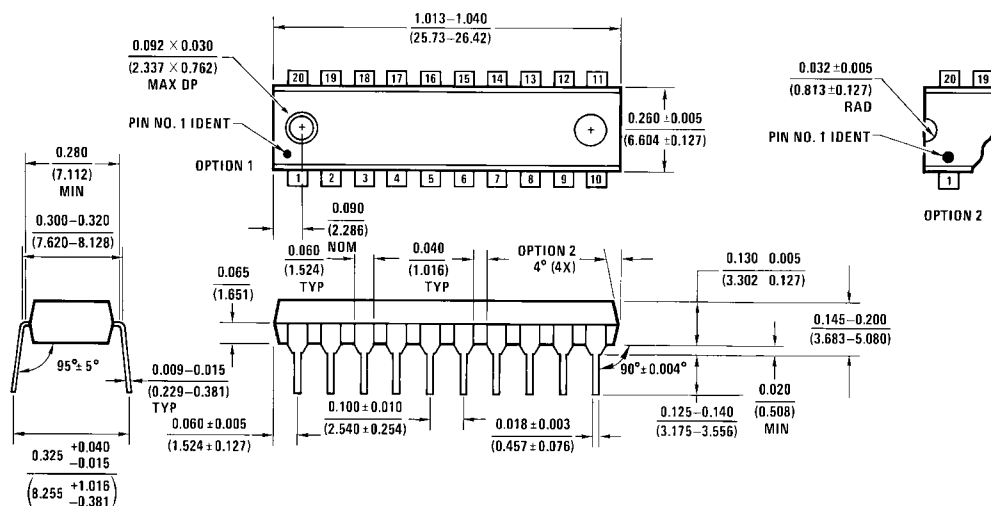
Symbol	Parameter	Conditions	From Input	To Output	Min	Max	Units
$t_{PLH}$	Propagation Delay Time LOW-to-HIGH Level Output	$V_{CC} = 4.5V$ to $5.5V$ $C_L = 50\text{ pF}$ $R_L = 500\Omega$	A or B Data	$\bar{A} = \bar{B}$	3	12	ns
$t_{PHL}$	Propagation Delay Time HIGH-to-LOW Level Output		A or B Data	$\bar{A}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