

## DM74ALS520/521 8-Bit Comparator

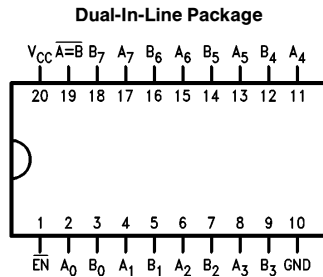
### General Description

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



TL/F/6114-2

**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 $\theta_{JA}$	
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	$\mu A$	
			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.

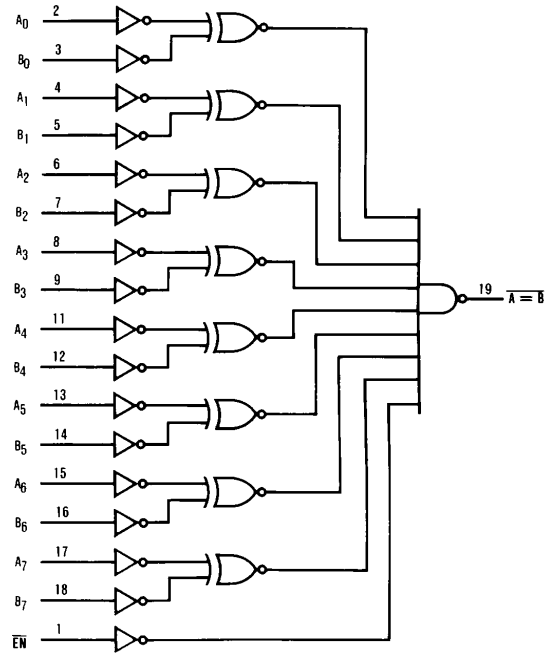
**Switching Characteristics** over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	From Input	To Output	DM74ALS 520, 521		Units
					Min	Max	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	V <sub>CC</sub> = 4.5V to 5.5V C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω	A or B Data	$\overline{A = B}$	3	12	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		A or B Data	$\overline{A = B}$	5	20	ns
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output		$\overline{EN}$	$\overline{A = B}$	2	12	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		$\overline{EN}$	$\overline{A = B}$	5	22	ns

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

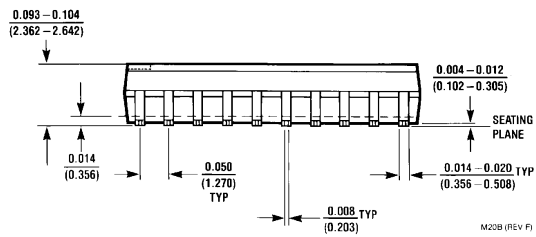
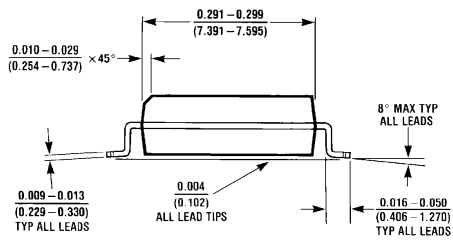
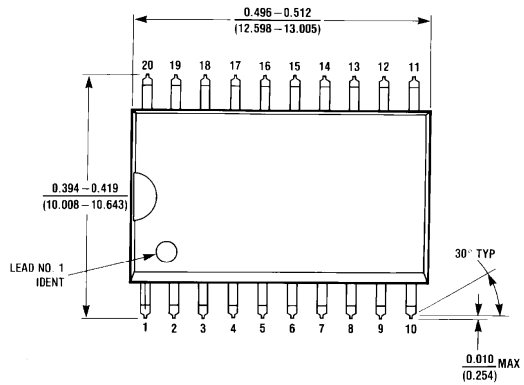
# Logic Diagrams

ALS520/521



TL/F/6114-4

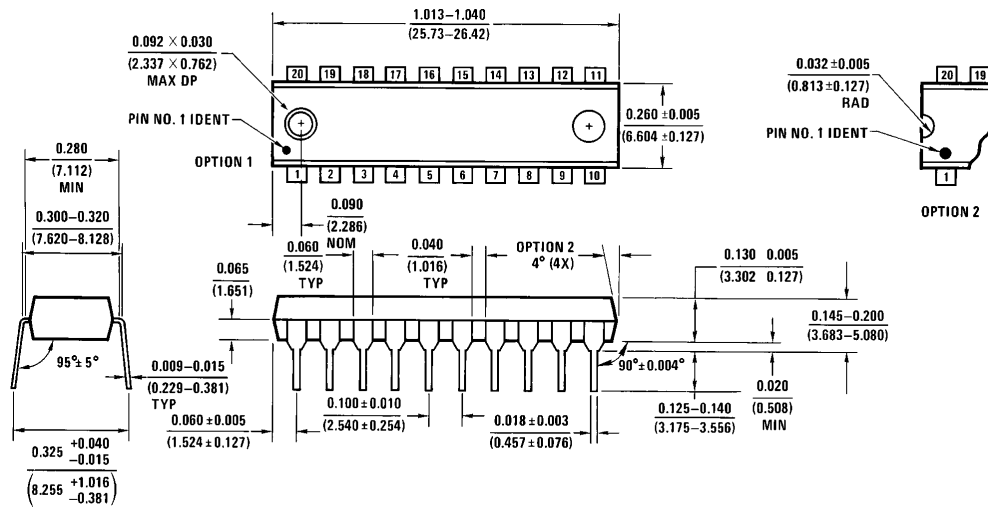
**Physical Dimensions** inches (millimeters)



M20B (REV F)

**S.O. Package (M)**  
**Order Number DM74ALS520WM or DM74ALS521WM**  
**NS Package Number M20B**

**Physical Dimensions** inches (millimeters) (Continued)



**Molded Dual-In-Line Package (N)**  
**Order Number DM74ALS520N or DM74ALS521N**  
**NS Package Number N20A**

N20A (REV G)

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