



T-43-15-00

DM74ALS40A

Dual 4-Input NAND Buffer

General Description

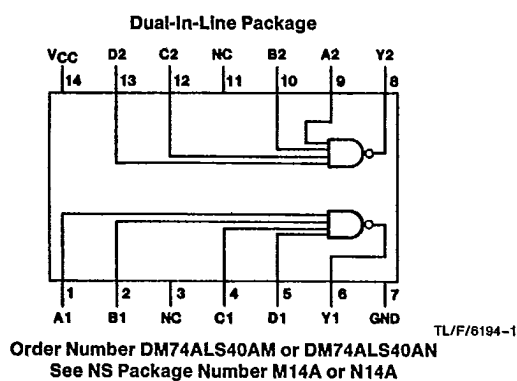
This device contains two independent gates, each of which performs the logic NAND function.

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 TTL counterpart
- Improved AC performance over LS40
- Improved line receiving characteristics

Connection Diagram



Function Table

$$Y = \overline{ABCD}$$

Inputs				Output
A	B	C	D	Y
X	X	X	L	H
X	X	L	X	H
X	L	X	X	H
L	X	X	X	H
H	H	H	H	L

H = High Logic Level

L = Low Logic Level

X = Either Low or High Logic Level

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	83.0 °C/W
M Package	114.0 °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	DM74ALS40A			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			-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	$V_{CC} = 4.5V$ $V_{IL} = \text{Max}$ $I_{OH} = -400\text{ }\mu A$	2.4	3.3		V
					$V_{CC} - 2$	V
V_{OL}	Low Level Output Voltage	$V_{CC} = 4.5V$ $V_{IH} = 2V$ $I_{OL} = 12\text{ mA}$		0.25	0.4	V
		$I_{OL} = 24\text{ mA}$		0.35	0.5	V
I_I	Input Current @ Max. Input Voltage	$V_{CC} = 5.5V$, $V_{IH} = 7V$			0.1	mA
I_{IH}	High Level Input Current	$V_{CC} = 5.5V$, $V_{IH} = 2.7V$			20	μA
I_{IL}	Low Level Input Current	$V_{CC} = 5.5V$, $V_{IL} = 0.4V$			-0.1	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$, $V_O = 2.25V$	-30		-112	mA
I_{CCH}	Supply Current with Outputs High	$V_{CC} = 5.5V$, $V_I = 0V$		0.43	0.8	mA
I_{CCL}	Supply Current with Outputs Low	$V_{CC} = 5.5V$, $V_I = 4.5V$		2.4	3.9	mA

Switching Characteristics

over recommended operating free air temperature range (Note 1).

Symbol	Parameter	Conditions	DM74ALS40A		Units
			Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$, $C_L = 50\text{ pF}$	2	8	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		2	7	ns

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