

## DM74ALS21A Dual 4-Input AND Gate

### General Description

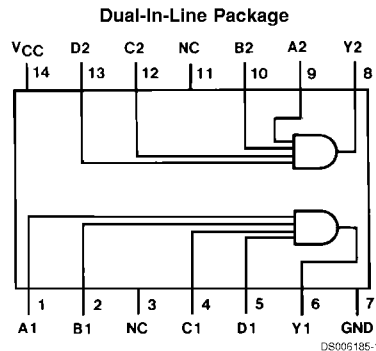
This device contains two independent gates, each of which performs the logic AND function.

### 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 Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts

### Connection Diagram



Order Number DM74ALS21AM or DM74ALS21AN  
See Package Number M14A or N14A

### Function Table

$$Y = ABCD$$

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

H = High Logic Level  
L = Low Logic Level  
X = Either Low or High Logic Level

**Absolute Maximum Ratings** (Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
DM74ALS	

Storage Temperature Range

-65°C to +150°C

Typical  $\theta_{JA}$ 

N Package

86.5°C/W

M Package

116.0°C/W

**Recommended Operating Conditions**

Symbol	Parameter	DM74ALS21A			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			-0.4	mA
$I_{OL}$	Low Level Output Current			8	mA
$T_A$	Free Air Operating Temperature	0		70	°C

**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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**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	$V_{CC} = 4.5V$ , $I_I = -18 mA$			-1.5	V
$V_{OH}$	High Level Output Voltage	$I_{OH} = -0.4 mA$ $V_{CC} = 4.5V$ to $5.5V$	$V_{CC} - 2$			V
$V_{OL}$	Low Level Output Voltage	$V_{CC} = 4.5V$ 74ALS $I_{OL} = 8 mA$		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	$\mu A$
$I_{IL}$	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
$I_{CC}$	Supply Current	$V_{CC} = 5.5V$				
		Outputs High		0.85	1.4	mA
		Outputs Low		1.4	2.3	mA

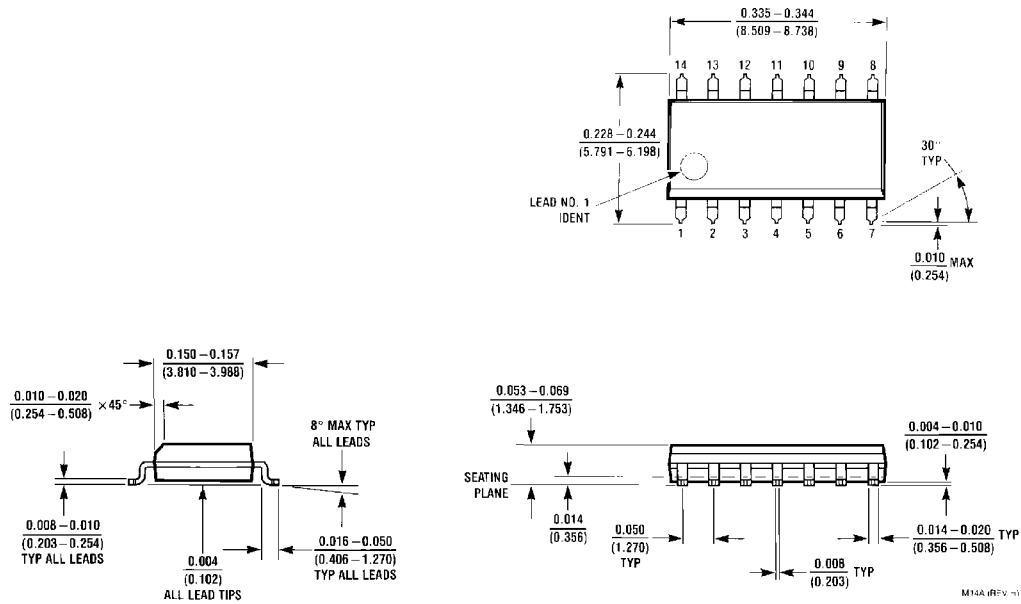
**Switching Characteristics**

over recommended operating free air temperature range (Note 2)

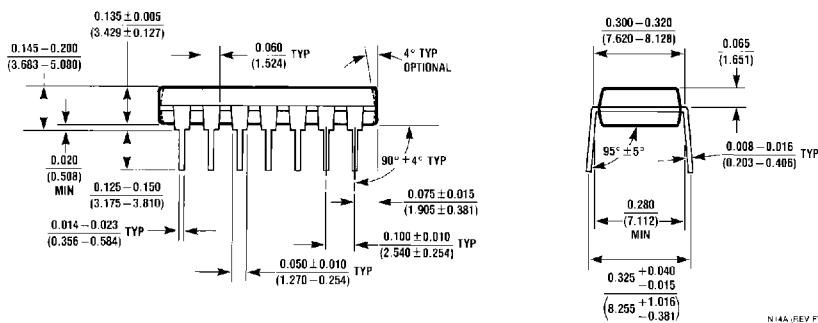
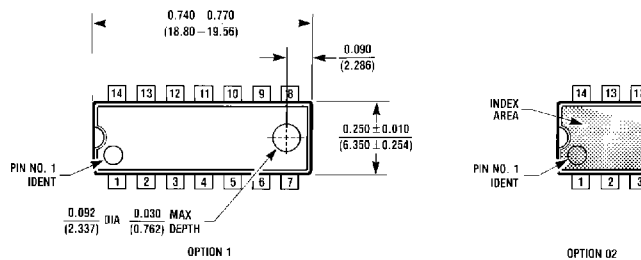
Symbol	Parameter	Conditions	DM74ALS21A		Units
			Min	Max	
$t_{PLH}$	Propagation Delay Time Low to High Level Output	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$	4	15	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	$C_L = 50 pF$	2	10	ns

**Note 2:** See Section 0 for test waveforms and output load.

**Physical Dimensions** inches (millimeters) unless otherwise noted



**S.O. Package (M)**  
**Order Number DM74ALS21AM**  
**Package Number M14A**



**Molded Dual-In-Line Package (N)**  
**Order Number DM74ALS21AN**  
**Package Number N14A**

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