

DM74ALS21A Dual 4-Input AND Gate

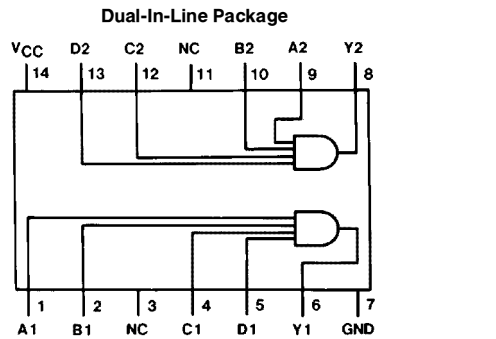
General Description

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 NS 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

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	86.5°C/W
M Package	116.0°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	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

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	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	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 _{CC}	Supply Current	V _{CC} = 5.5V		0.85	1.4	mA
				1.4	2.3	mA

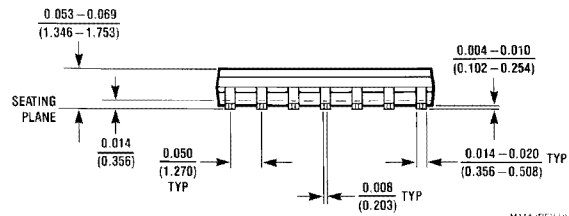
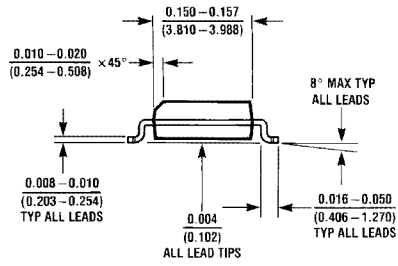
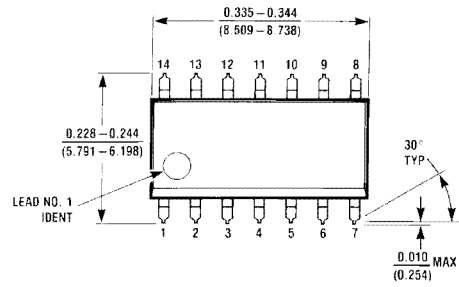
Switching Characteristics

over recommended operating free air temperature range (Note 1)

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 = 500Ω C _L = 50 pF	4	15	ns
t _{PHL}	Propagation Delay Time High to Low Level Output		2	10	ns

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

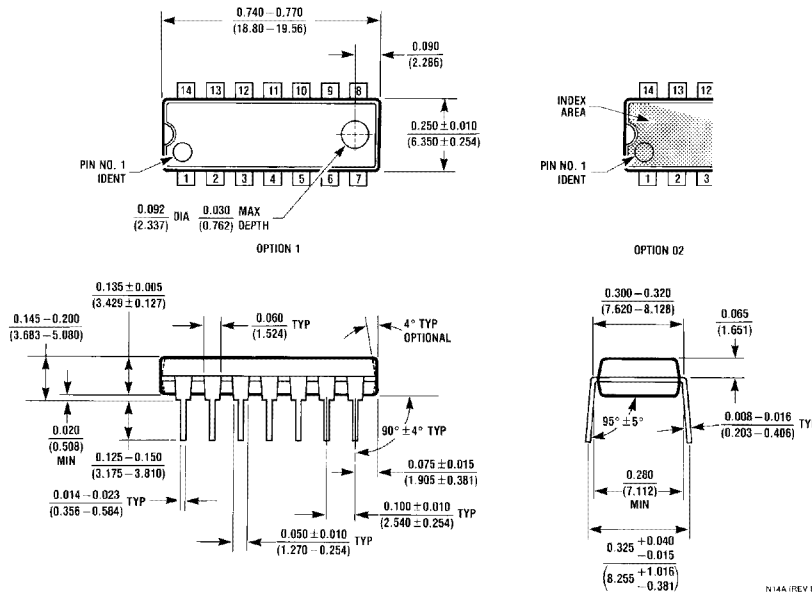
Physical Dimensions inches (millimeters)



M14A (REV H)

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

Physical Dimensions inches (millimeters) (Continued)



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

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