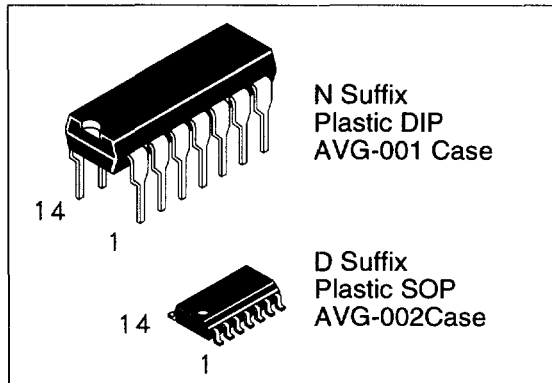


### Dual 4-Input AND Gates

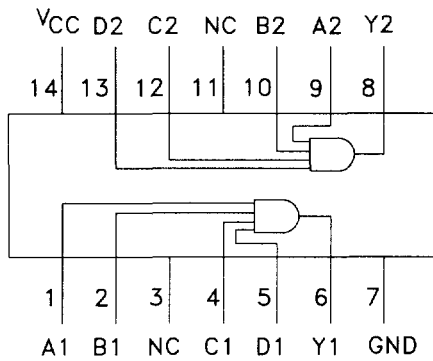
This device contains two independent gates, each of which performs the logic AND function.

- AVG's LS operates over extended Vcc from 4.5 to 5.5 V
- AVG's LS and ALS both have guaranteed DC and AC specification over full temperature and Vcc range
- Switching specifications for ALS at 50 pF
- AVG's ALS has the lowest speed power product (4pJ per gate typical) of all logic series

**DV74LS21**  
**DV74ALS21A**



**TRUTH TABLE**  
Y=ABCD



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

H = High Level Logic  
L = Low Level Logic  
X = Don't Care

NC = No Connection

### ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	LS21	ALS21A	Unit
V <sub>CC</sub>	Supply Voltage	7.0	7.0	V
V <sub>IN</sub>	Input Voltage	7.0	7.0	V
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	-65 to + 150	°C

### GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	LS21		ALS21A		Unit
		Min	Max	Min	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5.5	4.5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2.0		2.0		V
V <sub>IL</sub>	Low Level Input Voltage		0.8		0.8	V
I <sub>OH</sub>	High Level Output Current		-0.4		-0.4	mA
I <sub>OL</sub>	Low Level Output Current		8.0		8.0	mA
T <sub>A</sub>	Ambient Temperature Range	-10 to +70		-10 to + 70		°C

**DC ELECTRICAL CHARACTERISTICS** over full operating conditions

Symbol	Parameter	Conditions	LS21			ALS21A			Unit
			Min	Typ	Max	Min	Typ	Max	
$V_{IK}$	Input Clamp Voltage	$V_{CC} = \text{min}, I_{IN} = -18 \text{ mA}$			-1.5			-1.5	V
$V_{OH}$	High Level Output Voltage	$V_{CC} = \text{min}, I_{OH} = \text{max}$	$V_{CC}-2$	3.5		$V_{CC}-2$			V
$V_{OL}$	Low Level Output Voltage	$V_{CC} = \text{min}; I_{OL} = 4 \text{ mA}$ $V_{CC} = \text{min}; I_{OL} = 8 \text{ mA}$		0.25 0.35	0.4 0.5		0.25 0.35	0.4 0.5	V
$I_{IH}$	High Level Input Current	$V_{CC} = \text{max}, V_{IN} = 2.7\text{V}$ $V_{CC} = \text{max}, V_{IN} = 7\text{V}$			20 0.1			20 0.1	$\mu\text{A}$ mA
$I_{IL}$	Low Level Input Current	$V_{CC} = \text{max}, V_{IN} = 0.4\text{V}$			-0.4			-0.1	mA
$I_o$	Short Circuit Current	$V_{CC} = \text{max}, V_O = 2.25\text{V}$	-20		-110	-30		-112	mA
$I_{CC}$	Supply Current Outputs High Outputs Low	$V_{CC} = \text{max}$			2.4 4.4		0.85 1.4	1.4 2.3	mA mA

**SWITCHING CHARACTERISTICS** over full operating conditions

Symbol	Parameter	LS21 $C_L = 15\text{pF}$		ALS21A $C_L = 50\text{pF}$ $R_L = 500\Omega$		Unit
		Min	Max	Min	Max	
$t_{PLH}$	Turn Off Delay, Input to Output		15	4	15	ns
$t_{PHL}$	Turn On Delay, Input to Output		20	2	10	ns

**SWITCHING WAVEFORMS**