

TYPES SN54ALS21, SN74ALS21 DUAL 4-INPUT POSITIVE-AND GATES

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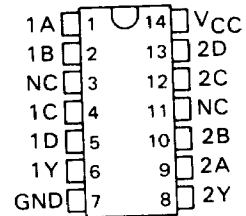
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VSS 1702/1238

description

These devices contain two independent 4-input AND gates. They perform the boolean functions $Y = A \cdot B \cdot C \cdot D$ or $Y = \overline{A + B + C + D}$ in positive logic.

The SN54ALS21 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS21 is characterized for operation from 0°C to 70°C .

(TOP VIEW)

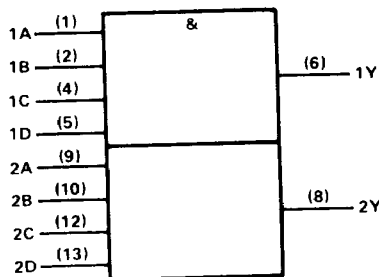


J Suffix—Case 632-07 (Ceramic)
N Suffix—Case 646-05 (Plastic)

FUNCTION TABLE (each gate)

INPUTS				OUTPUT
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

logic symbol



Pin numbers shown are for J and N packages.

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Operating free-air temperature range: SN54ALS21	-55 °C to 125 °C
SN74ALS21	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS21			SN74ALS21			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage	0.8			0.8			V
I_{OH}	High-level output current	-0.4			-0.4			mA
I_{OL}	Low-level output current	4			8			mA
T_A	Operating free-air temperature	-55	125		0	70		°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		SN54ALS21			SN74ALS21			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5 V,$	$I_I = -18 mA$	-1.5			-1.5			V
V_{OH}	$V_{CC} = 4.5 V,$	$I_{OH} = -0.4 mA$	2.5	3.4		2.5			V
	$V_{CC} = 4.75 V,$	$I_{OH} = -0.4 mA$				2.7	3.4		
V_{OL}	$V_{CC} = 4.5 V,$	$I_{OL} = 4 mA$	0.25		0.4	0.25		0.4	V
	$V_{CC} = 4.75 V,$	$I_{OL} = 8 mA$				0.35		0.5	
I_I	$V_{CC} = 5.5 V,$	$V_I = 7 V$	0.1			0.1			mA
I_{IH}	$V_{CC} = 5.5 V,$	$V_I = 2.7 V$	20			20			μA
I_{IL}	$V_{CC} = 5.5 V,$	$V_I = 0.4 V$	-0.1			-0.1			mA
I_{OS}^*	$V_{CC} = 5.5 V,$	$V_O = GND$	-25	-150		-25	-150		mA
I_{CCH}	$V_{CC} = 5.5 V,$	$V_I = 4.5 V$	1.2			1.2			mA
I_{CCL}	$V_{CC} = 5.5 V,$	$V_I = 0 V$	2.2			2.2			mA

†All typical values are at $V_{CC} = 5 V, T_A = 25 °C$.

*The current produced by grounding the outputs is approximately twice that produced with 2.25 V on the outputs.

switching characteristics

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 V,$ $C_L = 15 pF,$ $R_L = 500 \Omega,$ $T_A = 25 °C$		$V_{CC} = 4.5 V \text{ to } 5.5 V,$ $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = \text{MIN to MAX}$				UNIT
			TYP	SN54ALS21		SN74ALS21			
				MIN	MAX	MIN	MAX		
t_{PLH}	Any	Y	12	6	24	6	24	ns	
t_{PHL}	Any	Y	5	3	15	3	15	ns	



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