

TYPES SN54ALS09, SN74ALS09
QUADRUPLE 2-INPUT POSITIVE-AND GATES
WITH OPEN-COLLECTOR OUTPUTS
 D2661, APRIL 1982—REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

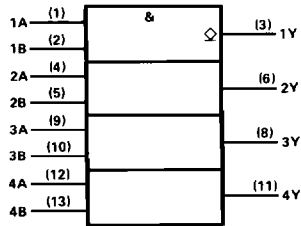
These devices contain four independent 2-input AND gates. They perform the Boolean functions $Y = A \cdot B$ or $Y = \overline{A} + \overline{B}$ in positive logic. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher V_{OH} levels.

The SN54ALS09 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS09 is characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

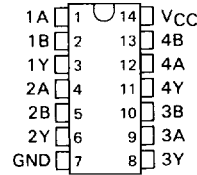
INPUTS		OUTPUT
A	B	Y
H	H	H
L	X	L
X	L	L

logic symbol

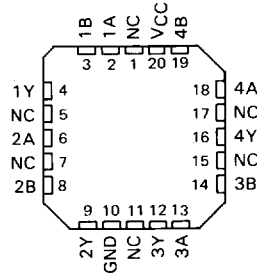


Pin numbers shown are for J and N packages.

SN54ALS09 . . . J PACKAGE
SN74ALS09 . . . N PACKAGE
 (TOP VIEW)



SN54ALS09 . . . FH PACKAGE
SN74ALS09 . . . FN PACKAGE
 (TOP VIEW)



NC — No internal connection

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ALS AND AS CIRCUITS

**TYPES SN54ALS09, SN74ALS09
QUADRUPLE 2-INPUT POSITIVE-AND GATES
WITH OPEN-COLLECTOR OUTPUTS**

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Off-state output voltage	7 V
Operating free-air temperature range: SN54ALS09	-55 °C to 125 °C
SN74ALS09	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS09			SN74ALS09			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			V		
V_{OH}	High-level output voltage				5.5			V		
I_{OL}	Low-level output current				4			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	SN54ALS09			SN74ALS09			UNIT		
		MIN	TYP†	MAX	MIN	TYP†	MAX			
V_{IK}	$V_{CC} = 4.5 V, I_I = -18 mA$	-1.5			-1.5			V		
I_{OH}	$V_{CC} = 4.5 V, V_{OH} = 5.5 V$	0.1			0.1			mA		
V_{OL}	$V_{CC} = 4.5 V, I_{OL} = 4 mA$	0.25			0.4			V		
	$V_{CC} = 4.5 V, I_{OL} = 8 mA$				0.35					
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_{CCH}	$V_{CC} = 5.5 V, V_I = 4.5 V$	1.35			2.4			mA		
I_{CCL}	$V_{CC} = 5.5 V, V_I = 0 V$	2.2			4			2.2	4	mA

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

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 V$ to $5.5 V,$ $C_L = 50 pF,$ $R_L = 2 k\Omega,$ $T_A = MIN$ to MAX				UNIT
			SN54ALS09		SN74ALS09		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	23	59	23	54	ns
t_{PHL}	A or B	Y	5	17	5	15	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

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