



MOTOROLA

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

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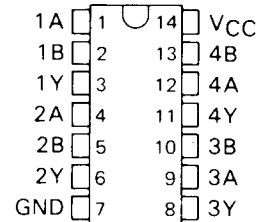
USS 1702/1276

description

These devices contain four independent 2-input AND gates. They perform the boolean functions $Y = A \cdot B$ or $Y = \overline{A + B}$ 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 .

(TOP VIEW)

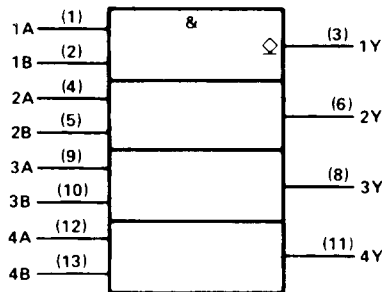


J Suffix—Case 632-07 (Ceramic)
N Suffix—Case 646-05 (Plastic)

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.

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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			0.8	V
V_{OH}	High-level output voltage			5.5			5.5	V
I_{OL}	Low-level output current			4				mA
							8	
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		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_{CCH}	$V_{CC} = 5.5 V$,	$V_I = 4.5 V$			2.4			2.4	mA
I_{CCL}	$V_{CC} = 5.5 V$,	$V_I = 0 V$			4.4			4.4	mA

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

switching characteristics

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 V$, $C_L = 15 pF$, $R_L = 2 k\Omega$, $T_A = 25 °C$		$V_{CC} = 4.5 V$ to $5.5 V$, $C_L = 50 pF$, $R_L = 2 k\Omega$, $T_A = MIN$ to MAX				UNIT
			'ALS09		SN54ALS09		SN74ALS09		
			TYP		MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	15		9	35	9	30	ns
t_{PHL}	A or B	Y	13		7	25	7	20	ns

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