

# SN54ALS15A, SN74ALS15A TRIPLE 3-INPUT POSITIVE-AND GATES WITH OPEN-COLLECTOR OUTPUTS

SDAS016A – MARCH 1984 – REVISED MAY 1986

- Package Options Include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

## description

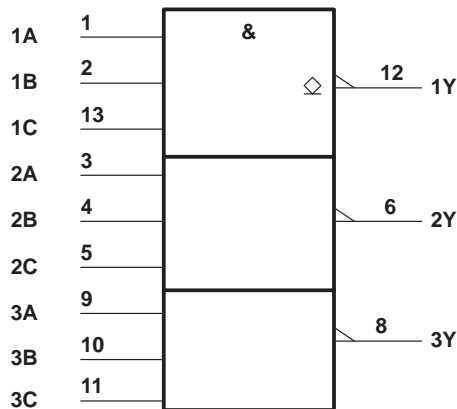
These devices contain three independent 3-input AND gates with open-collector outputs. These gates perform the Boolean functions  $Y = A \cdot B \cdot C$  or  $Y = \overline{A} + \overline{B} + \overline{C}$  in positive logic. The open-collector outputs require pullup resistors to perform correctly. 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 SN54ALS15A is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS15A is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE  
(each gate)

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

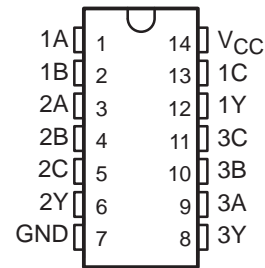
## logic symbol†



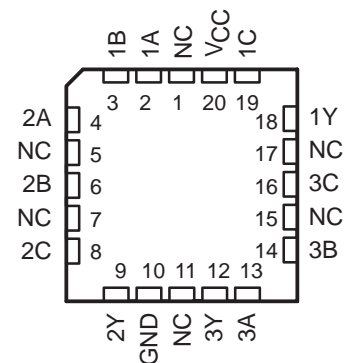
† This symbol is in accordance with ANS/EEE Std 91-1984 and IEC Publication 617-12

Pin numbers shown are for D, J, and N packages.

SN54ALS15A . . . J PACKAGE  
SN74ALS15 . . . D OR N PACKAGE  
(TOP VIEW)

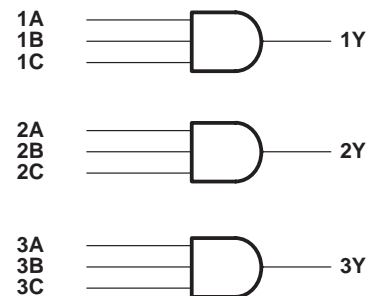


SN54ALS15A . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

## logic diagram (positive logic)



# SN54ALS15A, SN74ALS15A

## TRIPLE 3-INPUT POSITIVE-AND GATES

### WITH OPEN-COLLECTOR OUTPUTSWITH OPEN-COLLECTOR OUTPUTS

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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
Off-state output voltage	7 V
Operating free-air temperature range: SN54ALS15A	– 55°C to 125°C
SN74ALS15A	0°C to 70°C
Storage temperature range	–65°C to 150°C

#### recommended operating conditions

	SN54ALS15A			SN74ALS15A			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			0.7			0.8	V
$V_{OH}$ High-level output voltage			5.5			5.5	V
$I_{OL}$ 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	SN54ALS15A			SN74ALS15A			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V$ , $I_I = -18 mA$			–1.5			–1.5	V
$V_{OL}$	$V_{CC} = 4.5 V$ , $I_{OL} = 4 mA$		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5 V$ , $I_{OL} = 8 mA$					0.35	0.5	
$I_{OH}$	$V_{CC} = 4.5 V$ , $V_{OH} = 5.5 mA$			0.1			0.1	mA
$I_I$	$V_{CC} = 5.5 V$ , $V_I = 7 V$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5 V$ , $V_I = 2.7 V$			20			20	μA
$I_{IL}$	$V_{CC} = 5.5 V$ , $V_I = 0.4V$			–0.1			–0.1	mA
$I_{CCH}$	$V_{CC} = 5.5 V$ , $V_I = 4.5 V$		1	1.8		1	1.8	mA
$I_{CCL}$	$V_{CC} = 5.5 V$ , $V_I = 0 V$		1.66	3		1.66	3	mA

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

#### switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 V$ to $5.5 V$ , $C_L = 50 pF$ , $R_L = 50 \Omega$ , $T_A = MIN$ to $MAX$				UNIT
			SN54ALS15A		SN74ALS15A		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	Any	Y	20	59	20	45	ns
$t_{PHL}$	Any	Y	6	25	6	20	ns

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of *ALS/AS Logic Data Book, 1986*.



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