

# 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

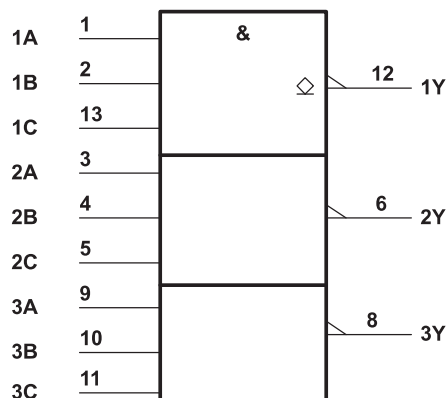
These devices contain three independent 3-input AND gates with open-collector outputs. These gates perform the Boolean functions  $Y = A \cdot B \cdot C$  or  $Y = \overline{A + B + C}$  in positive logic. The open-collector outputs require pullup resistors to perform correctly. They may be connected 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

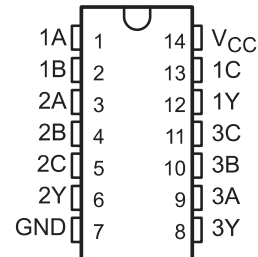
## logic symbol†



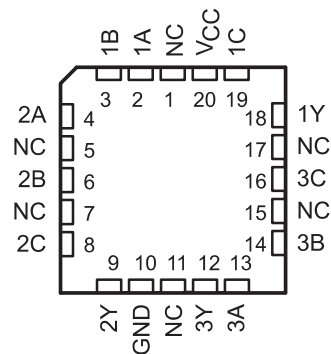
† This symbol is in accordance with ANS/IEEE Std 91-1984 and IEC Publication 617-12

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

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

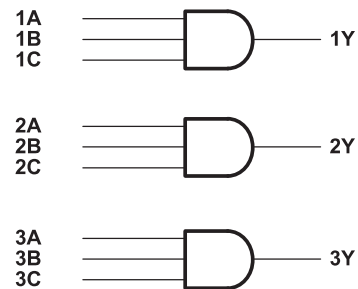


SN54ALS15A . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

## logic diagram (positive logic)



PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS  
INSTRUMENTS

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# 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,	$V_I = 0.4$ V			–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,  $T_A = 25^\circ\text{C}$

#### switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 50 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54ALS15A		SN74ALS15A		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	Any	Y	20	59	20	45	ns
t <sub>PHL</sub>	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*.

## PACKAGING INFORMATION

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN74ALS15AD	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI
SN74ALS15ADR	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI
SN74ALS15AN	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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