

TYPES SN54ALS540, SN54ALS541, SN74ALS540, SN74ALS541 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

D2661, APRIL 1982—REVISED DECEMBER 1983

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- P-N-P Inputs Reduce D-C Loading
- Data Flow-Thru Pinout (All Inputs on Opposite Side from Outputs)
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

These octal buffers and line drivers are designed to have the performance of the popular SN54ALS240/SN74ALS240 series and, at the same time, offer a pinout with inputs and outputs on opposite sides of the package. This arrangement greatly enhances printed circuit board layout.

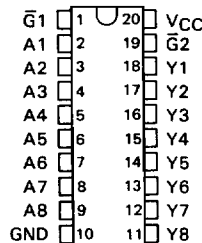
The three-state control gate is a 2-input NOR such that if either $\bar{G}1$ or $\bar{G}2$ is high, all eight outputs are in the high-impedance state.

The 'ALS540 provides inverted data and the 'ALS541 provides true data at the outputs.

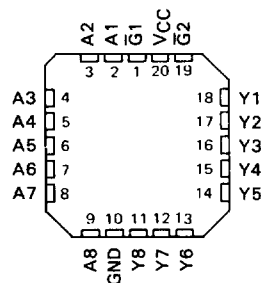
The -1 versions of the SN74ALS540 and SN74ALS541 parts are identical to the standard versions except that the recommended maximum I_{OL} is increased to 48 milliamperes. There are no -1 versions of the SN54ALS540 and SN54ALS541.

The SN54ALS540 and SN54ALS541 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS540 and SN74ALS541 are characterized for operation from 0°C to 70°C .

SN54ALS540, SN54ALS541 . . . J PACKAGE
SN74ALS540, SN74ALS541 . . . N PACKAGE
(TOP VIEW)



SN54ALS540, SN54ALS541 . . . FH PACKAGE
SN74ALS540, SN74ALS541 . . . FN PACKAGE
(TOP VIEW)

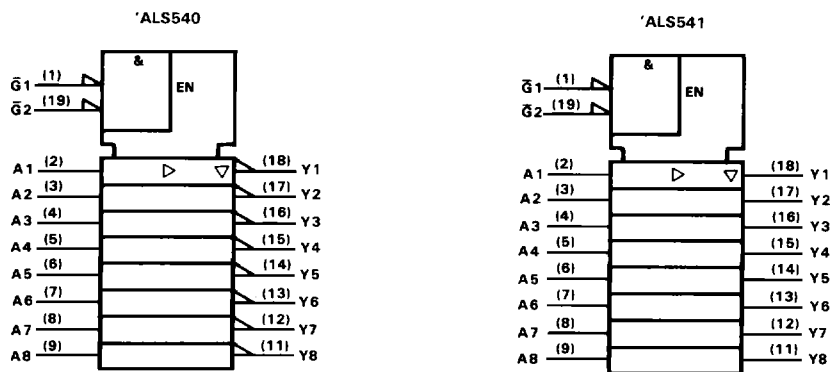


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ALS AND AS CIRCUITS

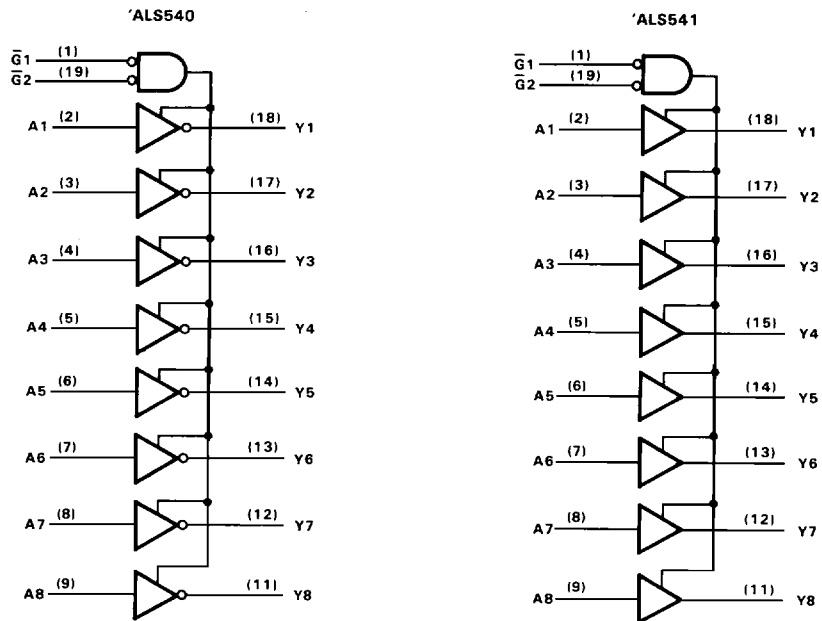
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logic symbols



Pin numbers shown are for J and N packages

logic diagrams (positive logic)



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ALS AND AS CIRCUITS

TYPES SN54ALS540, SN54ALS541, SN74ALS540, SN74ALS541 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54ALS540, SN54ALS541	-55 °C to 125 °C
SN74ALS540, SN74ALS541	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS540 SN54ALS541			SN74ALS540 SN74ALS541			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			-12			-15	mA
I_{OL}	Low-level output current			12			24	mA
							48 [†]	
T_A	Operating free-air temperature	-55		125	0		70	°C

[†]The extended limit applies only if V_{CC} is maintained between 4.75 V and 5.25 V.
The 48 mA limit applies for the SN74ALS540-1 and SN74ALS541-1 only.

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

PARAMETER	TEST CONDITIONS	SN54ALS540 SN54ALS541			SN74ALS540 SN74ALS541			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 to 5.5 V, $I_{OH} = -0.4$ mA	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5$ V, $I_{OH} = -3$ mA	2.4	3.2		2.4	3.2		
	$V_{CC} = 4.5$ V, $I_{OH} = -12$ mA	2						
V_{OL}	$V_{CC} = 4.5$ V, $I_{OH} = -15$ mA				2			V
	$V_{CC} = 4.5$ V, $I_{OL} = 12$ mA		0.25	0.4		0.25	0.4	
	$V_{CC} = 4.5$ V, $I_{OL} = 24$ mA					0.35	0.5	
I_{OZH}	$V_{CC} = 5.5$ V, $V_O = 2.7$ V						20	μ A
I_{OZL}	$V_{CC} = 5.5$ V, $V_O = 0.4$ V						-20	μ A
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	μ A
I_{IL}	$V_{CC} = 5.5$ V, $V_I = 0.4$ V			-0.1			-0.1	mA
$I_{O\text{§}}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V			-30			-112	mA
I_{CC}	'ALS540	$V_{CC} = 5.5$ V	Outputs high		15	15		mA
			Outputs low		18	18		
			Outputs disabled		29	29		
	'ALS541	$V_{CC} = 5.5$ V	Outputs high		15	15		mA
			Outputs low		18	18		
			Outputs disabled		19	19		

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

[§]The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

Additional information on these products can be obtained from the factory as it becomes available.

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ALS AND AS CIRCUITS

**TYPES SN54ALS540, SN54ALS541, SN74ALS540, SN74ALS541
OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

ALS540 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V,}$ $C_L = 50 \text{ pF,}$ $R_1 = 500 \Omega,$ $R_2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$						UNIT
			SN54ALS540			SN74ALS540			
			MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	
t _{PLH}	A	Y	6			6			ns
t _{PHL}			6			6			
t _{PZH}	\bar{G}	Y	13			13			ns
t _{PZL}			18			18			
t _{PHZ}	\bar{G}	Y	7			7			ns
t _{PLZ}			11			11			

ALS541 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V,}$ $C_L = 50 \text{ pF,}$ $R_1 = 500 \Omega,$ $R_2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$						UNIT
			SN54ALS541			SN74ALS541			
			MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	
t _{PLH}	A	Y	6			6			ns
t _{PHL}			6			6			
t _{PZH}	\bar{G}	Y	13			13			ns
t _{PZL}			18			18			
t _{PHZ}	\bar{G}	Y	7			7			ns
t _{PLZ}			11			11			

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

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