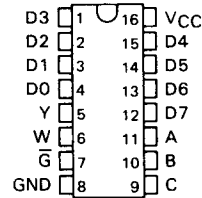


# SN54ALS251, SN54AS251, SN74ALS251, SN74AS251 1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2661, APRIL 1982 - REVISED MAY 1986

- Three-State Versions of 'ALS151 and 'AS151
- Three-State Outputs Interface Directly with System Bus
- Performs Parallel-to-Serial Conversion
- Complementary Outputs Provide True and Inverted Data
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS251, SN54AS251 . . . J PACKAGE  
SN74ALS251, SN74AS251 . . . D OR N PACKAGE  
(TOP VIEW)



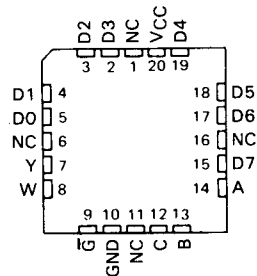
## description

These data selectors/multiplexers contain full binary decoding to select one-of-eight data sources and feature strobe-controlled complementary three-state outputs.

The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state), the low-impedance of the signal enabled output will drive the bus line to a high or low logic level. Both outputs are controlled by the strobe ( $\bar{G}$ ). The outputs are disabled when  $\bar{G}$  is high.

The SN54ALS251 and SN54AS251 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS251 and SN74AS251 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54ALS251, SN54AS251 . . . FK PACKAGE  
(TOP VIEW)



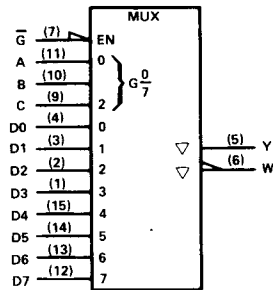
NC - No internal connection.

FUNCTION TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	$\bar{G}$		
X	X	X	H	Z	Z
L	L	L	L	D0	$\bar{D0}$
L	L	H	L	D1	$\bar{D1}$
L	H	L	L	D2	$\bar{D2}$
L	H	H	L	D3	$\bar{D3}$
H	L	L	L	D4	$\bar{D4}$
H	L	H	L	D5	$\bar{D5}$
H	H	L	L	D6	$\bar{D6}$
H	H	H	L	D7	$\bar{D7}$

D0, D1 . . . D7 = the level of the respective D input

## logic symbol†



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

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

This document contains information on products in more than one phase of development. The status of each device is indicated on the page(s) specifying its electrical characteristics.

TEXAS  
INSTRUMENTS

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

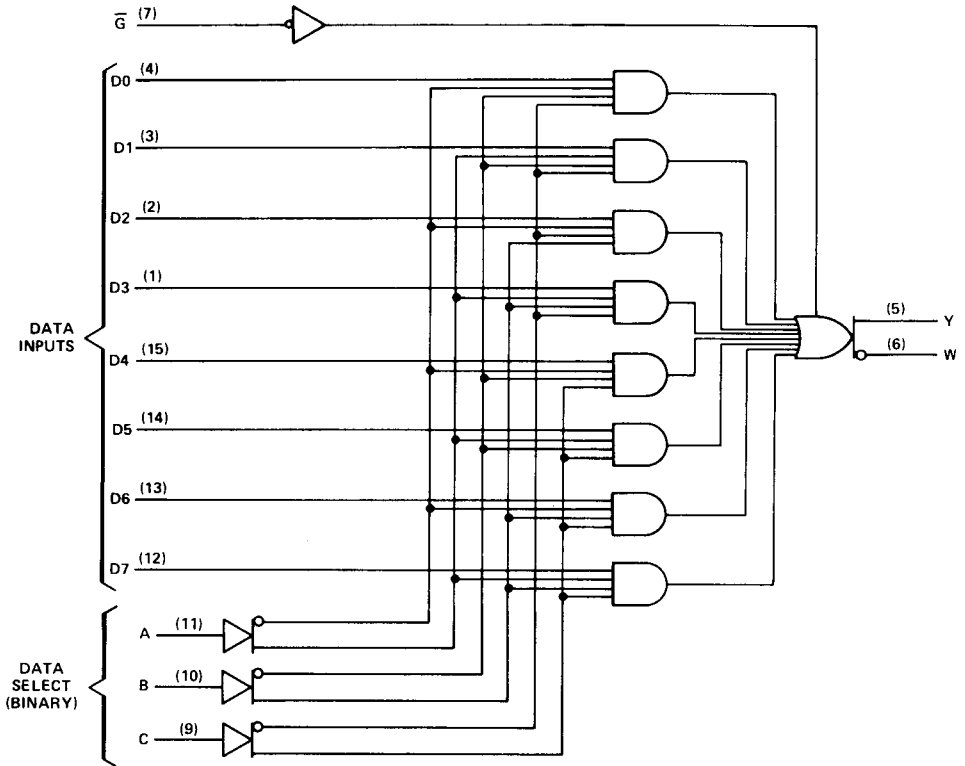
Copyright © 1982, Texas Instruments Incorporated

**SN54ALS251, SN54AS251, SN74ALS251, SN74AS251**  
**1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS**

logic diagram (positive logic)

**2**

**ALS and AS Circuits**



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

**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: SN54ALS251, SN54AS251 .....	-55 °C to 125 °C
SN74ALS251, SN74AS251 .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

# SN54ALS251, SN74ALS251

## 1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

### recommended operating conditions

	SN54ALS251			SN74ALS251			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage							V
I <sub>OH</sub> High-level output current				-1			-2.6 mA
I <sub>OL</sub> Low-level output current				12			24 mA
T <sub>A</sub> Operating free-air temperature	-55			125			0 70 °C

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

PARAMETER	TEST CONDITIONS		SN54ALS251			SN74ALS251			UNIT
			MIN	TYP <sup>†</sup>	MAX	MIN	TYP <sup>†</sup>	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA		-1.5			-1.5			V
V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V to 5.5 V, I <sub>OH</sub> = -0.4 mA		V <sub>CC</sub> - 2			V <sub>CC</sub> - 2			V
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -1 mA		2.4 3.3						
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -2.6 mA					2.4 3.2			
V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 12 mA		0.25 0.4			0.25 0.4			V
	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 24 mA					0.35 0.5			
I <sub>OZH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.7 V		20			20			μA
I <sub>OZL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V		-20			-20			μA
I <sub>I</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V		0.1			0.1			mA
I <sub>IH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V		20			20			μA
I <sub>IL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V		-0.1			-0.1			mA
I <sub>O<sup>‡</sup></sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.25 V		-30 -112			-30 -112			mA
I <sub>CC</sub>	Enabled	V <sub>CC</sub> = 5.5 V, Inputs at Gnd.	7 10			7 10			mA
	Disabled	V <sub>CC</sub> = 5.5 V, Inputs at 4.5 V	9.4 14			9.4 14			

<sup>†</sup>All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>‡</sup>The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I<sub>OS</sub>.

PRODUCTION DATA documents contain information 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**

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

**SN54ALS251, SN74ALS251**  
**1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS**

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
			SN54ALS251		SN74ALS251		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A, B or C	Y	1	21	5	18	ns
$t_{PHL}$			8	34	8	24	
$t_{PLH}$	A, B or C	W	8	38	8	24	ns
$t_{PHL}$			7	26	7	23	
$t_{PLH}$	Any D	Y	2	15	2	10	ns
$t_{PHL}$			3	23	3	15	
$t_{PLH}$	Any D	W	3	25	3	15	ns
$t_{PHL}$			3	20	3	15	
$t_{PZH}$	$\bar{G}$	Y	3	21	3	15	ns
$t_{PZL}$			3	19	3	15	
$t_{PZH}$	$\bar{G}$	W	3	21	3	15	ns
$t_{PZL}$			3	19	3	15	
$t_{PHZ}$	$\bar{G}$	Y	2	12	2	10	ns
$t_{PLZ}$			1	18	1	10	
$t_{PHZ}$	$\bar{G}$	W	2	12	2	10	ns
$t_{PLZ}$			1	18	1	10	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

2

ALS and AS Circuits

**recommended operating conditions**

		SN54AS251			SN74AS251			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage				0.8			V
I <sub>OH</sub>	High-level output current				-12			-15 mA
I <sub>OL</sub>	Low-level output current				32			48 mA
T <sub>A</sub>	Operating free-air temperature	-55			125			0 70 °C

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

PARAMETER	TEST CONDITIONS	SN54AS251			SN74AS251			UNIT
		MIN	TYP <sup>†</sup>	MAX	MIN	TYP <sup>†</sup>	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA	-1.2			-1.2			V
V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V to 5.5 V, I <sub>OH</sub> = -2 mA	V <sub>CC</sub> - 2			V <sub>CC</sub> - 2			V
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -12 mA	2.4 3.2						
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -15 mA				2.4 3.3			
V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 32 mA	0.25 0.5						V
	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 48 mA				0.35 0.5			
I <sub>OZH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.7 V	50			50			μA
I <sub>OZL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V	-50			-50			μA
I <sub>I</sub>	A, B, C	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V			0.2			mA
	All other				0.1			
I <sub>IH</sub>	A, B, C	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V			40			μA
	All other				20			
I <sub>IL</sub>	A, B, C	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V			-0.6			mA
	All other				-0.3			
I <sub>O</sub> <sup>‡</sup>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.25 V	-30 -112			-30 -112			mA
I <sub>CC</sub>	V <sub>CC</sub> = 5.5 V,	28			28			mA

<sup>†</sup>All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>‡</sup>The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I<sub>OS</sub>.

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
			SN54AS251			SN74AS251			
			MIN	TYP <sup>†</sup>	MAX	MIN	TYP <sup>†</sup>	MAX	
<sup>t</sup> PLH	A, B, or C	Y	5			5			ns
<sup>t</sup> PHL			5			5			
<sup>t</sup> PLH	A, B, or C	W	4.5			4.5			ns
<sup>t</sup> PHL			4.5			4.5			
<sup>t</sup> PLH	Any D	Y	3			3			ns
<sup>t</sup> PHL			4			4			
<sup>t</sup> PLH	Any D	W	3			3			ns
<sup>t</sup> PHL			2.5			2.5			
<sup>t</sup> PZH	$\bar{G}$	Y	5			5			ns
<sup>t</sup> PZL			6			6			
<sup>t</sup> PZH	$\bar{G}$	W	5			5			ns
<sup>t</sup> PZL			6			6			
<sup>t</sup> PHZ	$\bar{G}$	Y	3			3			ns
<sup>t</sup> PLZ			4			4			
<sup>t</sup> PHZ	$\bar{G}$	W	3			3			ns
<sup>t</sup> PLZ			4			4			

<sup>†</sup>All typical values are at  $V_{CC} = 5 \text{ V, } T_A = 25^\circ\text{C.}$

NOTE 1. Load circuit and voltage waveforms are shown in Section 1.

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

2

ALS and AS Circuits