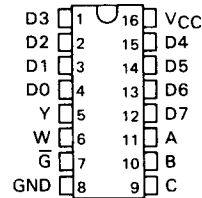


SN54ALS251, SN54AS251, SN74ALS251, SN74AS251 1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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)



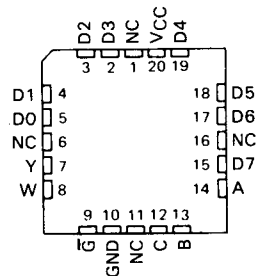
description

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°C to 125°C . The SN74ALS251 and SN74AS251 are characterized for operation from 0°C to 70°C .

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



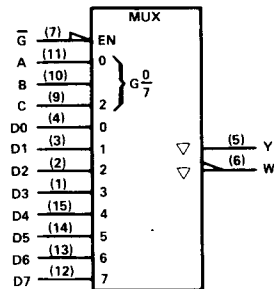
NC — No internal connection.

FUNCTION TABLE

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

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

logic symbol†



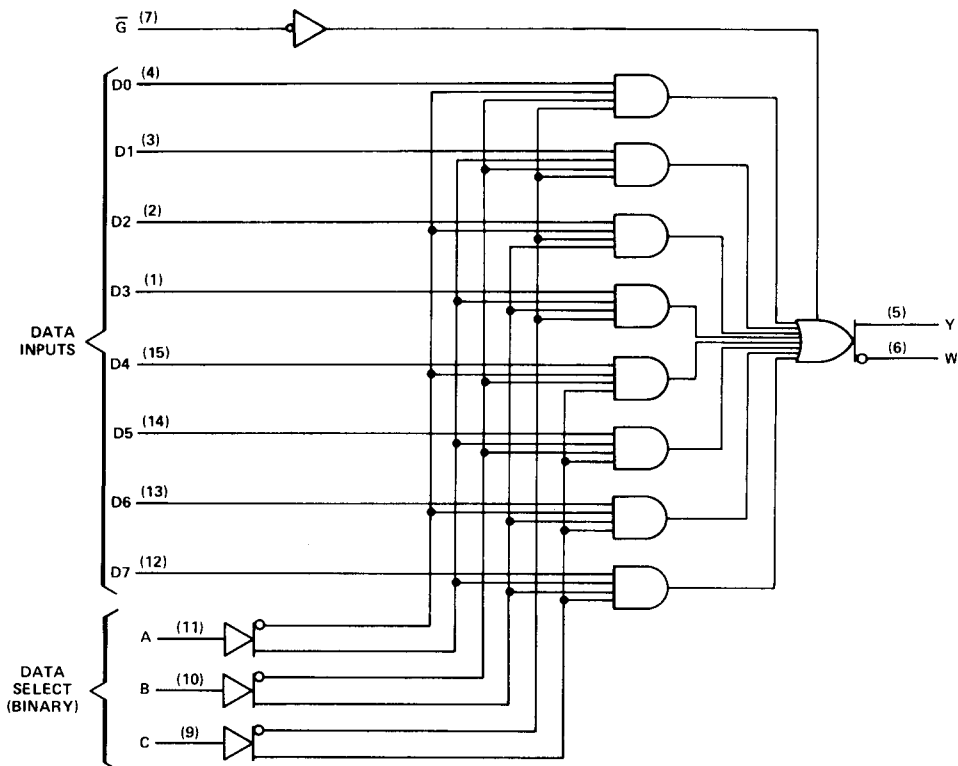
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, and N packages.

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

logic diagram (positive logic)

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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 _{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
I _{OH}	High-level output current			-1			-2.6	mA
I _{OL}	Low-level output current			12			24	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	SN54ALS251			SN74ALS251			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} = -1 mA	2.4	3.3					
	V _{CC} = 4.5 V, I _{OH} = -2.6 mA				2.4	3.2		
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 12 mA		0.25	0.4		0.25	0.4	V
	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			20	μA
I _{OZL}	V _{CC} = 5.5 V, V _I = 0.4 V			-20			-20	μA
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 _O [‡]	V _{CC} = 5.5 V, V _O = 2.25 V	-30		-112	-30		-112	mA
I _{CC}	Enabled		7	10		7	10	mA
	Disabled		9.4	14		9.4	14	

[†]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}.

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.

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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 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = 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}	$\overline{G}$	Y	3	21	3	15	ns
t _{PZL}			3	19	3	15	
t _{PZH}	$\overline{G}$	W	3	21	3	15	ns
t _{PZL}			3	19	3	15	
t _{PHZ}	$\overline{G}$	Y	2	12	2	10	ns
t _{PLZ}			1	18	1	10	
t _{PHZ}	$\overline{G}$	W	2	12	2	10	ns
t _{PLZ}			1	18	1	10	

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

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ALS and AS Circuits

recommended operating conditions

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

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

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

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX						UNIT
			SN54AS251			SN74AS251			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t _{PLH}	A, B, or C	Y	5			5			ns
t _{PHL}			5			5			
t _{PLH}	A, B, or C	W	4.5			4.5			ns
t _{PHL}			4.5			4.5			
t _{PLH}	Any D	Y	3			3			ns
t _{PHL}			4			4			
t _{PLH}	Any D	W	3			3			ns
t _{PHL}			2.5			2.5			
t _{PZH}	G̅	Y	5			5			ns
t _{PZL}			6			6			
t _{PZH}	G̅	W	5			5			ns
t _{PZL}			6			6			
t _{PHZ}	G̅	Y	3			3			ns
t _{PLZ}			4			4			
t _{PHZ}	G̅	W	3			3			ns
t _{PLZ}			4			4			

[†]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.

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ALS and AS Circuits