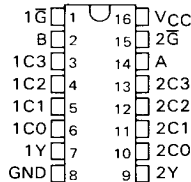


SN54ALS253, SN54AS253, SN74ALS253, SN74AS253 DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2661, APRIL 1982—REVISED MAY 1986

- Three-State Versions of 'ALS153 and 'AS153
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS253, SN54AS253 . . . J PACKAGE
SN74ALS253, SN74AS253 . . . D OR N PACKAGE
(TOP VIEW)



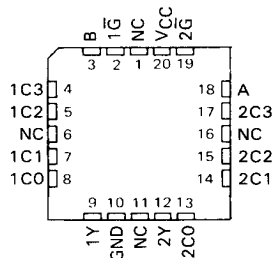
description

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.

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 single enabled output will drive the bus line to a high or low logic level. Each output has its own strobe (\bar{G}). The output is disabled when its strobe is high.

The SN54ALS253 and SN54AS253 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS253 and SN74AS253 are characterized for operation from 0°C to 70°C .

SN54ALS253, SN54AS253 . . . FK PACKAGE
(TOP VIEW)



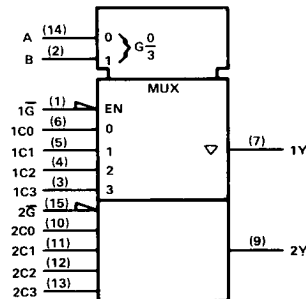
NC: No internal connection

FUNCTION TABLE

SELECT INPUTS		DATA INPUTS				OUTPUT CONTROL		OUTPUT
B	A	C0	C1	C2	C3	\bar{G}	Y	
X	X	X	X	X	X	H	Z	
L	L	L	X	X	X	L	L	
L	L	H	X	X	X	L	H	
L	H	X	L	X	X	L	L	
L	H	X	H	X	X	L	H	
H	L	X	X	L	X	L	L	
H	L	X	X	H	X	L	H	
H	H	X	X	X	L	L	L	
H	H	X	X	X	H	L	H	

Address inputs A and B are common to both sections.

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.

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**

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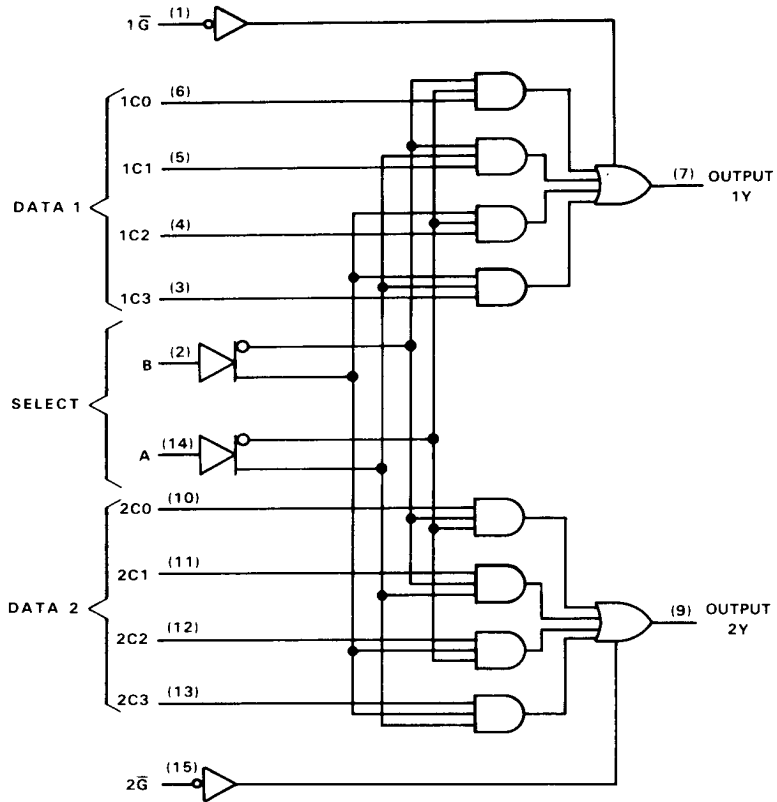
2-299

**SN54ALS253, SN54AS253, SN74ALS253, SN74AS253
DUAL 1-OF-4 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, VCC	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54ALS253, SN54AS253	-55 °C to 125 °C
SN74ALS253, SN74AS253	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

SN54ALS253, SN74ALS253 DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

recommended operating conditions

		SN54ALS253			SN74ALS253			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		SN54ALS253			SN74ALS253			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 _O = 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}	V _{CC} = 5.5 V		Outputs enabled		6.5 12		6.5 12		mA
			Outputs disabled		7.5 14		7.5 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}.

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
			SN54ALS253		SN74ALS253		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Any Y	5	30	5	21	ns
t _{PHL}			5	27	5	21	
t _{PLH}	Data (Any C)	Any Y	2	15	2	10	ns
t _{PHL}			3	18	3	14	
t _{PZH}	\bar{G}	Any Y	3	20	3	14	ns
t _{PZL}			2	19	4	16	
t _{PHZ}	\bar{G}	Any Y	2	12	2	10	ns
t _{PLZ}			2	18	2	14	

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

SN54AS253, SN74AS253 DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

recommended operating conditions

		SN54AS253			SN74AS253			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)

2

ALS and AS Circuits

PARAMETER	TEST CONDITIONS	SN54AS253			SN74AS253			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	3.2		
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 _O = 0.4 V			-50			-50	μA
I _I	V _{CC} = 5.5 V, V _I = 7 V	A, B			0.2			mA
		All others			0.1			
I _{IH}	V _{CC} = 5.5 V, V _I = 2.7 V	A, B			40			μA
		All others			20			
I _{IL}	V _{CC} = 5.5 V, V _I = 0.4 V	A, B			-1			mA
		All others			-0.5			
I _{O[±]}	V _{CC} = 5.5 V, V _O = 2.25 V	-30		-112	-30		-112	mA
I _{CC}	V _{CC} = 5.5 V	Outputs high		18	29	18	29	mA
		Outputs low		20	32	20	32	
		Outputs disabled		21	33	21	33	

[†]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}.

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
			SN54AS253		SN74AS253		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	4	14.5	4	13.5	ns
t _{PHL}			4	12	4	11.5	
t _{PLH}	Data (Any C)	Y	3	8.5	3	7.5	ns
t _{PHL}			3	8.5	3	8	
t _{PZH}	G	Any Y	4	13	4	12.5	ns
t _{PZL}			4	12	4	11.5	
t _{PHZ}	G	Any Y	2	6.5	2	6	ns
t _{PLZ}			2	8	2	7	

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