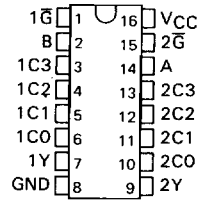


TYPES SN54ALS253, SN54AS253, SN74ALS253, SN74AS253 DUAL 1 OF 4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2661, APRIL 1982—REVISED DECEMBER 1983

- Three-State Versions of 'ALS153 and 'AS153
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Fully Compatible with Most TTL Circuits
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

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



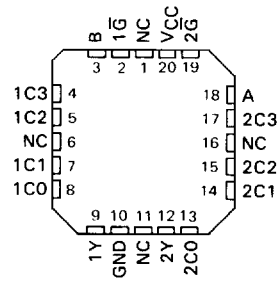
description

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 . . . FH PACKAGE
SN74ALS253, SN74AS253 . . . FN PACKAGE
(TOP VIEW)



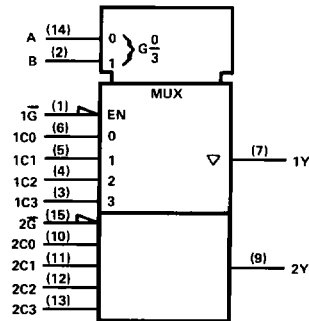
NC—No internal connection

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	L

Address inputs A and B are common to both sections.

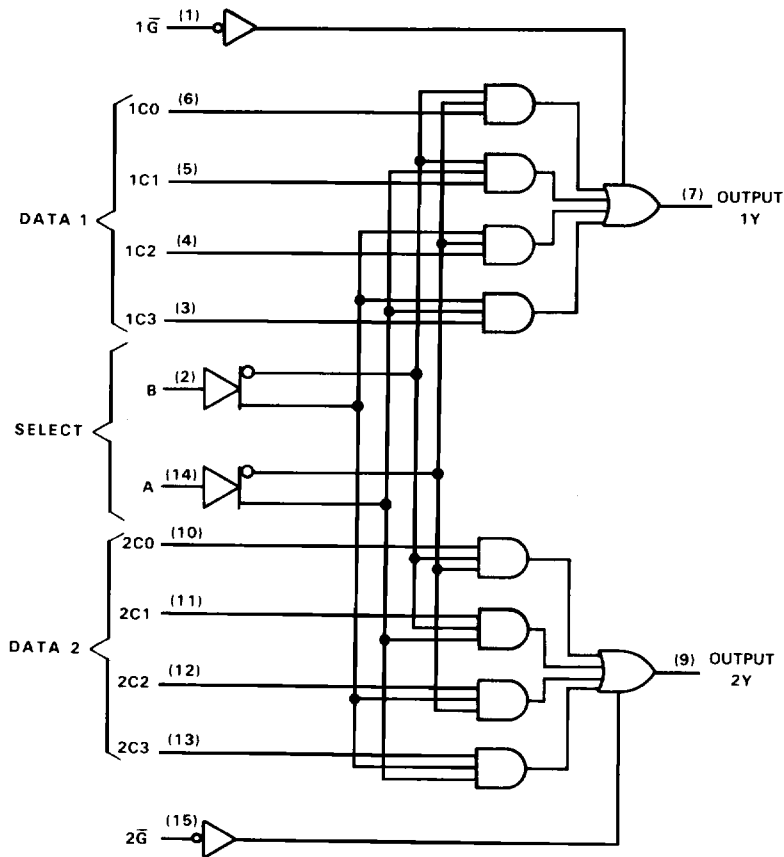
logic symbol



Pin numbers shown are for J and N packages.

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

logic diagram (positive logic)



Pin numbers shown are for J and N packages.

2
ALS AND AS CIRCUITS

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: SN54ALS253, SN54AS253	-55 °C to 125 °C
SN74ALS253, SN74AS253	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

TYPES 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	0.8			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			°C

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

PARAMETER	TEST CONDITIONS	SN54ALS253		SN74ALS253		UNIT
		MIN	TYP [†]	MAX	MIN	
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		mA
		Outputs disabled		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	25	5	21	ns
t _{PHL}			5	25	5	21	
t _{PLH}	Data (Any C)	Any Y	2	12	2	10	ns
t _{PHL}			3	17	3	14	
t _{PZH}	\bar{G}	Any Y	3	17	3	14	ns
t _{PZL}			4	19	4	16	
t _{PHZ}	\bar{G}	Any Y	2	12	2	10	ns
t _{PLZ}			2	16	2	14	

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

2
ALS AND AS CIRCUITS

TYPES 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			0			70	°C

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

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 _{OL}	V _{CC} = 4.5 V, I _{OL} = -15 mA			2.4	3.2	V		
	V _{CC} = 4.5 V, I _{OL} = 32 mA	0.25	0.5					
I _{OZH}	V _{CC} = 4.5 V, V _O = 2.7 V			0.35	0.5	μA		
	V _{CC} = 5.5 V, V _O = 2.7 V	50		50				
I _{OZL}	V _{CC} = 5.5 V, V _O = 0.4 V	-50		-50		μA		
	V _{CC} = 5.5 V, V _I = 7 V	0.2		0.2				
I _I	All others	0.1		0.1		mA		
	V _{CC} = 5.5 V, V _I = 2.7 V	40		40				
I _{IH}	All others	20		20		μA		
	V _{CC} = 5.5 V, V _I = 0.4 V	-1		-1				
I _{IL}	All others	-0.5		-0.5		mA		
	V _{CC} = 5.5 V, V _O = 2.25 V	-30	-112	-30	-112			
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: For load circuit and voltage waveforms, see page 1-12.

2 ALS AND AS CIRCUITS