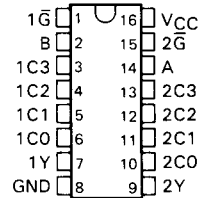


SN54ALS353, SN54AS353A, SN74ALS353, SN74AS353A DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2661, APRIL 1982—REVISED MAY 1986

- Inverting Versions of 'ALS253 and 'AS253
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Typical 'ALS353 Power per Multiplexer . . . 20 mW
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS353, SN54AS353A . . . J PACKAGE
SN74ALS353, SN74AS353A . . . D OR N PACKAGE
(TOP VIEW)



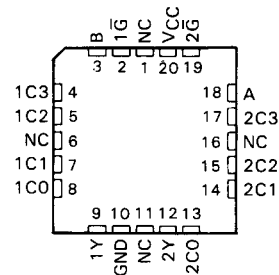
description

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR-invert gates. Separate strobe inputs (\bar{G}) 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 SN54ALS353 and SN54AS353A are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS353 and SN74AS353A are characterized for operation from 0°C to 70°C .

SN54ALS353, SN54AS353A . . . FK PACKAGE
(TOP VIEW)

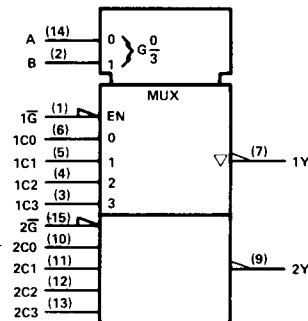


NC—No internal connection

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	X	X	X	X	L	H	
L	L	H	X	X	X	L	L	
L	H	X	L	X	X	L	H	
L	H	X	H	X	X	L	L	
H	L	X	X	L	X	L	H	
H	L	X	X	H	X	L	L	
H	H	X	X	X	L	L	H	
H	H	X	X	X	H	L	L	

Select 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.

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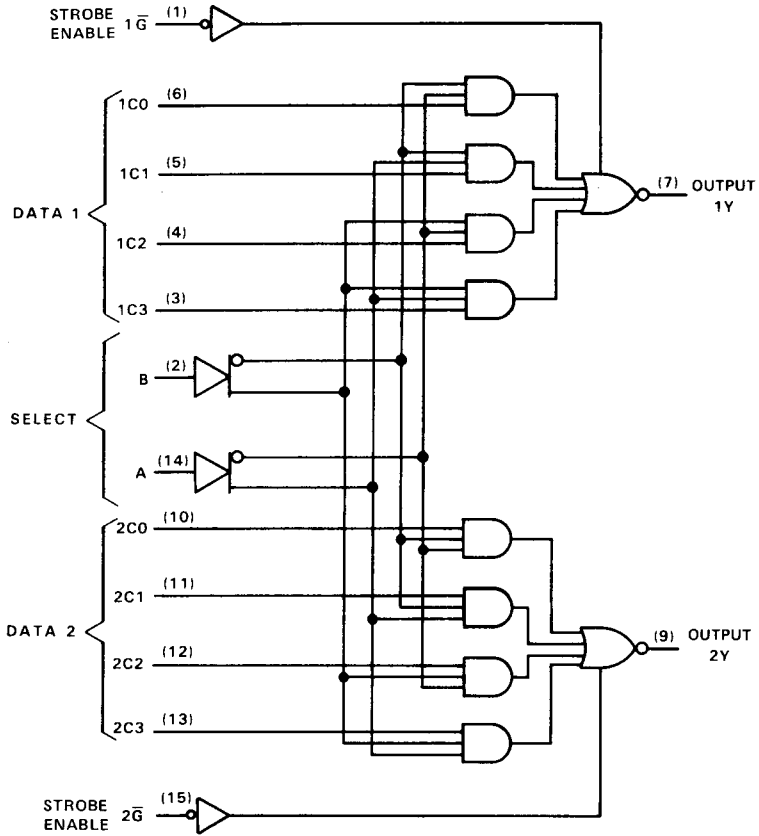
ALS and AS Circuits

SN54ALS353, SN54AS353A, SN74ALS353, SN74AS353A
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, V_{CC}	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54ALS353, SN54AS353A	-55 °C to 125 °C
SN74ALS353, SN74AS353A	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

SN54ALS353, SN74ALS353 DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

recommended operating conditions

	SN54ALS353			SN74ALS353			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			0			70 °C

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

PARAMETER	TEST CONDITIONS	SN54ALS353			SN74ALS353			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			0.25			V
	V _{CC} = 4.5 V, I _{OL} = 24 mA				0.35			
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}	disabled							mA
	enabled	V _{CC} = 5.5 V	All inputs, at 4.5 V		8	13		
		All inputs at Gnd			7	12		

[†]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
			SN54ALS353		SN74ALS353		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	5	32	5	24	ns
t _{PHL}			5	24	5	21	
t _{PLH}	Data (Any C)	Y	4	24	4	18	ns
t _{PHL}			3	15	3	13	
t _{PZH}	0	Y	3	18	3	13	ns
t _{PZL}			3	20	2	16	
t _{PHZ}	0	Y	2	12	2	10	ns
t _{PLZ}			2	22	2	14	

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

2

ALS and AS Circuits

SN54AS353A, SN74AS353A DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

recommended operating conditions

	SN54AS353A			SN74AS353A			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			V
I _{OH} High-level output current				-12			mA
I _{OL} Low-level output current				32			mA
T _A Operating free-air temperature	-55			125			°C

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

2

ALS and AS Circuits

PARAMETER	TEST CONDITIONS	SN54AS353A		SN74AS353A		UNIT	
		MIN	TYP ¹	MAX	MIN		TYP ¹
V _{IK}	V _{CC} = 4.5 V, I _I = -18 mA			-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 _O = 0.4 V			-50	-50	μA	
I _I	A, B	V _{CC} = 5.5 V, V _I = 7 V		0.2		mA	
	All others			0.1	0.1		
I _{IH}	A, B	V _{CC} = 5.5 V, V _I = 2.7 V		40		μA	
	All others			20	20		
I _{IL}	A, B	V _{CC} = 5.5 V, V _I = 0.4 V		-1		mA	
	All others			-0.5	-0.5		
I _{O²}	V _{CC} = 5.5 V, V _O = 2.25 V	-30	-112	-30	-112	mA	
I _{CC}	V _{CC} = 5.5 V	Outputs high	15	24	15	24	mA
		Outputs low	19	31	19	31	
		Outputs disabled	18	30	18	30	

¹All typical values are at V_{CC} = 5 V, T_A = 25°C.

²The 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
			SN54AS353A		SN74AS353A		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	3	10	3	9	ns
t _{PHL}			4	14	4	12	
t _{PLH}	Data (Any C)	Y	3	8.5	3	7.5	ns
t _{PHL}			2	6.5	2	6	
t _{PZH}	Strobe	Y	3	8.5	3	7.5	ns
t _{PZL}			4	13.5	4	12.5	
t _{PHZ}	Strobe	Y	2	6.5	2	5.5	ns
t _{PLZ}			3	9	3	7.5	

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