

# SN54ALS352, SN54AS352, SN74ALS352, SN74AS352 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

D2661, APRIL 1982—REVISED MAY 1986

- Inverting Versions of 'ALS153 and 'AS153
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Strobe (Enable) Line Provided for Cascading (N Lines to n Lines)
- Typical 'ALS352 Power per Multiplexer . . . 16 mW
- Typical 'AS352 Average Propagation Delay Times  
Data Input to Output . . . 2.7 ns  
Strobe Input to Output . . . 4.5 ns  
Select Input to Output . . . 4.5 ns
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

## description

Each of these data selectors/multiplexers contains inverters and drivers to supply fully complementary 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.

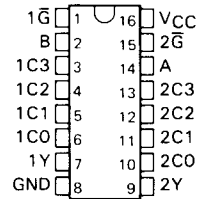
The SN54ALS352 and SN54AS352 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS352 and SN74AS352 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE

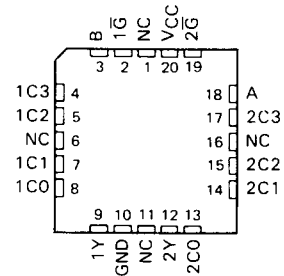
SELECT INPUTS		DATA INPUTS				STROBE	OUTPUT
B	A	C0	C1	C2	C3	$\bar{G}$	Y
X	X	X	X	X	X	H	H
L	L	L	X	X	X	L	H
L	L	H	X	X	X	L	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	L	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	L	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	L	L

Select inputs A and B are common to both sections.

SN54ALS352, SN54AS352 . . . J PACKAGE  
SN74ALS352, SN74AS352 . . . D OR N PACKAGE  
(TOP VIEW)

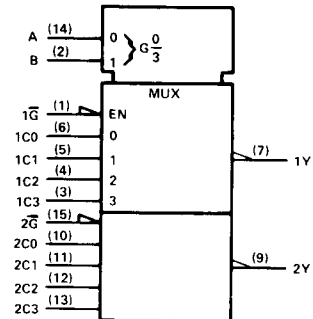


SN54ALS352, SN54AS352 . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

## 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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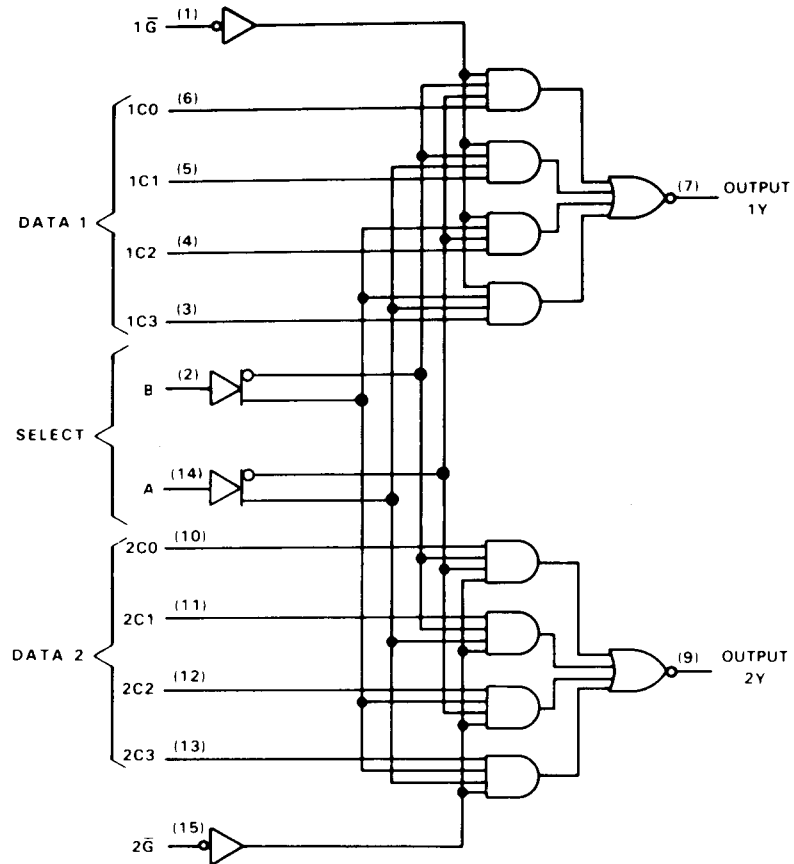
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**SN54ALS352, SN54AS352, SN74ALS352, SN74AS352**  
**DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS**

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
Operating free-air temperature range: SN54ALS352, SN54AS352 .....	-55 °C to 125 °C
SN74ALS352, SN74AS352 .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

# SN54ALS352, SN74ALS352 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

## recommended operating conditions

	SN54ALS352			SN74ALS352			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	0.7			0.8			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			0			70 °C

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

PARAMETER	TEST CONDITIONS	SN54ALS352			SN74ALS352			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>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</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, See Note 1	6.5		10	6.5	10		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>.

NOTE 1: I<sub>CC</sub> is measured with data and select inputs at 4.5 V, and G inputs grounded.

## switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54ALS352		SN74ALS352		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Y	5	32	5	24	ns
t <sub>PHL</sub>			5	24	5	21	
t <sub>PLH</sub>	Data (Any C)	Y	3	24	3	18	ns
t <sub>PHL</sub>			2	15	2	13	
t <sub>PLH</sub>	G	Y	4	26	4	18	ns
t <sub>PHL</sub>			4	24	4	20	

NOTE 2: Load circuit and voltage waveforms are shown in Section 1.

# SN54AS352, SN74AS352

## DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

### recommended operating conditions

	SN54AS352			SN74AS352			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			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

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## ALS and AS Circuits

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

PARAMETER	TEST CONDITIONS	SN54AS352			SN74AS352			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>I</sub>	A, B			0.2			0.2	mA
	All others	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V		0.1			0.1	
I <sub>IH</sub>	A, B			40			40	μA
	All others	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V		20			20	
I <sub>IL</sub>	A, B			-1			-1	mA
	All others	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V		-0.5			-0.5	
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	Outputs high	15.5	25	15.5	25		mA
		Outputs low	17.5	28	17.5	28		

<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 <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54AS352		SN74AS352		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Y	4	12.5	4	11	ns
t <sub>PHL</sub>			4	14	4	13	
t <sub>PLH</sub>	Data (Any C)	Y	2	7.5	2	6.5	ns
t <sub>PHL</sub>			2	7	2	6	
t <sub>PLH</sub>	$\bar{G}$	Y	3	8	3	7	ns
t <sub>PHL</sub>			4	13.5	4	12	

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