

# SN54LS353, SN74LS353

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

### WITH 3-STATE OUTPUTS

BULLETIN NO. DL-S 12464, OCTOBER 1976 — REVISED MARCH 1988

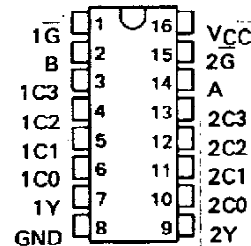
- Inverting Versions of SN54LS253, SN74LS253
- Schottky-Diode-Clamped Transistors
- Permits Multiplexing from N lines to 1 line
- Performs Parallel-to-Serial Conversion
- Typical Average Propagation Delay Times:  
Data Input to Output . . . 12 ns  
Control Input to Output . . . 16 ns  
Select Input to Output . . . 21 ns
- Fully Compatible with most TTL Circuits
- Low Power Dissipation . . . 35 mW Typical (Enabled)
- Inverted Data

#### description

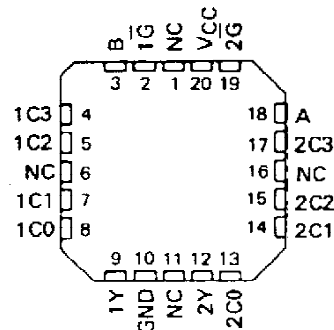
Each of these Schottky-clamped data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR-invert gates. Separate output control inputs are provided for each of the two four-line sections.

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.

SN54LS353 . . . J OR W PACKAGE  
SN74LS353 . . . D OR N PACKAGE  
(TOP VIEW)



SN54LS353 . . . 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	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.

H = high level, L = low level, X = irrelevant, Z = high impedance (off)

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	7 V
Off-state output voltage	5.5 V
Operating free-air temperature range: SN54LS353	-55°C to 125°C
SN74LS353	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1. Voltage values are with respect to network ground terminal.

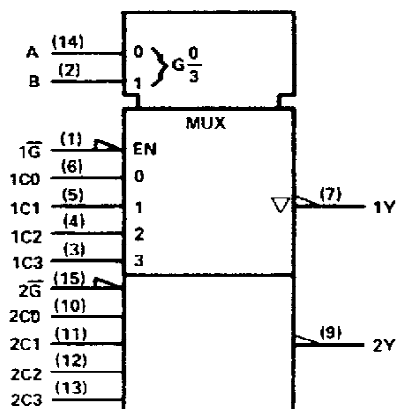
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# **SN54LS353, SN74LS353** **DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS** **WITH 3-STATE OUTPUTS**

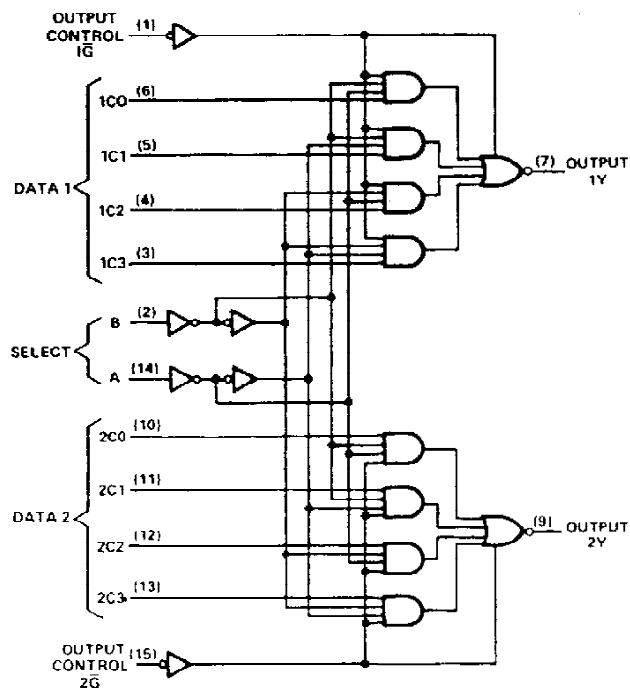
logic symbol†



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

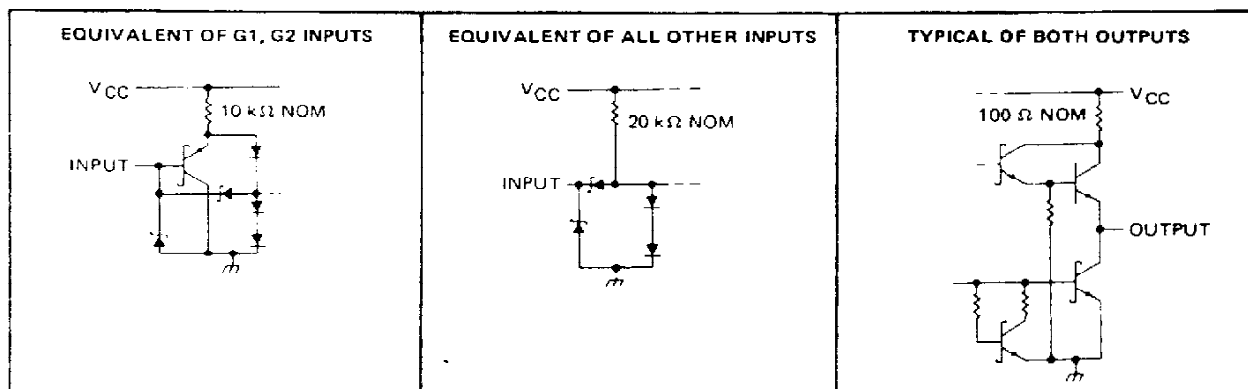
Pin numbers shown are for D, J, N, and W packages.

logic diagram (positive logic)



Pin numbers shown are for D, J, N, and W packages.

schematic of inputs and outputs



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# **SN54LS353, SN74LS353** **DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS** **WITH 3-STATE OUTPUTS**

recommended operating conditions

		SN54LS353			SN74LS353			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.75	5	5.25	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			4			8	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 †		SN54LS353		SN74LS353		UNIT
				MIN	TYP ‡	MAX	MIN	
V <sub>IK</sub>		V <sub>CC</sub> = MIN, I <sub>I</sub> = - 18 mA		- 1.5		- 1.5		V
V <sub>OH</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OH</sub> = MAX		2.4	3.4	2.4	3.1	V
V <sub>OL</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX		I <sub>OL</sub> = 4 mA		0.25 0.4		V
				I <sub>OL</sub> = 8 mA		0.35 0.5		
I <sub>OZ</sub>		V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V		V <sub>O</sub> = 2.7 V		20		μA
				V <sub>O</sub> = 0.4 V		- 20		
I <sub>I</sub>		V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V		0.1		0.1		mA
I <sub>IH</sub>		V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V		20		20		μA
I <sub>IL</sub>	G <sub>1</sub> , G <sub>1</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V		- 0.2		- 0.2		mA
	- 0.4			- 0.4				
I <sub>OS</sub> §		V <sub>CC</sub> = MAX		- 30	- 130	- 30	- 130	mA
I <sub>CC</sub>		V <sub>CC</sub> = MAX, See Note 2		Condition A		7	12	mA
				Condition B		8.5	14	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

§ Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2:  $I_{CC}$  is measured with the outputs open under the following conditions:

- A. All inputs grounded.
- B. Output control at 4.5 V, all inputs grounded.

switching characteristics,  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
$t_{PLH}$	Data	Y	$C_L = 15 \text{ pF},$ See Note 3	$R_L = 2 \text{ k}\Omega,$	11	25	ns	
$t_{PHL}$					13	20		
$t_{PLH}$	Select	Y			20	45	ns	
$t_{PHL}$					21	32		
$t_{PZH}$	Output	Y			11	23	ns	
$t_{PZL}$	Control				15	23		
$t_{PHZ}$	Output	Y	$C_L = 5 \text{ pF},$ See Note 3	$R_L = 2 \text{ k}\Omega,$	27	41	ns	
$t_{PLZ}$	Control		12	27				

†  $t_{PLH}$  = Propagation delay time, low-to-high-level output

$t_{PHL}$  = Propagation delay time, high-to-low-level output

$t_{PZH}$  = Output enable time to high level

$t_{PZL}$  = Output enable time to low level

$t_{PHZ}$  = Output disable time from high level

$t_{PLZ}$  = Output disable time from low level

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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