

SN54HC353, SN74HC353 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

- Inverting Versions of 'HC253
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- High-Current Outputs Can Drive Up to 15 LSTTL Loads
- 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

Separate output enable inputs (\bar{G}) are provided for each of the two four-line sections of these data selectors/multiplexers.

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

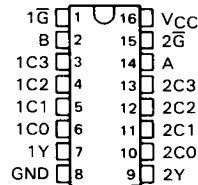
The SN54HC353 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC353 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

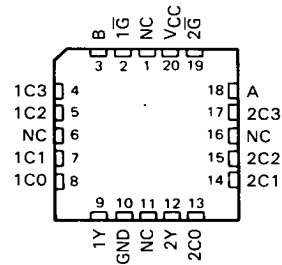
SELECT INPUTS		DATA INPUTS				OUTPUT ENABLE	OUTPUT
B	A	C0	C1	C2	C3	\bar{G}	Y
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	H
L	L	H	X	X	X	L	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	L	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	L	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	L	L

Select inputs A and B are common to both sections.

SN54HC353, SN74HC353 J PACKAGE
SN74HC353 DW OR N PACKAGE
(TOP VIEW)

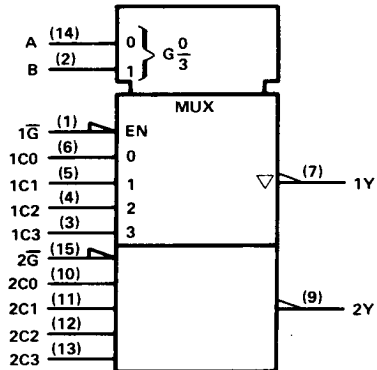


SN54HC353 FK PACKAGE
(TOP VIEW)



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 DW, 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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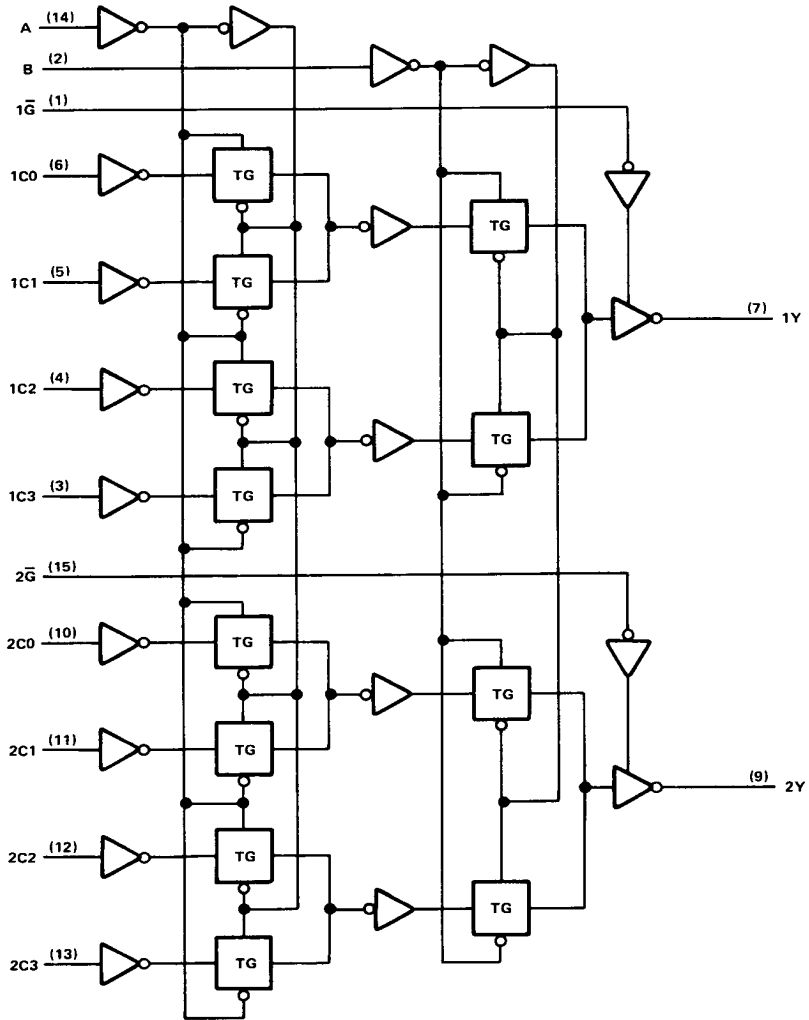
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WITH 3-STATE OUTPUTS

logic diagram (positive logic)

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Pin numbers shown are for DW, J, and N packages.

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TEXAS
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SN54HC353, SN74HC353
DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS

absolute maximum ratings over operating free-air temperature †

Supply voltage, V_{CC}	-0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 35 mA
Continuous current through V_{CC} or GND pins	± 70 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or J package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: DW or N package	260°C
Storage temperature range	-65°C to 150°C

†Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN54HC353			SN74HC353			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	2	5	6	2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V		1.5	$V_{CC} = 2$ V		1.5	V
		$V_{CC} = 4.5$ V		3.15	$V_{CC} = 4.5$ V		3.15	
		$V_{CC} = 6$ V		4.2	$V_{CC} = 6$ V		4.2	
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V		0	$V_{CC} = 2$ V		0	V
		$V_{CC} = 4.5$ V		0	$V_{CC} = 4.5$ V		0	
		$V_{CC} = 6$ V		0	$V_{CC} = 6$ V		0	
V_I	Input voltage	0		V_{CC}	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	0		V_{CC}	V
t_t	Input transition (rise and fall) times	$V_{CC} = 2$ V		0	$V_{CC} = 2$ V		1000	ns
		$V_{CC} = 4.5$ V		0	$V_{CC} = 4.5$ V		500	
		$V_{CC} = 6$ V		0	$V_{CC} = 6$ V		400	
T_A	Operating free-air temperature	-55		125	-40		85	°C

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DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25 °C			SN54HC353		SN74HC353		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL} , I _{OH} = -20 μA	2 V	1.9	1.998		1.9		1.9	V	
		4.5 V	4.4	4.499		4.4		4.4		
		6 V	5.9	5.999		5.9		5.9		
	4.5 V	3.98	4.30		3.7		3.84			
V _{OL}	V _I = V _{IH} or V _{IL} , I _{OL} = 20 μA	2 V		0.002	0.1		0.1	0.1	V	
		4.5 V		0.001	0.1		0.1	0.1		
		6 V		0.001	0.1		0.1	0.1		
	4.5 V		0.17	0.26		0.4	0.33			
V _{OL}	V _I = V _{IH} or V _{IL} , I _{OL} = 7.8 mA	6 V		0.15	0.26		0.4	0.33	V	
		6 V		0.15	0.26		0.4	0.33		
I _I	V _I = V _{CC} or 0	6 V		±0.1	±100		±1000	±1000	nA	
I _{OZ}	V _O = V _{CC} or 0	6 V		±0.01	±0.5		±10	±10	±5 μA	
I _{CC}	V _I = V _{CC} or 0, I _O = 0	6 V			8		160	80	μA	
C _i		2 to 6 V		3	10		10	10	pF	

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HCNOS Devices

SN54HC353, SN74HC353
DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 50$ pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	$T_A = 25^\circ\text{C}$			SN54HC353		SN74HC353		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	2 V	60	185	280	230	ns			
			4.5 V	17	37	56	46				
			6 V	14	32	48	39				
t_{pd}	Data (Any C)	Y	2 V	48	175	265	220	ns			
			4.5 V	14	35	53	44				
			6 V	11	30	45	37				
t_{en}	\bar{G}	Y	2 V	37	135	205	170	ns			
			4.5 V	11	27	41	34				
			6 V	9	23	35	29				
t_{dis}	\bar{G}	Y	2 V	22	135	205	170	ns			
			4.5 V	13	27	41	34				
			6 V	11	23	35	29				
t_t		Any	2 V	20	60	90	75	ns			
			4.5 V	8	12	18	15				
			6 V	6	10	15	13				

C_{pd}	Power dissipation capacitance per multiplexer	No load, $T_A = 25^\circ\text{C}$	40 pF typ
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switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 150$ pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	$T_A = 25^\circ\text{C}$			SN54HC353		SN74HC353		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	2 V	75	270	410	335	ns			
			4.5 V	21	54	82	67				
			6 V	18	47	70	58				
t_{pd}	Data (Any C)	Y	2 V	67	260	395	325	ns			
			4.5 V	19	52	79	63				
			6 V	16	45	67	56				
t_{en}	\bar{G}	Y	2 V	54	220	335	275	ns			
			4.5 V	16	44	67	55				
			6 V	14	38	57	48				
t_t		Y	2 V	45	210	315	265	ns			
			4.5 V	17	42	63	53				
			6 V	13	36	53	45				

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

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