

SN54HC251, SN74HC251 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

- 3-State Version of 'HC151
- High-Current 3-State Outputs Interface Directly with System Bus or Can Drive Up to 15 LSTTL Loads
- Performs Parallel-to-Serial Conversion
- Complementary Outputs Provide True and Inverted Data
- 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

These data selectors/multiplexers contain full binary decoding to select one-of-eight data sources and feature strobe-controlled complementary three-state outputs.

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. Both outputs are controlled by the strobe (\bar{G}). The outputs are disabled when \bar{G} is high.

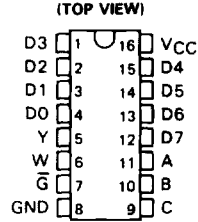
The SN54HC251 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC251 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

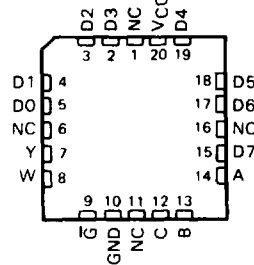
INPUTS			STROBE \bar{G}	OUTPUTS	
C	B	A		Y	W
X	X	X	H	Z	Z
L	L	L	L	D0	$\bar{D0}$
L	L	H	L	D1	$\bar{D1}$
L	H	L	L	D2	$\bar{D2}$
L	H	H	L	D3	$\bar{D3}$
H	L	L	L	D4	$\bar{D4}$
H	L	H	L	D5	$\bar{D5}$
H	H	L	L	D6	$\bar{D6}$
H	H	H	L	D7	$\bar{D7}$

D0, D1 . . . D7 = the level of the respective D input.

SN54HC251 . . . J PACKAGE
SN74HC251 . . . D OR N PACKAGE

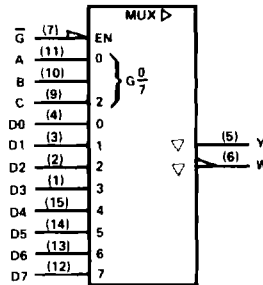


SN54HC251 . . . FK PACKAGE
(TOP VIEW)



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.

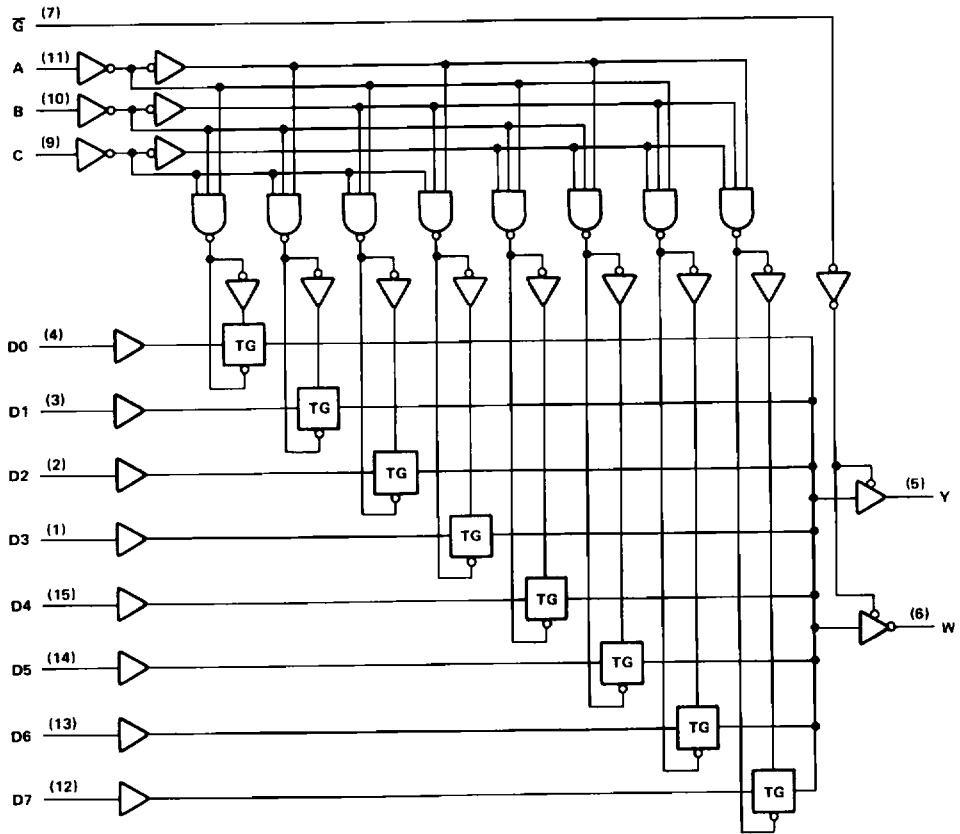


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SN54HC251, SN74HC251
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logic diagram (positive logic)



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

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HCMOS Devices

SN54HC251, SN74HC251 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

absolute maximum ratings over operating free-air temperature range[†]

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: D 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

		SN54HC251			SN74HC251			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		1.5			V
		$V_{CC} = 4.5$ V	3.15		3.15			
		$V_{CC} = 6$ V	4.2		4.2			
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V	0	0.3	0	0.3		V
		$V_{CC} = 4.5$ V	0	0.9	0	0.9		
		$V_{CC} = 6$ V	0	1.2	0	1.2		
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	1000	0	1000		ns
		$V_{CC} = 4.5$ V	0	500	0	500		
		$V_{CC} = 6$ V	0	400	0	400		
T_A	Operating free-air temperature	-55	125		-40	85		°C

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HCMOS Devices



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SN54HC251, SN74HC251
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			SN54HC251		SN74HC251		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		
	V _I = V _{IH} or V _{IL} , I _{OH} = -6 mA	4.5 V	3.98	4.30		3.7		3.84		
V _I = V _{IH} or V _{IL} , I _{OH} = -7.8 mA	6 V	5.48	5.80		5.2		5.34			
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	
	V _I = V _{IH} or V _{IL} , I _{OL} = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
V _I = V _{IH} or V _{IL} , I _{OL} = 7.8 mA	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, V _I = V _{IH} or V _{IL}	6 V		±0.01	±0.5		±10		±5	μA
I _{CC}	V _I = V _{CC} or 0, I _O = 0	6 V					8		160	μA
C _i		2 to 6 V			3	10		10	10	pF

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HCNOS Devices

SN54HC251, SN74HC251
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°C			SN54HC251		SN74HC251		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	W or Y	2 V	58	205		300		256	ns	
			4.5 V	21	41		60		51		
			6 V	19	35		51		44		
t _{pd}	Any D	W or Y	2 V	44	195		283		244	ns	
			4.5 V	17	39		57		49		
			6 V	15	33		48		41		
t _{en}	\bar{C}	W or Y	2 V	30	145		210		181	ns	
			4.5 V	10	29		42		36		
			6 V	9	25		36		31		
t _{dis}	\bar{C}	W or Y	2 V	25	195		283		244	ns	
			4.5 V	15	39		57		49		
			6 V	14	33		48		41		
t _t			2 V	20	75		110		95	ns	
			4.5 V	8	15		22		19		
			6 V	6	13		19		16		

C _{pd}	Power dissipation capacitance	No load, T _A = 25°C	70 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°C			SN54HC251		SN74HC251		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	W or Y	2 V	72	300		450		375	ns	
			4.5 V	25	60		90		75		
			6 V	22	52		77		65		
t _{pd}	Any D	W or Y	2 V	59	300		450		375	ns	
			4.5 V	21	60		90		75		
			6 V	18	52		77		65		
t _{en}	\bar{C}	W or Y	2 V	50	230		340		285	ns	
			4.5 V	17	46		68		57		
			6 V	15	40		58		50		
t _t			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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HC MOS Devices


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