

SN54HC151, SN74HC151 8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

SCLS110C – DECEMBER 1982 – MAY 1997

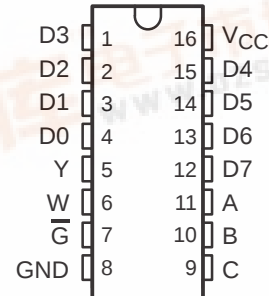
- **8-Line to 1-Line Multiplexers Can Perform as:**
 - Boolean Function Generators
 - Parallel-to-Serial Converters
 - Data Source Selectors
- **Package Options Include Plastic Small-Outline (D) and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs**

description

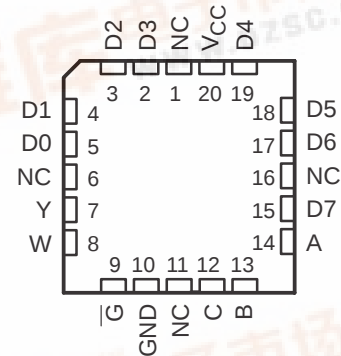
These monolithic data selectors/multiplexers provide full binary decoding to select one of eight data sources. The strobe ($\overline{G}$) input must be at a low logic level to enable the inputs. A high level at the strobe terminal forces the W output high and the Y output low.

The SN54HC151 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC151 is characterized for operation from -40°C to 85°C .

SN54HC151 ... J OR W PACKAGE
SN74HC151 ... D OR N PACKAGE
(TOP VIEW)



SN54HC151 ... FK PACKAGE
(TOP VIEW)



NC – No internal connection

FUNCTION TABLE

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

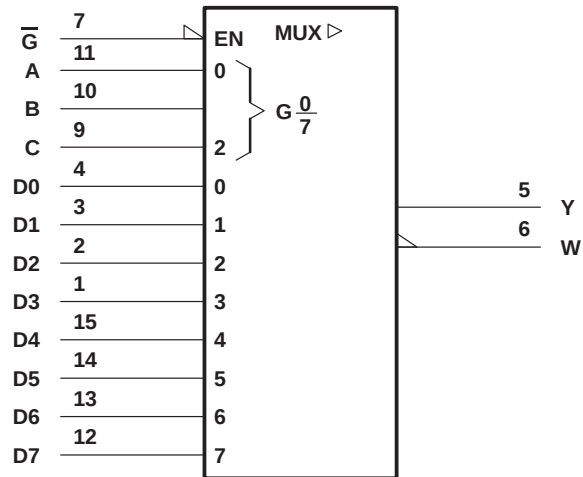
D0, D1 ... D7 = the level of the respective D input

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logic symbol†

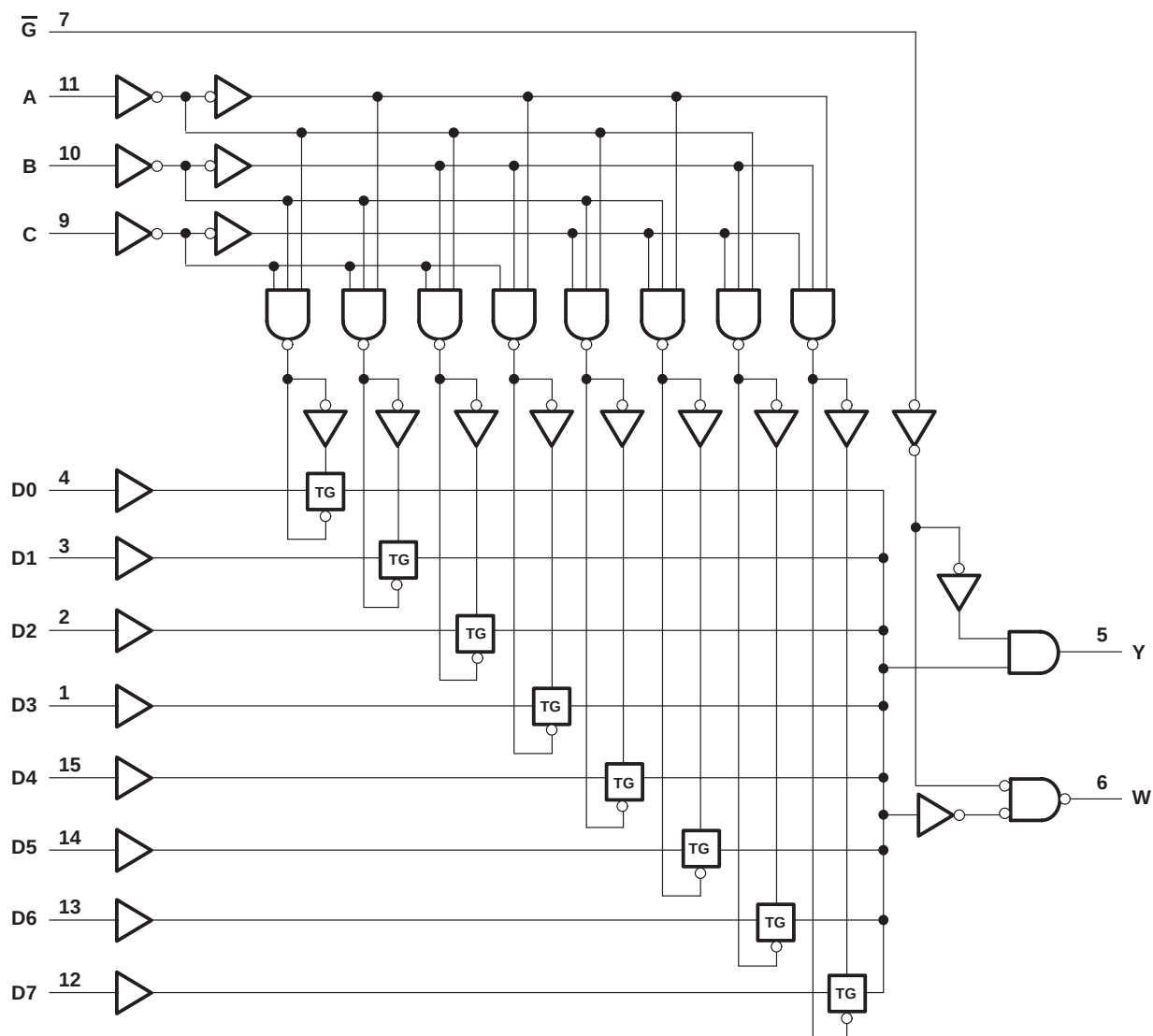


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the D, J, N, and W packages.

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logic diagram (positive logic)



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

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absolute maximum ratings over operating free-air temperature range†

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1)	±20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±35 mA
Continuous current through V_{CC} or GND	±70 mA
Package thermal impedance, θ_{JA} (see Note 2): D package	113°C/W
N package	78°C/W
Storage temperature range, T_{stg}	–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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JEDEC 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions

			SN54HC151			SN74HC151			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			V
		V _{CC} = 4.5 V	0			1.35			
		V _{CC} = 6 V	0			1.8			
V _I	Input voltage		0			V _{CC}			V
V _O	Output voltage		0			V _{CC}			V
t _t	Input transition (rise and fall) time	V _{CC} = 2 V	0			1000			ns
		V _{CC} = 4.5 V	0			500			
		V _{CC} = 6 V	0			400			
T _A	Operating free-air temperature		−55			125			°C

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

PARAMETER	TEST CONDITIONS		V _{CC}	T _A = 25°C			SN54HC151		SN74HC151		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		
		I _{OH} = –6 mA	4.5 V	3.98	4.3		3.7		3.84		
		I _{OH} = –7.8 mA	6 V	5.48	5.8		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	
		I _{OL} = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
		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 _{CC}	V _I = V _{CC} or 0, I _O = 0		6 V			8		160		80	µA
C _i			2 V to 6 V		3	10		10		10	pF

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC151		SN74HC151		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	Y or W	2 V		94	250		360		312	ns
			4.5 V		30	50		73		63	
			6 V		25	43		62		54	
	Any D	Y or W	2 V		74	195		283		244	
			4.5 V		23	39		57		49	
			6 V		20	33		48		41	
	$\overline{G}$	Y or W	2 V		49	127		185		159	
			4.5 V		15	25		37		32	
			6 V		13	22		32		28	
t _t		Y or W	2 V		22	75		110		95	ns
			4.5 V		9	15		22		19	
			6 V		8	13		19		16	

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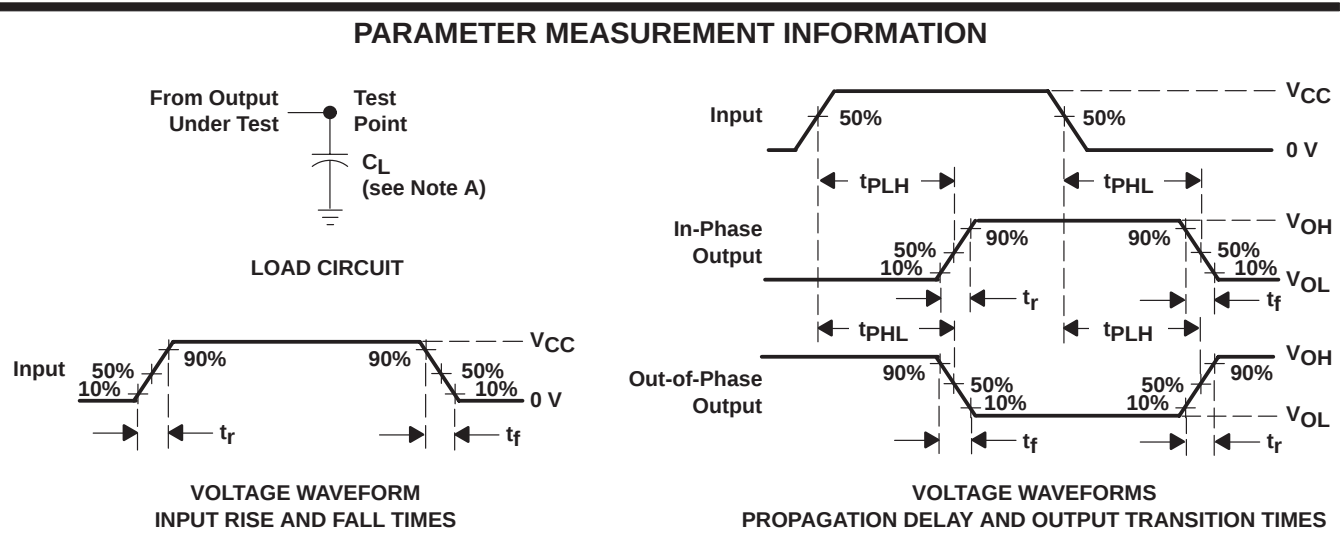
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switching characteristics over recommended operating free-air temperature range, $C_L = 150\text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC151		SN74HC151		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	Y or W	2 V		107	350		525		440	ns
			4.5 V		33	70		105		88	
			6 V		30	59		89		76	
	Any D	Y or W	2 V		90	275		415		345	
			4.5 V		29	51		83		69	
			6 V		25	47		72		59	
	$\overline{G}$	Y or W	2 V		67	205		310		255	
			4.5 V		21	41		62		51	
			6 V		18	35		53		43	
t _t		Y or W	2 V		51	210		315		265	ns
			4.5 V		16	42		63		53	
			6 V		14	36		53		45	

operating characteristics, T_A = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load	70	pF



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