

SN54F151A, SN74F151A
1 OF 8 DATA SELECTORS/MULTIPLEXERS

D2932, MARCH 1987—REVISED JULY 1989

- 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" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality Reliability

description

These monolithic data selectors/multiplexers provide full binary decoding to select one of eight data sources. The strobe input (\bar{G}) 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.

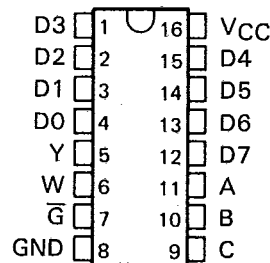
The SN54F151A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F151A is characterized for operation from 0°C to 70°C .

FUNCTION TABLE

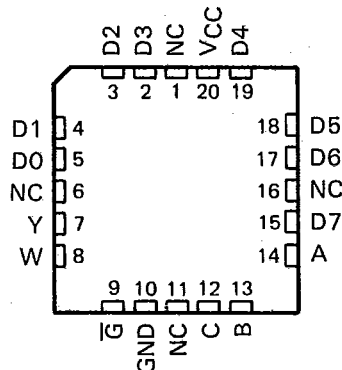
INPUTS			STROBE \bar{G}	OUTPUTS	
C	B	A		Y	W
X	X	X	H	L	H
L	L	L	L	D0	$\bar{D0}$
L	L	H	L	D1	$\bar{D1}$
L	H	L	L	D2	$\bar{D2}$
L	H	H	L	D3	$\bar{D3}$
H	L	L	L	D4	$\bar{D4}$
H	L	H	L	D5	$\bar{D5}$
H	H	L	L	D6	$\bar{D6}$
H	H	H	L	D7	$\bar{D7}$

H = high level, L = low level,
X = irrelevant
D0, D1 . . . D7 = the level of the D respective input

SN54F151A . . . J PACKAGE
SN74F151A . . . D OR N PACKAGE *T-66-21-53*
(TOP VIEW)

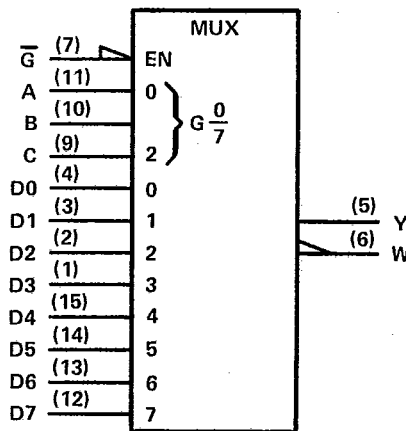


SN54F151A . . . FK PACKAGE
(TOP VIEW)



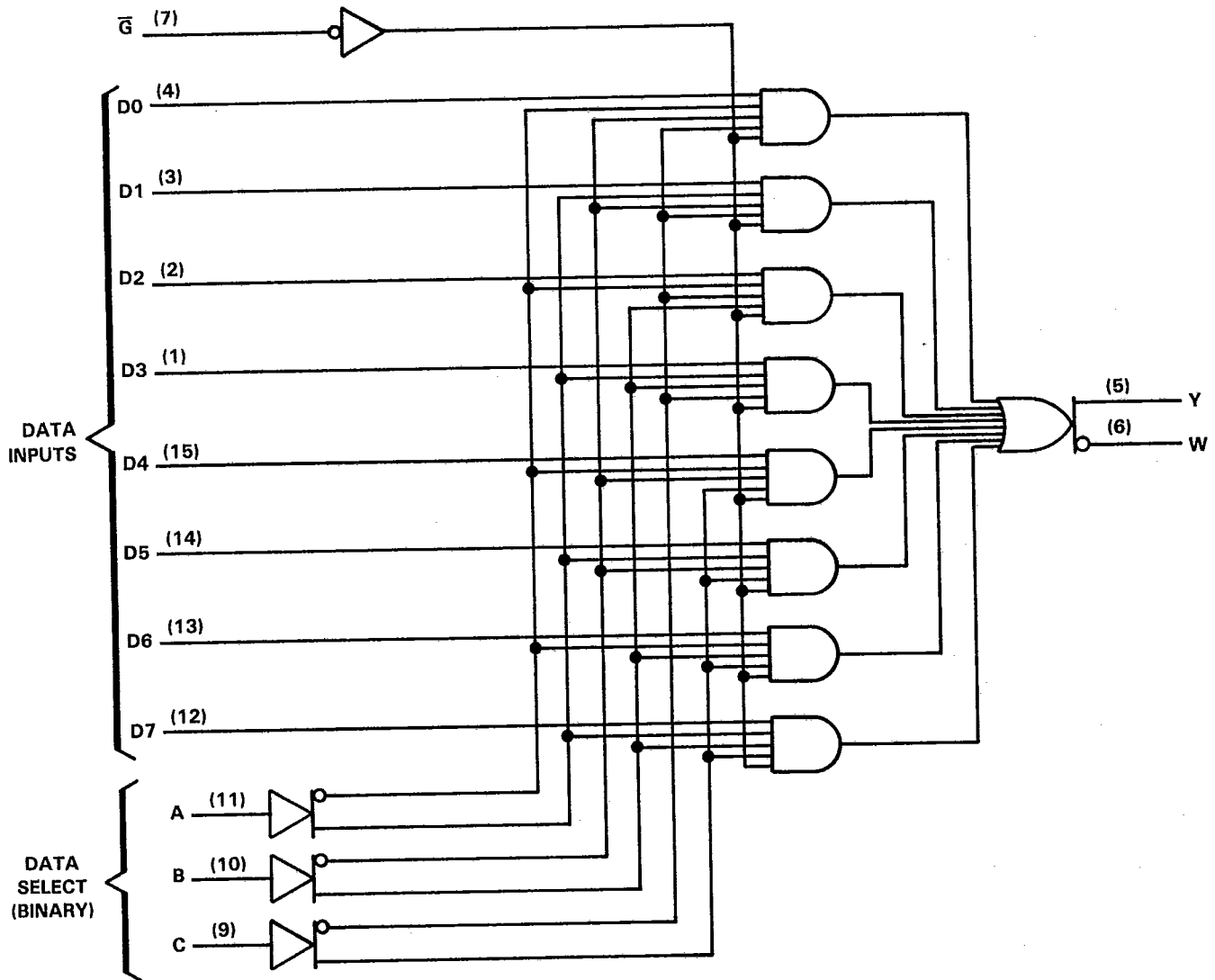
NC—No internal connection

logic symbol†



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

logic diagram (positive logic)



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}	-0.5 V to 7 V
Input voltage [†]	-1.2 V to 7 V
Input current	-30 mA to 5 mA
Voltage applied to any output in the high state	-0.5 V to V_{CC}
Current into any output in the low state	40 mA
Operating free-air temperature range: SN54F151A	-55°C to 125°C
SN74F151A	0°C to 70°C
Storage temperature range	-65°C to 150°C

[†]The input voltage ratings may be exceeded provided the input current ratings are observed.

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1 OF 8 DATA SELECTORS/MULTIPLEXERS

T-66-21-53

recommended operating conditions

	SN54F151A			SN74F151A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.8			0.8	V
I _{IK} Input clamp current			-18			-18	mA
I _{OH} High-level output current			-1			-1	mA
I _{OL} Low-level output current			20			20	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	SN54F151A			SN74F151A			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V _{IK}	V _{CC} = 4.5 V, I _I = -18 mA			-1.2			-1.2	V
V _{OH}	V _{CC} = 4.5 V, I _{OH} = -1 mA	2.5	3.4		2.5	3.4		V
	V _{CC} = 4.75 V, I _{OH} = -1 mA				2.7			
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 20 mA		0.3	0.5		0.3	0.5	V
I _I	V _{CC} = 5.5 V, V _I = 7 V			0.1			0.1	mA
I _{IH}	V _{CC} = 5.5 V, V _I = 2.7 V			20			20	μA
I _{IL}	V _{CC} = 5.5 V, V _I = 0.5 V			-0.6			-0.6	mA
I _{OS} ‡	V _{CC} = 5.5 V, V _O = 0	-60		-150	-60		-150	mA
I _{CC}	V _{CC} = 5.5 V, V _I = 4.5 V		13.5	21		13.5	21	mA

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, C _L = 50 pF, R _L = 500 Ω, T _A = 25°C			V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX [§]				UNIT
			'F151A			SN54F151A		SN74F151A		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A, B, or C	W	3.9	5.2	9	2	11.5	3.5	9.5	ns
t _{PHL}			3.1	4.3	7.5	3	8	3	7.5	
t _{PLH}	A, B, or C	Y	4.5	6	10.5	4.1	13.5	4.1	12	ns
t _{PHL}			4	5.6	9	4	9.5	4	9	
t _{PLH}	\bar{G}	W	3	4.1	6.1	3	7.5	3	7	ns
t _{PHL}			2.8	3.5	6	2.5	6.5	2.5	6	
t _{PLH}	\bar{G}	Y	4.4	5.3	9.5	3.8	12	3.8	10.5	ns
t _{PHL}			3.5	4.5	7	3	8	3	7.5	
t _{PLH}	DATA (any D)	W	2.7	3.6	6.5	1.8	7.5	2.4	7	ns
t _{PHL}			1.2	1.9	4	1.1	6	1.1	5	
t _{PLH}	DATA (any D)	Y	2.9	3.7	6.5	2.5	8.5	2.5	7.5	ns
t _{PHL}			3.3	4.2	7	2.6	9	2.7	7.5	

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

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

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

NOTE 1: Load circuits and waveforms are shown in Section 1 of the *F Logic (SN54/74F) Data Book, 1989*.