

SN54F251A, SN74F251A 1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

D2932, MARCH 1987—REVISED JANUARY 1989

- Three-State Versions of SN54F151A and SN74F151A
- Three-State Outputs Interface Directly with System Bus
- 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 SN54F251A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F251A is characterized for operation from 0°C to 70°C .

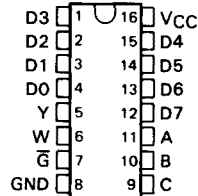
FUNCTION TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	$\bar{G}$		
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

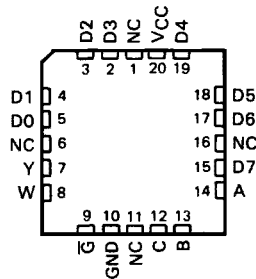
SN54F251A . . . J PACKAGE
SN74F251A . . . D OR N PACKAGE

(TOP VIEW)



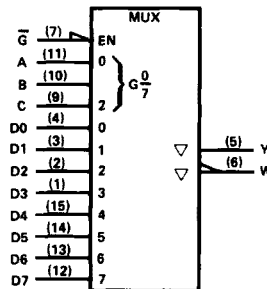
SN54F251A . . . FK PACKAGE

(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.

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Data Sheets

PRODUCT PREVIEW

PRODUCT PREVIEW documents contain information on products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.

TEXAS
INSTRUMENTS

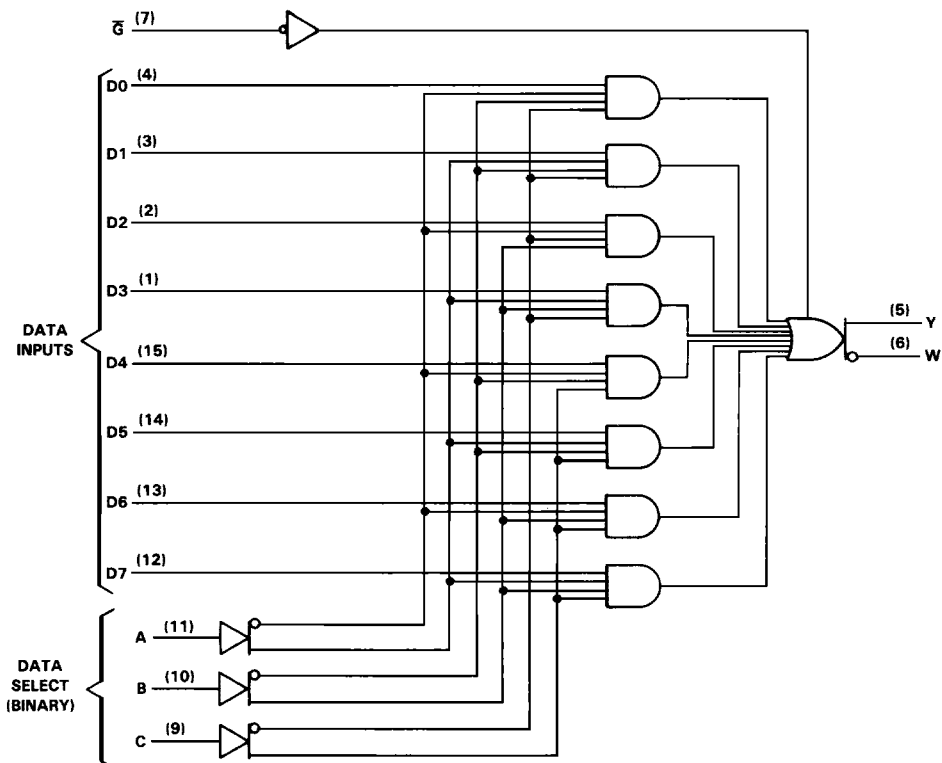
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logic diagram (positive logic)



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

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PRODUCT PREVIEW

SN54F251A, SN74F251A

1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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 disabled or power-off state	-0.5 V to 5.5 V
Voltage applied to any output in the high state	-0.5 V to V_{CC}
Current into any output in the low state: SN54F251A	40 mA
SN74F251A	48 mA
Operating free-air temperature range: SN54F251A	-55°C to 125°C
SN74F251A	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.

recommended operating conditions

	SN54F251A			SN74F251A			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			-3			-3	mA
I_{OL} Low-level output current			20			24	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	SN54F251A			SN74F251A			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
	$I_{OH} = -3$ mA	2.4	3.3		2.4	3.3		
	$V_{CC} = 4.75$ V, $I_{OH} = -1$ mA to -3 mA				2.7			
V_{OL}	$V_{CC} = 4.5$ V, $I_{OL} = 20$ mA	0.30	0.5					V
	$I_{OL} = 24$ mA				0.35	0.5		
I_{OZH}	$V_{CC} = 5.5$ V, $V_O = 2.7$ V			50			50	μA
I_{OZL}	$V_{CC} = 5.5$ V, $V_O = 0.5$ V			-50			-50	μA
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, Condition A		15	22		15	22	mA
	See Note 1, Condition B		16	24		16	24	

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

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

NOTE 1: I_{CC} is measured with the outputs open under the following conditions:

- Select input and data input at 4.5 V, output control grounded.
- All inputs at 4.5 V.

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Data Sheets

PRODUCT PREVIEW

SN54F251A, SN74F251A **1-OF-8 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS**

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 5 V, CL = 50 pF, R1 = 500 Ω, R2 = 500 Ω, TA = 25 °C			VCC = 4.5 V to 5.5 V, CL = 50 pF, R1 = 500 Ω, R2 = 500 Ω, TA = MIN to MAX†			UNIT	
			'F251A			SN54F251A		SN74F251A		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
tPLH	A, B, or C	W	2.7	5.4	9	2.7	11.5	2.7	9.5	ns
tPHL			2.4	4.6	7.5	2.4	8	2.4	7.5	
tPLH	A, B, or C	Y	3.7	7.1	10.5	2.7	14	3.7	12.5	ns
tPHL			3.2	5.6	8.5	2.2	10.5	3.2	9	
tPLH	Data	W	2.2	4.6	6.5	1.7	8	2.2	7	ns
tPHL			(Any D)	1	2.1	4	1	6	1	
tPLH	Data	Y	2.7	4.6	7	1.7	9	1.7	8	ns
tPHL			(Any D)	2.7	5.1	7	2.7	9	2.7	
tPZH	0	W	1.7	3.9	6	1.3	7	1.7	7	ns
tPZL			1.7	3.9	6	1.7	7.5	1.7	6.5	
tPHZ	0	W	1.7	3.6	5.5	1.7	6	1.7	6	ns
tPLZ			1	2.6	4.5	1	5	2.9	4.5	
tPZH	0	Y	2.7	4.4	7	2.3	8.5	2.3	7.5	ns
tPZL			2.7	5.1	7.5	2.7	9	2.7	8	
tPHZ	0	Y	1.3	3.4	5.5	1.3	5.5	1.3	5.5	ns
tPLZ			2	2.6	4.5	1	5.5	1	4.5	

†For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.

NOTE 2: Load circuits and waveforms are shown in Section 1.