- **Three-State Versions of SN54F153 and SN74F153**
- **Permits Multiplexing from N Lines to 1 Line**
- **Performs Parallel-to-Serial Conversion**
- **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

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.

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. Each output has its own strobe ($\overline{G}$). The output is disabled when its strobe is high.

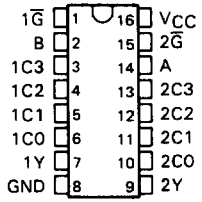
The SN54F253 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74F253 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE

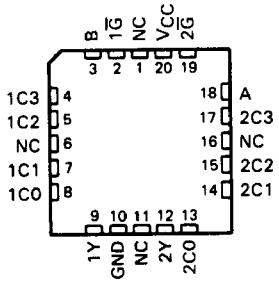
SELECT INPUTS		DATA INPUTS				STROBE	OUTPUT
B	A	C0	C1	C2	C3	$\overline{G}$	Y
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Address inputs A and B are common to both sections.

SN54F253 . . . J PACKAGE
SN74F253 . . . D OR N PACKAGE
(TOP VIEW)

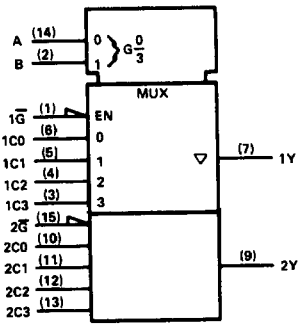


SN54F253 . . . FK PACKAGE
(TOP VIEW)



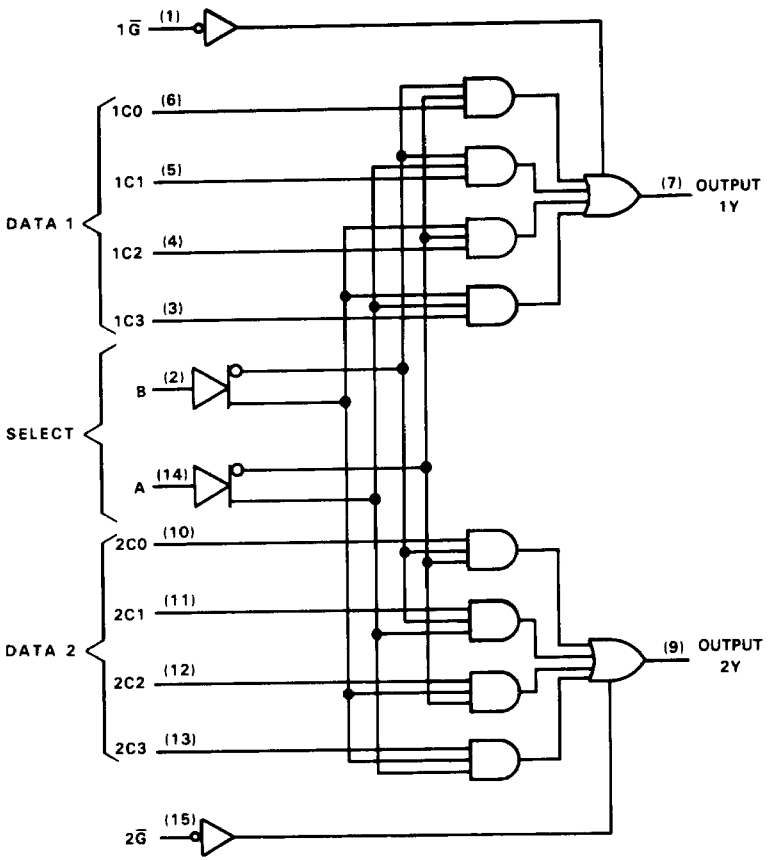
NC—No internal connection

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.

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 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: SN54F253 . . . . . 40 mA
SN74F253 . . . . . 48 mA
Operating free-air temperature range: SN54F253 . . . . . −55°C to 125°C
SN74F253 . . . . . 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

		SN54F253			SN74F253			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			SN54F253			SN74F253			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} = 4.5 V		I_{OH} = −3 mA	2.4	3.3		2.4	3.3		
	Any output	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_{CCH}	V_{CC} = 5.5 V, See Note 1		Condition A		11.5	16		11.5	16	mA
I_{CCL}			Condition B		16	23		16	23	
I_{CCZ}			Condition C		16	23		16	23	

† 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.
NOTE 1: I_{CC} is measured with the outputs open under the following conditions:
A. Inputs A, B, 1C3, and 2C3 at 4.5 V, other inputs grounded
B. All inputs grounded
C. Inputs $1\overline{G}$ and $2\overline{G}$ at 4.5 V, other inputs grounded.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			'F253			SN54F253		SN74F253		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Any Y	3.7	8.1	11.5	2.7	15	3.7	13	ns
t_{PHL}			2.2	6.1	9	1.7	11	2.2	10	
t_{PLH}	Data (Any C)	Any Y	2.2	5.1	7	1.7	9	2.2	8	ns
t_{PHL}			1.7	4.1	6	1.7	8	1.7	7	
t_{PZH}	$\overline{G}$	Any Y	2.2	5.6	8	1.7	10	2.2	9	ns
t_{PZL}			2.2	5.6	8	1.7	10	2.2	9	
t_{PHZ}	$\overline{G}$	Any Y	1.2	3.3	5	1.2	6.5	1.2	6	ns
t_{PLZ}			1.2	4	6	1.2	8	1.2	7	

† 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.

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