TYPES SN54LS253, SN74LS253
DUAL 4-LINE-TO-1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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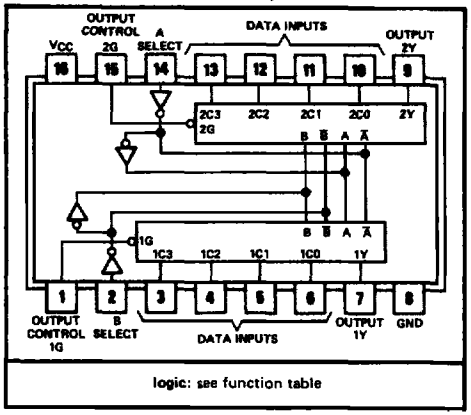
- Three-State Version of SN54LS153/SN74LS153
- Schottky-Diode-Clamped Transistors
- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Typical Average Propagation Delay Times:
  Data Input to Output . . . 12 ns
  Control Input to Output . . . 16 ns
  Select Input to Output . . . 21 ns
- Fully Compatible with Most TTL and DTL Circuits
- Low Power Dissipation . . . 35 mW Typical (Enabled)

SN54LS253 . . . J OR W PACKAGE
SN74LS253 . . . J OR N PACKAGE
(TOP VIEW)



logic: see function table

description

Each of these Schottky-clamped data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, 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.

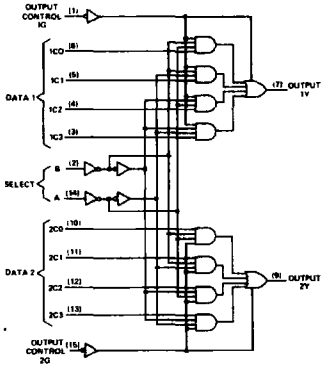
logic

FUNCTION TABLE

SELECT INPUTS		DATA INPUTS				OUTPUT CONTROL	OUTPUT
B	A	C0	C1	C2	C3	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.
H = high level, L = low level, X = irrelevant, Z = high impedance (off)

functional block diagram



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 7 V
Off-state output voltage . . . . . 5.5 V
Operating free-air temperature range: SN54LS253 . . . . . −55°C to 125°C
SN74LS253 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

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recommended operating conditions

	SN54LS253			SN74LS253			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−1			−2.6	mA
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS†		SN54LS253			SN74LS253			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH}	High-level input voltage			2			2			V
V_{IL}	Low-level input voltage					0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN, I_I = −18 mA				−1.5			−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL} max, I_{OH} = MAX		2.4	3.4		2.4	3.1		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL} max	I_{OL} = 4 mA		0.25	0.4		0.25	0.4	V
			I_{OL} = 8 mA					0.25	0.5	
I_{OZ}	Off-State (high-impedance state) output current	V_{CC} = MAX, V_{IH} = 2 V	V_O = 2.7 V			20			20	μA
			V_O = 0.4 V			−20			−20	
I_I	Input current at maximum input voltage	V_{CC} = MAX, V_I = 7 V				0.1			0.1	mA
I_{IH}	High-level input current	V_{CC} = MAX, V_I = 2.7 V				20			20	μA
I_{IL}	Low-level input current	V_{CC} = MAX, V_I = 0.4 V				−0.4			−0.4	mA
I_{OS}	Short-circuit output current§	V_{CC} = MAX		−30		−130	−30		−130	mA
I_{CC}	Supply current	V_{CC} = MAX, See Note 2	Condition A		7	12		7	12	mA
			Condition B		8.5	14		8.5	14	

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

‡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 duration for the short-circuit should exceed one second.

NOTE 2: I_{CC} is measured with the outputs open under the following conditions:

A. All inputs grounded.

B. Output control at 4.5 V, all inputs grounded.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER¶	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Data	Y	C_L = 15 pF, R_L = 2 kΩ, See Note 3		17	25	ns
t_{PHL}					13	20	
t_{PLH}	Select	Y			30	45	ns
t_{PHL}					21	32	
t_{ZH}	Output Control	Y			15	28	ns
t_{ZL}					15	23	
t_{HZ}	Output Control	Y	C_L = 5 pF, R_L = 2 kΩ, See Note 3		27	41	ns
t_{LZ}					18	27	

¶t_{PLH} ≡ Propagation delay time, low-to-high-level output
t_{PHL} ≡ Propagation delay time, high-to-low-level output
t_{ZH} ≡ Output enable time to high level
t_{ZL} ≡ Output enable time to low level
t_{HZ} ≡ Output disable time from high level
t_{LZ} ≡ Output disable time from low level

NOTE 3: Load circuit and waveforms are shown on page 3-11.

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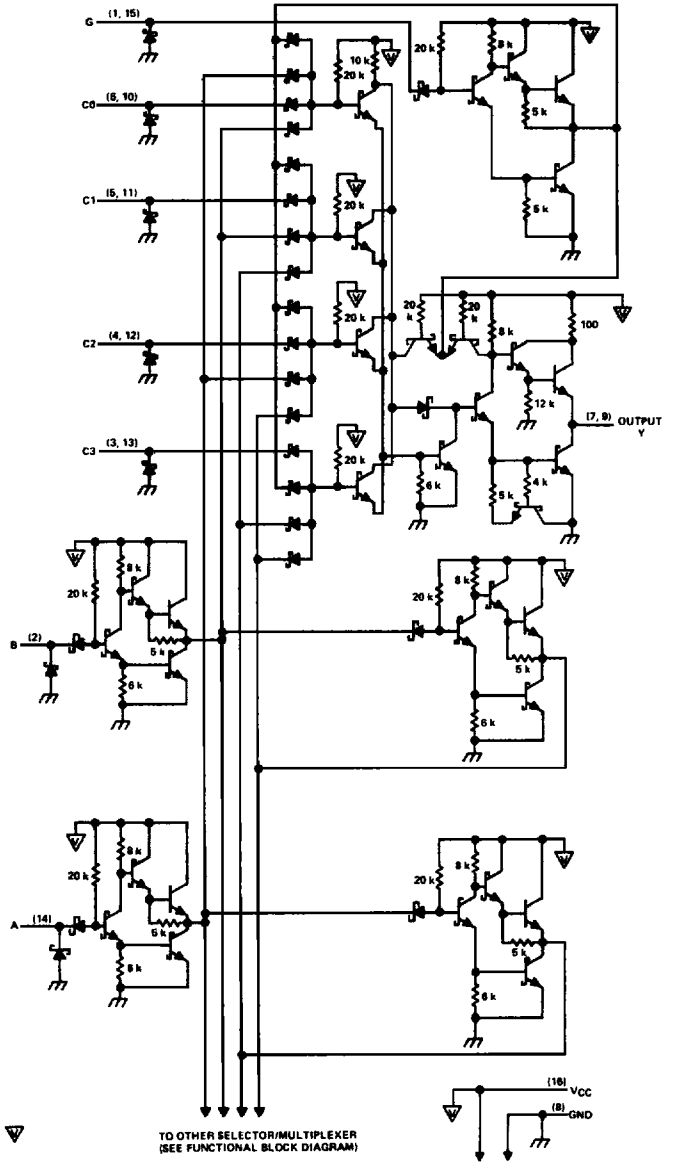
schematic (each selector/multiplexer, and the common select section)



▽ . . . V_{CC} bus

Resistor values shown are nominal and in ohms.