D951, JANUARY 1971—REVISED MAY 1990

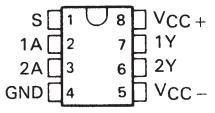
- **Satisfies Requirement of EIA Standard RS-232-C**
- **Withstands Sustained Output Short-Circuit to any Low-Impedance Voltage Between −25 V and 25 V**
- **2-μs Max Transition Time Through the 3 V to −3 V Transition Region Under Full 2500-pF Load**
- **Inputs Compatible With Most TTL Families**
- **Common Strobe Input**
- **Inverting Output**
- **Slew Rate Can Be Controlled With an External Capacitor at the Output**
- **Standard Supply Voltages . . . ±12 V**

description

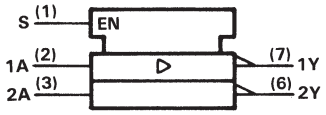
The SN75150 is a monolithic dual line driver designed to satisify the requirements of the standard interface between data terminal equipment and data communication equipment as defined by EIA standard RS-232-C. A rate of 20,000 bits per second can be transmitted with a full 2500-pF load. Other applications are in data-transmission systems using relatively short single lines, in level translators, and for driving MOS devices. The logic input is compatible with most TTL families. Operation is from 12-V and −12-V power supplies.

The SN75150 is characterized for operation from 0°C to 70°C.

D, JG, OR P PACKAGE
(TOP VIEW)

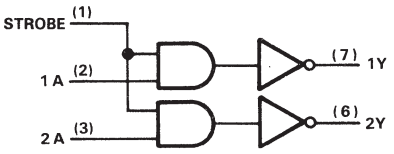


logic symbol†

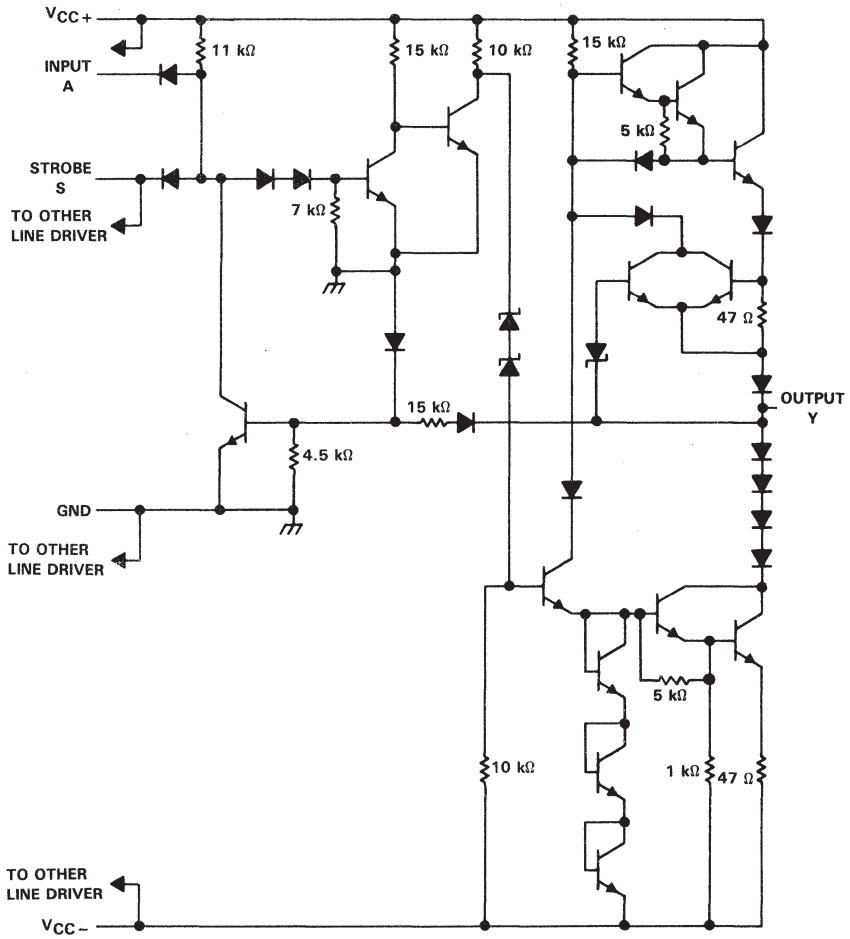


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC publication 617-12.

logic diagram (positive logic)



schematic (each line driver)



Resistor values shown are nominal.

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

Supply voltage, V_{CC+} (see Note 1) . . . . . 15 V
Supply voltage, V_{CC-} . . . . . −15 V
Input voltage . . . . . 15 V
Applied output voltage . . . . . ±25 V
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or P package . . . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: JG package . . . . . 300°C

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

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
JG	825 mW	6.6 mW/°C	528 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC+}	10.8	12	13.2	V
Supply voltage, V_{CC-}	−10.8	−12	−13.2	V
High-level input voltage, V_{IH}	2		5.5	V
Low-level input voltage, V_{IL}	0		0.8	V
Applied output voltage, V_O			±15	V
Operating free-air temperature, T_A	0		70	°C

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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{OH}	High-level output voltage	V_{CC+} = 10.8 V, V_{CC-} = −13.2 V, V_{IL} = 0.8 V, R_L = 3 kΩ to 7 kΩ		5	8		V
V_{OL}	Low-level output voltage (see Note 2)	V_{CC+} = 10.8 V, V_{CC-} = −10.8 V, V_{IH} = 2 V, R_L = 3 kΩ to 7 kΩ			−8	−5	V
I_{IH}	High-level input current	V_{CC+} = 13.2 V, V_{CC-} = −13.2 V, V_I = 2.4 V	Data input		1	10	μA
			Strobe input		2	20	
I_{IL}	Low-level input current	V_{CC+} = 13.2 V, V_{CC-} = −13.2 V, V_I = 0.4 V	Data input		−1	−1.6	mA
			Strobe input		−2	−3.2	
I_{OS}	Short-circuit output current‡	V_{CC+} = 13.2 V, V_{CC-} = −13.2 V	V_O = 25 V		2	8	mA
			V_O = −25 V		−3	−8	
			V_O = 0, V_I = 3 V	10	15	30	
			V_O = 0, V_I = 0	−10	−15	−30	
I_{CCH+}	Supply current from V_{CC+}, high-level output	V_{CC+} = 13.2 V, V_{CC-} = −13.2 V, V_I = 0, R_L = 3 kΩ, T_A = 25°C			10	22	mA
I_{CCH-}	Supply current from V_{CC-}, high-level output				−1	−10	
I_{CCL+}	Supply current from V_{CC+}, low-level output	V_{CC+} = 13.2 V, V_{CC-} = −13.2 V, V_I = 3 V, R_L = 3 kΩ, T_A = 25°C			8	17	mA
I_{CCL-}	Supply current from V_{CC-}, low-level output				−9	−20	

† All typical values are at V_{CC+} = 12 V, V_{CC-} = −12 V, T_A = 25°C.
‡ Not more than one output should be shorted at a time.
NOTE 2: The algebraic convention, in which the less positive (more negative) limit is designated as minimum, is used in this data sheet for logic levels only, e.g., when −5 V is the maximum, the typical value is a more negative voltage.

switching characteristics, V_{CC+} = 12 V, V_{CC-} = −12 V, T_A = 25°C (see Figure 1)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{TLH}	Transition time, low-to-high-level output	C_L = 2500 pF, R_L = 3 kΩ to 7 kΩ	0.2	1.4	2	μs
t_{THL}	Transition time, high-to-low-level output		0.2	1.5	2	μs
t_{TLH}	Transition time, low-to-high-level output	C_L = 15 pF, R_L = 7 kΩ		40		ns
t_{THL}	Transition time, high-to-low-level output			20		ns
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 15 pF, R_L = 7 kΩ		60		ns
t_{PHL}	Propagation delay time, high-to-low-level output			45		ns

TEXAS INSTRUMENTS
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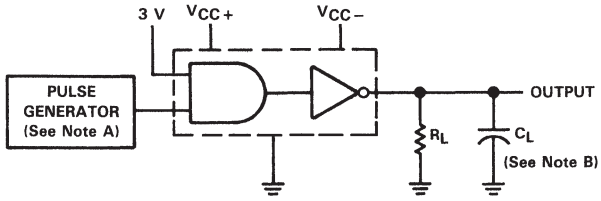
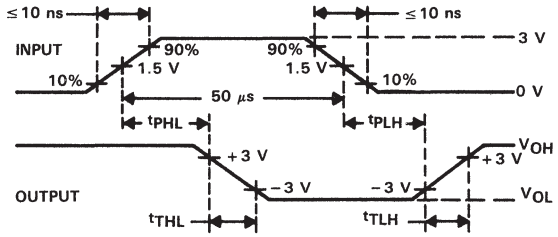
PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: duty cycle ≤ 50%, $Z_O \approx 50\ \Omega$.
B. C_L includes probe and jig capacitance.

FIGURE 1. SWITCHING CHARACTERISTICS

TYPICAL CHARACTERISTICS

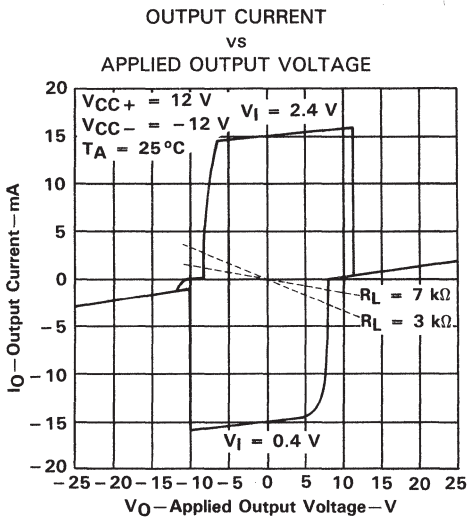


FIGURE 2

APPLICATION INFORMATION

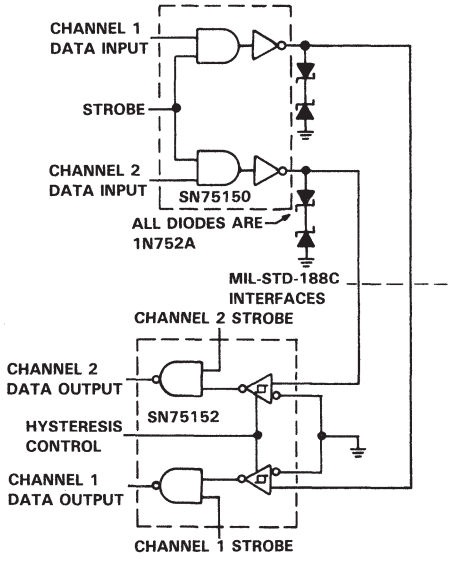


FIGURE 3. DUAL-CHANNEL SINGLE-ENDED INTERFACE CIRCUIT MEETING MIL-STD-188C, PARAGRAPH 7.2.