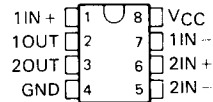


# SN55157, SN75157 DUAL DIFFERENTIAL LINE RECEIVER

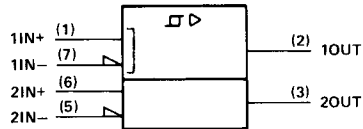
D2300, SEPTEMBER 1980—REVISED SEPTEMBER 1986

- Meets EIA Standards RS-422-A and RS-423-A
- Meets Federal Standards 1020 and 1030
- Operates from Single 5-V Power Supply
- Wide Common-Mode Voltage Range
- High Input Impedance
- TTL-Compatible Outputs
- High-Speed Schottky Circuitry
- 8-Pin Dual-In-Line Package
- Similar to uA9637AC except for Corner V<sub>CC</sub> and Ground Pin Positions

SN55157 . . . JG PACKAGE  
SN75157 . . . D, JG, OR P PACKAGE  
(TOP VIEW)



## logic symbol†



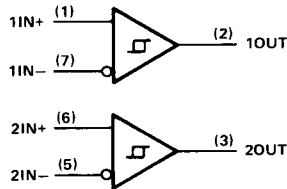
†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

## description

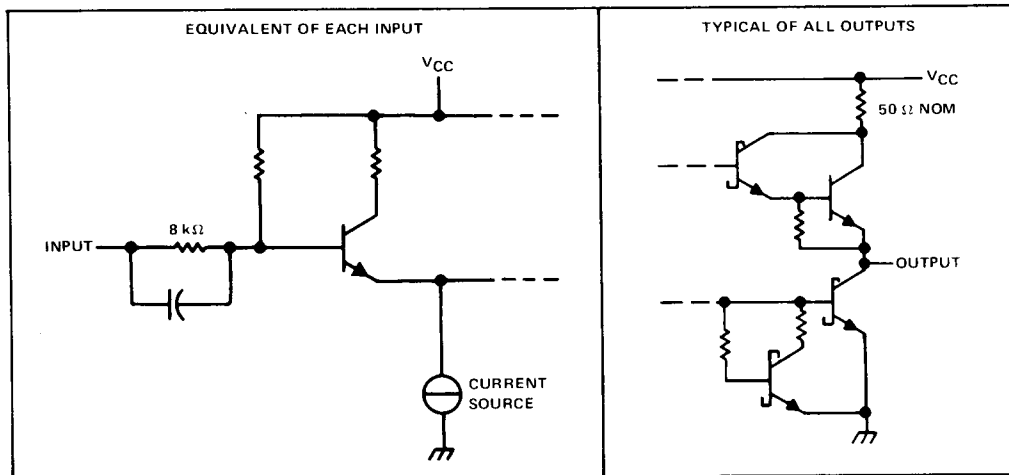
The SN75157 is a dual differential line receiver designed to meet EIA standards RS-422-A and RS-423-A and Federal Standards 1020 and 1030. It utilizes Schottky circuitry and has TTL-compatible outputs. The inputs are compatible with either a single-ended or a differential-line system. The device operates from a single 5-volt power supply and is supplied in an 8-pin dual-in-line package and small outline package.

The SN55157 is characterized over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN75157 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

## logic diagram



## schematics of inputs and outputs



PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

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# SN55157, SN75157 DUAL DIFFERENTIAL LINE RECEIVER

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

Supply voltage, V <sub>CC</sub> (see Note 1)	−0.5 V to 7 V
Input voltage	±15 V
Differential input voltage (see Note 2)	±15 V
Output voltage (see Note 1)	−0.5 V to 5.5 V
Low-level output current	50 mA
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 3):	
SN55157 JG package	1050 mW
SN75157 D package	725 mW
JG package	825 mW
P package	1000 mW
Operating free-air temperature range: SN55157	−55°C to 125°C
SN75157	0°C to 70°C
Storage temperature range	−65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds JG package	300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds D or P package	260°C

- NOTES: 1. All voltage values, except differential input voltage, are with respect to the network ground terminal.  
 2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.  
 3. For operation above 25°C free-air temperature, derate the SN55157 JG package to 672 mW at 70°C at the rate of 8.4 mW/°C, the SN75157 JG package to 528 mW at 70°C at the rate of 6.6 mW/°C, the D package to 464 mW at 70°C at the rate of 5.8 mW/°C, and the P package to 640 mW at 70°C at the rate of 8.0 mW/°C. In the JG package, SN55157 chips are alloy mounted and SN75157 chips are glass mounted.

## recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V <sub>CC</sub>	4.75	5	5.25	V
Common-mode input voltage, V <sub>IC</sub>	±7			V
Operating free-air temperature, T <sub>A</sub>	SN55157	−55	25	125
	SN75157	0	25	70
				°C

## electrical characteristics over recommended ranges of supply voltage, common-mode input voltage, and operating free-air temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP <sup>†</sup>	MAX	UNIT
V <sub>T</sub> Threshold voltage (V <sub>T+</sub> and V <sub>T−</sub> )		−0.2		0.2	V
	See Note 5	−0.4		0.4	
V <sub>hys</sub> Hysteresis (V <sub>T+</sub> − V <sub>T−</sub> )		70			mV
V <sub>OH</sub> High-level output voltage	V <sub>ID</sub> = 0.2 V, I <sub>O</sub> = −1 mA	2.5	3.5		V
V <sub>OL</sub> Low-level output voltage	V <sub>ID</sub> = −0.2 V, I <sub>O</sub> = 20 mA	0.35	0.5		V
I <sub>I</sub> Input current	V <sub>CC</sub> = 0 to 5.5 V, See Note 6	V <sub>I</sub> = 10 V	1.1	3.25	mA
		V <sub>I</sub> = −10 V	−1.6	−3.25	
I <sub>OS</sub> Short-circuit output current <sup>‡</sup>	V <sub>O</sub> = 0, V <sub>ID</sub> = 0.2 V	−40	−75	−100	mA
I <sub>CC</sub> Supply current	V <sub>ID</sub> = −0.5 V, No load	35		50	mA

<sup>†</sup>All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>‡</sup>Only one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTES: 4. The algebraic convention, where the less-positive (more-negative) limit is designated as minimum, is used in this data sheet for threshold levels only.

5. The expanded threshold parameter is tested with a 500-Ω resistor in series with each input.

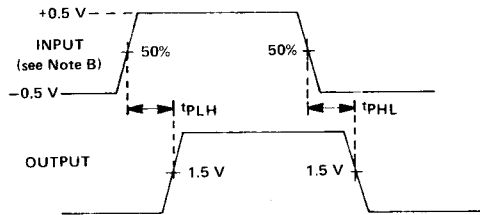
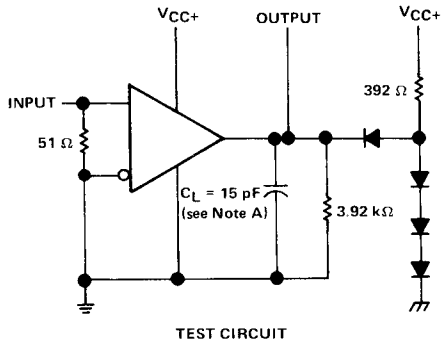
6. The input not under test is grounded.

# SN55157, SN75157 DUAL DIFFERENTIAL LINE RECEIVER

switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
$t_{PLH}$ Propagation delay time, low-to-high-level output	$C_L = 15\text{ pF}$ , See Figure 1		15	25	ns
$t_{PHL}$ Propagation delay time, high-to-low-level output			13	25	ns

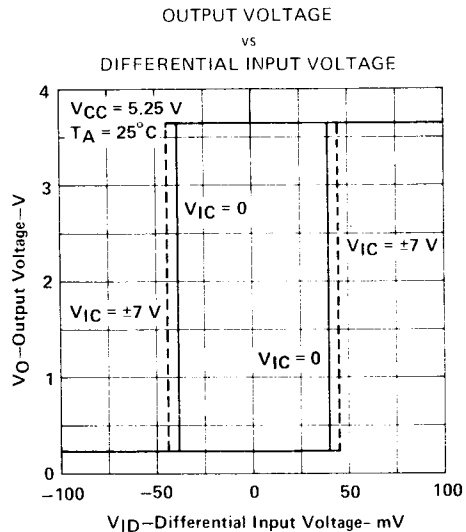
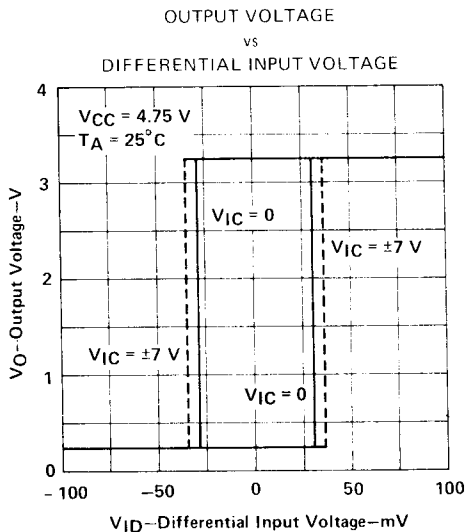
## PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. The input pulse is supplied by a generator having the following characteristics:  $t_r \leq 5\text{ ns}$ ,  $t_f \leq 5\text{ ns}$ ,  $PRR \leq 5\text{ MHz}$ , duty cycle = 50%.

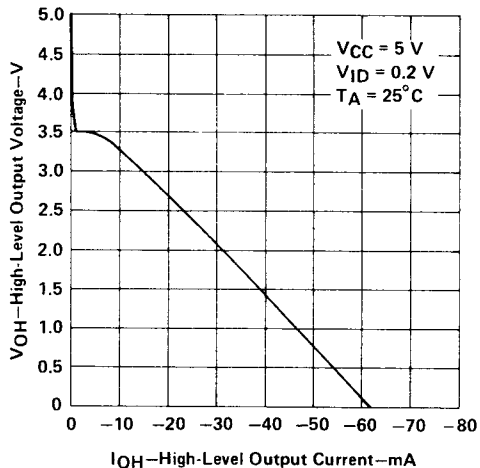
FIGURE 1. TRANSITION TIMES

## TYPICAL CHARACTERISTICS



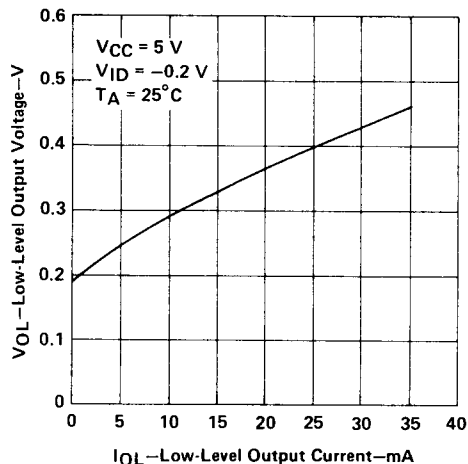
**TYPICAL CHARACTERISTICS**

HIGH-LEVEL OUTPUT VOLTAGE  
 vs  
 HIGH-LEVEL OUTPUT CURRENT



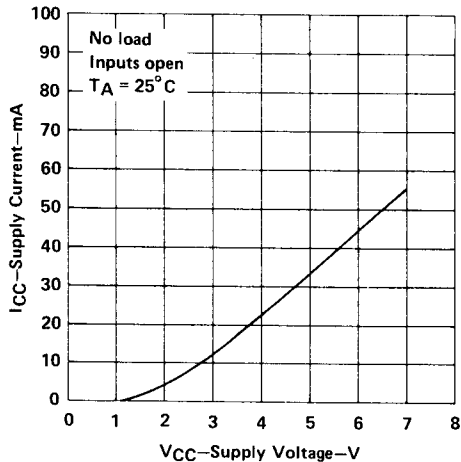
**FIGURE 4**

LOW-LEVEL OUTPUT VOLTAGE  
 vs  
 LOW-LEVEL OUTPUT CURRENT



**FIGURE 5**

SUPPLY CURRENT  
 vs  
 SUPPLY VOLTAGE



**FIGURE 6**

TYPICAL APPLICATION DATA

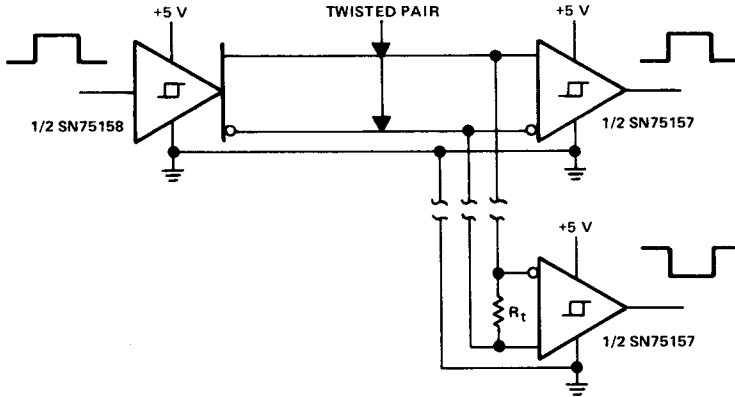


FIGURE 7. RS-422-A SYSTEM APPLICATIONS