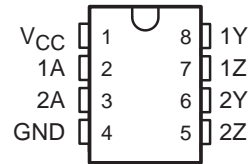


SN75ALS191 DUAL DIFFERENTIAL LINE DRIVER

SLLS032B – DECEMBER 1987 – REVISED MAY 1995

- Meets or Exceeds the Requirements of ANSI Standard EIA/TIA-422-B and ITU Recommendation V.11
- Designed to Operate at 20 Mbaud or Higher
- TTL-and CMOS-Input Compatibility
- Single 5-V Supply Operation
- Output Short-Circuit Protection
- Improved Replacement for the μ A9638

D OR P PACKAGE
(TOP VIEW)



description

The SN75ALS191 is a dual, high-speed, differential line driver designed to meet ANSI Standard EIA/TIA-422-B and ITU Recommendation V.11. The inputs are TTL- and CMOS-compatible and have input clamp diodes. Schottky-diode-clamped transistors minimize propagation delay time. This device operates from a single 5-V power supply and is supplied in eight-pin packages.

The SN75ALS191 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each driver)

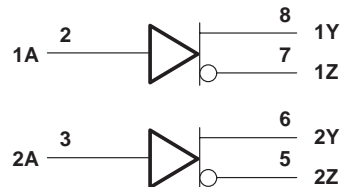
INPUTS A	OUTPUTS	
	Y	Z
H	H	L
L	L	H

H = high level, L = low level,
Z = high impedance

logic symbol†



logic diagram (positive logic)



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



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PRODUCTION DATA information is 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**

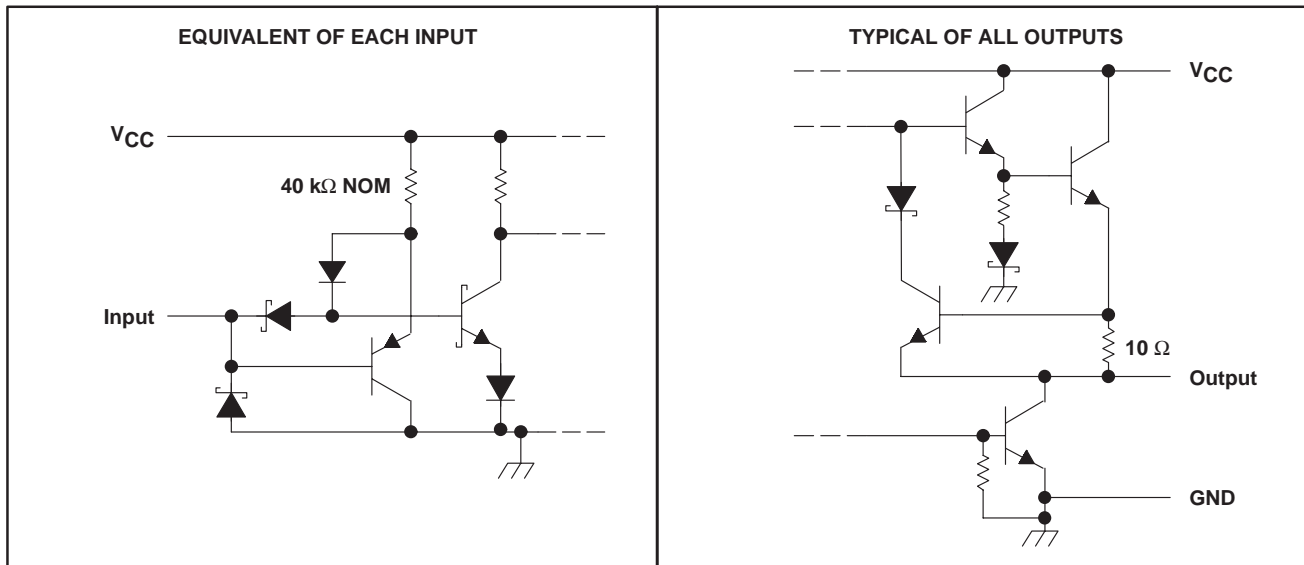
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schematics of inputs and outputs



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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage, V_I	7 V
Continuous total dissipation	See Dissipation Rating Table
Operating free-air temperature range, T_A	0°C to 70°C
Storage temperature range, T_{stg}	- 65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values except differential output voltage (V_{OD}) are with respect to network ground terminal.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
High-level input voltage, V_{IH}	2			V
Low-level input voltage, V_{IL}			0.8	V
High-level output current, I_{OH}			- 50	mA
Low-level output current, I_{OL}			50	mA
Operating free-air temperature, T_A	0		70	°C



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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT	
V_{IK}	Input clamp voltage	$V_{CC} = 4.75\text{ V}$,	$I_I = -18\text{ mA}$		-1	-1.2	V	
V_{OH}	High-level output voltage	$V_{CC} = 4.75\text{ V}$,	$V_{IH} = 2\text{ V}$,	$I_{OH} = -10\text{ mA}$	2.5	3.3	V	
				$I_{OH} = -40\text{ mA}$	2			
V_{OL}	Low-level output voltage	$V_{CC} = 4.75\text{ V}$,	$V_{IH} = 2\text{ V}$,			0.5	V	
$ V_{OD1} $	Differential output voltage	$V_{CC} = 5.25\text{ V}$,	$I_O = 0$			$2 V_{OD2}$	V	
$ V_{OD2} $	Differential output voltage			2			V	
$\Delta V_{OD} $	Change in magnitude of differential output voltage‡	$V_{CC} = 4.75\text{ V to }5.25\text{ V}$, See Figure 1	$R_L = 100\ \Omega$,			± 0.4	V	
V_{OC}	Common-mode output voltage§					3	V	
$\Delta V_{OC} $	Change in magnitude of common-mode output voltage‡					± 0.4	V	
I_O	Output current with power off			$V_{CC} = 0$	$V_O = 6\text{ V}$	0.1	100	μA
		$V_O = -0.25\text{ V}$	-0.1		-100			
		$V_O = -0.25\text{ V to }6\text{ V}$	± 100					
I_I	Input current	$V_{CC} = 5.25\text{ V}$,	$V_I = 5.5\text{ V}$			50	μA	
I_{IH}	High-level input current	$V_{CC} = 5.25\text{ V}$,	$V_I = 2.7\text{ V}$			25	μA	
I_{IL}	Low-level input current	$V_{CC} = 5.25\text{ V}$,	$V_I = 0.5\text{ V}$			200	μA	
I_{OS}	Short-circuit output current¶	$V_{CC} = 5.25\text{ V}$,	$V_O = 0$	-50			-150	mA
I_{CC}	Supply current (all drivers)	$V_{CC} = 5.25\text{ V}$,	No load,	All inputs at 0 V		32	40	mA

† All typical values are at $V_{CC} = 5\text{ V}$ and $T_A = 25^\circ\text{C}$.

‡ $|V_{OD}|$ and $|V_{OC}|$ are the changes in magnitude of V_{OD} and V_{OC} , respectively, that occur when the input is changed from a high level to a low level.

§ In ANSI Standard EIA/TIA-422-B, V_{OC} , which is the average of the two output voltages with respect to ground, is called output offset voltage, V_{OS} .

¶ Only one output at a time should be shorted, and duration of the short circuit should not exceed one second.

switching characteristics over recommended operating free-air temperature range, $V_{CC} = 5\text{ V}$

PARAMETER		TEST CONDITIONS		MIN	TYP#	MAX	UNIT	
$t_{d(OD)}$	Differential-output delay time				3.5	7	ns	
$t_{t(OD)}$	Differential-output transition time	$C_L = 15\text{ pF}$,	$R_L = 100\ \Omega$,	See Figure 2		3.5	7	ns
	Skew					1.5	4	ns

Typical values are at $T_A = 25^\circ\text{C}$.



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PARAMETER MEASUREMENT INFORMATION

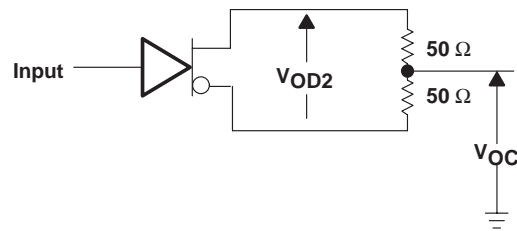
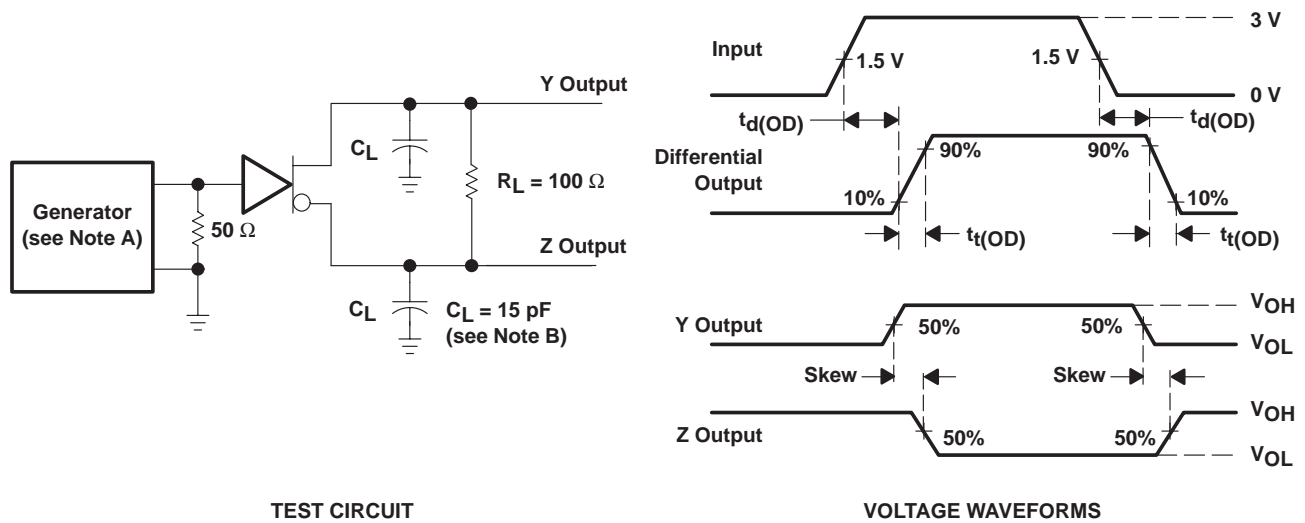


Figure 1. Differential and Common-Mode Output Voltages



NOTES: A. The input pulse generator has the following characteristics: $Z_0 = 50 \Omega$, $PRR \leq 500 \text{ kHz}$, $t_W = 100 \text{ ns}$, $t_r = \leq 5 \text{ ns}$.
B. C_L includes probe and jig capacitance.

Figure 2. Test Circuit and Voltage Waveforms

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