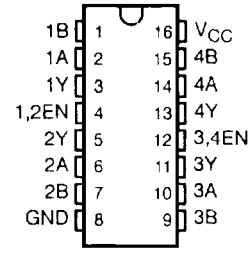
- **Meets or Exceeds the Requirements of ANSI EIA/TIA-422-B, EIA/TIA-423-B, and RS-485**
- **Meets ITU Recommendations V.10, V.11, X.26, and X.27**
- **Designed for Multipoint Bus Transmission on Long Bus Lines in Noisy Environments**
- **Low Supply Current Requirement 27 mA Max**
- **Common-Mode Input Voltage Range of −12 V to 12 V**
- **Input Sensitivity . . . ±200 mV**
- **Input Hysteresis . . . 50 mV Typ**
- **High Input Impedance . . . 12 kΩ Min**
- **Operates From Single 5-V Supply**

N OR NS† PACKAGE
(TOP VIEW)



† The NS package is only available left-ended taped and reeled (order device SN75ALS175NSLE).

FUNCTION TABLE (EACH RECEIVER)

DIFFERENTIAL INPUTS A – B	ENABLE EN	OUTPUT Y
$V_{ID} \geq 0.2$ V	H	H
-0.2 V $< V_{ID} < 0.2$ V	H	?
$V_{ID} \leq -0.2$ V	H	L
X	L	Z
Open Circuit	H	H

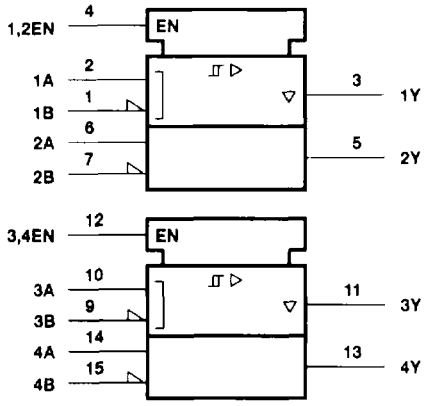
H = high level, L = low level, ? = indeterminate,
X = irrelevant, Z = high impedance (off)

description

The SN75ALS175 is a monolithic quadruple differential line receiver with 3-state outputs. It is designed to meet the requirements of ANSI Standards EIA/TIA-422-B, EIA/TIA-423-B, and RS-485 and several ITU recommendations. Advanced low-power Schottky technology provides high speed without the usual power penalty. Each of the two pairs of receivers has a common active-high enable. The device features high input impedance, input hysteresis for increased noise immunity, and input sensitivity of ±200 mV over a common-mode input voltage range of −12 V to 12 V.

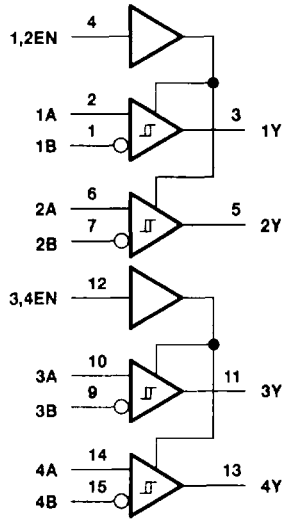
The SN75ALS175 is characterized for operation from 0°C to 70°C.

logic symbol‡

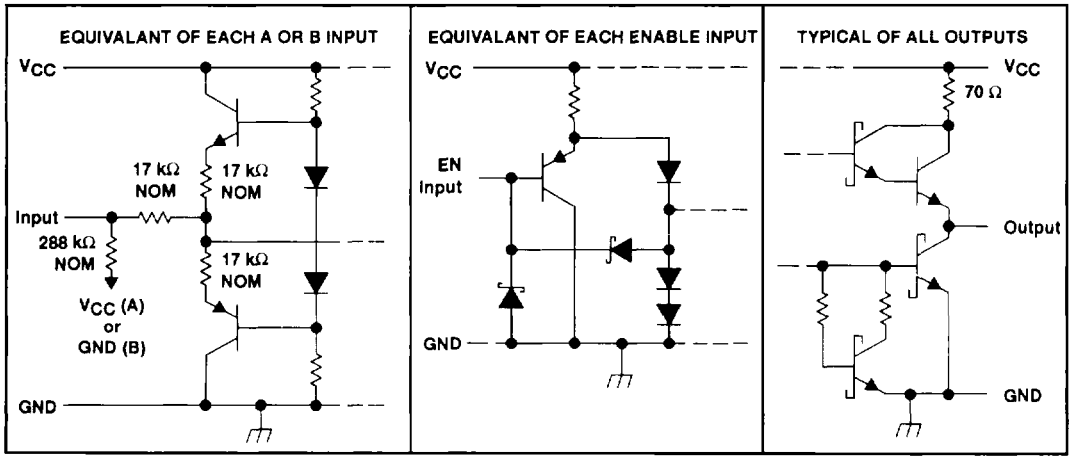


‡ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic



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 (A or B inputs) ..... ±14 V
Differential input voltage, V_{ID} (see Note 2) ..... ±14 V
Enable input voltage, V_I ..... 7 V
Low-level output current, I_{OL} ..... 50 mA
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 input voltage, are with respect to network ground terminal.
2. Differential-input voltage is measured at the noninverting input with respect to the corresponding inverting input.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
N	1150 mW	9.2 mW/°C	736 mW
NS	625 mW	5.0 mW/°C	400 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
Common-mode input voltage, V_{IC}			±12	V
Differential input voltage, V_{ID}			±12	V
High-level enable-input voltage, V_{IH}	2			V
Low-level enable-input voltage, V_{IL}			0.8	V
High-level output current, I_{OH}			−400	μA
Low-level output current, I_{OL}			8	mA
Operating free-air temperature, T_A	0		70	°C

electrical characteristics over recommended ranges of common-mode input voltage, supply voltage and operating free-air temperature (unless otherwise noted) (see Note 3)

PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V_{IT+}	Positive-going input threshold voltage						200	mV
V_{IT-}	Negative-going input threshold voltage				−200‡			mV
V_{hys}	Hysteresis voltage ($V_{IT+} - V_{IT-}$)					50		mV
V_{IK}	Enable-input clamp voltage	I_I = −18 mA					−1.5	V
V_{OH}	High-level output voltage	V_{ID} = 200 mV,	I_{OH} = −400 μA,	See Figure 1	2.7			V
V_{OL}	Low-level output voltage	V_{ID} = −200 mV,	I_{OL} = 8 mA,	See Figure 1			0.45	V
I_{OZ}	High-impedance-state output current	V_O = 0.4 V to 2.4 V					±20	μA
I_I	Line input current	Other input at 0 V,	See Note 3	V_I = 12 V			1	mA
				V_I = −7 V			−0.8	
I_{IH}	High-level enable-input current	$V_{IH(E)}$ = 2.7 V					20	μA
I_{IL}	Low-level enable-input current	$V_{IL(E)}$ = 0.4 V					−100	μA
r_i	Input resistance				12			kΩ
I_{OS}	Short-circuit output current	V_O = 0			−15		−85	mA
I_{CC}	Suply current (total package)	No load,	Outputs enabled			16	24	mA
		No load,	Outputs disabled			18	27	

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ The algebraic convention, in which the less positive (more negative) limit is designated as minimum, is used in this data sheet for threshold voltage levels only.
NOTE 3: Refer to ANSI Standards RS-485 for exact conditions.

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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
t_{PHL}	Propagation delay time, high- to low-level output	V_{ID} = −2.5 V to 2.5 V,		9	18	27	ns
t_{PLH}	Propagation delay time, low- to high-level output	C_L = 15 pF,	See Figure 2	9	18	27	ns
t_{PZH}	Output enable time to high level	C_L = 15 pF,	See Figure 3	4	12	18	ns
t_{PZL}	Output enable time to low level			6	13	21	ns
t_{PHZ}	Output disable time from high level	C_L = 15 pF,	See Figure 3	10	21	27	ns
t_{PLZ}	Output disable time from low level			8	15	25	ns

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

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PARAMETER MEASUREMENT INFORMATION

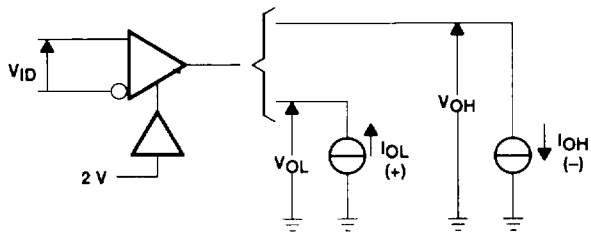
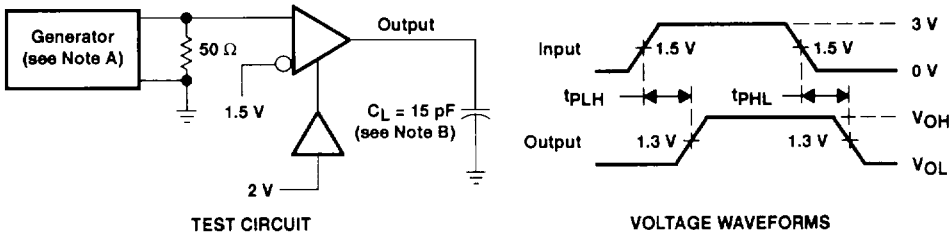


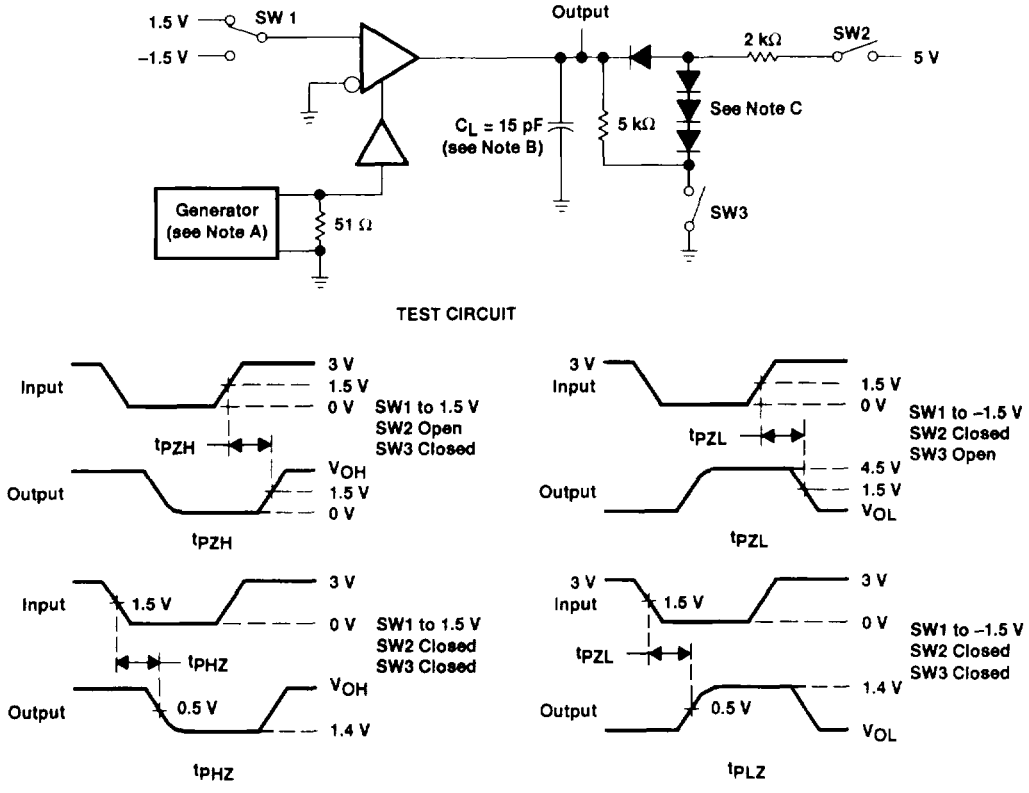
Figure 1. V_{OH}, V_{OL}



NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle = 50%, t_r = t_f = 6 ns.
B. C_L includes probe and jig capacitance.

Figure 2. Propagation Delay Times

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle = 50%, t_r = t_f = 6 ns.
B. C_L includes probe and jig capacitance.
C. All diodes are 1N916 or equivalent.

Figure 3. Enable and Disable Times