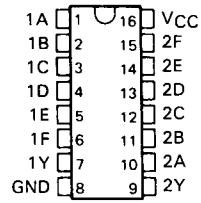
D1334, SEPTEMBER 1987—REVISED AUGUST 1989

- **Permits Digital Data Transmission over Coaxial Cable, Strip Line, or Twisted Pair**
- **Operates with 50-Ω to 500-Ω Transmission Lines**
- **TTL-Compatible with 5-V Supply**
- **2.4-V Output at I_{OH} = −75 mA**
- **Uncommitted Emitter-Follower Output Structure for Party-Line Operation**
- **IMPACT™ Low-Power Schottky Technology**
- **Improved Replacement for the SN75121 and Signetics 8T13**
- **Glitchless Power-Up/Power-Down**
- **Short-Circuit Protection**
- **AND-OR Logic Configuration**
- **High Speed . . . Maximum Propagation Delay Time of 14 ns at C_L = 15 pF**

D OR N PACKAGE
(TOP VIEW)



FUNCTION TABLE

INPUTS						OUTPUT
A	B	C	D	E	F	Y
H	H	H	H	X	X	H
X	X	X	X	H	H	H
All other input combinations						L

H = high level
L = low level
X = irrelevant

description

The SN75ALS121 dual line driver is designed for digital data transmission over lines having impedances from 50 to 500 Ω. It is compatible with standard TTL logic and supply voltage levels.

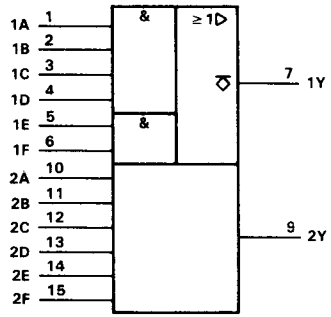
The low-impedance emitter-follower outputs drive terminated lines such as coaxial cable, strip line, or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 1.5 volts. All inputs are in conventional TTL configuration. Gating can be used during power-up and power-down sequences to ensure that no noise is introduced on the line.

The SN75ALS121 employs the IMPACT™ process to achieve fast switching speeds, low power dissipation, and reduced input current requirements.

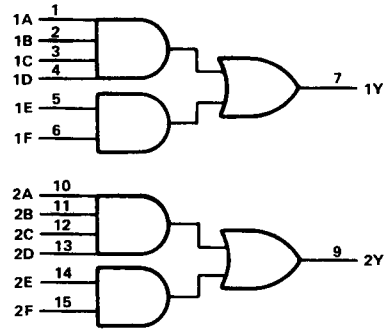
The SN75ALS121 is characterized for operation from 0°C to 70°C.

IMPACT is a trademark of Texas Instruments Incorporated

logic symbol†

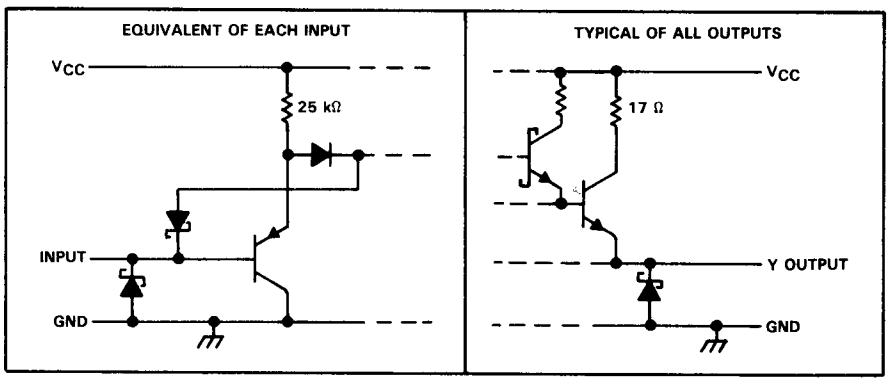


logic diagram (positive logic)



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

schematics of inputs and outputs



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

Supply voltage, V_{CC} (see Note 1) . . . . . 6 V
Input voltage . . . . . 6 V
Output voltage . . . . . 6 V
Continuous total dissipation at (or below) 25°C free air temperature (see Note 2):
D package . . . . . 950 mW
N package . . . . . 1150 mW
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 . . . . . 260°C

NOTES: 1. All voltage values are with respect to network ground terminal.
2. For operation above 25°C free-air temperature, derate the D package linearly to 608 mW at 70°C at the rate of 7.6 mW/°C and the N package to 736 mW at 70°C at the rate of 9.2 mW/°C.

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}			−75	mA
Operating free-air temperature range, T_A	0		70	°C

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage	V_{CC} = 5 V,	I_I = −12 mA				−1.5	V
$V_{(BR)I}$	Input breakdown voltage	V_{CC} = 5 V,	I_I = 10 mA		5.5			V
V_{OH}	High-level output voltage	V_{IH} = 2 V,	I_{OH} = −75 mA,	See Note 3	2.4	3.2		V
I_{OH}	High-level output current	V_{CC} = 5 V, T_A = 25°C,	V_{IH} = 4.5 V, See Note 3	V_{OH} = 2 V,	−100	−200	−250	mA
I_{OL}	Low-level output current	V_{IL} = 0.8 V,	V_{OL} = 0.4 V,	See Note 3			800	μA
$I_{O(off)}$	Off-state output current	V_{CC} = 3 V,	V_O = 3 V				500	μA
I_{IH}	High-level input current	V_I = 4.5 V					40	μA
I_{IL}	Low-level input current	V_I = 0.4 V					−250	μA
I_{OS}	Short-circuit output current	V_{CC} = 5 V				−5	−30	mA
I_{CCH}	Supply current, outputs high	V_{CC} = 5.25 V,	All inputs at 2 V,	No load		9	14	mA
I_{CCL}	Supply current, outputs low	V_{CC} = 5.25 V,	All inputs at 0.8 V,	No load		13	30	mA

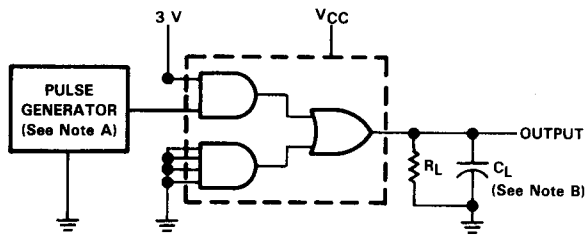
† All typical values are at V_{CC} = 5 V and T_A = 25°C.
NOTE 3: The output voltage and current limits are ensured for any appropriate combination of high and low inputs specified by the function table for the desired output.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature

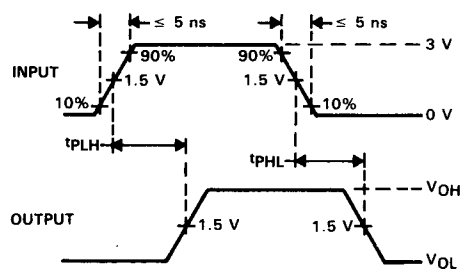
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	R_L = 37 Ω, C_L = 15 pF, See Figure 1		6	14	ns
t_{PHL}	Propagation delay time, high-to-low-level output			4	14	ns
t_{PLH}	Propagation delay time, low-to-high-level output	R_L = 37 Ω, C_L = 1000 pF, See Figure 1		18	30	ns
t_{PHL}	Propagation delay time, high-to-low-level output			29	50	ns

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

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: Z_O = 50 Ω, t_w = 200 ns, duty cycle = 50%.
B. C_L includes probe and jig capacitance.

FIGURE 1. SWITCHING CHARACTERISTICS

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

TYPICAL CHARACTERISTICS

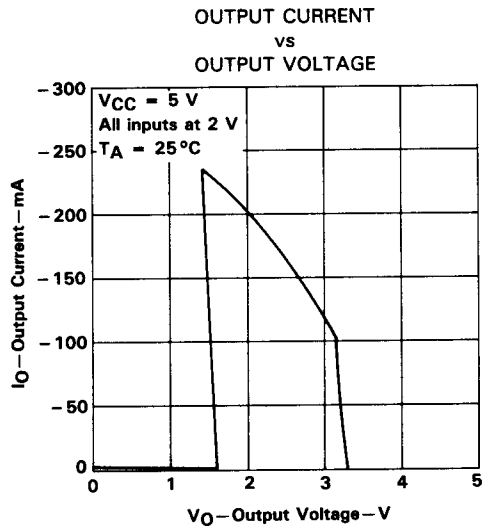


FIGURE 2