

- Permits Digital Data Transmission Over Coaxial Cable, Strip Line, or Twisted Pair
- Operates With  $50\text{-}\Omega$  to  $500\text{-}\Omega$  Transmission Lines
- TTL Compatible With 5-V Supply
- 2.4-V Output at  $I_{OH} = -75\text{ mA}$
- 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  $C_L = 15\text{ pF}$

#### description

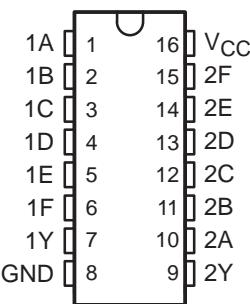
The SN75ALS121 dual line driver is designed for digital data transmission over lines having impedances from  $50$  to  $500\text{ }\Omega$ . It is compatible with standard TTL logic and supply voltage levels.

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 V. 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  $0^\circ\text{C}$  to  $70^\circ\text{C}$ .

D OR N PACKAGE  
(TOP VIEW)



NOT RECOMMENDED FOR NEW DESIGN

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

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TEXAS  
INSTRUMENTS

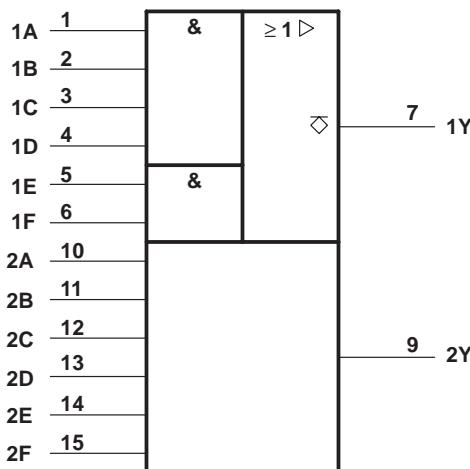
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# SN75ALS121

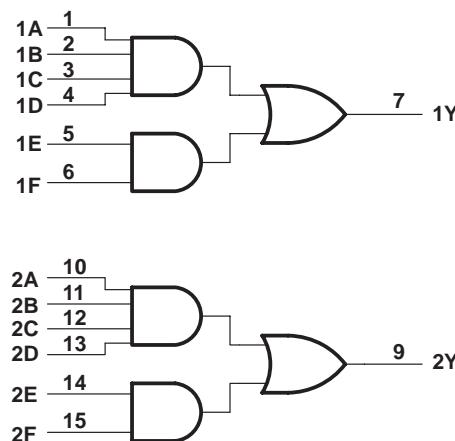
## DUAL LINE DRIVER

SLLS030A – D1334, SEPTEMBER 1987 – REVISED AUGUST 1989

## logic symbol†

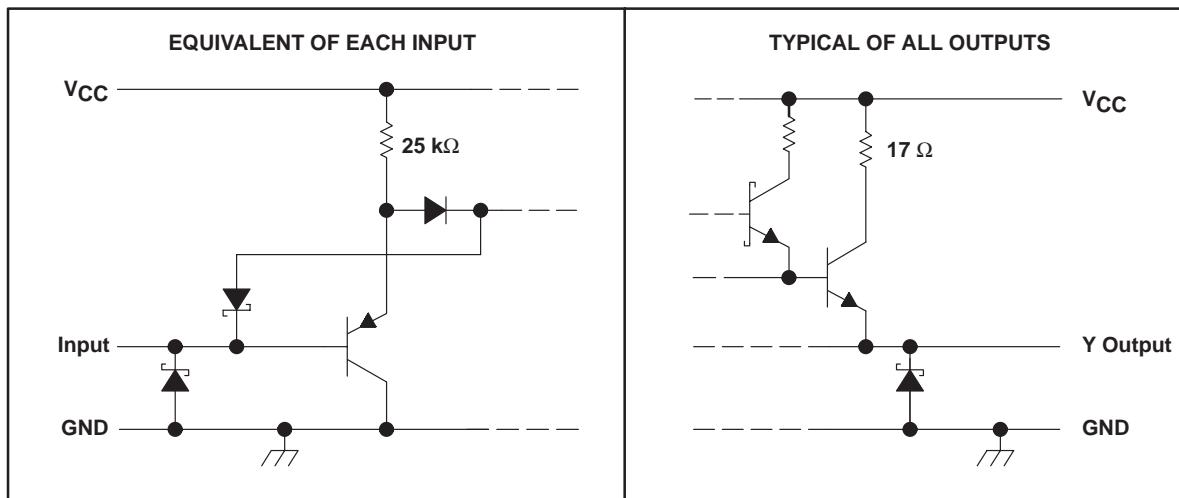


## logic diagram (positive logic)



† 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 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 .....	260°C

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

**DISSIPATION RATING TABLE**

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	OPERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING
D	950 mW	7.6 mW/°C	608 mW
N	1150 mW	9.2 mW/°C	736 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, $I_{OH}$			–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	TYPT <sup>†</sup>	MAX	UNIT
$V_{IK}$ Input clamp voltage	$V_{CC} = 5 \text{ V}$ , $I_I = -12 \text{ mA}$			–1.5	V
$V_{(BR)I}$ Input breakdown voltage	$V_{CC} = 5 \text{ V}$ , $I_I = 10 \text{ mA}$		5.5		V
$V_{OH}$ High-level output voltage	$V_{IH} = 2 \text{ V}$ , $I_{OH} = -75 \text{ mA}$ , See Note 2	2.4	3.2		V
$I_{OH}$ High-level output current	$V_{CC} = 5 \text{ V}$ , $V_{IH} = 4.5 \text{ V}$ , $V_{OH} = 2 \text{ V}$ , $T_A = 25^\circ\text{C}$ , See Note 2	–100	–200	–250	mA
$I_{OL}$ Low-level output current	$V_{IL} = 0.8 \text{ V}$ , $V_{OL} = 0.4 \text{ V}$ , See Note 2			–800	µA
$I_{O(off)}$ Off-state output current	$V_{CC} = 3 \text{ V}$ , $V_O = 3 \text{ V}$			500	µA
$I_{IH}$ High-level input current	$V_I = 4.5 \text{ V}$			40	µA
$I_{IL}$ Low-level input current	$V_I = 0.4 \text{ V}$			–250	µA
$I_{OS}$ Short-circuit output current	$V_{CC} = 5 \text{ V}$		–5	–30	mA
$I_{CCH}$ Supply current, outputs high	$V_{CC} = 5.25 \text{ V}$ , All inputs at 2 V, No load		9	14	mA
$I_{CCL}$ Supply current, outputs low	$V_{CC} = 5.25 \text{ V}$ , All inputs at 0.8 V, No load		13	30	mA

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

NOTE 2: 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.

# SN75ALS121

## DUAL LINE DRIVER

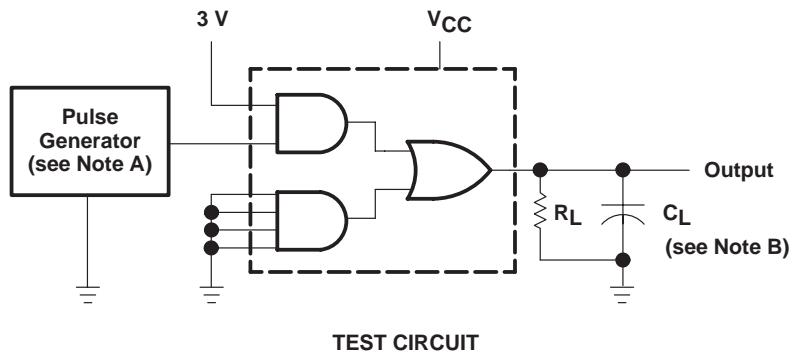
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### switching characteristics over recommended ranges of supply voltage and operating free-air temperature

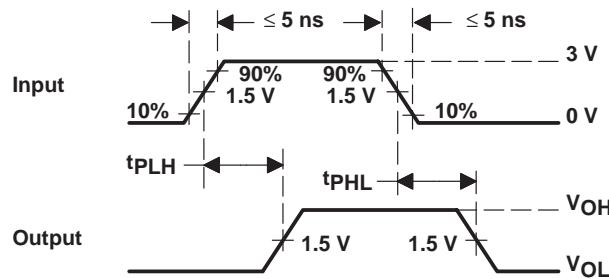
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	$R_L = 37 \Omega$ , $C_L = 15 \text{ pF}$ , See Figure 1	6	14		ns
$t_{PHL}$		4	14		ns
$t_{PLH}$	$R_L = 37 \Omega$ , $C_L = 1000 \text{ pF}$ , See Figure 1	18	30		ns
$t_{PHL}$		29	50		ns

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

### PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

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

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

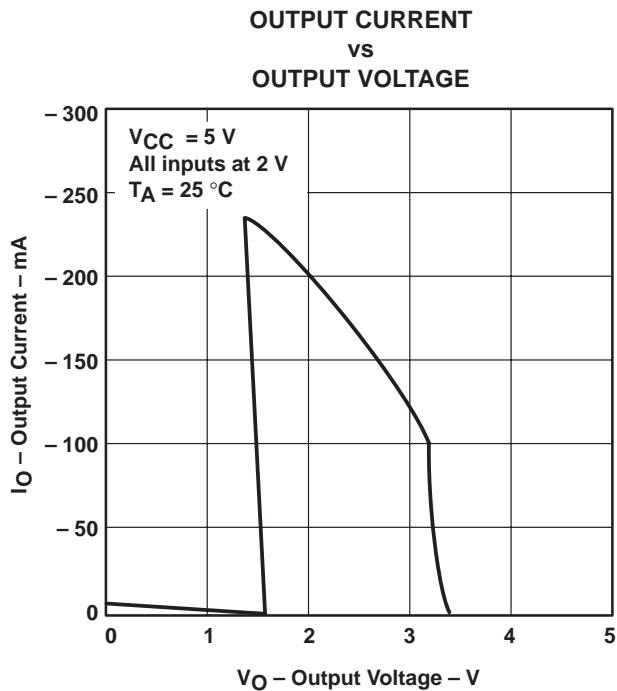


Figure 2



**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN75ALS121N	OBsolete	PDIP	N	16		TBD	Call TI	Call TI

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBsolete:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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