

- Designed for Digital Data Transmission Over 50-Ω to 500-Ω Coaxial Cable, Strip Line, or Twisted Pair
- High Speed  
 $t_{pd} = 20$  ns Maximum at  $C_L = 15$  pF
- TTL Compatible With Single 5-V Supply
- 2.4-V Output at  $I_{OH} = -75$  mA
- Uncommitted Emitter-Follower Output Structure for Party-Line Operation
- Short-Circuit Protection
- AND-OR Logic Configuration
- Designed for Use With Triple Line Receivers SN55122, SN75122
- Designed to Be Interchangeable With Signetics N8T13

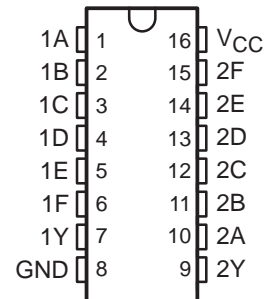
## description

The SN55121 and SN75121 dual line drivers are designed for digital data transmission over lines having impedances from 50 to 500 Ω. They are also compatible with standard TTL logic and supply-voltage levels.

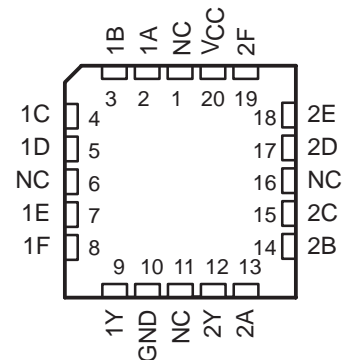
The low-impedance emitter-follower outputs of the SN55121 and SN75121 can drive terminated lines such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 1.5 V. All of the inputs are in conventional TTL configuration and the gating can be used during power-up and power-down sequences to ensure that no noise is introduced to the line.

The SN55121 is characterized for operation over the full military temperature range of -55°C to 125°C. The SN75121 is characterized for operation from 0°C to 70°C.

SN55121 . . . J PACKAGE  
SN75121 . . . D OR N PACKAGE  
(TOP VIEW)



SN55121 . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

**THE SN75121 IS NOT  
RECOMMENDED FOR NEW DESIGNS**



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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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# SN55121, SN75121 DUAL LINE DRIVERS

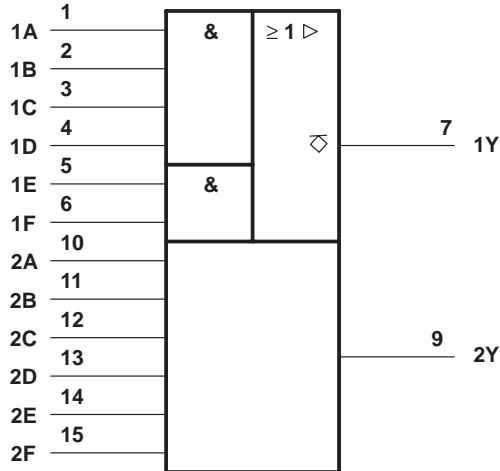
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FUNCTION TABLE

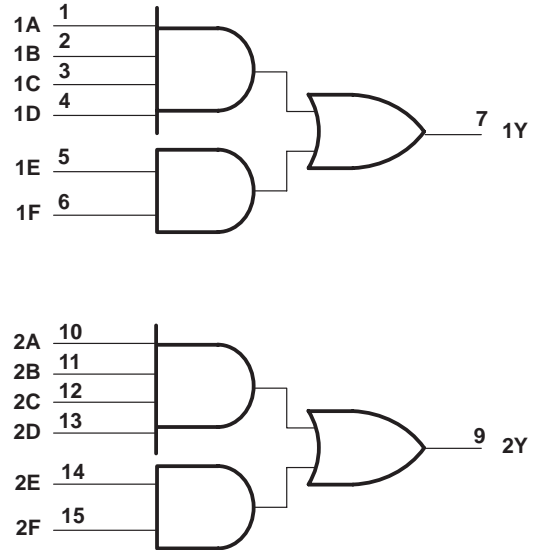
| INPUTS                       |   |   |   |   |   | OUTPUT |
|------------------------------|---|---|---|---|---|--------|
| A                            | B | C | D | E | F | Y      |
| H                            | H | H | H | X | X | H      |
| X                            | X | X | X | H | H |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

H = high level, L = low level, X = irrelevant

## logic symbol†

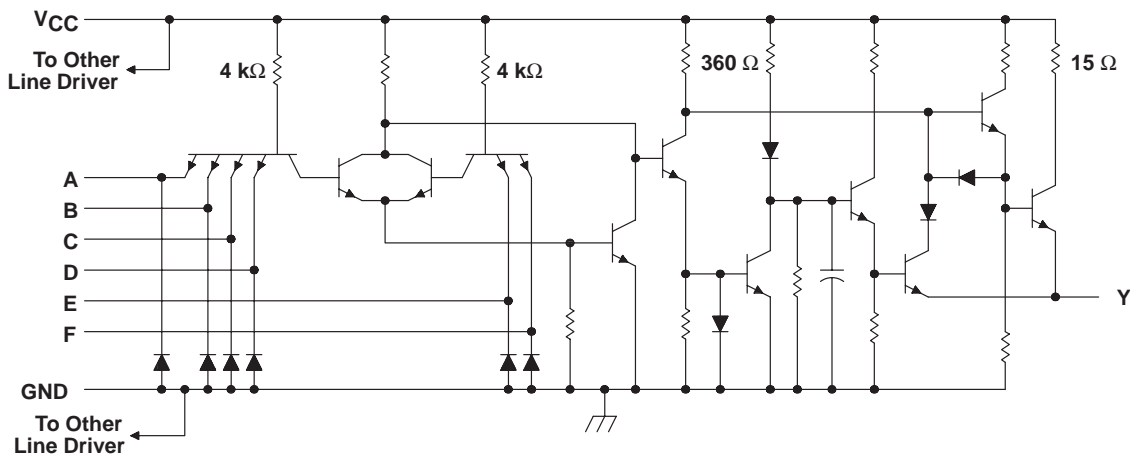


## logic diagram (positive logic)



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.  
Pin numbers shown are for the D, J, and N packages.

## schematic (each driver)



All resistor values shown are nominal.

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

|  |                              |
|--|------------------------------|
| Supply voltage, $V_{CC}$ (see Note 1)  | 6 V                          |
| Input voltage  | 6 V                          |
| Output voltage   | 6 V                          |
| Continuous total power dissipation   | See Dissipation Rating Table |
| Storage temperature range, $T_{stg}$   | –65°C to 150°C               |
| Case temperature for 60 seconds: FK package                                  | 260°C                        |
| Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J package      | 300°C                        |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or N package | 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.

NOTE 1: All voltage values are with respect to both ground terminals connected together.

**DISSIPATION RATING TABLE**

| PACKAGE | $T_A \leq 25^\circ\text{C}$<br>POWER RATING | DERATING FACTOR<br>ABOVE $T_A = 25^\circ\text{C}$ | $T_A = 70^\circ\text{C}$<br>POWER RATING | $T_A = 125^\circ\text{C}$<br>POWER RATING |
|---------|---|---|--|---|
| D       | 950 mW                                      | 7.6 mW/°C   | 608 mW                                   | —   |
| FK‡     | 1375 mW                                     | 11.0 mW/°C  | 880 mW                                   | 275 mW                                    |
| J‡      | 1375 mW                                     | 11.0 mW/°C  | 880 mW                                   | 275 mW                                    |
| N       | 1150 mW                                     | 9.2 mW/°C   | 736 mW                                   | —   |

‡ In the FK and J packages, SN55121 chips are either silver glass or alloy mounted.

**recommended operating conditions**

|                                       | SN55121 |     |      | SN75121 |     |      | UNIT |
|---------------------------------------|---------|-----|------|---------|-----|------|------|
|                                       | MIN     | NOM | MAX  | MIN     | NOM | MAX  |      |
| Supply voltage, $V_{CC}$              | 4.75    | 5   | 5.25 | 4.75    | 5   | 5.25 | V    |
| High-level input voltage, $V_{IH}$    | 2       |     |      | 2       |     |      | V    |
| Low-level input voltage, $V_{IL}$     |         |     | 0.8  |         |     | 0.8  | V    |
| High-level output current, $I_{OH}$   |         |     | –75  |         |     | –75  | mA   |
| Operating free-air temperature, $T_A$ | –55     |     | 125  | 0       |     | 70   | °C   |

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

| PARAMETER    |   | TEST CONDITIONS                                       |  | MIN  | MAX  | UNIT          |
|--------------|---|---|--|------|------|---------------|
| $V_{IK}$     | Input clamp voltage                       | $V_{CC} = 5\text{ V}$ ,                               | $I_I = -12\text{ mA}$                    |      | -1.5 | V             |
| $V_{(BR)}$   | Breakdown voltage                         | $V_{CC} = 5\text{ V}$ ,                               | $I_I = 10\text{ mA}$                     | 5.5  |      | V             |
| $V_{OH}$     | High-level output voltage                 | $V_{IH} = 2\text{ V}$ ,                               | $I_{OH} = -75\text{ mA}$ ,<br>See Note 2 | 2.4  |      | V             |
| $I_{OH}$     | High-level output current                 | $V_{CC} = 5\text{ V}$ ,<br>$T_A = 25^\circ\text{C}$ , | $V_{IH} = 4.5\text{ V}$ ,<br>See Note 2  | -100 | -250 | mA            |
| $I_{OL}$     | Low-level output current                  | $V_{IL} = 0.8\text{ V}$ ,                             | $V_{OL} = 0.4\text{ V}$ ,<br>See Note 2  | -800 |      | $\mu\text{A}$ |
| $I_{O(off)}$ | Off-state output current                  | $V_{CC} = 3\text{ V}$ ,                               | $V_O = 3\text{ V}$                       |      | 500  | $\mu\text{A}$ |
| $I_{IH}$     | High-level output current                 | $V_I = 4.5\text{ V}$                                  |  |      | 40   | $\mu\text{A}$ |
| $I_{IL}$     | Low-level output current                  | $V_I = 0.4\text{ V}$                                  |  | -0.1 | -1.6 | mA            |
| $I_{OS}$     | Short-circuit output current <sup>†</sup> | $V_{CC} = 5\text{ V}$ ,                               | $T_A = 25^\circ\text{C}$                 |      | -30  | mA            |
| $I_{CCH}$    | Supply current, outputs high              | $V_{CC} = 5.25\text{ V}$ ,                            | All inputs at 2 V,<br>Outputs open       |      | 28   | mA            |
| $I_{CCL}$    | Supply current, outputs low               | $V_{CC} = 5.25\text{ V}$ ,                            | All inputs at 0.8 V,<br>Outputs open     |      | 60   | mA            |

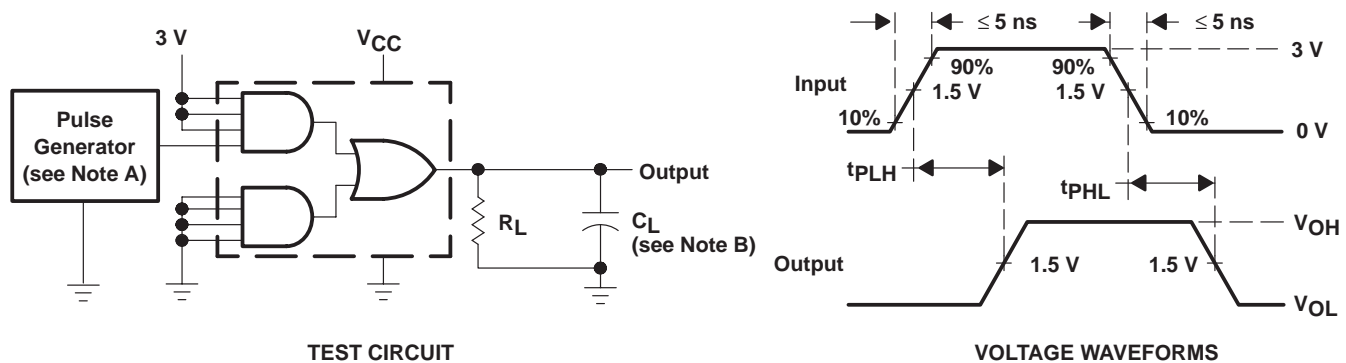
<sup>†</sup> Not more than one output should be shorted at a time.

NOTE 2: The output voltage and current limits are valid for any appropriate combination of high and low inputs specified by the function table for the desired output.

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

| PARAMETER |  | TEST CONDITIONS   |              | MIN | TYP | MAX | UNIT |
|-----------|--|---|--------------|-----|-----|-----|------|
| $t_{PLH}$ | Propagation delay time, low-to-high level output | $R_L = 37\ \Omega$ , $C_L = 15\text{ pF}$ ,<br>See Figure 1   | See Figure 1 |     | 11  | 20  | ns   |
| $t_{PHL}$ | Propagation delay time, high-to-low level output |   |              |     | 8   | 20  |      |
| $t_{PLH}$ | Propagation delay time, low-to-high level output | $R_L = 37\ \Omega$ , $C_L = 1000\text{ pF}$ ,<br>See Figure 1 | See Figure 1 |     | 22  | 50  | ns   |
| $t_{PHL}$ | Propagation delay time, high-to-low level output |   |              |     | 20  | 50  |      |

### PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics:  $Z_O \approx 50\ \Omega$ ,  $t_w = 200\text{ ns}$ , duty cycle  $\leq 50\%$ , PRR  $\leq 500\text{ kHz}$ .  
B.  $C_L$  includes probe and jig capacitance.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

OUTPUT CURRENT vs OUTPUT VOLTAGE

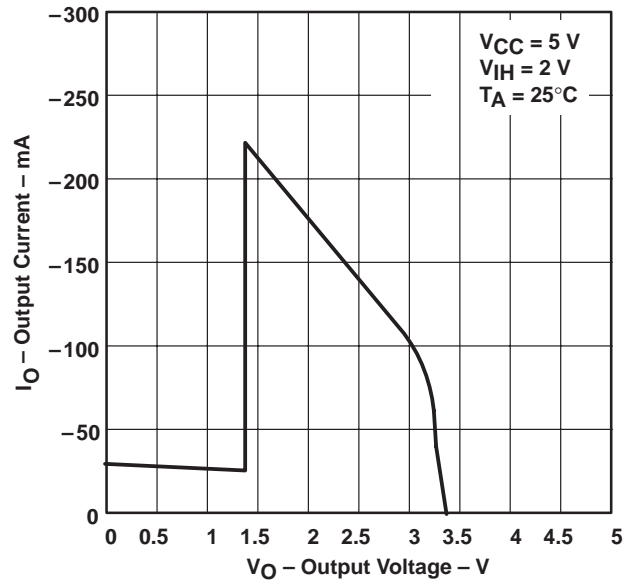


Figure 2

# SN55121, SN75121 DUAL LINE DRIVERS

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## APPLICATION INFORMATION

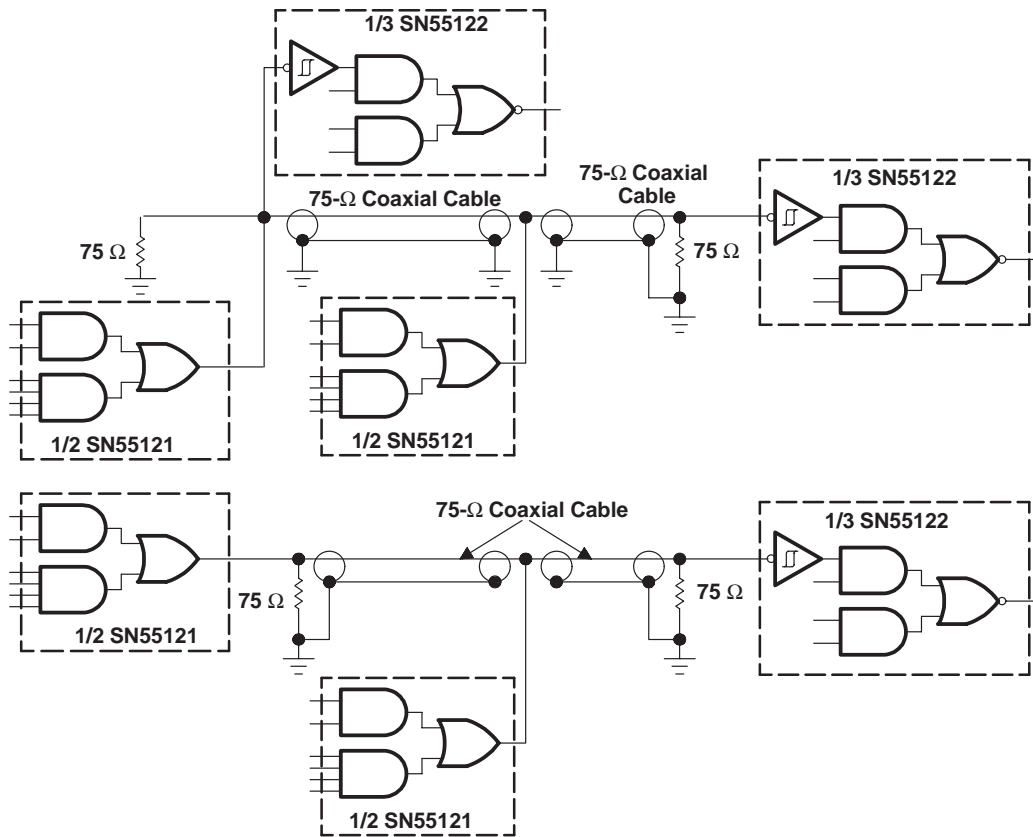


Figure 3. Single-Ended Party-Line Circuits

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