

# **DS75121 Dual Line Drivers**

### **General Description**

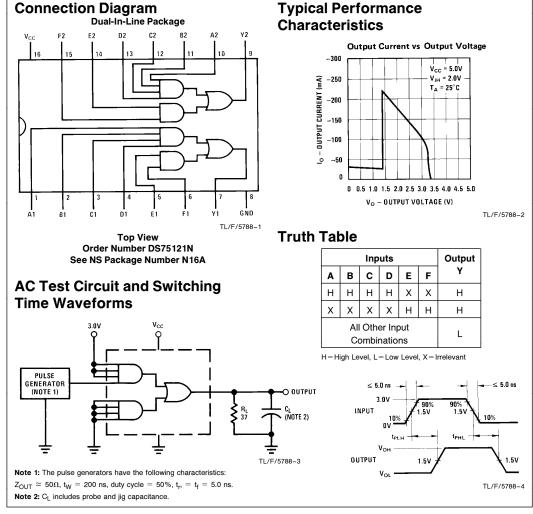
The DS75121 is a monolithic dual line driver designed to drive long lengths of coaxial cable, strip line, or twisted pair transmission lines having impedances from  $50\Omega$  to  $500\Omega$ . It is compatible with standard TTL logic and supply voltage levels.

The DS75121 will drive terminated low impedance lines due to the low-impedance emitter-follower outputs. In addition the outputs are uncommitted allowing two or more drivers to drive the same line.

Output short-circuit protection is incorporated to turn off the output when the output voltage drops below approximately 1.5V.

### Features

- Designed for digital data transmission over 50Ω to 500Ω coaxial cable, strip line, or twisted pair transmission lines
- TTL compatible
- Open emitter-follower output structure for party-line operation
- Short-circuit protection
- AND-OR logic configuration
- High speed (max propagation delay time 20 ns)
- Plug-in replacement for the SN75121 and the 8T13



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### Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

| Supply Voltage, V <sub>CC</sub>                      | 6.0V    |
|--|---------|
| Input Voltage  | 6.0V    |
| Output Voltage                                       | 6.0V    |
| Output Current                                       | -75 mA  |
| Maximum Power Dissipation* at 25°C<br>Molded Package | 1280 mW |
| Lead Temperature (Soldering, 4 seconds)              | 260°C   |
| *Derate molded package 10.2 mW/°C above 25°C.        |         |

### **Operating Conditions**

|                                 | Min  | Max  | Units |
|---------------------------------|------|------|-------|
| Supply Voltage, V <sub>CC</sub> | 4.75 | 5.25 | V     |
| Temperature, T <sub>A</sub>     |      |      |       |
| DS75121                         | 0    | +75  | °C    |
|                                 |      |      |       |

# Electrical Characteristics $V_{CC}=4.75V$ to 5.25V (unless otherwise noted) (Notes 2 and 3)

| Symbol              | Parameter                          | Conditions  | Min  | Тур | Мах  | Units |
|---------------------|------------------------------------|---|------|-----|------|-------|
| V <sub>IH</sub>     | High Level Input Voltage           |   | 2.0  |     |      | V     |
| VIL                 | Low Level Input Voltage            |   |      |     | 0.8  | V     |
| VI                  | Input Clamp Voltage                | $V_{CC} = 5.0V, I_{I} = -12 \text{ mA}$   |      |     | -1.5 | V     |
| lį –                | Input Current at Max Input Voltage | $V_{CC} = 5.25V, V_{IN} = 5.5V$   |      |     | 1    | mA    |
| V <sub>OH</sub>     | High Level Output Voltage          | $V_{IH} = 2.0V, I_{OH} = -75 \text{ mA}$ (Note 4)                               | 2.4  |     |      | V     |
| I <sub>OH</sub>     | High Level Output Current          | $V_{CC} = 5.0V, V_{IH} = 4.75V, V_{OH} = 2.0V,$<br>$T_A = 25^{\circ}C$ (Note 4) | -100 |     | -250 | mA    |
| IOL                 | Low Level Output Current           | V <sub>IL</sub> = 0.8V, V <sub>OL</sub> = 0.4V (Note 4)                         |      |     | -800 | μΑ    |
| I <sub>O(OFF)</sub> | Off State Output Current           | $V_{CC} = 0V, V_{O} = 3.0V$   |      |     | 500  | μΑ    |
| Чн                  | High Level Input Current           | $V_{I} = 4.5V$  |      |     | 40   | μΑ    |
| Ι <sub>ΙL</sub>     | Low Level Input Current            | $V_{I} = 0.4V$  | -0.1 |     | -1.6 | mA    |
| I <sub>OS</sub>     | Short Circuit Output Current       | $V_{CC} = 5.0V, T_A = 25^{\circ}C$  |      |     | -30  | mA    |
| ICCH                | Supply Current, Outputs High       | $V_{CC} = 5.25V$ , All Inputs at 2.0V, Outputs Open                             |      |     | 28   | mA    |
| I <sub>CCL</sub>    | Supply Current, Outputs Low        | $V_{CC} = 5.25V$ , All Inputs at 0.8V, Outputs Open                             |      |     | 60   | mA    |

# Switching Characteristics $v_{CC}=$ 5.0V, $T_{A}=$ 25°C

| Symbol           | Parameter                | Conditions                              |                    | Min | Тур | Max | Units |
|------------------|--------------------------|---|--------------------|-----|-----|-----|-------|
| t <sub>PLH</sub> | Propagation Delay Time,  | $R_L = 37\Omega$ , (See AC Test Circuit | $C_L = 15  pF$     |     | 11  | 20  | ns    |
|                  | Low-to-High Level Output | and Switching Time Waveforms)           | $C_{L} = 1000  pF$ |     | 22  | 50  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time,  | $R_L = 37\Omega$ , (See AC Test Circuit | $C_L = 15  pF$     |     | 8.0 | 20  | ns    |
|                  | High-to-Low Level Output | and Switching Time Waveforms)           | $C_{L} = 1000  pF$ |     | 20  | 50  | ns    |

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

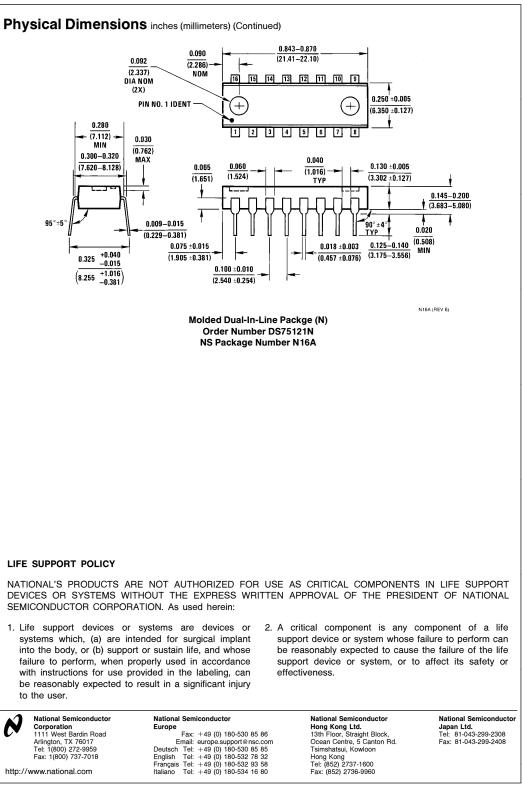
Note 2: Unless otherwise specified min/max limits apply across the 0°C to  $+70^{\circ}$ C range for the DS75121. All typical values are for T<sub>A</sub> = 25°C and V<sub>CC</sub> = 5V. Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

Note 4: The output voltage and current limits are guaranteed for any appropriate combination of high and low inputs specified by the truth table for the desired output.

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