

## 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.

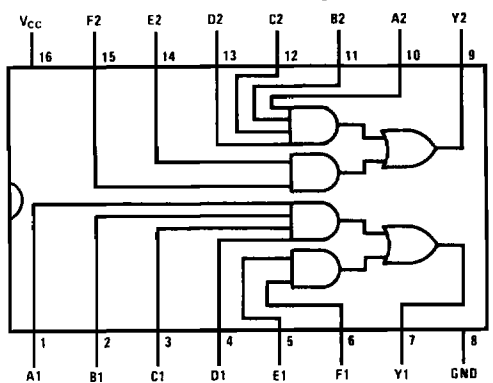
Output short-circuit protection is incorporated to turn off the output when the output voltage drops below approximately 1.5V.

### Features

- Designed for digital data transmission over  $50\Omega$  to  $500\Omega$  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

### Connection Diagram

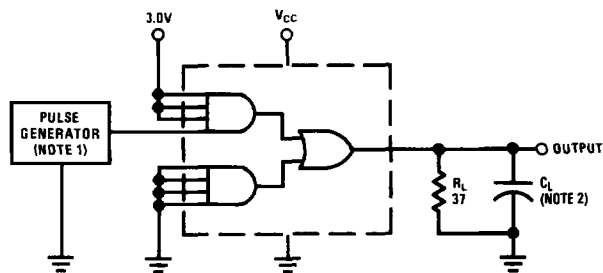
Dual-In-Line Package



TL/F/5788-1

Top View  
Order Number DS75121N  
See NS Package Number N16A

### AC Test Circuit and Switching Time Waveforms



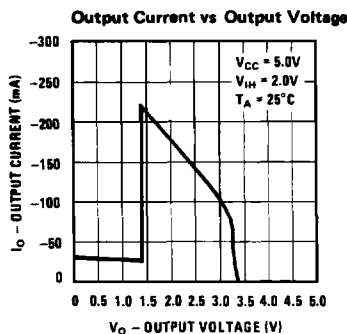
TL/F/5788-3

Note 1: The pulse generators have the following characteristics:

$Z_{OUT} \approx 50\Omega$ ,  $t_{W} = 200$  ns, duty cycle = 50%,  $t_r = t_f = 5.0$  ns.

Note 2:  $C_L$  includes probe and jig capacitance.

### Typical Performance Characteristics

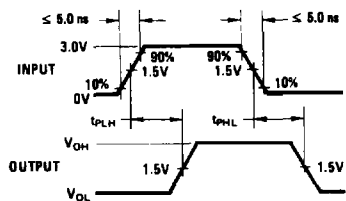


TL/F/5788-2

### Truth Table

Inputs						Output Y
A	B	C	D	E	F	
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



TL/F/5788-4

**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, $V_{CC}$	6.0V
Input Voltage	6.0V
Output Voltage	6.0V
Output Current	-75 mA

Maximum Power Dissipation\* at 25°C

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, $V_{CC}$	4.75	5.25	V
Temperature, $T_A$			
DS75121	0	+75	°C

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{IH}$	High Level Input Voltage		2.0			V
$V_{IL}$	Low Level Input Voltage				0.8	V
$V_I$	Input Clamp Voltage	$V_{CC} = 5.0V$ , $I_I = -12$ mA			-1.5	V
$I_I$	Input Current at Max Input Voltage	$V_{CC} = 5.25V$ , $V_{IN} = 5.5V$			1	mA
$V_{OH}$	High Level Output Voltage	$V_{IH} = 2.0V$ , $I_{OH} = -75$ mA (Note 4)	2.4			V
$I_{OH}$	High Level Output Current	$V_{CC} = 5.0V$ , $V_{IH} = 4.75V$ , $V_{OH} = 2.0V$ , $T_A = 25^\circ C$ (Note 4)	-100		-250	mA
$I_{OL}$	Low Level Output Current	$V_{IL} = 0.8V$ , $V_{OL} = 0.4V$ (Note 4)			-800	$\mu A$
$I_{O(Off)}$	Off State Output Current	$V_{CC} = 0V$ , $V_O = 3.0V$			500	$\mu A$
$I_{IH}$	High Level Input Current	$V_I = 4.5V$			40	$\mu A$
$I_{IL}$	Low Level Input Current	$V_I = 0.4V$	-0.1		-1.6	mA
$I_{OS}$	Short Circuit Output Current	$V_{CC} = 5.0V$ , $T_A = 25^\circ C$			-30	mA
$I_{CCH}$	Supply Current, Outputs High	$V_{CC} = 5.25V$ , All Inputs at 2.0V, Outputs Open			28	mA
$I_{CCL}$	Supply Current, Outputs Low	$V_{CC} = 5.25V$ , All Inputs at 0.8V, Outputs Open			60	mA

**Switching Characteristics**  $V_{CC} = 5.0V$ ,  $T_A = 25^\circ C$ 

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{PLH}$	Propagation Delay Time, Low-to-High Level Output	$R_L = 37\Omega$ , (See AC Test Circuit and Switching Time Waveforms)				
		$C_L = 15$ pF		11	20	ns
$t_{PHL}$	Propagation Delay Time, High-to-Low Level Output	$R_L = 37\Omega$ , (See AC Test Circuit and Switching Time Waveforms)				
		$C_L = 1000$ pF		22	50	ns
$t_{PLH}$	Propagation Delay Time, Low-to-High Level Output	$R_L = 37\Omega$ , (See AC Test Circuit and Switching Time Waveforms)				
		$C_L = 15$ pF		8.0	20	ns
$t_{PHL}$	Propagation Delay Time, High-to-Low Level Output	$R_L = 37\Omega$ , (See AC Test Circuit 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°C range for the DS75121. All typical values are for  $T_A = 25^\circ C$  and  $V_{CC} = 5V$ .

**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.