

DS55121/DS75121 Dual Line Drivers

General Description

The DS55121/DS75121 are monolithic dual line drivers designed to drive long lengths of coaxial cable, strip line, or twisted pair transmission lines having impedances from 50Ω to 500Ω. Both are compatible with standard TTL logic and supply voltage levels.

The DS55121/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.

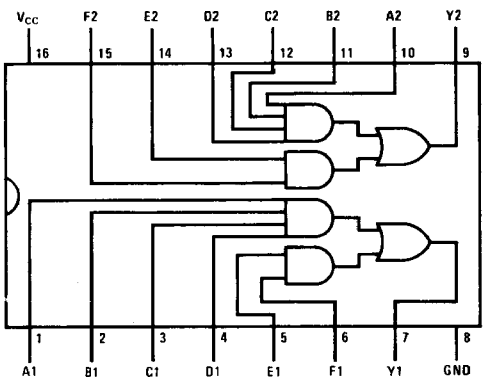
Output short-circuit protection is incorporated to turn off the output when the output voltage drops below approximately 1.5V.

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 SN55121/SN75121 and the 8T13

Connection Diagram

Dual-In-Line Package

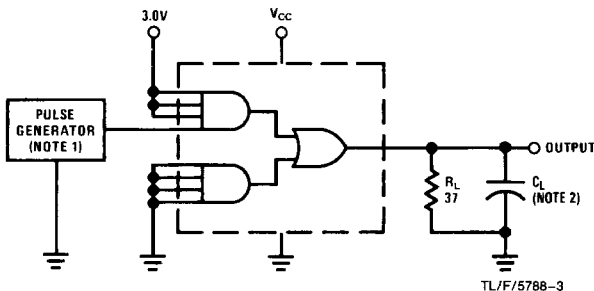


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Top View

Order Number DS55121J, DS75121J or DS75121N
See NS Package Number J16A or N16A

AC Test Circuit and Switching Time Waveforms



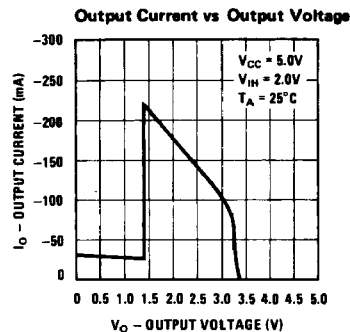
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Note 1: The pulse generators have the following characteristics:

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

Note 2: C_L includes probe and jig capacitance.

Typical Performance Characteristics

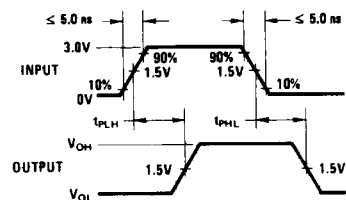


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Truth Table

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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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

Cavity Package	1371 mW
Molded Package	1280 mW

Lead Temperature (Soldering, 4 seconds) 260°C

*Derate cavity package 9.1 mW/°C above 25°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			
DS55121	-55	+125	°C
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	μA
$I_{O(OFF)}$	Off State Output Current	$V_{CC} = 0V$, $V_O = 3.0V$			500	μA
I_{IH}	High Level Input Current	$V_I = 4.5V$			40	μA
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 $-55^\circ C$ to $+125^\circ C$ temperature range for the DS55121 and across the $0^\circ C$ to $+70^\circ C$ 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.