

- 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

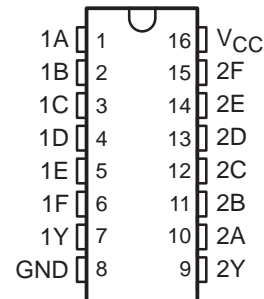
## description

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.

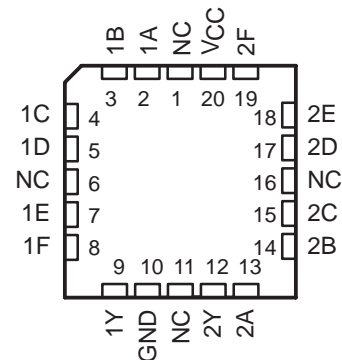
The low-impedance emitter-follower outputs of the SN55121 and SN75121 can drive terminated lines such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping 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  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN75121 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

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**



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1998, Texas Instruments Incorporated

# SN55121, SN75121 DUAL LINE DRIVERS

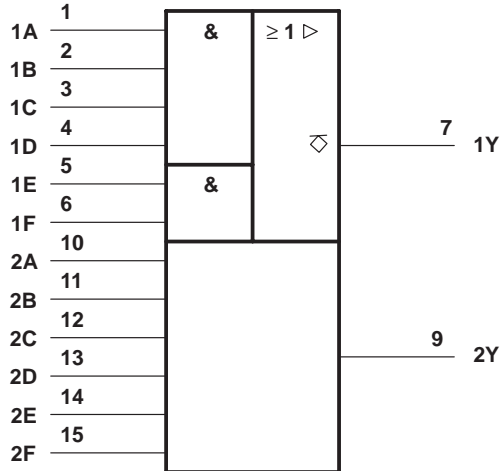
SLLS074C – SEPTEMBER 1973 – REVISED MAY 1998

FUNCTION TABLE

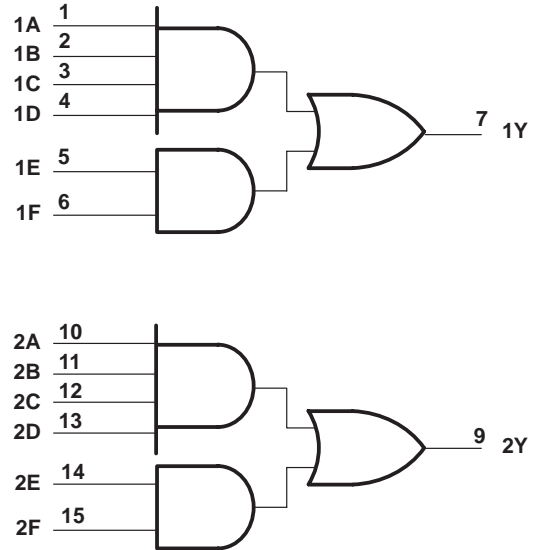
INPUTS						OUTPUT
A	B	C	D	E	F	Y
H	H	H	H	X	X	H
X	X	X	X	H	H	H
All other input combinations						L

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

## logic symbol†

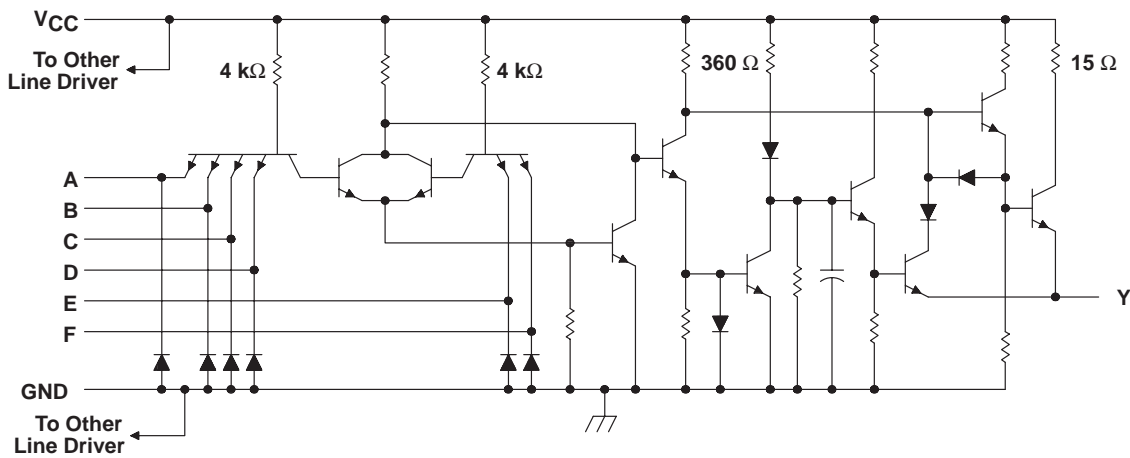


## logic diagram (positive logic)



† 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	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 125^\circ\text{C}$ 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

# SN55121, SN75121 DUAL LINE DRIVERS

SLLS074C – SEPTEMBER 1973 – REVISED MAY 1998

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	$V_{IH} = 2\text{ V}$ ,	$I_{OH} = -75\text{ mA}$ , See Note 2	2.4		V	
$I_{OH}$	High-level output current	$V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$ ,	$V_{IH} = 4.5\text{ V}$ , See Note 2	$V_{OH} = 2\text{ V}$ ,	-100	-250	mA
$I_{OL}$	Low-level output current	$V_{IL} = 0.8\text{ V}$ ,	$V_{OL} = 0.4\text{ V}$ ,		-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, Outputs open		28		mA
$I_{CCL}$	Supply current, outputs low	$V_{CC} = 5.25\text{ V}$ ,	All inputs at 0.8 V, Outputs open		60		mA

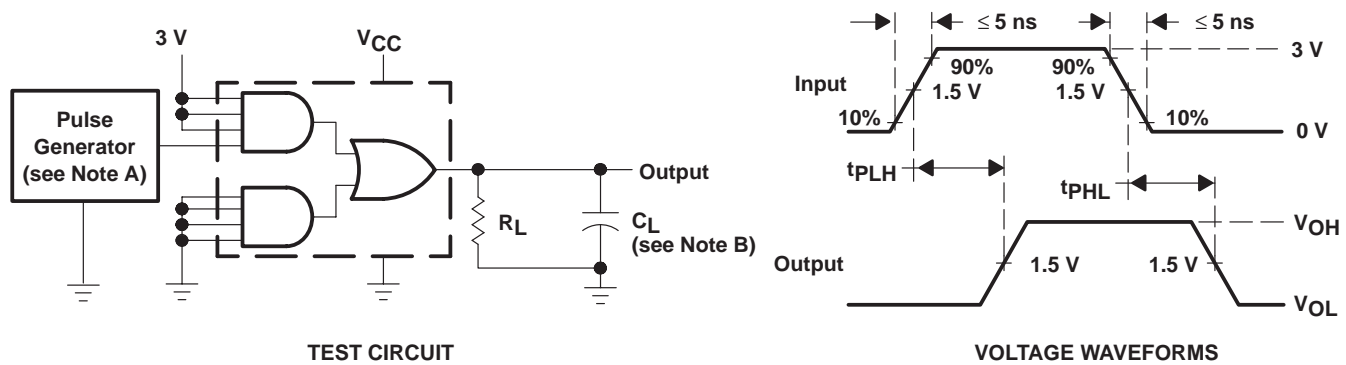
<sup>†</sup> Not more than one output should be shorted at a time.

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	$R_L = 37\ \Omega$ , $C_L = 15\text{ pF}$ ,	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	$R_L = 37\ \Omega$ , $C_L = 1000\text{ pF}$ ,	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

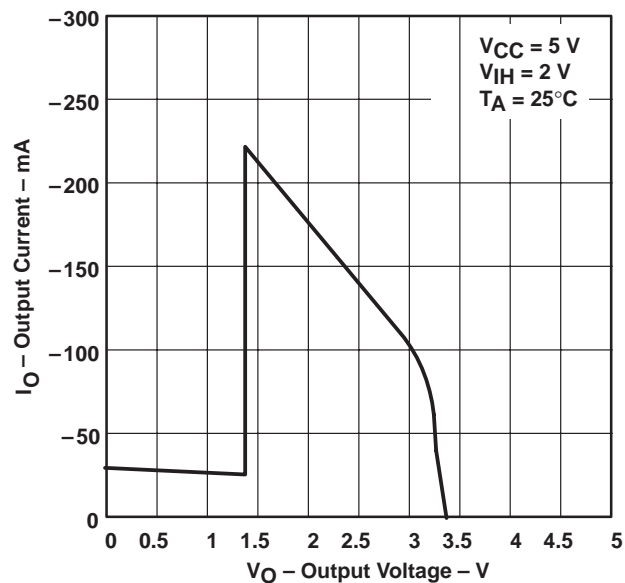


Figure 2

# SN55121, SN75121 DUAL LINE DRIVERS

SLLS074C – SEPTEMBER 1973 – REVISED MAY 1998

## APPLICATION INFORMATION

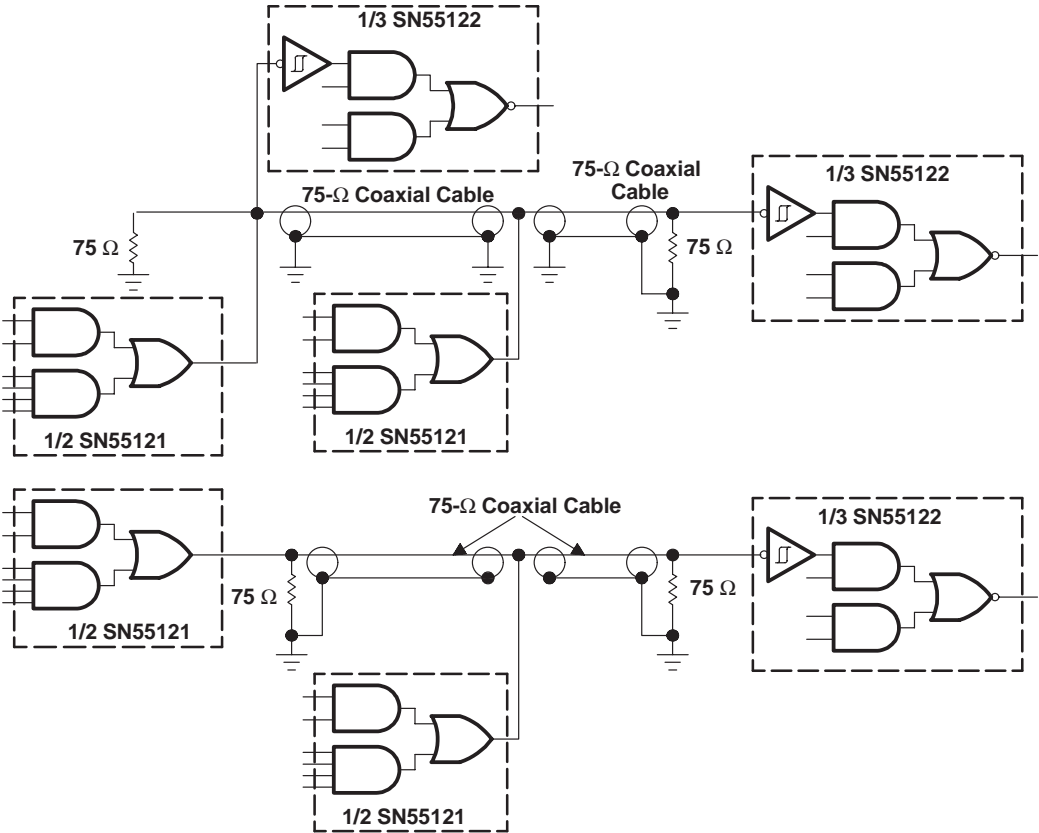


Figure 3. Single-Ended Party-Line Circuits

**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>
SN55121J	OBSOLETE	CDIP	J	16		None	Call TI	Call TI
SN75121D	OBSOLETE	SOIC	D	16		None	Call TI	Call TI
SN75121N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75121NSR	ACTIVE	SO	NS	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ55121FK	OBSOLETE	LCCC	FK	20		None	Call TI	Call TI
SNJ55121J	OBSOLETE	CDIP	J	16		None	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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

**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" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

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

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

<b>Products</b>		<b>Applications</b>	
Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>	Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>	Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
		Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
		Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
		Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments  
Post Office Box 655303 Dallas, Texas 75265