TYPES SN55121, SN55122, SN75121, SN75122
DUAL LINE DRIVERS AND TRIPLE LINE RECEIVERS

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LINE CIRCUITS

- Designed for Digital Data Transmission over Coaxial Cable, Strip Line, or Twisted Pair
- Designed for Operation with 50-Ω to 500-Ω Transmission Lines
- TTL Compatible with Single 5-V Supply

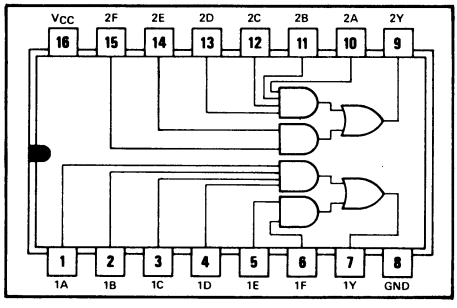
additional features of SN55121, SN75121 line drivers

- Plug-In Replacement for Signetics 8T13
- 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
- High Speed . . .Maximum Propagation Delay Time = 20 ns

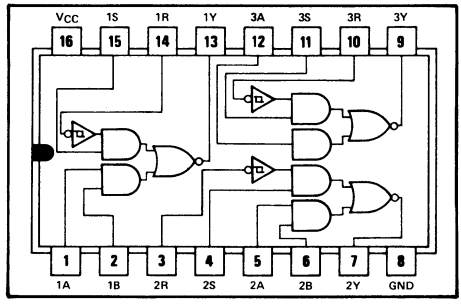
additional features of SN55122, SN75122 line receivers

- Plug-In Replacement for Signetics 8T14
- Built-In Input Threshold Hysteresis
- High Speed . . . Typical Propagation Delay Time = 20 ns
- Independent Channel Strobes
- Input Gating Increases Application Flexibility
- Fanout to 10 Series 54/74 Standard Loads

SN55121, SN75121
J OR N
DUAL-IN-LINE PACKAGE (TOP VIEW)



SN55122, SN75122
J OR N
DUAL-IN-LINE PACKAGE (TOP VIEW)



description

The SN55121, SN75121 dual line drivers and the SN55122, SN75122 triple line receivers are designed for digital data transmission over lines having impedances from 50 to 500 ohms. They are also compatible with standard TTL logic and supply voltage levels.

The low-impedance emitter-follower outputs of the SN55121, SN75121 will 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 which turns on when the output voltage drops below approximately 1.5 volts. 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 SN55122, SN75122 have receiver inputs with built-in hysteresis to provide increased noise margin for single-ended systems. The high impedance of this input presents a minimum load to the driver and allows termination of the transmission line in its characteristic impedance to minimize line reflection. An open line will affect the receiver input as would a low-level input voltage and the receiver input can withstand a level of −0.15 volt with power on or off. The other inputs are in TTL configuration. The S input must be high to enable the receiver input. Two of the line receivers have A and B inputs which, if both are high, will hold the output low. The third receiver has only an A input which, if high, will hold the output low.

SN55121, SN75121 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

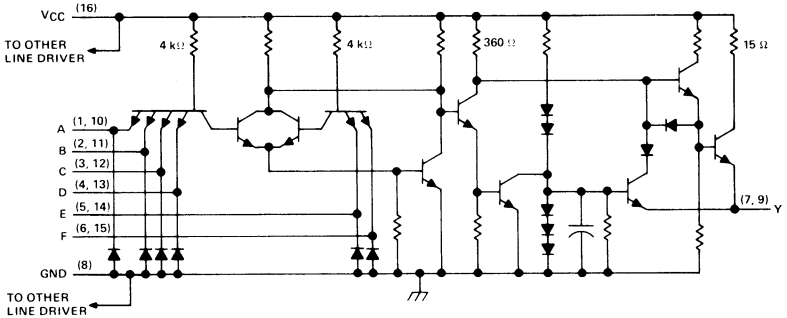
H = high level
L = low level
X = irrelevant

SN55122, SN75122 FUNCTION TABLE

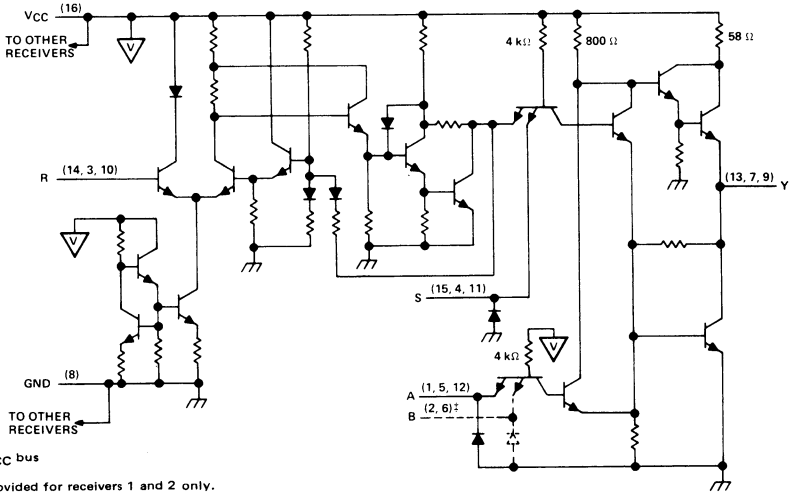
INPUTS				OUTPUT
A	B†	R	S	Y
H	H	X	X	L
X	X	L	H	L
L	X	H	X	H
L	X	X	L	H
X	L	H	X	H
X	L	X	L	H

†B input and last two lines of the function table are applicable to receivers 1 and 2 only.

SN55121, SN75121 schematic (each driver)



SN55122, SN75122 schematic (each receiver)



▽ . . . V_{CC} bus

‡B input is provided for receivers 1 and 2 only.
Resistor values shown are nominal.

SN55121, SN75121 absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 6 V
Input voltage . . . . . 6 V
Output voltage . . . . . 6 V
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2) . . . . . 800 mW
Operating free-air temperature range: SN55121 . . . . . −55°C to 125°C
SN75121 . . . . . 0°C to 75°C
Lead temperature 1/16 inch from case for 60 seconds: J package . . . . . 300°C
Lead temperature 1/16 inch from case for 10 seconds: N package . . . . . 260°C

SN55121, SN75121 recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
High-level output current, I_{OH}			−75	mA
Operating free-air temperature, T_A: SN55121	−55		125	°C
SN75121	0		75	°C

SN55121, SN75121 electrical characteristics over recommended operating free-air temperature range, V_{CC} = 4.75 V to 5.25 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS			MIN	MAX	UNIT
V_{IH}	High-level input voltage				2		V
V_{IL}	Low-level input voltage					0.8	V
V_I	Input clamp voltage	V_{CC} = 5 V,	I_I = −12 mA			−1.5	V
$V_{(BR)I}$	Input breakdown voltage	V_{CC} = 5 V,	I_I = 10 mA		5.5		V
V_{OH}	High-level output voltage	V_{IH} = 2 V,	I_{OH} = −75 mA,	See Note 3	2.4		V
I_{OH}	High-level output current	V_{CC} = 5 V, T_A = 25°C,	V_{IH} = 4.5 V, See Note 3	V_{OH} = 2 V,	−100	−250	mA
I_{OL}	Low-level output current	V_{IL} = 0.8 V,	V_{OL} = 0.4 V,	See Note 3		−800	μA
$I_{O(off)}$	Off-state output current	V_{CC} = 0,	V_O = 3 V			500	μA
I_{IH}	High-level input current	V_I = 4.5 V				40	μA
I_{IL}	Low-level input current	V_I = 0.4 V			−0.1	−1.6	mA
I_{OS}	Short-circuit output current	V_{CC} = 5 V,	T_A = 25°C			−30	mA
I_{CCH}	Supply current, outputs high	V_{CC} = 5.25 V,	All inputs at 2 V,	Outputs open		28	mA
I_{CCL}	Supply current, outputs low	V_{CC} = 5.25 V,	All inputs at 0.8 V,	Outputs open		60	mA

SN55121, SN75121 switching characteristics, V_{CC} = 5 V, T_A = 25°C

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

NOTES: 1. Voltage values are with respect to network ground terminal.
2. For operation above 25°C free-air temperature, refer to Dissipation Derating Curve, Figure 3.
3. The output voltage and current limits are guaranteed for any appropriate combination of high and low inputs specified by the function table for the desired output.

SN55122, SN75122 absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 6 V
Input voltage: R input . . . . . 6 V
A, B, or S input . . . . . 5.5 V
Output voltage . . . . . 6 V
Output current . . . . . ±100 mA
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2) . . . . . 800 mW
Operating free-air temperature range: SN55122 . . . . . −55°C to 125°C
SN75122 . . . . . 0°C to 75°C
Storage temperature range . . . . . −65°C to 150°C
Lead temperature 1/16 inch from case for 60 seconds: J package . . . . . 300°C
Lead temperature 1/16 inch from case for 10 seconds: N package . . . . . 260°C

SN55122, SN75122 recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
High-level output current, I_{OH}			−500	μA
Low-level output current, I_{OL}			16	mA
Operating free-air temperature, T_A: SN55122	−55		125	°C
SN75122	0		75	°C

SN55122, SN75122 electrical characteristics over recommended operating free-air temperature range, V_{CC} = 4.75 V to 5.25 V (unless otherwise noted)

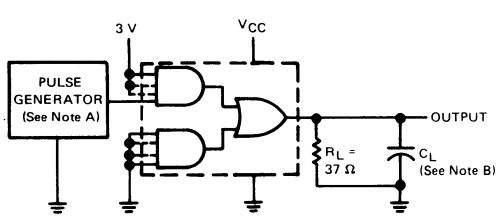
PARAMETER			TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IH}	High-level input voltage	A,B,R, or S		2			V
V_{IL}	Low-level input voltage	A,B,R, or S				0.8	V
$V_{T+}-V_{T-}$	Hysteresis†	R	V_{CC} = 5 V, T_A = 25°C	0.3	0.6		V
V_I	Input clamp voltage	A,B, or S	V_{CC} = 5 V, I_I = −12 mA			−1.5	V
$V_{(BR)I}$	Input breakdown voltage	A,B, or S	V_{CC} = 5 V, I_I = 10 mA	5.5			V
V_{OH}	High-level output voltage		V_{IH} = 0 V, V_{IL} = 0.8 V, I_{OH} = −500 μA, See Note 3	2.6			V
			$V_{I(A)}$ = 0 V, $V_{I(B)}$ = 0 V, $V_{I(S)}$ = 2 V, $V_{I(R)}$ = 1.45 V (See Note 4), I_{OH} = −500 μA	2.6			
V_{OL}	Low-level output voltage		V_{IH} = 2 V, V_{IL} = 0.8 V, I_{OL} = 16 mA, See Note 3			0.4	V
			$V_{I(A)}$ = 0 V, $V_{I(B)}$ = 0 V, $V_{I(S)}$ = 2 V, $V_{I(R)}$ = 1.45 V (See Note 5), I_{OL} = 16 mA			0.4	
I_{IH}	High-level input current	A,B, or S	V_I = 4.5 V			40	μA
		R	V_I = 3.8 V			170	
I_{IL}	Low-level input current	A,B, or S	V_I = 0.4 V	−0.1		−1.6	mA
I_{OS}	Short-circuit output current‡		V_{CC} = 5 V, T_A = 25°C	−50		−100	mA
I_{CC}	Supply current		V_{CC} = 5.25 V			72	mA

†Hysteresis is the difference between the positive-going input threshold voltage, V_{T+}, and the negative-going input threshold voltage, V_{T-}. See Figure 5.
‡Not more than one output should be shorted at a time.
NOTES: 1. Voltage values are with respect to network ground terminal.
2. For operation above 25°C free-air temperature, refer to Dissipation Derating Curve, Figure 3.
3. The output voltage limits are guaranteed for any appropriate combination of high and low inputs specified by the function table for the desired output.
4. Receiver input was at a high level immediately before being reduced to 1.45 V.
5. Receiver input was at a low level immediately before being raised to 1.45 V.

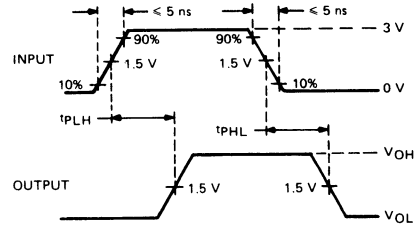
SN55122, SN75122 switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH} Propagation delay time, low-to-high-level output from R input	See Figure 2		20	30	ns
t_{PHL} Propagation delay time, high-to-low-level output from R input			20	30	

PARAMETER MEASUREMENT INFORMATION

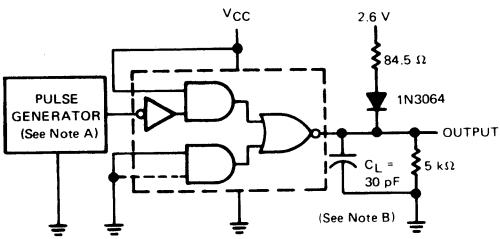


TEST CIRCUIT

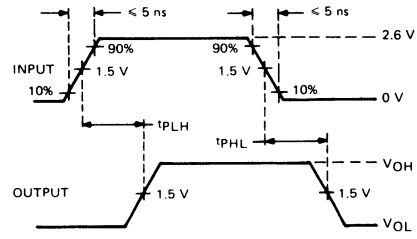


VOLTAGE WAVEFORMS

FIGURE 1—SN55121, SN75121 SWITCHING TIMES



TEST CIRCUIT



VOLTAGE WAVEFORMS

FIGURE 2—SN55122, SN75122 SWITCHING TIMES

NOTES: A. The pulse generators have the following characteristics: $Z_{out} \approx 50\ \Omega$, t_w = 200 ns, duty cycle = 50%.
B. C_L includes probe and jig capacitance.

THERMAL INFORMATION

DISSIPATION DERATING CURVE

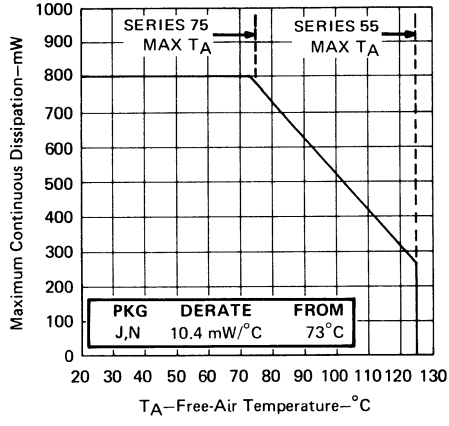


FIGURE 3

TYPICAL CHARACTERISTICS

SN55121, SN75121
OUTPUT CURRENT
vs
OUTPUT VOLTAGE

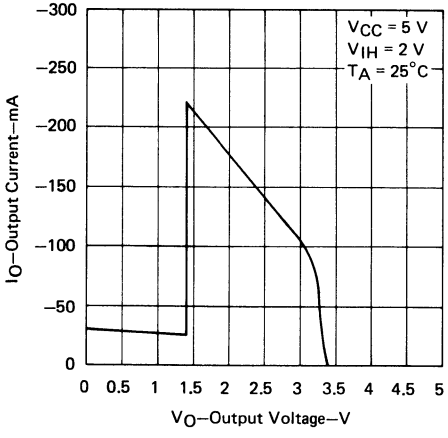


FIGURE 4

SN55122, SN75122
OUTPUT VOLTAGE
vs
INPUT VOLTAGE

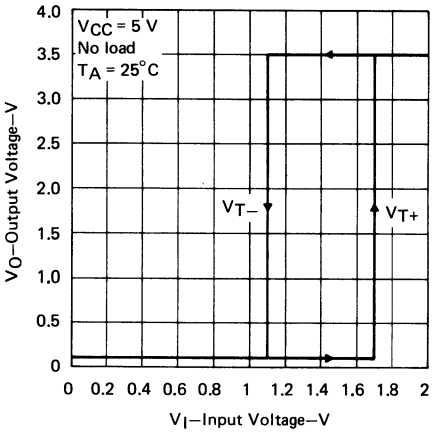


FIGURE 5

TYPICAL APPLICATION DATA

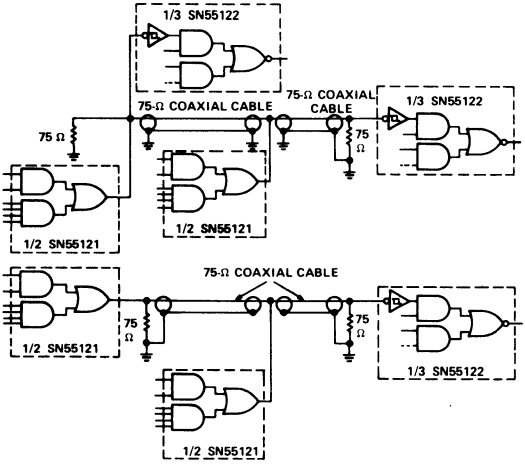
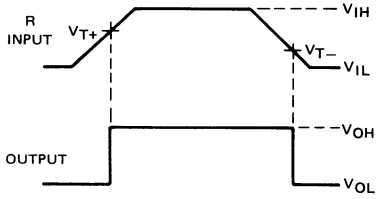


FIGURE 6—SINGLE-ENDED PARTY LINE CIRCUITS



The high gain and built-in hysteresis of the SN55122 and SN75122 line receivers enable them to be used as Schmitt triggers in squaring up pulses.

FIGURE 7—PULSE SQUARING

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