National Semiconductor

DS55122
Triple Line Receiver

General Description

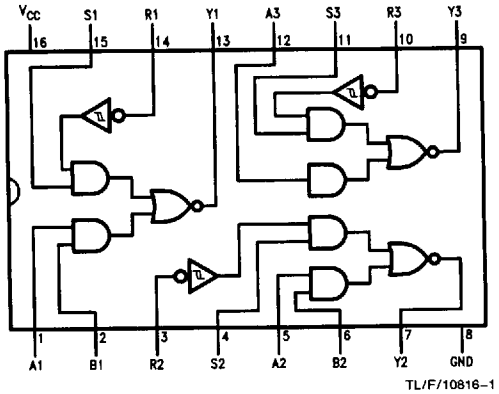
The DS55122 is a triple line receiver designed for digital data transmission with line impedances from 50Ω to 500Ω. Each receiver has one input with built-in hysteresis which provides a large noise margin. The other inputs on each receiver are in a standard TTL configuration. The DS55122 is compatible with standard TTL logic and supply voltage levels.

Features

- Built-in input threshold hysteresis
- High speed—typical propagation delay time 20 ns
- Independent channel strobes
- Input gating increases application flexibility
- Single 5.0V supply operation
- Fanout to 10 series standard loads
- Plug-in replacement for the SN55122

Connection Diagram

Dual-In-Line Package



TL/F/10816–1

Top View

For Complete Military 883 Specifications, see RETS Data Sheet.

Order Number DS55122J/883 or DS55122W/883
See NS Package Number J16A or W16A

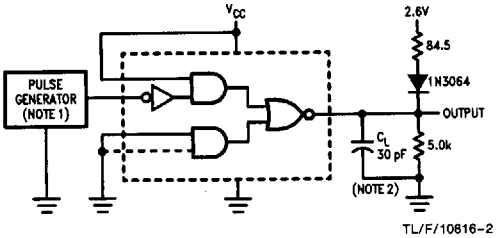
Truth Table

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

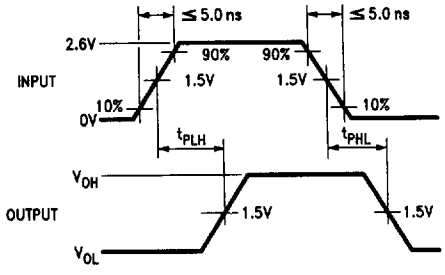
H = high level, L = low level, X = irrelevant

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

AC Test Circuit and Switching Time Waveforms



TL/F/10816–2



TL/F/10816–3

Note 1: The pulse generator has 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.

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	
R Input	6.0V
A, B, or S Input	5.5V
Output Voltage	6.0V
Output Current	±100 mA
Maximum Power Dissipation* at 25°C (J)	1433 mW
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	300°C

*Derate cavity package 9.6 mW/°C above 25°C; derate molded package 10.9 mW/°C above 25°C.

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})	4.75	5.25	V
Operating Temperature (T_A)			
DS55122	−55	+125	°C
High Level Output Current (I_{OH})		−500	μA
Low Level Output Current (I_{OL})		16	mA

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	A, B, R, or S		2.0			V
V_{IL}	Low Level Input Voltage	A, B, R, or S				0.8	V
$V_{T+}-V_{T-}$	Hysteresis	V_{CC} = 5.0V, T_A = 25°C, R, (Note 6)		0.3	0.6		V
V_I	Input Clamp Voltage	V_{CC} = 5.0V, I_I = −12 mA, A, B, or S				−1.5	V
I_I	Input Clamp at Max Input Voltage	V_{CC} = 5.25V, V_{IN} = 5.5V, A, B, or S				1.0	mA
V_{OH}	High Level Output Voltage	I_{OH} = −500 μA	V_{IH} = 2V, V_{IL} = 0.8V, (Note 4)	2.6			V
			$V_{I(A)}$ = 0V, $V_{I(B)}$ = 0V, $V_{I(R)}$ = 1.45V, $V_{I(S)}$ = 2.0V, (Note 7)	2.6			V
V_{OL}	Low Level Output Voltage	I_{OL} = 16 mA	V_{IH} = 2.0V, V_{IL} = 0.8V, (Note 4)			0.4	V
			$V_{I(A)}$ = 0V, $V_{I(B)}$ = 0V, $V_{I(R)}$ = 1.45V, $V_{I(S)}$ = 2.0V, (Note 8)			0.4	V
I_{IH}	High Level Input Current	V_I = 4.5V, A, B, or S				40	μA
		V_I = 3.8V, R				170	μA
I_{IL}	Low Level Input Current	V_I = 0.4V, A, B, or S		−0.1		−1.6	mA
I_{OS}	Short Circuit Output Current	V_{CC} = 5.0V, T_A = 25°C, (Note 5)		−50		−100	mA
I_{CC}	Supply Current	V_{CC} = 5.25V				72	mA

Switching Characteristics V_{CC} = 5.0V, T_A = 25°C

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PLH}	Propagation Delay Time, Low-to-High Level Output from R Input	(See AC Test Circuit and Switching Time Waveforms)		20	30	ns
t_{PHL}	Propagation Delay Time, High-to-Low Level Output from R Input	(See AC Test Circuit and Switching Time Waveforms)		20	30	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: All currents into device pins are shown as positive, currents out of device pins shown as negative, all voltage values are referenced with respect to network ground terminal, unless otherwise noted. All values shown as max or min on absolute value basis.

Note 3: Min/max limits apply across the guaranteed operating temperature range of −55°C to +125°C for DS55122 and 0°C to +75°C for DS75122, unless otherwise specified. Typicals are for V_{CC} = 5.0V, T_A = 25°C. Positive current is defined as current into the referenced pin.

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.

Note 5: Not more than one output should be shorted at a time.

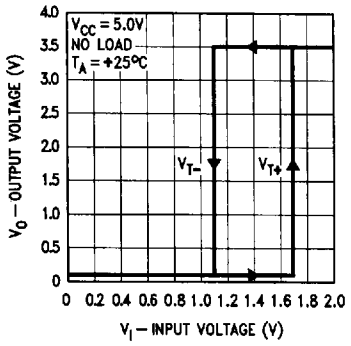
Note 6: Hysteresis is the difference between the positive going input threshold voltage, V_{T+}, and the negative going input threshold voltage, V_{T-}.

Note 7: Receiver input was at a high level immediately before being reduced to 1.45V.

Note 8: Receiver input was at a low level immediately before being raised to 1.45V.

Typical Performance Characteristics

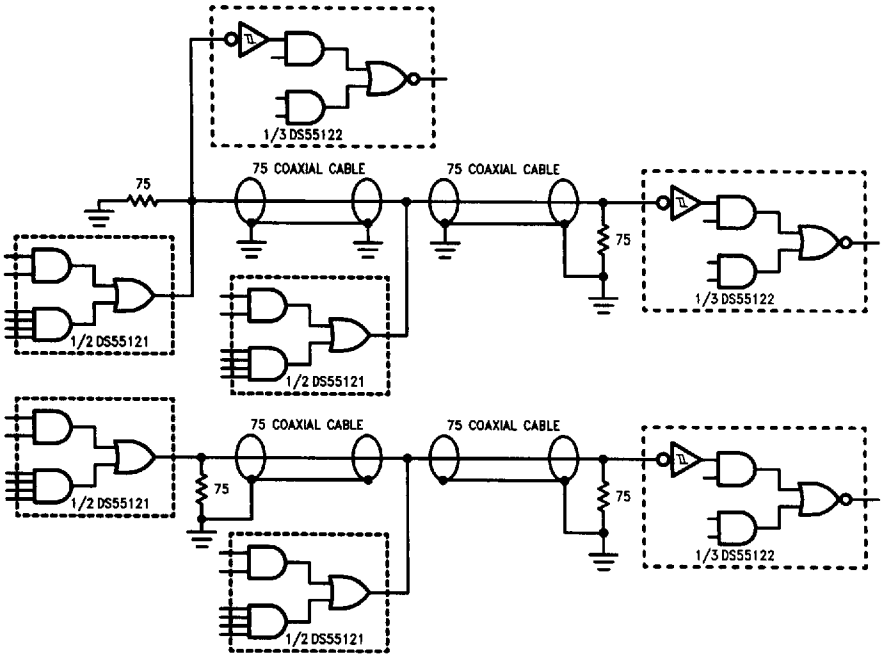
Output Voltage vs Receiver Input Voltage



TL/F/10816–4

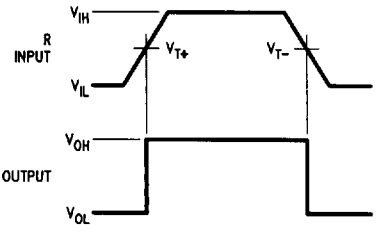
Typical Applications

Single-Ended Party Line Circuits



TL/F/10816–5

Pulse Squaring



The high gain and built-in hystersis of the DS55122 line receiver enables it to be used as a Schmitt trigger in squaring up pulses.

TL/F/10816–6