National Semiconductor

DS75129 Eight-Channel Line Receivers

General Description

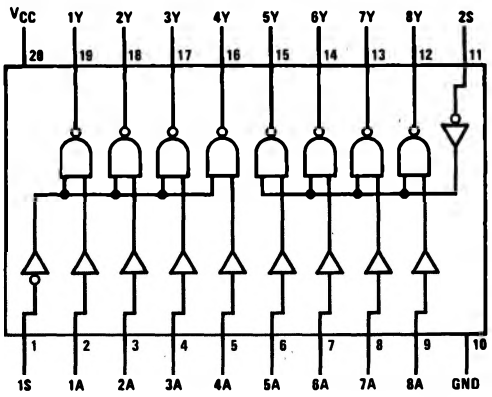
The DS75129 is an eight-channel line receiver designed to satisfy the requirements of the input-output interface specification for IBM 360/370. The device features common strobes for each group of four receivers. The DS75129 has an active-low strobe. Special low-power design and Schottky-diode-clamped transistors allow low supply-current requirements while maintaining fast switching speeds and high-current TTL outputs. The DS75129 is characterized for operation from 0°C to 70°C.

Features

- Meets IBM 360/370 I/O specification
- Input resistance—7 kΩ to 20 kΩ
- Output compatible with TTL
- Schottky-clamped transistors
- Operates from a single 5V supply
- High speed—low propagation delay
- Ratio specification—t_{PLH}/t_{PLH}
- Common strobe for each group of four receivers
- DS75129 strobe—active-low

Connection Diagram

DS75129
Dual-In-Line Package



positive logic: $Y = \overline{AS}$.

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Top View

Order Number DS75129N
See NS Package Number N20A

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}	7V
Input Voltage Range	−0.15V to 7V
Strobe Input Voltage	7V
Maximum Power Dissipation* at 25°C (Note 2)	
Molded Package	1687 mW
Operating Free-Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

*Derate molded package 13.5 mW/°C above 25°C.

Lead Temperature 260°C
1/16 Inch from Case for 4 Seconds: N Package

Recommended Operating Conditions

	Min	Typ	Max	Units
Supply Voltage, V_{CC}	4.5	5.0	5.5	V
High-Level Output Current, I_{OH}			−0.4	mA
Low-Level Output Current, I_{OL}			16	mA
Operating Free-Air Temperature, T_A	0		70	°C

Electrical Characteristics over recommended operating free-air temperature range (Note 3)

Symbol	Parameter		Conditions	Min	Typ (Note 5)	Max	Units
V_{IH}	High-Level Input Voltage	A		1.7			V
		S		2			
V_{IL}	Low-Level Input Voltage	A				0.7	V
		S				0.7	
V_{OH}	High-Level Output Voltage		V_{CC} = 4.5V, V_{IL} = 0.7V, I_{OH} = 0.4 mA	2.4	3.1		V
V_{OL}	Low-Level Output Voltage		V_{CC} = 4.5V, V_{IH} = 1.7V, I_{OL} = 16 mA		0.4	0.5	V
V_I	Input Clamp Voltage	S	V_{CC} = 4.5V, I_I = −18 mA			−1.5	V
I_{IH}	High-Level Input Current	A	V_{CC} = 5.5V, V_I = 3.11V		0.3	0.42	mA
		S	V_{CC} = 5.5V, V_I = 2.7V			20	μA
I_{IL}	Low-Level Input Current	A	V_{CC} = 5.5V, V_I = 0.15V			−0.24	mA
		S	V_{CC} = 5.5V, V_I = 0.4V			−0.4	
I_{OS}	Short-Circuit Output Current (Note 4)		V_{CC} = 5.5V, V_O = 0V	−18		−60	mA
r_I	Input Resistance		V_{CC} = 4.5V, 0V, or Open, ΔV, = 0.15V to 4.15V	7		20	kΩ
I_{CC}	Supply Current		V_{CC} = 5.5V, Strobe at 0.4V, All A Inputs at 0.7V		19	31	mA
			V_{CC} = 5.5V, Strobe at 0.4V, All A Inputs at 4V		32	53	

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: For operation above 25°C free-air temperature, refer to Thermal Ratings for ICs, in App Note AN-336.

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.

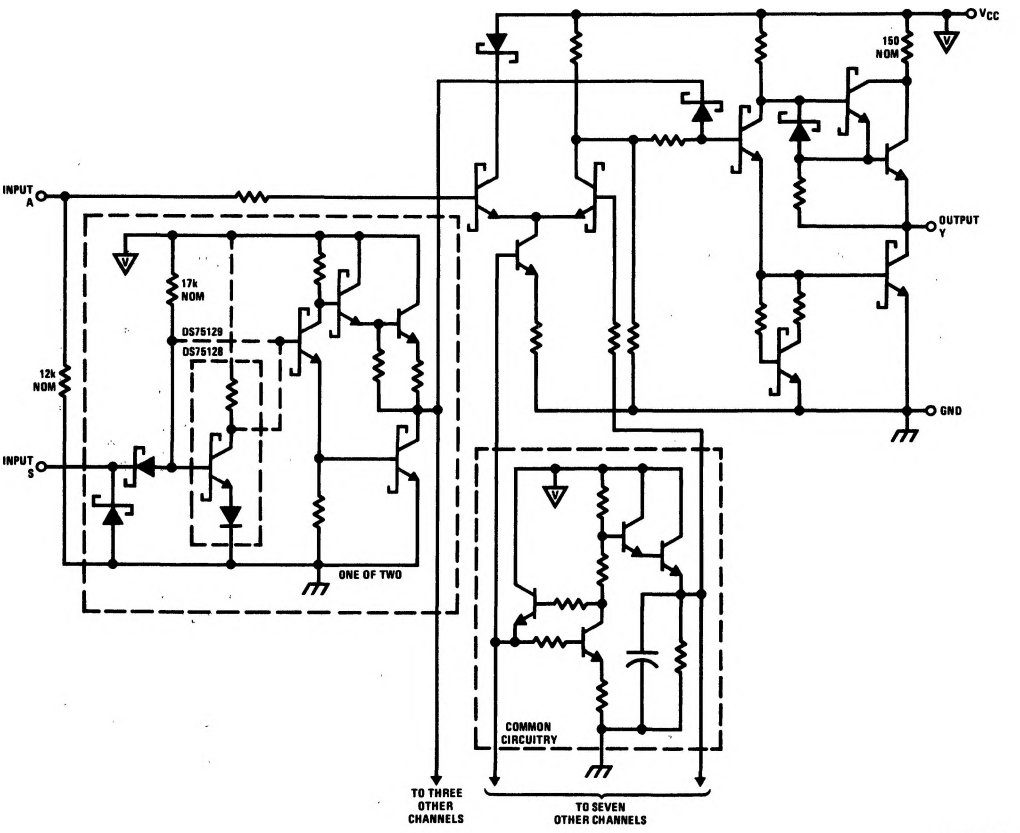
Note 4: Only one output should be shorted at a time.

Note 5: All typical values are at V_{CC} = 5V, T_A = 25°C.

Switching Characteristics V_{CC} = 5V, T_A = 25°C

Symbol	Parameter		Conditions	Min	Typ	Max	Units
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	A	R_L = 400Ω, C_L = 50 pF, See *Figure 1*	7	14	25	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output	A		10	18	30	ns
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	S			20	35	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output	S			16	30	ns
t_{PLH} / t_{PHL}	Ratio of Propagation Delay Times	A		0.5	0.8	1.3	
t_{TLH}	Transition Time, Low-to-High-Level Output			1	7	12	ns
t_{THL}	Transition Time, High-to-Low-Level Output			1	3	12	ns

Schematic Diagram (each receiver)



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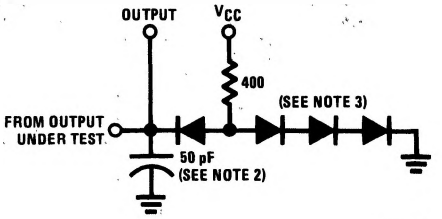
AC Test Circuit and Switching Time Waveforms



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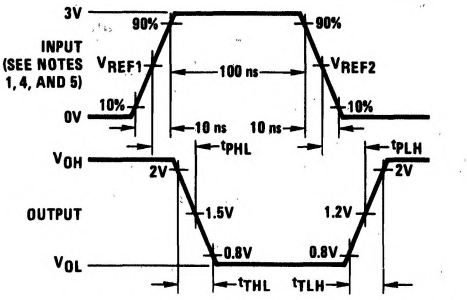

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Note 1: Input pulses are supplied by a generator having the following characteristics: Z_O = 50Ω, PRR = 5 MHz.

Note 2: Includes probe and jig capacitance.

Note 3: All diodes are 1N3064 or equivalent.

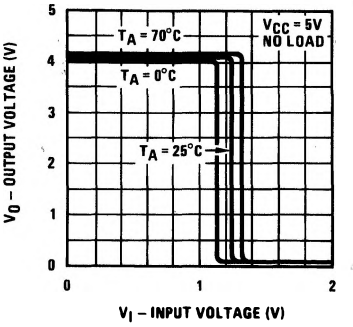
Note 4: The strobe inputs of DS75129 are in-phase with the output.

Note 5: V_{REF1} = 0.7V and V_{REF2} = 1.7V for testing data (A) inputs, V_{REF1} = V_{REF2} = 1.3V for strobe inputs.

FIGURE 1

Typical Characteristics

Voltage Transfer Characteristics From A Inputs



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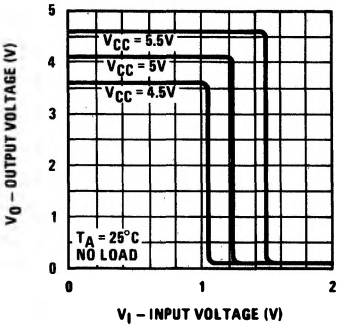
Voltage Transfer Characteristics From A Inputs



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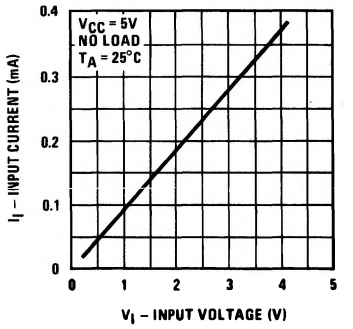
Input Current vs Input Voltage, A Inputs



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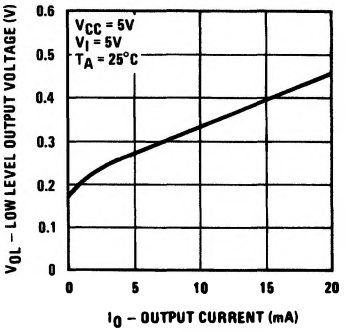
Low-Level Output Voltage vs Output Current



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