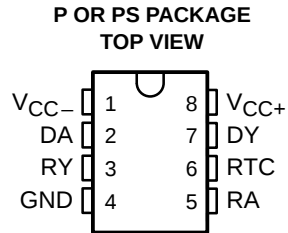


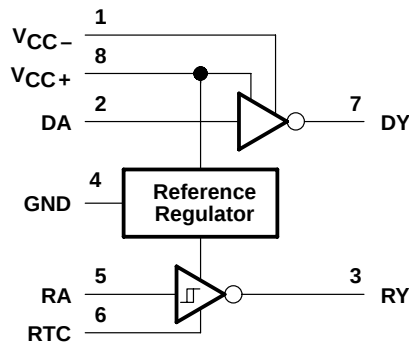
- Meets or Exceeds the Requirements of ANSI TIA/EIA-232-C
- Wide Range of Supply Voltage
 $V_{CC} = \pm 4.5 \text{ V to } \pm 15 \text{ V}$
- Low Power . . . 117 mW ($V_{CC} = \pm 9 \text{ V}$)
- Receiver Output TTL Compatible
- Response Control Provides:
 - Input Threshold Shifting
 - Input Noise Filtering



description

The SN751701 line driver and receiver is designed to satisfy the requirements of the standard interface between data terminal equipment and data communication equipment as defined by ANSI TIA/EIA-232-E. The driver used is similar to the SN75188. The receiver used is similar to the SN75189A. The device operates over a wide range of supply voltages ($V_{CC} = \pm 4.5 \text{ V to } \pm 15 \text{ V}$) from the included reference regulator.

logic diagram



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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**

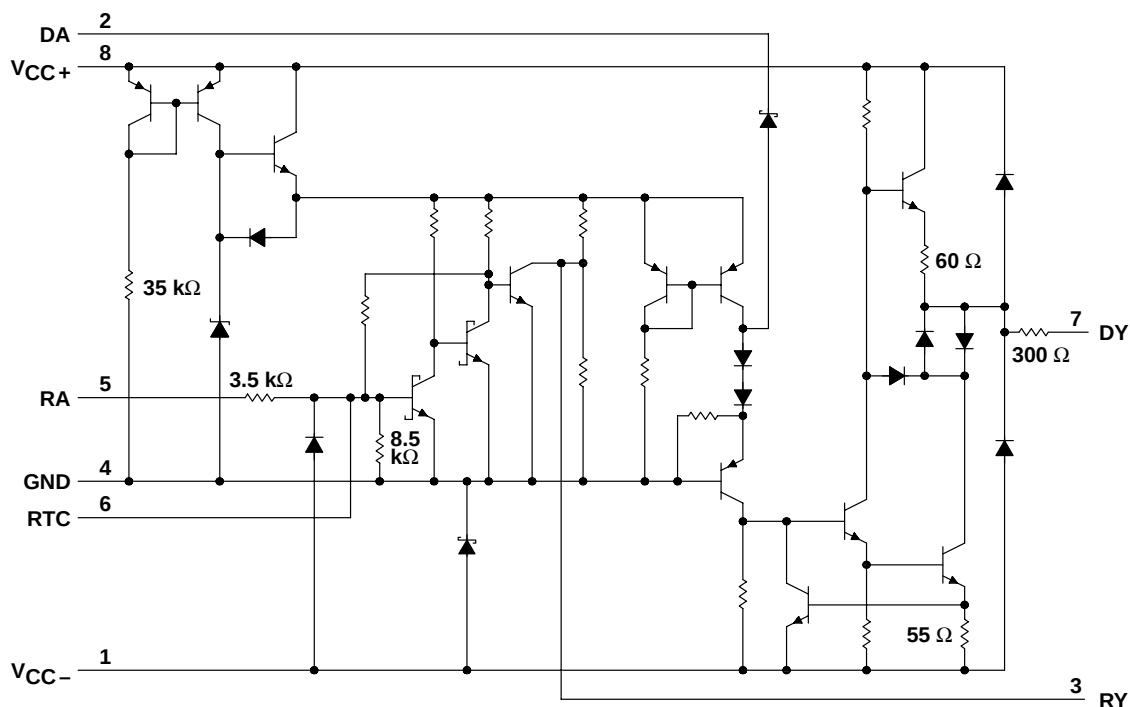
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SN751701 LINE DRIVER AND RECEIVER

SLLS531 – MARCH 2002

schematic



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC+} (see Note 1)	–0.4 V to 18 V
Supply voltage range, V_{CC-} (see Note 1)	0.4 V to –18 V
Input voltage range, V_I : Driver	–5 V to 18 V
Receiver	–30 V to 30 V
Output voltage range, V_O : Driver	–25 V to 25 V
Receiver	–0.4 V to 7 V
Output current, I_O (D) Driver	50 mA
Response control current range, I_{RES}	–10 mA to 10 mA
Continuous total power dissipation	See Dissipation Rating Table
Package thermal impedance, θ_{JA} (see Note 2): P package	85°C/W
PS package	95°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C
Storage temperature range, T_{stg}	–65°C to 150°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.

NOTES: 1. All voltage values are with respect to the network ground terminal.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

		MIN	MAX	UNIT
V_{CC+}	Supply voltage	4.5	15	V
V_{CC-}	Supply voltage	-4.5	-15	V
$V_{I(D)}$	Input voltage, driver		15	V
$V_{I(R)}$	Input voltage, receiver	-25	25	V
I_{RESP}	Response control current	-5.5	5.5	mA
$I_{O(R)}$	Output current, receiver		24	mA
T_A	Operating free-air temperature	P package	-20	85
		PS package	-20	70
				°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

total device

PARAMETER	TEST CONDITIONS		MIN	TYP [†]	MAX	UNIT
I_{CCH+} High-level supply current	$V_{CC} = \pm 5\text{ V}$	$V_{I(D)} = 2\text{ V},$ $V_{I(R)} = V_{T+(max)},$ Output open		6.3	8.1	mA
	$V_{CC} = \pm 9\text{ V}$			9.1	11.9	
	$V_{CC} = \pm 12\text{ V}$			10.4	14	
I_{CCL+} Low-level supply current	$V_{CC} = \pm 5\text{ V}$	$V_{I(D)} = 0.8\text{ V},$ $V_{I(R)} = V_{T-(min)},$ Output open		2.5	3.4	mA
	$V_{CC} = \pm 9\text{ V}$			3.7	5.1	
	$V_{CC} = \pm 12\text{ V}$			4.1	5.6	
I_{CCH-} High-level supply current	$V_{CC} = \pm 5\text{ V}$	$V_{I(D)} = 2\text{ V},$ $V_{I(R)} = V_{T+(max)},$ Output open		-2.4	-3.1	mA
	$V_{CC} = \pm 9\text{ V}$			-3.9	-4.9	
	$V_{CC} = \pm 12\text{ V}$			-4.8	-6.1	
I_{CCL-} Low-level supply current	$V_{CC} = \pm 5\text{ V}$	$V_{I(D)} = 0.8\text{ V},$ $V_{I(R)} = V_{T-(min)},$ Output open		-0.2	-0.35	mA
	$V_{CC} = \pm 9\text{ V}$			-0.25	-0.4	
	$V_{CC} = \pm 12\text{ V}$			-0.27	-0.45	
I_{CC+} Positive supply current	$V_{CC} = \pm 5\text{ V}$	$V_{I(R)} = V_{T+(max)}, V_{I(D)} = 0\text{ V},$ $V_{CC-} = 0\text{ V},$ Output open		4.8	6.4	mA
	$V_{CC} = \pm 12\text{ V}$			6.7	9.1	

[†] All typical values are at $T_A = 25^\circ\text{C}$.

SN751701

LINE DRIVER AND RECEIVER

SLLS531 – MARCH 2002

electrical characteristics over recommended operating free-air temperature range, $V_{CC+} = 12\text{ V}$, $V_{CC-} = -12\text{ V}$ (unless otherwise noted)

driver section

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V_{IH} High-level input voltage		2			V
V_{IL} Low-level input voltage				0.8	V
V_{OH} High-level output voltage	$V_{I(D)} = 0.8\text{ V}$, $R_L = 3\text{ k}\Omega$	$V_{CC} = \pm 5\text{ V}$	3.2	3.7	V
		$V_{CC} = \pm 9\text{ V}$	6.5	7.2	
		$V_{CC} = \pm 12\text{ V}$	8.9	9.8	
V_{OL} Low-level output voltage	$V_{I(D)} = 2\text{ V}$, $R_L = 3\text{ k}\Omega$	$V_{CC} = \pm 5\text{ V}$	-3.6	-3.2	V
		$V_{CC} = \pm 9\text{ V}$	-7.1	-6.4	
		$V_{CC} = \pm 12\text{ V}$	-9.7	-8.8	
I_{IH} High-level input current	$V_{I(D)} = 7\text{ V}$			5	μA
I_{IL} Low-level input current	$V_{I(D)} = 0\text{ V}$		-0.73	-1.2	mA
$I_{OS(H)}$ High-level short-circuit output current	$V_{I(D)} = 0.8\text{ V}$, $V_{O(D)} = 0\text{ V}$	-7	-12	-14.5	mA
$I_{OS(L)}$ Low-level short-circuit output current	$V_{I(D)} = 2\text{ V}$, $V_{O(D)} = 0\text{ V}$	6.5	11.5	14	mA
r_O Output resistance	$V_{CC+} = 0\text{ V}$, $V_{O(D)} = -2\text{ V}$ to 2 V	300			Ω

† All typical values are at $T_A = 25^\circ\text{C}$.

switching characteristics, $V_{CC+} = 12\text{ V}$, $V_{CC-} = -12\text{ V}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

driver section (see Figure 2)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH} Propagation delay time, low- to high-level output	$R_L = 3\text{ k}\Omega$, $C_L = 50\text{ pF}$		340	480	ns
t_{PHL} Propagation delay time, high- to low-level output			100	150	
t_{TLH} Transition time, low- to high-level output	$R_L = 3\text{ k}\Omega$, $C_L = 50\text{ pF}$		120	180	ns
t_{THL} Transition time, high- to low-level output			105	160	
t_{TLH} Transition time, low- to high-level output	$R_L = 3\text{ k}\Omega$ to $7\text{ k}\Omega$ (see Note 3), $C_L = 2500\text{ pF}$		2.1	3	μs
t_{THL} Transition time, high- to low-level output			2.1	3	

NOTE 3: The time is measured between 3 V and -3 V on output waveform.

electrical characteristics over recommended operating free-air temperature range, $V_{CC+} = 12\text{ V}$, $V_{CC-} = -12\text{ V}$ (unless otherwise noted)

receiver section (see Figure 1) (see Note 4)

PARAMETER	TEST CONDITIONS	MIN	TYP [†]	MAX	UNIT
V_{IT+} Positive-going input threshold voltage		1.2	1.9	2.3	V
V_{IT-} Negative-going input threshold voltage		0.6	0.95	1.2	V
V_{hys} Hysteresis voltage ($V_{IT+} - V_{IT-}$)		0.6			V
$V_{O(H)}$ High-level output voltage	$V_{I(R)} = V_{T-(min)}$, $I_{OL} = -10\text{ }\mu\text{A}$	$V_{CC+} = 5\text{ V}$	3.7	4.1	4.5
		$V_{CC+} = 12\text{ V}$	4.4	4.7	5.2
	$V_{I(R)} = V_{T-(min)}$, $I_{OH} = -0.4\text{ mA}$	$V_{CC+} = 5\text{ V}$	3.1	3.4	3.8
		$V_{CC+} = 12\text{ V}$	3.6	4	4.5
$V_{O(L)}$ Low-level output voltage	$V_{I(R)} = V_{T+(max)}$, $I_{OL} = 24\text{ mA}$		0.2	0.3	V
I_{IH} High-level input current	$V_{I(R)} = 25\text{ V}$	3.6	6.7	8.3	mA
	$V_{I(R)} = 3\text{ V}$	0.43	0.67	1	mA
I_{IL} Low-level input current	$V_{I(R)} = -25\text{ V}$	-3.6	-6.7	-8.3	mA
	$V_{I(R)} = -3\text{ V}$	-0.43	-0.74	-1	mA
I_{OS} Short-circuit output current	$V_{I(R)} = V_{T-(min)}$		-2.8	-3.7	mA

[†] All typical values are at $T_A = 25^\circ\text{C}$.

NOTE 4: Response Control pin is open.

switching characteristics, $V_{CC+} = 12\text{ V}$, $V_{CC-} = -12\text{ V}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

receiver section (see Figure 2)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH} Propagation delay time, low- to high-level output	$R_L = 400\text{ k}\Omega$, $C_L = 50\text{ pF}$		150	240	ns
t_{PHL} Propagation delay time, high- to low-level output			50	100	
t_{TLH} Transition time, low- to high-level output	$R_L = 400\text{ k}\Omega$, $C_L = 50\text{ pF}$		250	360	ns
t_{THL} Transition time, high- to low-level output			18	35	

PARAMETER MEASUREMENT INFORMATION

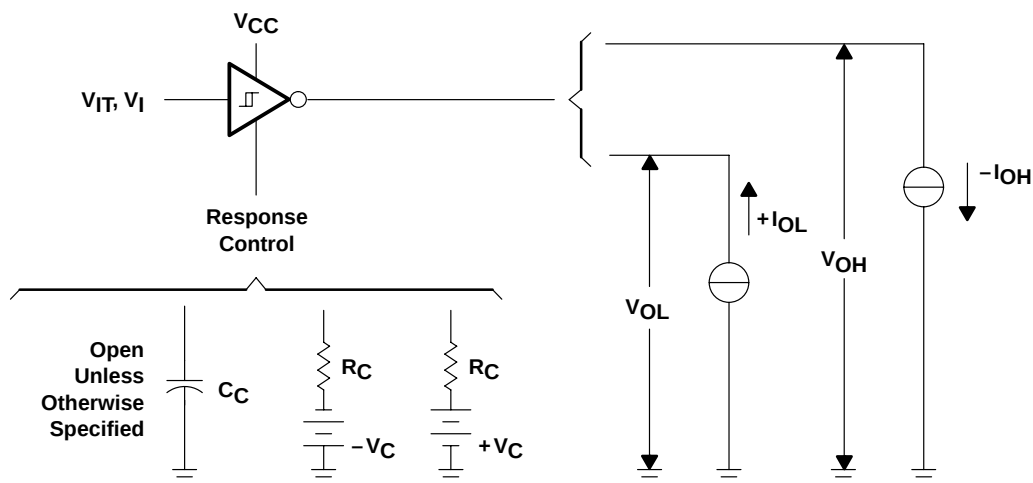
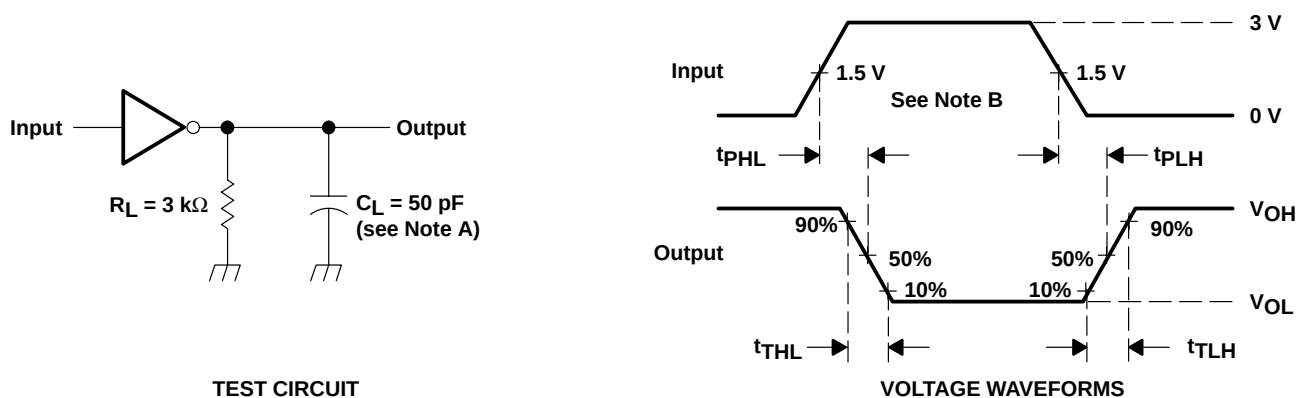


Figure 1. Receiver Section Test Circuit (V_{IT+} , V_{IT-} , V_{OH} , V_{OL})

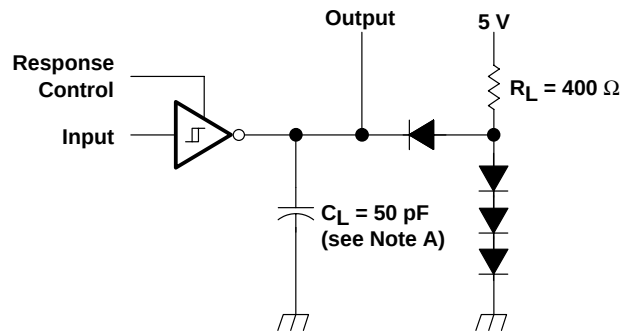


NOTES: A. C_L includes probe and jig capacitance.

B. The input waveform is supplied by a generator having the following characteristics: $Z_O = 50 \Omega$, $t_W = 500 \text{ ns}$, $t_{TLH} \leq 5 \text{ ns}$, $t_{THL} \leq 5 \text{ ns}$.

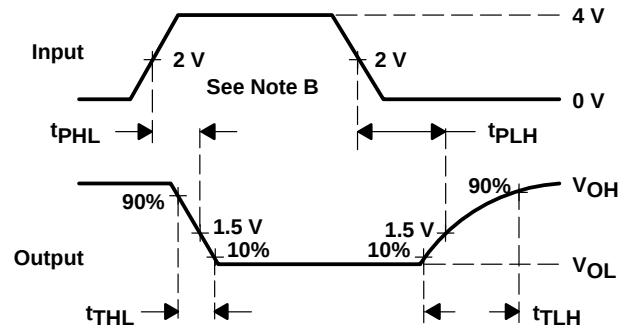
Figure 2. Driver Section Switching Test Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

- NOTES: A. C_L includes probe and jig capacitance.
B. The input waveform is supplied by a generator having the following characteristics: $Z_O = 50 \Omega$, $t_w = 500 \text{ ns}$, $t_{THL} \leq 5 \text{ ns}$, $t_{TLH} \leq 5 \text{ ns}$.



VOLTAGE WAVEFORMS

Figure 3. Receiver Section Switching Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

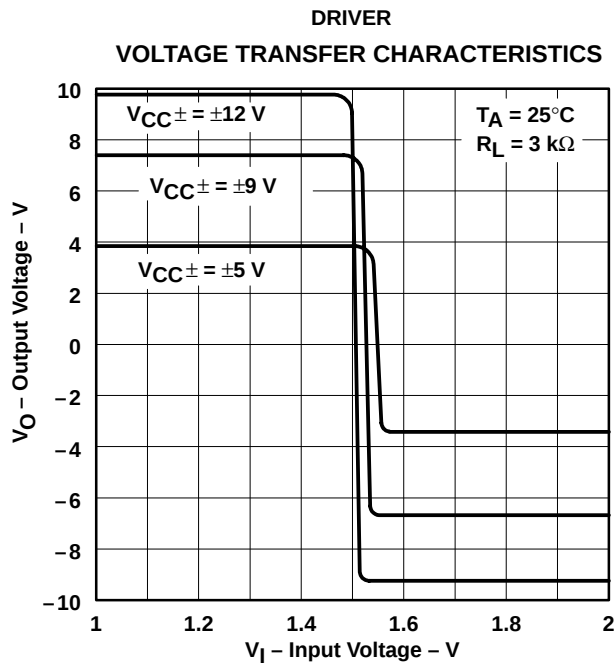


Figure 4

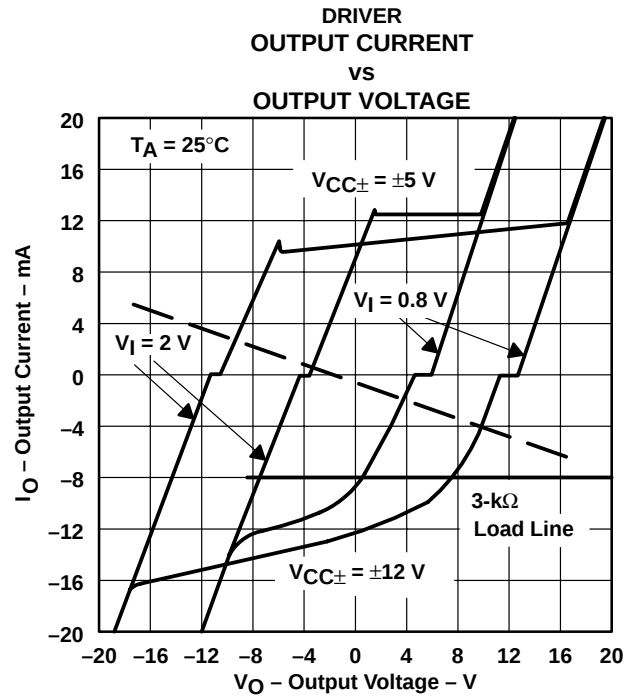


Figure 5

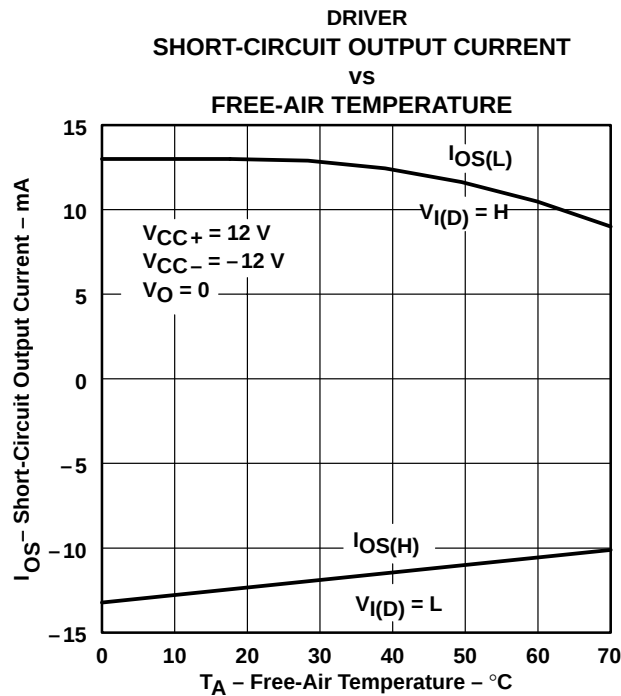


Figure 6

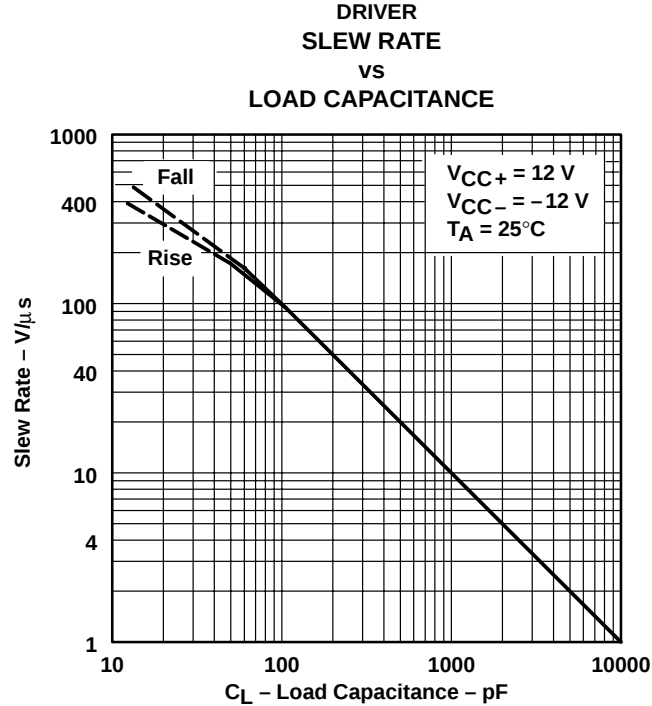


Figure 7

TYPICAL CHARACTERISTICS

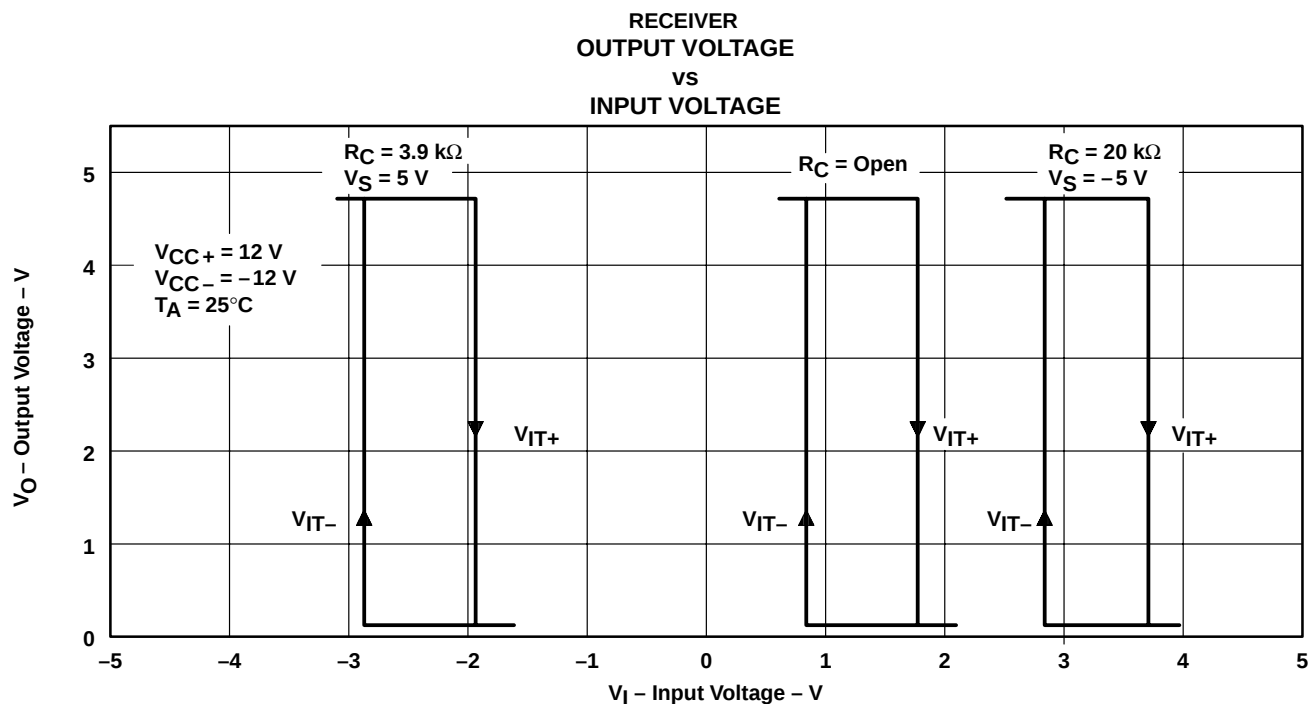


Figure 8

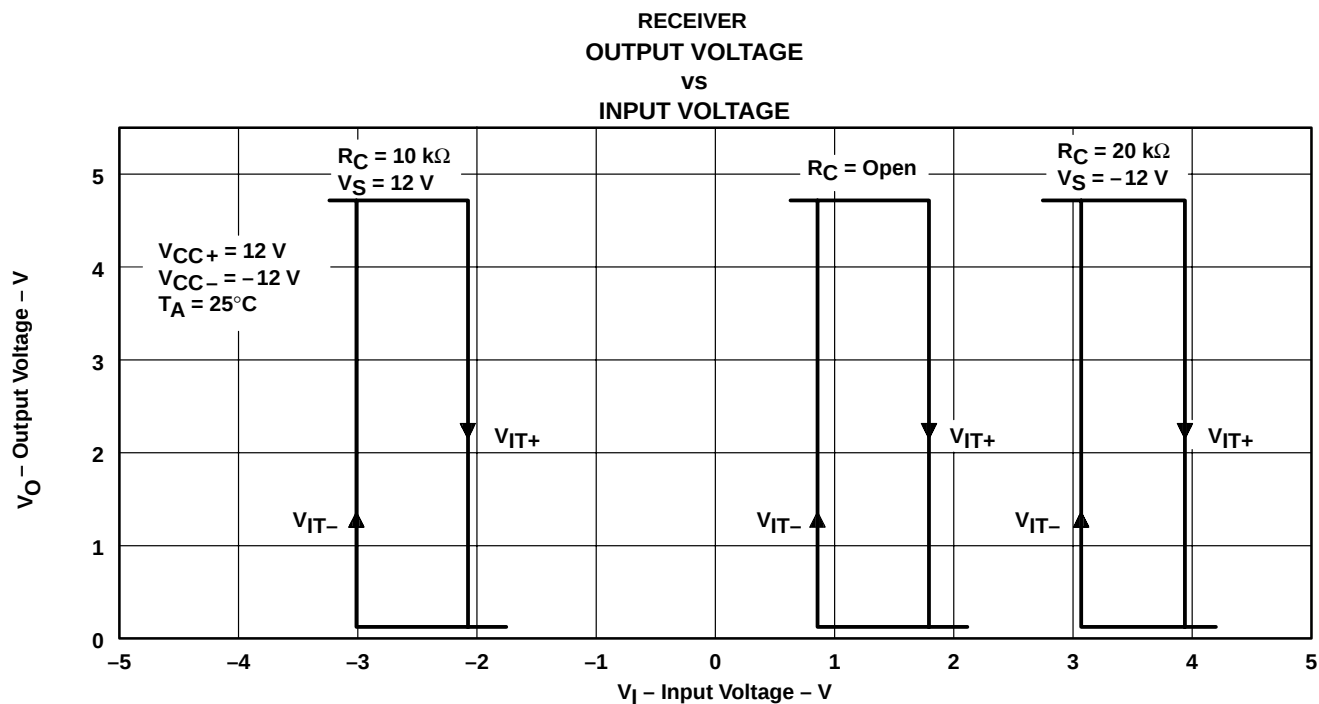


Figure 9

TYPICAL CHARACTERISTICS

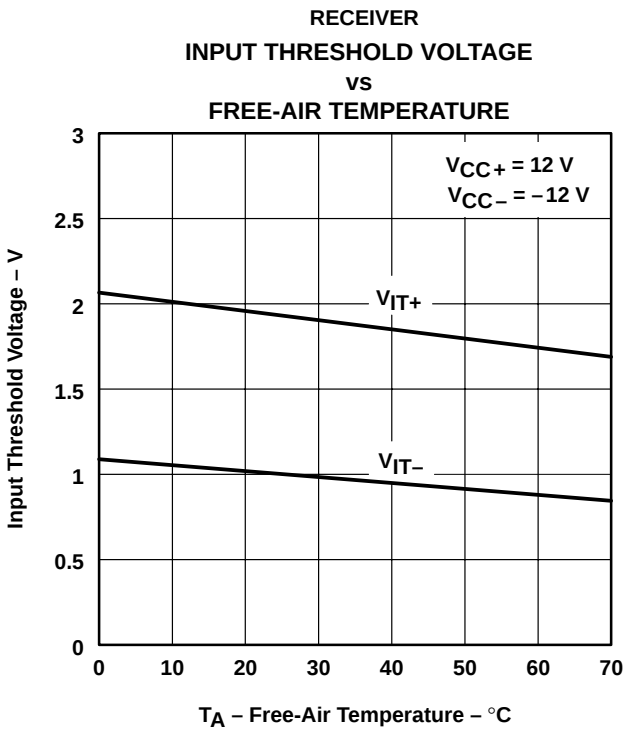


Figure 10

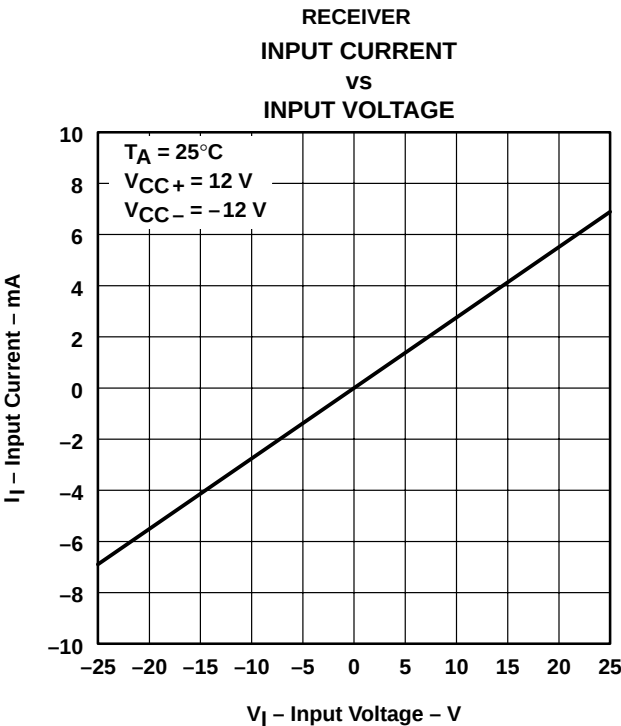


Figure 11

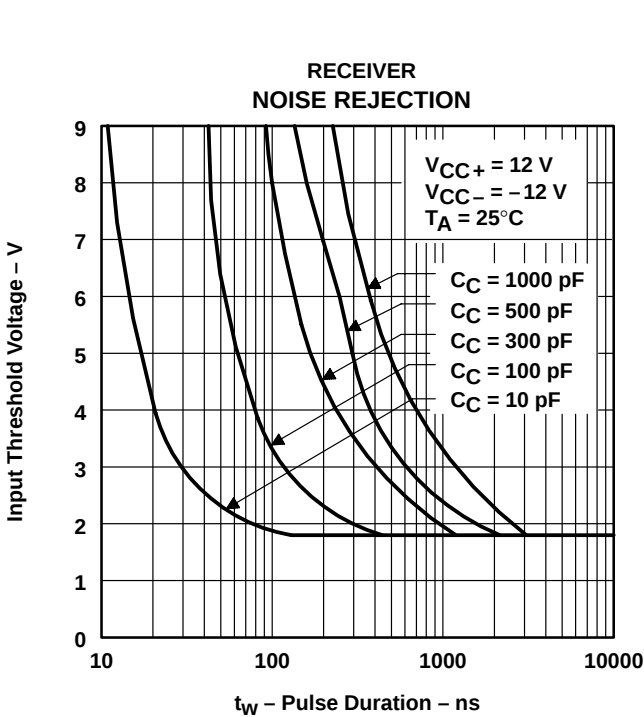


Figure 12

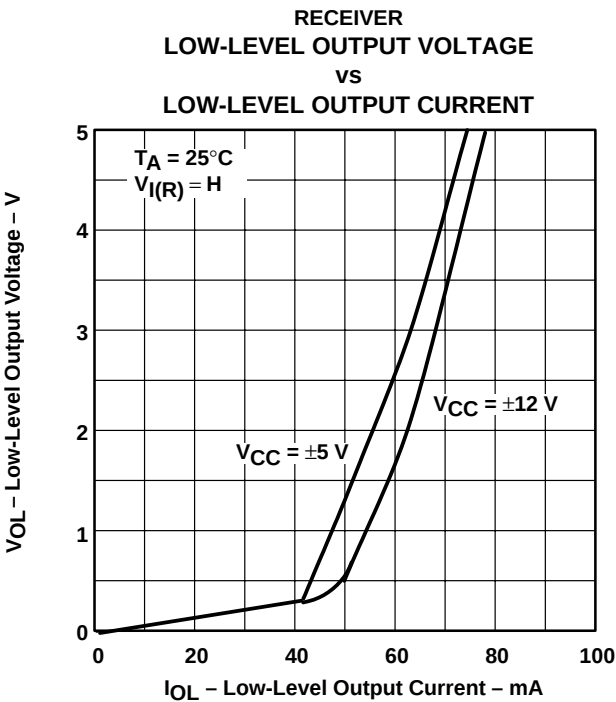


Figure 13

TYPICAL CHARACTERISTICS

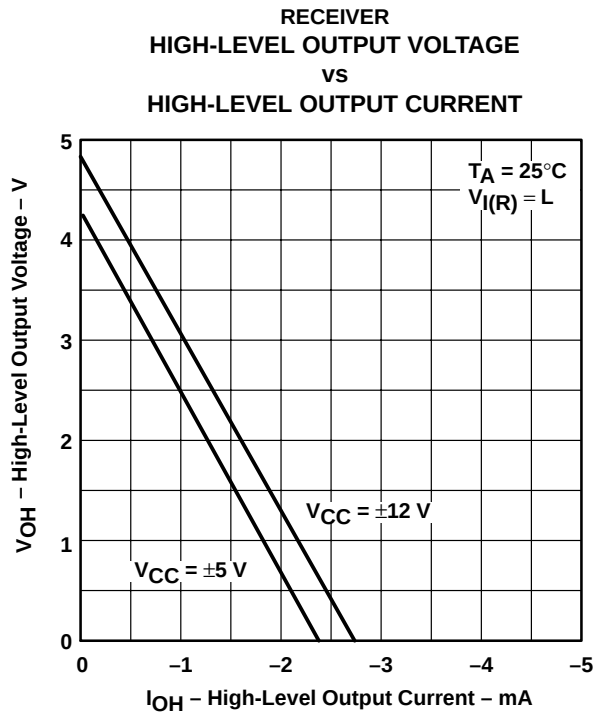


Figure 14

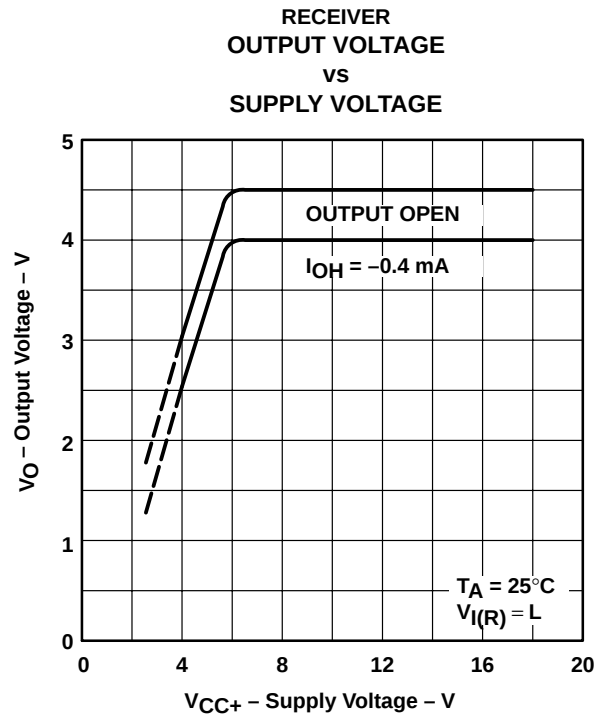


Figure 15

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PRODUCT FOLDER | PRODUCT INFO: [FEATURES](#) | [DESCRIPTION](#) | [DATASHEETS](#) | [PRICING/AVAILABILITY/PKG](#) | [APPLICATION NOTES](#) | [MORE LITERATURE](#)

SN751701, RS-232C Regulator

DEVICE STATUS: ACTIVE

PARAMETER NAME	SN751701
Drivers Per Package	1
Receivers Per Package	1
Driver (RL) (Ohms)	3000
Supply Voltage(s) (V)	+ - 5, 9, 12
Driver tpd (ns)	480
Receiver tpd (ns)	240
ICC (max) (mA)	11.9

FEATURES

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- Meets or Exceeds the Requirements of ANSI TIA/EIA-232-C
- Wide Range of Supply Voltage $V_{CC} = \pm 4.5\text{ V to } \pm 15\text{ V}$
- Low Power ...117 mW ($V_{CC} = \pm 9\text{ V}$)
- Receiver Output TTL Compatible
- Response Control Provides:
 - Input Threshold Shifting
 - Input Noise Filtering

DESCRIPTION

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The SN751701 line driver and receiver is designed to satisfy the requirements of the standard interface between data terminal equipment and data communication equipment as defined by ANSI TIA/EIA-232-E. The driver used is similar to the SN75188. The receiver used is similar to the SN75189A. The device operates over a wide range of supply voltages ($V_{CC} = \pm 4.5\text{ V to } \pm 15\text{ V}$) from the included reference regulator.

TECHNICAL DOCUMENTS

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To view the following documents, [Acrobat Reader 4.0](#) is required.

To download a document to your hard drive, right-click on the link and choose 'Save'.

DATASHEET

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Full datasheet in Acrobat PDF: [sn751701.pdf](#) (174 KB) (Updated: 03/12/2002)

APPLICATION NOTES

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- [Analog Applications Journal \(Rev. A\)](#) (SLYT010A - Updated: 03/17/2000)
- [Interface Circuits for TIA/EIA-232-F \(Rev. A\)](#) (SLLA037A - Updated: 09/19/2002)
- [Low-Voltage, Single-Supply 232-Standard Interface Solutions \(Rev. A\)](#) (SLLA083A - Updated: 09/19/2000)
- [Signaling Rate versus Transfer Rate](#) (SLLA098 - Updated: 03/01/2001)

MORE LITERATURE

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- [Enhanced Plastic Portfolio Brochure](#) (SGZB004, 387 KB - Updated: 08/19/2002)

- [QML Class V Space Products Military Brief \(Rev. A\)](#) (SGZN001A, 257 KB - Updated: 10/07/2002)

PRICING / AVAILABILITY / PKG							▲Back to Top						
DEVICE INFORMATION							TI INVENTORY STATUS			REPORTED DISTRIBUTOR INVENTORY			
Updated Daily							As Of 09:00 AM GMT, 17 Apr 2003			As Of 09:00 AM GMT, 17 Apr 2003			
ORDERABLE DEVICE	STATUS	PACKAGE TYPE PINS		TEMP (°C)	PRODUCT CONTENT	BUDGETARY PRICING QTY \$US	STD PACK QTY	IN STOCK	IN PROGRESS QTY DATE	LEAD TIME	DISTRIBUTOR COMPANY REGION	IN STOCK	PURCHASE
SN751701PSR	ACTIVE	SOP (PS)	8	-20 TO 70	View Contents	1KU 1.04	2000	0 *	>10k 30 Apr	2 WKS	None Reported View Distributors		

Table Data Updated on: 4/17/2003