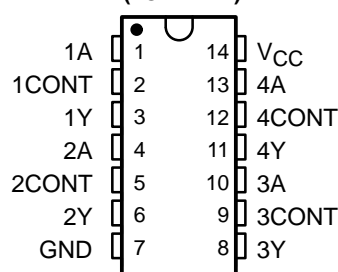


MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

- Input Resistance . . . 3 kΩ to 7 kΩ
- Input Signal Range . . . ±30 V
- Operate From Single 5-V Supply
- Built-In Input Hysteresis (Double Thresholds)
- Have Response Control that Provides:
 - Input Threshold Shifting
 - Input Noise Filtering
- Meet or Exceed the Requirements of ANSI EIA/TIA-232-E and ITU Recommendation V.28
- Fully Interchangeable With Motorola™ MC1489 and MC1489A

SN55189, SN55189A . . . J OR W PACKAGE
MC1489, MC1489A, SN75189, SN75189A
D, N, OR NS† PACKAGE
(TOP VIEW)



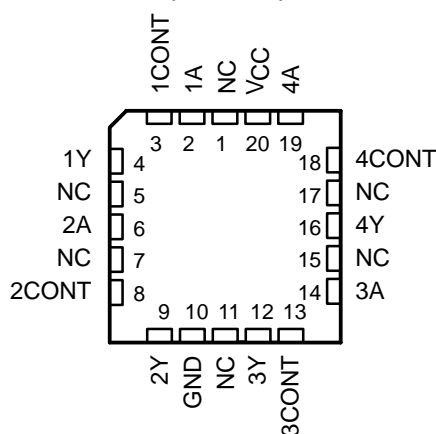
† The NS package is only available left-end taped and reeled. For SN75189, i.e., order SN75189NSLE.

description

These devices are monolithic low-power Schottky quadruple line receivers designed to satisfy the requirements of the standard interface between data terminal equipment and data communication equipment as defined by ANSI EIA/TIA-232-E. A separate response control terminal is provided for each receiver. A resistor or a resistor and bias voltage source can be connected between this terminal and ground to shift the input threshold levels. An external capacitor can be connected between this terminal and ground to provide input noise filtering.

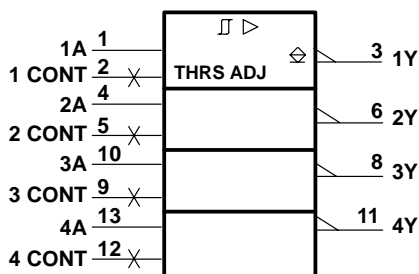
The SN55189 and SN55189A are characterized for operation over the full military temperature range of -55°C to 125°C. The MC1489, MC1489A, SN75189, and SN75189A are characterized for operation from 0°C to 70°C.

SN55189, SN55189A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

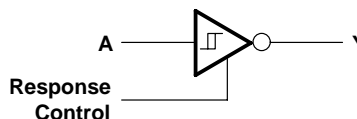
logic symbol‡



‡ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, N, NS, and W packages.

logic diagram (positive logic)



Motorola is a trademark of Motorola, Incorporated.

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**

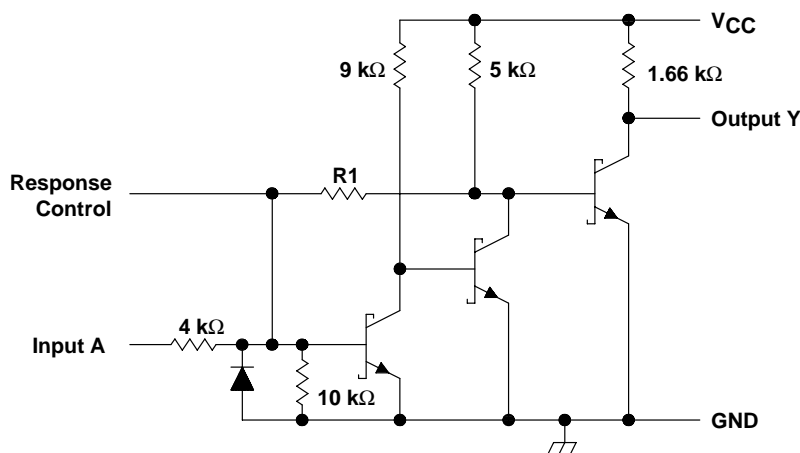
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1995, Texas Instruments Incorporated

MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

schematic (each receiver)



	MC1489 SN55189 SN75189	MC1489A SN55189A SN75189A
R1	8.4 kΩ	1.84 kΩ

Resistor values shown are nominal.

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

	SN55189 SN55189A	MC1489, MC1489A SN75189 SN75189A	UNIT
Supply voltage, V_{CC} (see Note 1)	10	10	V
Input voltage, V_I	± 30	± 30	V
Output current, I_O	20	20	mA
Continuous total power dissipation	See Dissipation Rating Table		
Operating temperature range, T_A	-55 to 125	0 to 70	°C
Storage temperature range, T_{stg}	-65 to 150	-65 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 or W package	300	300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D, N, or NS 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 network ground terminals.

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	N/A
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	N/A
NS	625 mW	4.0 mW/°C	445 mW	N/A
W	1000 mW	8.0 mW/°C	640 mW	200 mW

† In the J package, SN55189 and SN55189A chips are either silver glass or alloy mounted.



MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

electrical characteristics over operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 1\%$ (unless otherwise noted)

PARAMETER	TEST FIGURE	TEST CONDITIONS†		SN55189 SN55189A			MC1489, MC1489A SN75189 SN75189A			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IT+} Positive-going input threshold voltage	1	'89	$T_A = 25^\circ\text{C}$	1	1.3	1.5	1	1.3	1.5	V
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$				0.9		1.6	
			$T_A = -55^\circ\text{C to } 125^\circ\text{C}$	0.6		1.9				
		'89A	$T_A = 25^\circ\text{C}$	1.75	1.9	2.25	1.75	1.9	2.25	
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$				1.55		2.25	
			$T_A = -55^\circ\text{C to } 125^\circ\text{C}$	1.30		2.65				
V_{IT-} Negative-going input threshold voltage	1	'89, '89A	$T_A = 25^\circ\text{C}$	0.75	1.0	1.25	0.75	1.0	1.25	V
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$				0.65		1.25	
			$T_A = -55^\circ\text{C to } 125^\circ\text{C}$	0.35		1.6				
V_{OH} High-level output voltage	1	$V_I = 0.75\text{ V}$, $I_{OH} = -0.5\text{ mA}$		2.6	4	5	2.6	4	5	V
		Input open, $I_{OH} = -0.5\text{ mA}$		2.6	4	5	2.6	4	5	
V_{OL} Low-level output voltage	1	$V_I = 3\text{ V}$, $I_{OL} = 10\text{ mA}$			0.2	0.45		0.2	0.45	V
I_{IH} High-level input current	2	$V_I = 25\text{ V}$		3.6		8.3	3.6		8.3	mA
		$V_I = 3\text{ V}$		0.43			0.43			
I_{IL} Low-level input current	2	$V_I = -25\text{ V}$		-3.6		-8.3	-3.6		-8.3	mA
		$V_I = -3\text{ V}$		-0.43			-0.43			
I_{OS} Short-circuit output current	3				-3			-3		mA
I_{CC} Supply current	2	$V_I = 5\text{ V}$, Outputs open			20	26		20	26	mA

† All characteristics are measured with the response control terminal open.

‡ All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

switching characteristics, $V_{CC} = 5\text{ V}$, $C_L = 15\text{ pF}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST FIGURE	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH} Propagation delay time, low- to high-level output	4	$R_L = 3.9\text{ k}\Omega$		25	85	ns
t_{PHL} Propagation delay time, high- to low-level output		$R_L = 390\ \Omega$		25	50	
t_{TLH} Transition time, low- to high-level output		$R_L = 3.9\text{ k}\Omega$		120	175	ns
t_{THL} Transition time, high- to low-level output		$R_L = 390\ \Omega$		10	20	



MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

PARAMETER MEASUREMENT INFORMATION†

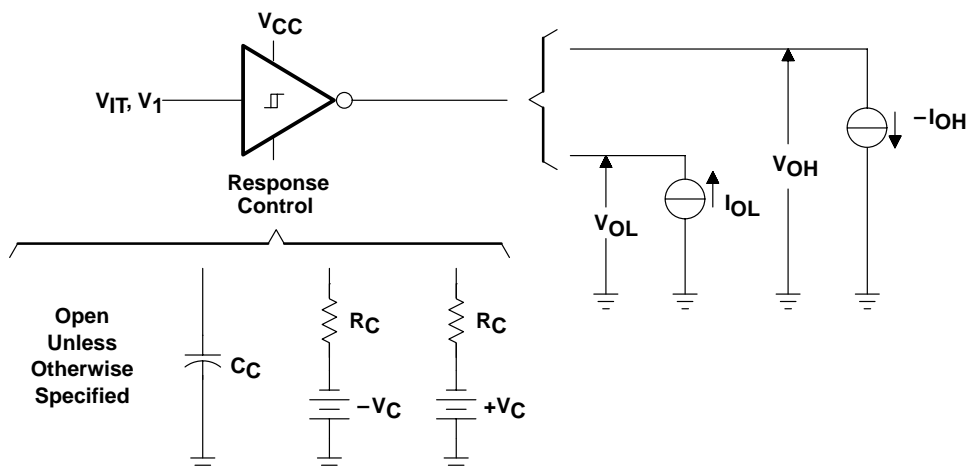
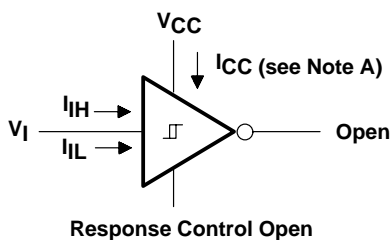


Figure 1. V_{IT+} , V_{IT-} , V_{OH} , V_{OL}



NOTE A. I_{CC} is tested for all four receivers simultaneously.

Figure 2. I_{iH} , I_{iL} , I_{CC}

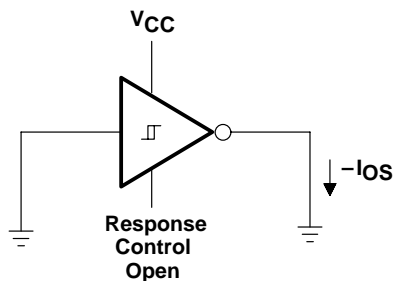
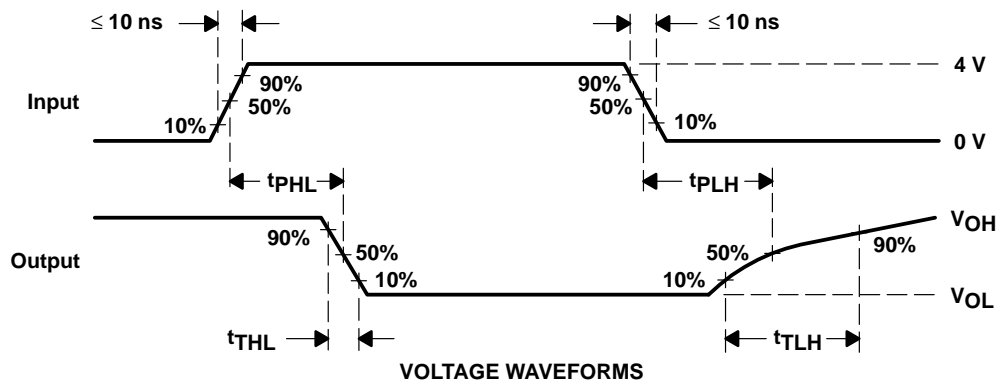
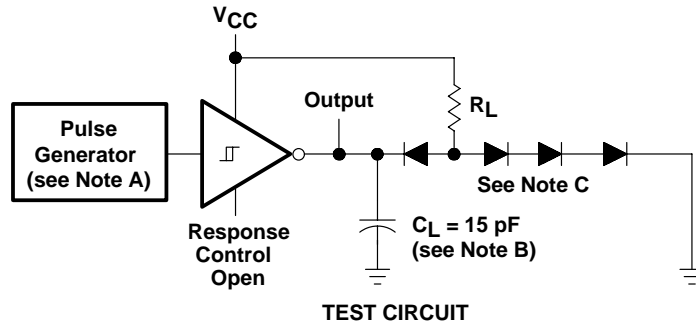


Figure 3. I_{os}

† Arrows indicate actual direction of current flow. Current into a terminal is a positive value.

PARAMETER MEASUREMENT INFORMATION



- NOTES: B. The pulse generator has the following characteristics: $Z_O = 50 \Omega$, $t_w = 500 \text{ ns}$.
 C. C_L includes probe and jig capacitances.
 D. All diodes are 1N3064 or equivalent.

Figure 4. Test Circuit and Voltage Waveforms

MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

TYPICAL CHARACTERISTICS

SN65189, SN75189
OUTPUT VOLTAGE
vs
INPUT VOLTAGE

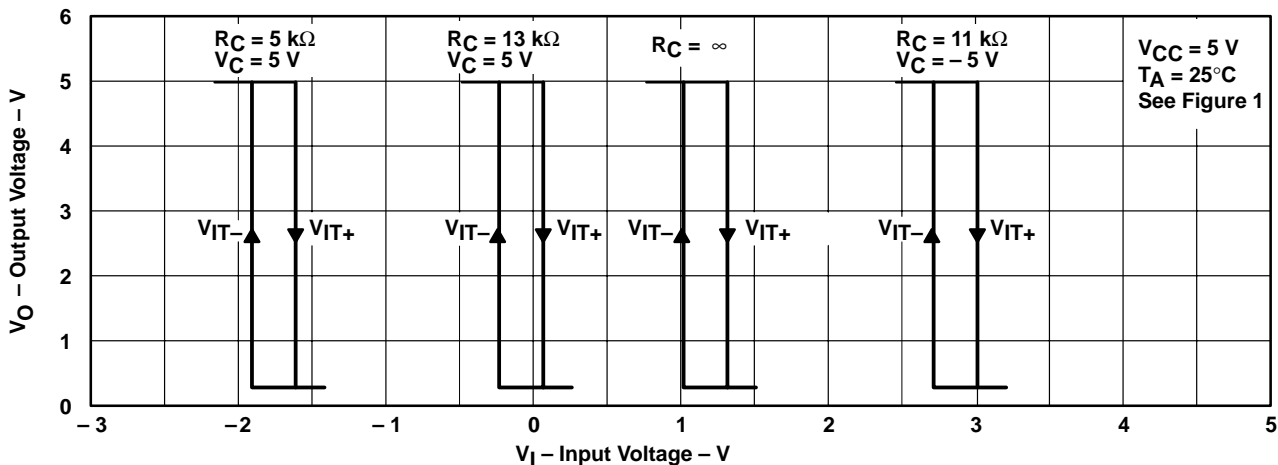


Figure 5

SN65189A, SN75189A
OUTPUT VOLTAGE
vs
INPUT VOLTAGE

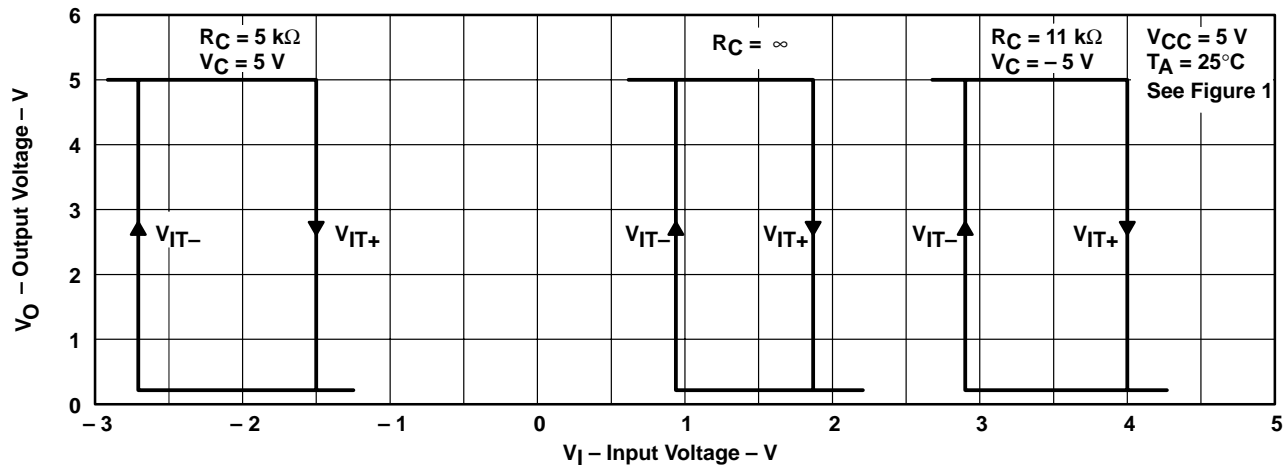


Figure 6

TYPICAL CHARACTERISTICS†

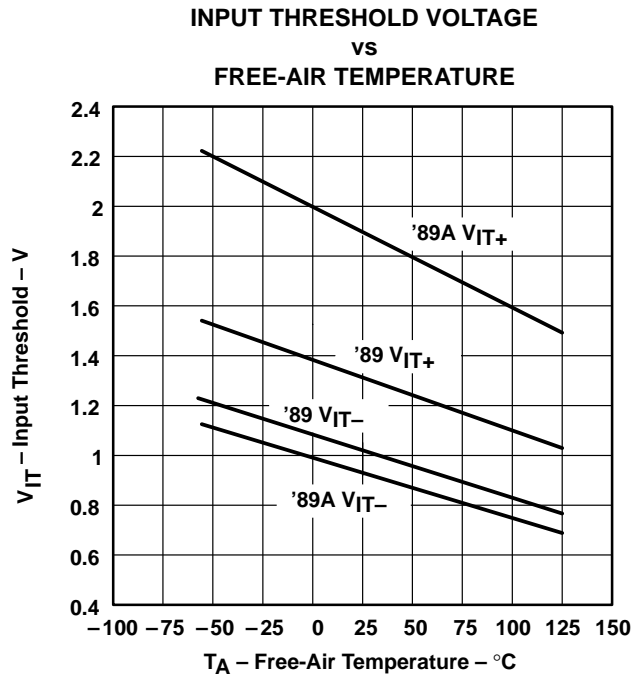


Figure 7

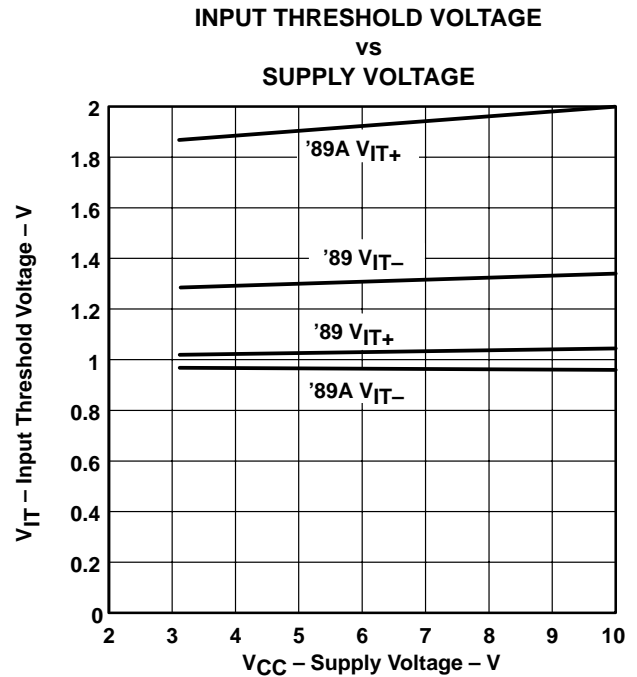


Figure 8

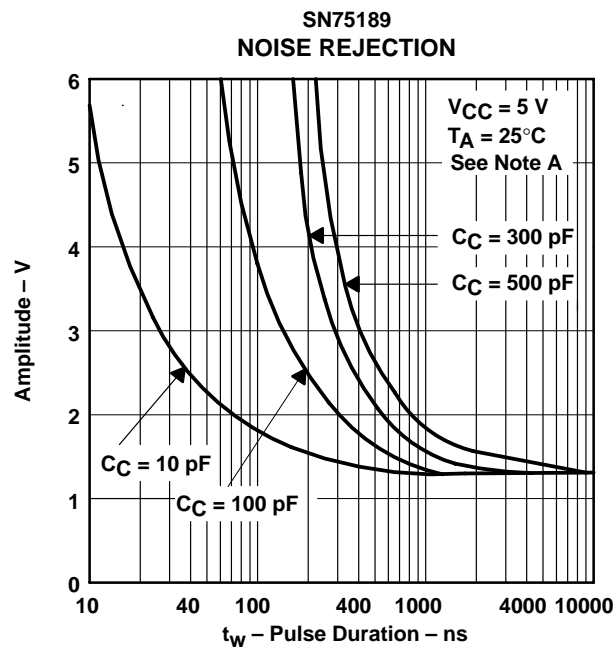


Figure 9

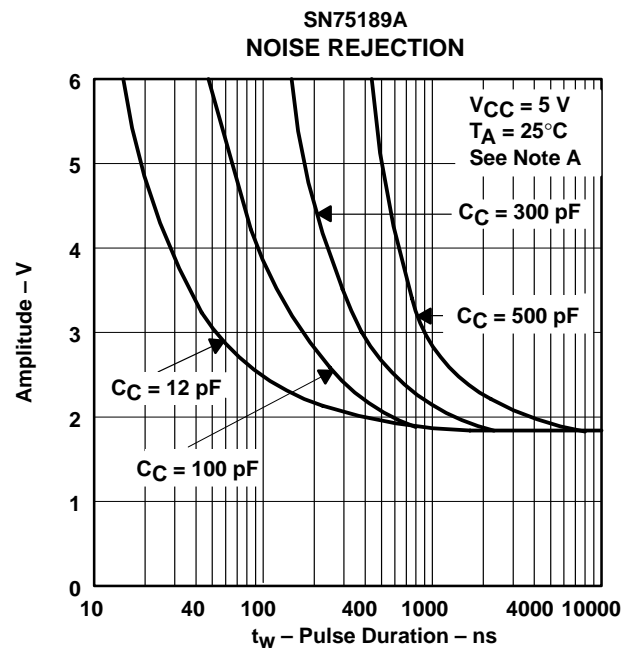


Figure 10

NOTE A: These figures shows the maximum amplitude of a positive-going pulse that, starting from 0 V, will not cause a change of the output level.

† Data for free-air temperatures below 0°C and above 70°C are applicable to SN55189 and SN55189A circuits only.

MC1489, MC1489A, SN55189, SN55189A, SN75189, SN75189A QUADRUPLE LINE RECEIVERS

SLLS095B – SEPTEMBER 1973 – REVISED MAY 1995

TYPICAL CHARACTERISTICS

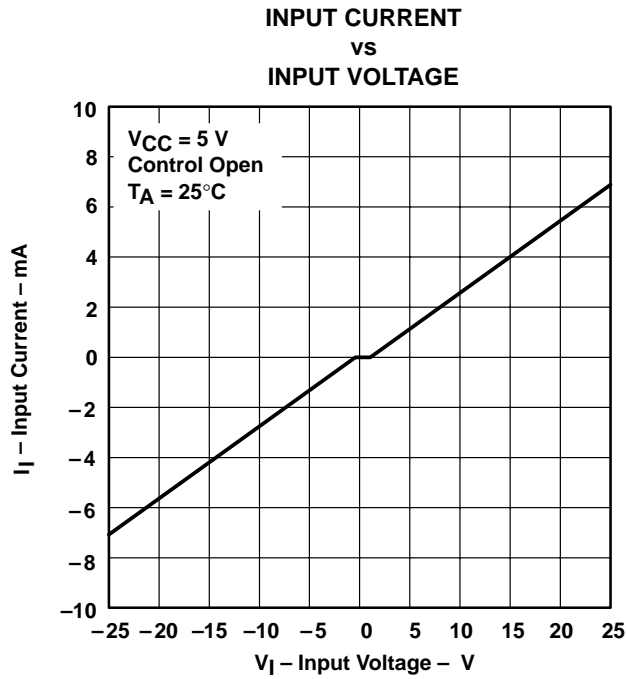


Figure 11

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.