

Low Power Quad RS-232 Receiver

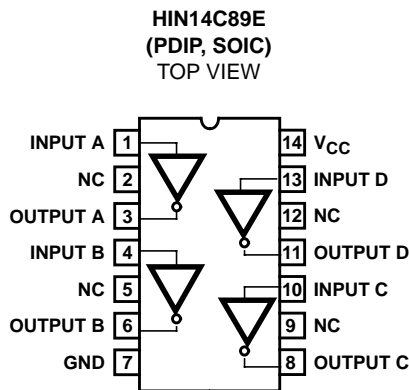
The HIN14C89E is a high-ESD tolerant, very low power, quad RS-232 receiver interface circuit that is designed to meet EIA/TIA-232, EIA/TIA-562, and CCITT V.28 specifications.

The receivers can handle up to $\pm 25V$, and have a 3 to $7k\Omega$ input impedance. The receivers have hysteresis and on-chip noise filtering to improve noise rejection and make external filtering components unnecessary. The outputs are TTL and CMOS compatible and operate at 240Kbps.

Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE	PKG. NO.
HIN14C89ECP	0 to 70	14 Ld PDIP	E14.3
HIN14C89ECBN	0 to +70	14 Ld SOIC	M14.15

Pinout



Features

- Pin-Compatible ESD Upgrade for "1489" Socket
- Meets All RS-232C Specifications
- Enhanced ESD Protection
 - $\pm 15KV$ Human Body Model
 - $\pm 15KV$ IEC1000-4-2, Air-Gap Discharge
 - $\pm 8KV$ IEC1000-4-2, Contact Discharge
- Latch-Up Free During an ESD Event
- Very Low Power Consumption ($1\mu A$ Typical)
- 240Kbps Data Rate (Typical)
- 4 Receivers per Package
 - $\pm 25V$ Input Voltage Range
 - 3 to $7k\Omega$ Input Impedance
 - 0.5V Hysteresis to Improve Noise Rejection
- All Critical Parameters are Guaranteed Over the Entire Commercial Temperature Range
 - Functionally Interchangeable and Pin Compatible with MAX1489E, MC1489, MC14C89A, SN75189, SN75C189, DS1489, DS14C89, and DS14C89A

Applications

- Computers - Portable and Mainframe
- Peripherals - Printers and Terminals
- Modems
- Dataloggers

Absolute Maximum Ratings

V_{CC} to Ground (GND - 0.3V) < V_{CC} < 6V
 Input Voltages
 Input A - D $\pm 25V$
 Output Voltages
 Output A - D (GND - 0.3V) < VRXOUT < (V+ + 0.3V)
 Short Circuit Duration
 Output A - D Continuous
 Continuous Total Power Dissipation ($T_A = 25^\circ C$)
 Plastic Package 375mW
 Derate -7.0 mW/C above $70^\circ C$
 ESD Classification: EIC1000-4-2 Class 4 Compliant

Thermal Information

Thermal Resistance (Typical, Note 1) θ_{JA} ($^\circ C/W$)
 14 Ld PDIP Package 90
 14 Ld SOIC Package 120
 Maximum Junction Temperature (Plastic Package) $150^\circ C$
 Maximum Storage Temperature Range $-65^\circ C$ to $150^\circ C$
 Maximum Lead Temperature (Soldering 10s) $300^\circ C$
 Temperature Ranges
 HIN14C89EC $0^\circ C$ to $70^\circ C$

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications Test Conditions: $V_{CC} = +5V \pm 10\%$, $T_A =$ Operating Temperature Range

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage High, V_{OH}	$I_{OUT} = -3.2mA$	2.5	4.1	-	V
Output Voltage Low, V_{OL}	$I_{OUT} = 3.2mA$	-	0.17	0.4	V
Output Short Circuit Current, I_{OS} (Note 2)	Shorted to GND	-	-11	-	mA
	Shorted to V_{CC}	-	35	-	
Supply Current, I_{CC}		-	1	100	μA
Input Voltage Range, V_{IN}		-25	-	25	V
Input Voltage High, V_{IH}		-	2.15	2.60	V
Input Voltage Low, V_{IL}		0.75	1.4	-	V
Input Hysteresis, V_{HYST}		-	0.7	-	V
Input Resistance, R_{IN}		3.0	5.0	7.0	k Ω
Output Propagation Delay, Low to High, t_{PLH}		-	1.9	4.0	μS
Output Propagation Delay, High to Low, t_{PHL}		-	2.0	4.0	μS
Output Propagation Delay Skew, [$t_{PLH} + t_{PHL}$], t_{SKEW}		-	120	-	nS
Output Transition Time, t_{TR}	$V_{OUT} = 10\%$ to 90%	-	110	-	nS
Input Noise Rejection, t_N	Pulse Amplitude = 5V	-	0.8	-	μS
Guaranteed Data Rate, DR	$V_{CC} = 5V$	120	240	-	kbps
ESD Protection	Human Body Model (Note 3)	-	± 15	-	kV
	IEC1000-4-2 (Contact Discharge)		± 8		
	IEC1000-4-2 (Air-Gap Discharge)		± 15		

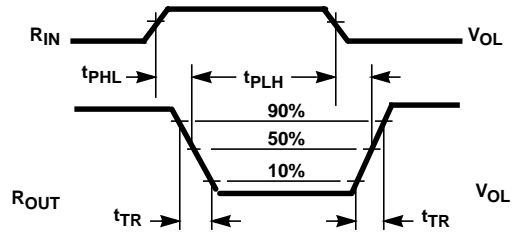
NOTES:

- Guaranteed by design.
- R_{IN} pins to GND.

Pin Description

PIN	NAME	FUNCTION
1, 4, 10, 13	INPUT	Receiver Inputs
2, 5, 9, 12	N.C.	No Connects
3, 6, 8, 11	OUTPUT	Receiver Outputs
7	GND	Ground
14	V _{CC}	Supply Voltage

Timing Diagram



$$\text{AVERAGE PROPAGATION DELAY} = \frac{t_{PHL} + t_{PLH}}{2}$$

FIGURE 1. PROPAGATION DELAY DEFINITION

HIN14C89E

Die Characteristics

DIE DIMENSIONS:

67 x 76 x 14 ±1 mils

METALLIZATION:

Type: Al

Thickness: 10kÅ ±1kÅ

PASSIVATION:

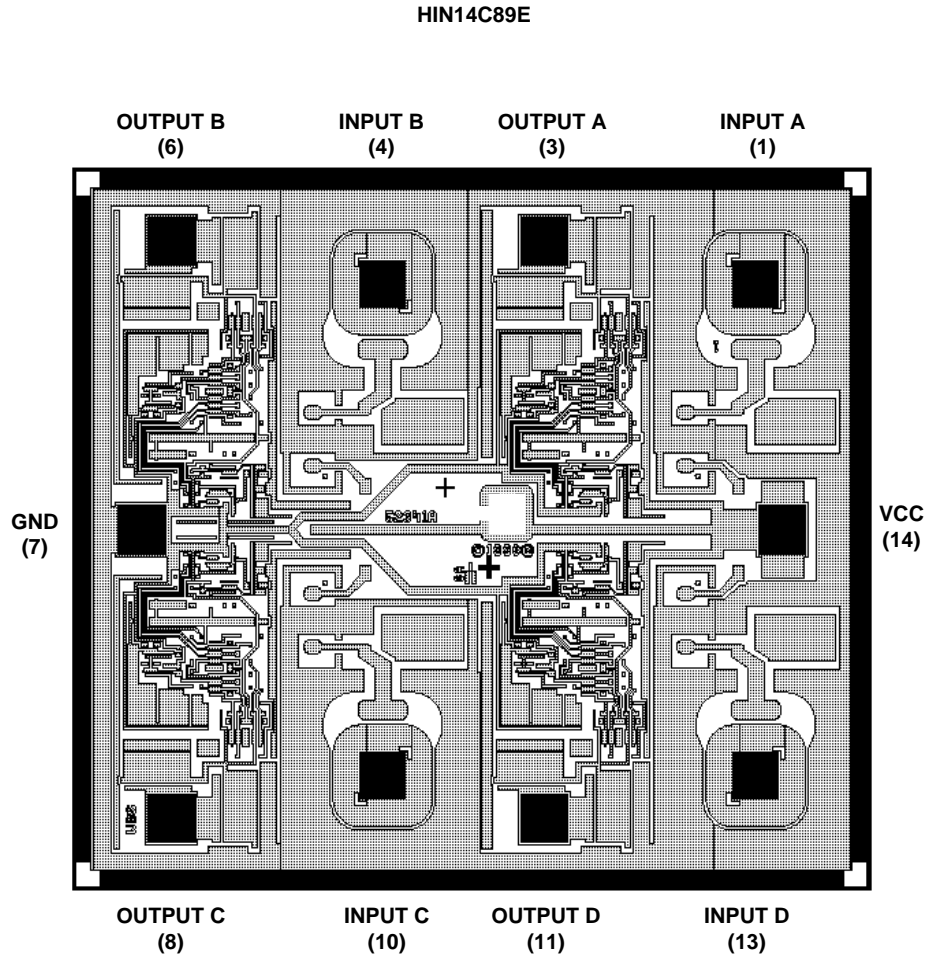
Type: SiO₂ / Si₃N₄ Sandwich

Thickness: 7kÅ ±20% Oxide under 8kÅ ±15% Nitride

WORST CASE CURRENT DENSITY:

2.2 x 10⁴ A/cm²

Metallization Mask Layout



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