

**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.

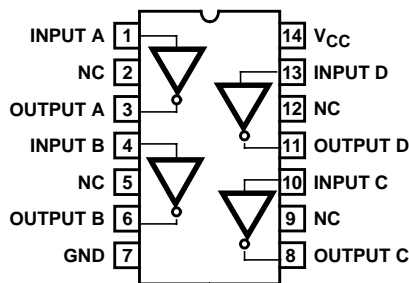
The receivers can handle up to  $\pm 25V$ , and have a 3 to  $7k\Omega$  input impedance. The receivers have hysteresis and on-chip noise filtering to improve noise rejection and make external filtering components unnecessary. The outputs are TTL and CMOS compatible and operate at 240Kbps.

**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**

**HIN14C89E**  
(PDIP, SOIC)  
TOP VIEW



**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°C  
 ESD Classification: EIC1000-4-2 Class 4 Compliant

## Thermal Information

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

- $\theta_{JA}$  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	$\mu A$
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 $\Omega$
Output Propagation Delay, Low to High, $t_{PLH}$		-	1.9	4.0	$\mu S$
Output Propagation Delay, High to Low, $t_{PHL}$		-	2.0	4.0	$\mu S$
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	-	$\mu S$
Guaranteed Data Rate, DR	$V_{CC} = 5V$	120	240	-	kbps
ESD Protection	Human Body Model (Note 3) IEC1000-4-2 (Contact Discharge) IEC1000-4-2 (Air-Gap Discharge)	-	$\pm 15$ $\pm 8$ $\pm 15$	-	kV

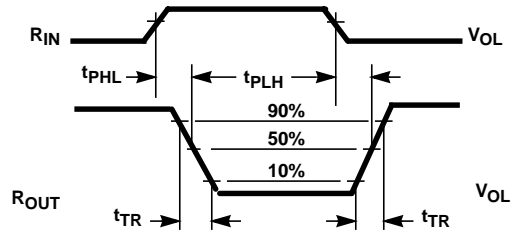
### NOTES:

- 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 <sub>CC</sub>	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

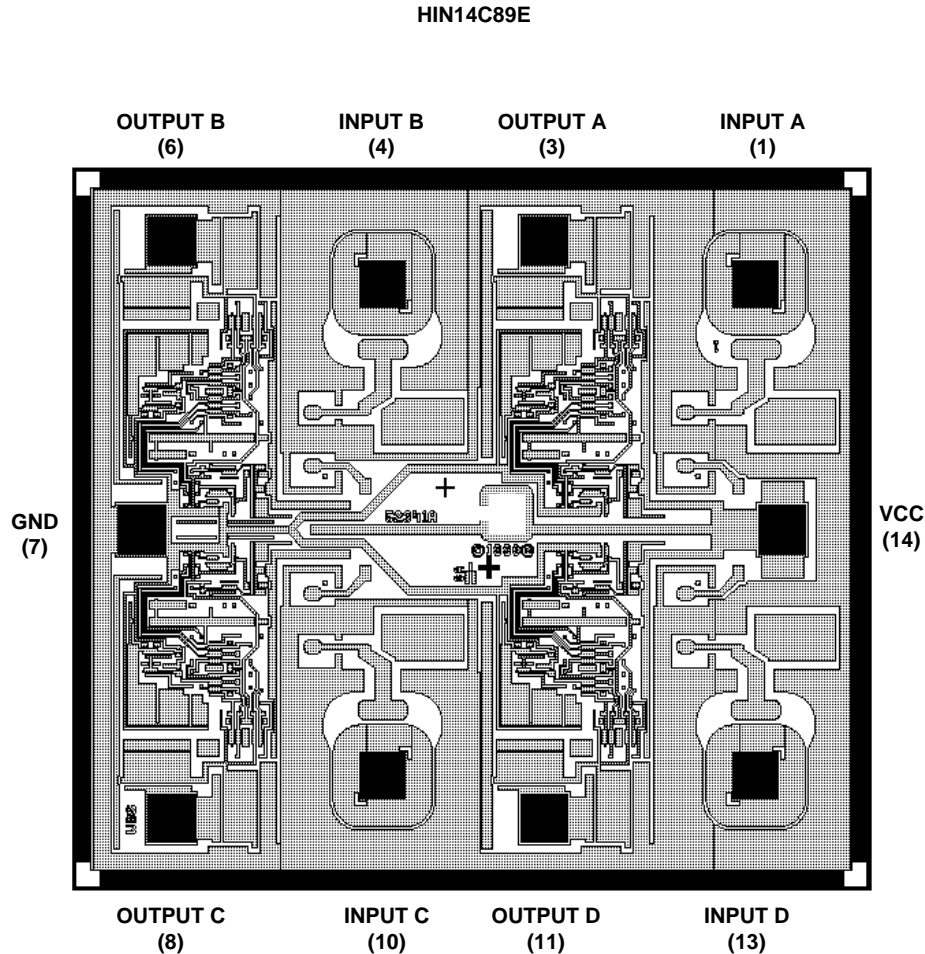
### PASSIVATION:

Type: SiO<sub>2</sub> / Si<sub>3</sub>N<sub>4</sub> Sandwich  
Thickness: 7kÅ ±20% Oxide under 8kÅ ±15% Nitride

### WORST CASE CURRENT DENSITY:

2.2 x 10<sup>4</sup> A/cm<sup>2</sup>

## Metallization Mask Layout



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