



HMC  
148-1 Remington Blvd.  
Ronkonkoma, New York 11779  
(516) 471-4040 • FAX (516) 471-4044

# HMC14C89

## QUAD CMOS RS-232 LINE RECEIVER WITH 3-STATE OUTPUTS

### FEATURES

- CMOS pin-for-pin replacement for the bipolar 1489/1489A Quad Line Receiver.
- Meets EIA RS-232-C/D and CCITT V.24/V.28 specifications.
- Low power dissipation: 0.05 mW.
- Needs no external components.

### INPUTS

- Enable Input (with pull-up resistor) to control 3-state outputs.
- Variable receiver amplitude: 3V to 50V.
- 0.8V hysteresis for noise suppression.
- 3 to 7kohm internal resistance.
- Static protection.

### OUTPUTS

- 3-state operation.
- TTL & CMOS compatible.
- Propagation delay less than 600ns.
- Latch-up protection.

### GENERAL DESCRIPTION

The HMC14C89 is the pin-for-pin, low power CMOS direct replacement for the bipolar 1489/1489A Quad Line Receiver.

In addition, it has 3-state outputs controlled by one Enable pin.

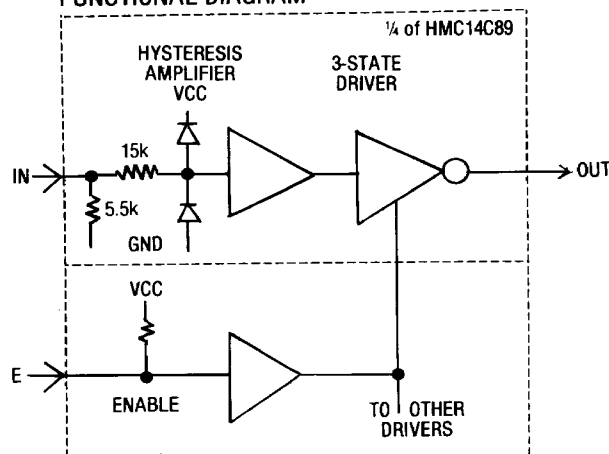
It is designed as a variable input line receiver for computers, peripherals, modems, printers, instruments and other data communication/terminal equipment. The inputs conform to RS-232-C/D and CCITT V.24/V.28 specifications, and outputs are compatible with standard TTL and CMOS levels.

The device does not require any external components, such as response control capacitors (hysteresis at inputs, filters noise), thereby simplifying new designs or pin-for-pin replacements of the bipolar 1489/1489A. Low power dissipation (0.05mW compared with 130mW for the bipolar) makes it ideal for battery operation, and 3-state outputs increase versatility.

Receiver inputs can accommodate a wide voltage range from a nominal 3V amplitude (0V, +3V) to 50V (-25V, +25V). Their typical on threshold of 1.8V and off threshold of 1.0V provide 0.8V d-c hysteresis for noise suppression which is further aided by the slow response of the inputs to noise near the threshold points. Inputs also have an equivalent of 4 to 5kohm internal resistance for the RS-232 line load.

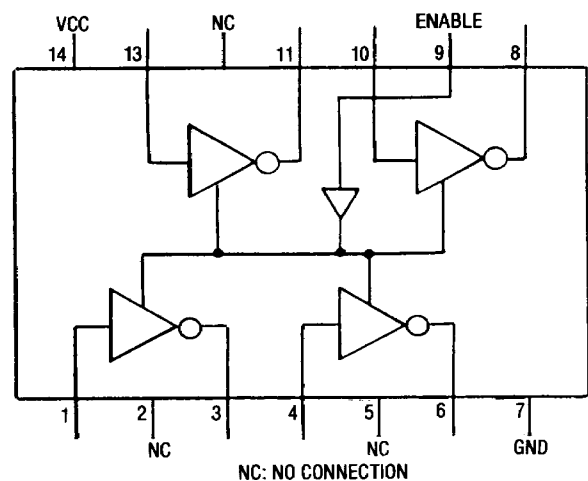
Enable input may be left floating when 3-state operation is not needed. It has a pull-up resistor. Connecting it to GND will bring all 4 outputs to high impedance state. Output propagation delay is less 600ns.

### FUNCTIONAL DIAGRAM



HMC14C89P 14 Pin Dual-In-Line Plastic  
HMC14C89C 14 Pin Dual-In-Line Ceramic  
HMC14C89S 14 Pin Small Outline Plastic

### PIN ASSIGNMENT & PACKAGE



# HMC14C89 QUAD CMOS LINE RECEIVER

## ABSOLUTE MAXIMUM RATINGS

VCC	GND-0.3V to 6V
Receiver Inputs	-30V to +30V
Any Other Pin	GND-0.3V to VCC+0.3V
Power Dissipation at 25°C	1.0W
Junction Temperature	150°C
Lead Temperature (solder 10s)	260°C
Storage Temperature	-65°C to 150°C

## OPERATING CONDITIONS

Temperature Range	-40°C to +85°C
GND	0V
VCC	4.5V to 5.5V

## DC & AC ELECTRICAL CHARACTERISTICS

Ta = -40°C to +85°C, GND = 0V, VCC = +4.5V to 5.5V

SYM	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
<b>Pd</b>	Power Dissipation, Package	Vi & Vo floating			0.05	mW
<b>Icc</b>	VCC Supply Current	Vi & Vo floating			10	μA
<b>Iie</b>	Enable Input — Current	Vie = 0V			-20	μA
<b>Vie</b>	— Voltage, "0"		0		0.8	V
	— Voltage, "1"	Enable may be left floating for "1"	2.4		VCC	V
<b>Rir</b>	Receiver Input — Resistance	To GND	3	5.5	7	kohm
<b>Vir</b>	— Voltage, On Threshold	From "0" to "1"	1.35	1.8	2.35	V
	Off Threshold	From "1" to "0"	0.75	1.0	1.25	V
	Hysteresis	Between On & Off Thresholds	0.6	0.8		V
	"0"		-25		0.75	V
	"1"		2.35		+25	V
<b>Vo</b>	Receiver Output — Voltage, "0"	Io = 10μA, Vcc = 5V			0.1	V
		Io = 2mA, Vcc = 5V			0.5	V
	"1"	Io = -10μA, Vcc = 5V	4.9			V
		Io = -0.5mA, Vcc = 5V	3.8			V
<b>tp</b>	— Propagation Delay	From Vir = "0" to Vo = "0" or Vir = "1" to Vo = "1" Vir = -5V to +5V			600	ns



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