

**66189**

**RADIATION TOLERANT OPTOCOUPLER  
PIN FOR PIN REPLACEMENT FOR 3C91C**

**Mii**  
OPTOELECTRONIC PRODUCTS  
DIVISION

Revision B 7/14/00

**Features:**

- High Reliability
- Base lead eliminated for improved noise immunity
- Proton & Total Dose Tolerant
- Stability over wide temperature
- +500V electrical isolation

**Applications:**

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

**DESCRIPTION**

The **66189** contains a proton tolerant LED optically coupled to a silicon photodiode detector circuit. The optocoupler is built on a TO-72 header. The anode of the LED is electrically connected to the case. This optocoupler is capable of transmitting signals between two galvanic sources. The potential difference between transmitter and receiver should not go over the maximum isolation voltage. The internal base connection has been eliminated for improved noise immunity.

**ABSOLUTE MAXIMUM RATINGS**

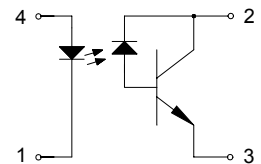
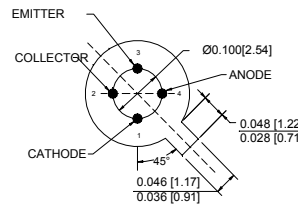
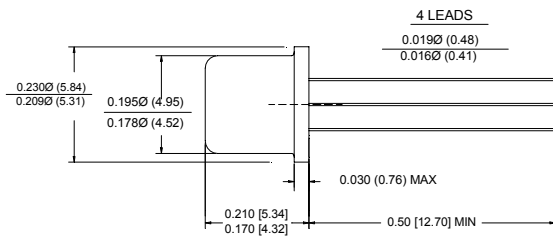
Input to Output Voltage .....	500V
Emitter-Collector Voltage .....	5V
Collector-Emitter Voltage .....	40V
Reverse Input Voltage .....	7V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1) .....	50mA
Peak Forward Input Current (Value applies for $t_w \leq 1\mu s$ , PRR < 300 pps) .....	1A
Continuous Collector Current .....	50mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) .....	230mW
Storage Temperature .....	-55°C to +150°C
Operating Free-Air Temperature Range .....	-55°C to +100°C
Lead Solder Temperature (10 seconds max.) .....	260°C

**Notes:**

1. Derate linearly to 100°C free-air temperature at the rate of 0.67 mA/°C above 65°C.
2. Derate linearly to 100°C free-air temperature at the rate of 2.3 mW/°C.

**Package Dimensions**

**Schematic Diagram**



DIMENSIONS ARE IN INCHES (MILLIMETERS)

**ELECTRICAL CHARACTERISTICS**T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode Static Reverse Current	I <sub>R</sub>			1	μA	V <sub>R</sub> = 3V
Input Diode Static Forward Voltage	V <sub>F</sub>		1.8	2.0	V	I <sub>F</sub> = 10mA
Input Diode Static Forward Voltage	V <sub>F</sub>		1.9	2.2	V	I <sub>F</sub> = 20mA
Reverse Breakdown Voltage	B <sub>VR</sub>	7	12		V	I <sub>R</sub> = 100μA
Input Diode Capacitance	C <sub>IN</sub>		25		pF	V = 0V, f = 1MHz

**OUTPUT TRANSISTOR**T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	40	48		V	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0, I <sub>F</sub> = 0
Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	5	7		V	I <sub>C</sub> = 0mA, I <sub>E</sub> = 10μA, I <sub>F</sub> = 0
Collector-Emitter Dark Current	I <sub>CEO</sub>			50	nA	V <sub>CE</sub> = 40V, I <sub>F</sub> = 0mA
	I <sub>CEO</sub>			10	nA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 0mA

**COUPLED CHARACTERISTICS**T<sub>A</sub> = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
On State Collector Current	I <sub>C(ON)</sub>	4			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA
On State Collector Current	I <sub>C(ON)</sub>	3			mA	V <sub>CE</sub> = 0.4V, I <sub>F</sub> = 10mA
On State Collector Current	I <sub>C(ON)</sub>	2			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>			0.4	V	I <sub>F</sub> = 50mA, I <sub>C</sub> = 10mA
Isolation Resistance	R <sub>ISO</sub>	10 <sup>9</sup>			Ω	V <sub>IN-OUT</sub> = 500V
Input to Output Capacitance	C <sub>IO</sub>		2	2.5	pF	f = 1MHz
Delay Time	t <sub>d</sub>		2	4	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Storage Time	t <sub>s</sub>		0.2	0.5	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Rise Time	t <sub>r</sub>		3	5	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Fall Time	t <sub>f</sub>		4	7	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I <sub>FL</sub>	0	1	μA
Input Current, High Level	I <sub>FH</sub>	2	20	mA
Supply Voltage	V <sub>CE</sub>	5	50	V
Operating Temperature	T <sub>A</sub>	-55	100	°C

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
66189-001	Commercial optocoupler with 100% testing
66189-101	Optocoupler with Group "A" testing
66189-103	Optocoupler screened to JANTX
66189-105	Optocoupler screened to JANTXV