

**66189****PROTON RADIATION TOLERANT OPTOCOUPLER**

09/22/03

**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**

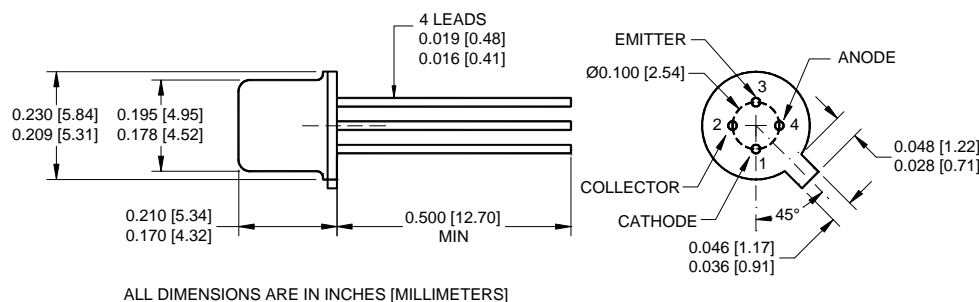
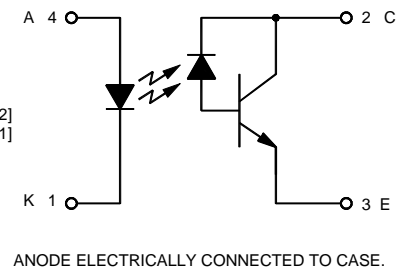
The **66189** contains a proton tolerant 660nm LED optically coupled to a silicon photodiode detector circuit. The optocoupler is mounted in a hermetic TO-72 package. The internal base connection has been eliminated for improved noise immunity.

**ABSOLUTE MAXIMUM RATINGS**

Emitter-Collector Voltage .....	5V
Collector-Emitter Voltage .....	40V
Reverse Input Voltage .....	7V
Input Diode Continuous Forward Current (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 (Note 2) .....	230mW
Input to Output Isolation Voltage .....	500V
Storage Temperature .....	-55°C to +150°C
Operating Free-Air Temperature Range .....	-55°C to +100°C
Lead Solder Temperature (10 seconds, 1/16" from case) .....	260°C

**Notes:**

1. Derate linearly to 100°C free-air temperature at the rate of 0.67 mA/°C above 25°C.
2. Derate linearly to 100°C free-air temperature at the rate of 3.0 mW/°C above 25°C.

**Package Dimensions****Schematic Diagram**

# 66189

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### 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>			2.0	V	I <sub>F</sub> = 10mA
Input Diode Static Forward Voltage	V <sub>F</sub>			2.2	V	I <sub>F</sub> = 20mA
Reverse Breakdown Voltage	B <sub>VR</sub>	7			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			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			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 -55°C +100°C
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>			2.5	pF	f = 1MHz
Delay Time	t <sub>d</sub>			4	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Storage Time	t <sub>s</sub>			0.5	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Rise Time	t <sub>r</sub>			5	μs	V <sub>CE</sub> = 5V, I <sub>F</sub> = 2mA, R <sub>L</sub> = 100Ω
Fall Time	t <sub>f</sub>			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	35	V
Operating Temperature	T <sub>A</sub>	-55	100	°C

### SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
66189-001	Commercial
66189-101	Screened to JAN level
66189-103	Screened to JANTX level
66189-105	Screened to JANTXV level