

**66193**

**PROTON RADIATION TOLERANT OPTOCOUPLER  
(REPLACEMENT FOR 3C91C)**



05/06/2013

**Features:**

- High Reliability
- Base lead eliminated for improved noise immunity
- Rugged package
- Stability over wide temperature
- +500V electrical isolation

**Applications:**

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

**DESCRIPTION**

The **66193** contains a proton tolerant LED optically coupled to a silicon planar phototransistor. 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.

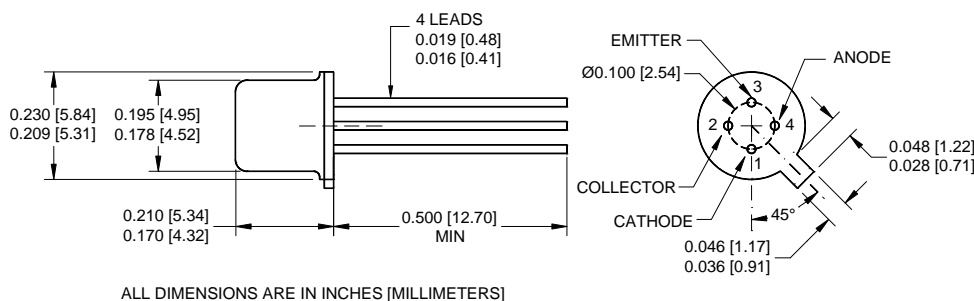
**ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage.....	500 V
Emitter-Collector Voltage.....	5 V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero) .....	60 V
Reverse Input Voltage .....	7 V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1) .....	50 mA
Peak Forward Input Current (Value applies for $t_w \leq 1\mu s$ , PRR < 300 pps) .....	50 mA
Continuous Collector Current .....	1 A
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) .....	300 mW
Storage Temperature.....	-65°C to +150°C
Operating Free-Air Temperature Range .....	-55°C to +100°C
Lead Solder Temperature (10 seconds max.) .....	240°C

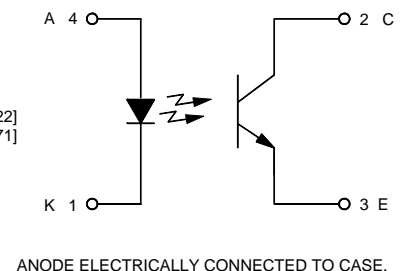
**Notes:**

1. Derate linearly to +65°C free-air temperature at the rate of 1.15 mA/°C.
2. Derate linearly to 100°C free-air temperature at the rate of 3 mW/°C.

**Package Dimensions**



**Schematic Diagram**



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**PROTON RADIATION TOLERANT OPTOCOUPLER (Replacement for 3C91C)****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> = 3 V
Input Diode Static Forward Voltage	V <sub>F</sub>			2.0	V	I <sub>F</sub> = 10 mA
Input Diode Static Forward Voltage -55°C	V <sub>F</sub>			2.2	V	I <sub>F</sub> = 20 mA
Reverse Breakdown Voltage	B <sub>VR</sub>	7			V	I <sub>R</sub> = 100 μA
Input Diode Capacitance	C <sub>IN</sub>		25		PF	V = 0 V, f = 1 MHz

**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>	50			V	I <sub>C</sub> = 1 mA, I <sub>B</sub> = 0, I <sub>F</sub> = 0
Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	7			V	I <sub>C</sub> = 10 μA
Collector-Emitter Dark Current	I <sub>CEO1</sub> I <sub>CEO2</sub>			100 10	nA	V <sub>CE</sub> = 50 V, I <sub>F</sub> = 0 mA V <sub>CE</sub> = 5 V, I <sub>F</sub> = 0 mA

**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> = 5 V, I <sub>F</sub> = 10 mA
On State Collector Current	I <sub>C(ON)</sub>	3			mA	V <sub>CE</sub> = 0.4 V, I <sub>F</sub> = 10 mA
On State Collector Current -55°C	I <sub>C(ON)</sub>	2			mA	V <sub>CE</sub> = 5 V, I <sub>F</sub> = 10 mA
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>			0.4	V	I <sub>F</sub> = 50 mA, I <sub>C</sub> = 10 mA
Isolation Resistance	R <sub>ISO</sub>	10 <sup>9</sup>			Ω	V <sub>IN-OUT</sub> = 500 V
Input to Output Capacitance	C <sub>IO</sub>		2	2.5	pF	f = 1 MHz
Delay Time	t <sub>d</sub>		2	4	μs	V <sub>CE</sub> = 5 V, I <sub>F</sub> = 2 mA, R <sub>L</sub> = 100 Ω
Storage Time	t <sub>s</sub>		0.2	0.5	μs	V <sub>CE</sub> = 5 V, I <sub>F</sub> = 2 mA, R <sub>L</sub> = 100 Ω
Rise Time	t <sub>r</sub>		3	5	μs	V <sub>CE</sub> = 5 V, I <sub>F</sub> = 2 mA, R <sub>L</sub> = 100 Ω
Fall Time	t <sub>f</sub>		4	5	μs	V <sub>CE</sub> = 5 V, I <sub>F</sub> = 2 mA, R <sub>L</sub> = 100 Ω

**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
66193-003	Single Channel optocoupler, commercial (-55° to +100°C)
66193-002	Single Channel optocoupler -55 to +100°C Mil Temp Tested
66193-000	Single Channel optocoupler -55 to +100°C with 100% device screening

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