

**66163**

**SINGLE CHANNEL OPTOCOUPLED  
DIRECT REPLACEMENT FOR 3C91C**

**Mii**  
OPTOELECTRONIC PRODUCTS  
DIVISION

REVISION C  
12/29/00

**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 **66163** contains a gallium arsenide infrared LED optically coupled to a silicon planar phototransistor. The optocoupler is built on a TO-46 header. The collector of the phototransistor 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.

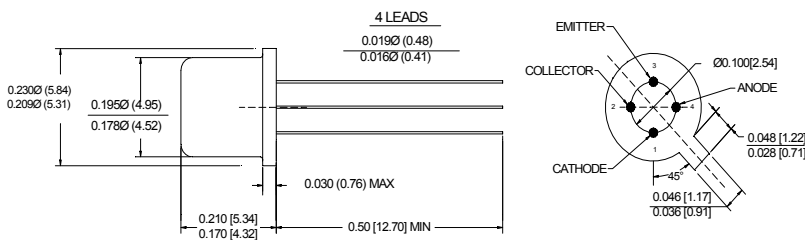
**ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage .....	500V
Emitter-Collector Voltage .....	5V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero) .....	60V
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) .....	500mA
Continuous Collector Current .....	50mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) .....	230mW
Storage Temperature .....	-65°C to +150°C
Operating Free-Air Temperature Range .....	-55°C to +125°C
Lead Solder Temperature (10 seconds max.) .....	260°C

**Notes:**

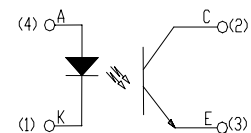
1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 2.3 mW/°C.

**Package Dimensions**



DIMENSIONS ARE IN INCHES (MILLIMETERS)

**Schematic Diagram**



NOTE: ANODE ELECTRICALLY CONNECTED TO CASE

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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>		1.15	1.2	V	I <sub>F</sub> = 2mA
Input Diode Static Forward Voltage	V <sub>F</sub>		1.3	1.5	V	I <sub>F</sub> = 50mA
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>	50			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>	7			V	I <sub>C</sub> = 0mA, I <sub>E</sub> = 10μA, I <sub>F</sub> = 0
Collector-Emitter Dark Current	I <sub>CEO1</sub>			60	nA	V <sub>CE</sub> = 50V, I <sub>F</sub> = 0mA
	I <sub>CEO2</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		20	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
On State Collector Current	I <sub>C(ON)</sub>	20			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	5	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	10	mA
Supply Voltage	V <sub>CE</sub>	5	50	V
Operating Temperature	T <sub>A</sub>	-55	125	°C

**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
66163-001	Single Channel optocoupler, commercial (0° to 70°C)
66163-011	Single Channel optocoupler full military operating temperature range
66163-101	Single Channel optocoupler tested over full military temperature range with 100% device screening
66163-017	Single Channel optocoupler full military operating temperature range w/200% CTR
66163-107	Single Channel optocoupler tested over full military temperature range with 100% device screening w/200% CTR