

66183

PROTON RADIATION TOLERANT OPTOCOUPLER
(Single Channel, Electrically Similar to 4N49)

Mii
OPTOELECTRONIC PRODUCTS
DIVISION

REVISION C 5/6/02

Features:

- High Reliability
- Base lead provided for conventional transistor biasing
- Rugged package
- Stability over wide temperature
- +1000V electrical isolation

Applications:

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

DESCRIPTION

The **66183** is a single channel device electrically similar to the 4N49. This product has been designed to be more tolerant to proton radiation. The 66183 optocoupler is packaged in a hermetically sealed 6 pin leadless chip carrier (LCC). This device can be supplied to customer specifications as well as tested in accordance with MIL-PRF-19500 to Class S level.

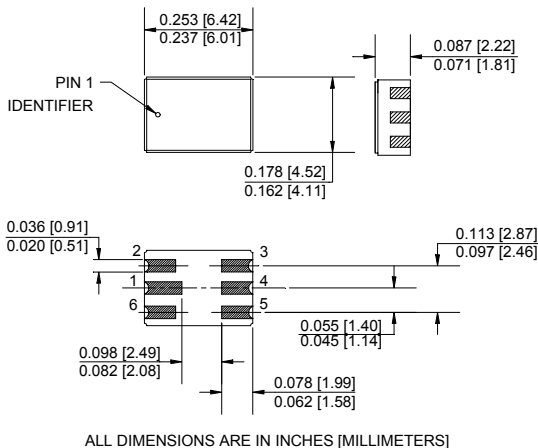
ABSOLUTE MAXIMUM RATINGS

| | |
|--|-----------------|
| Input to Output Voltage | 1kV |
| Emitter-Base Voltage | 7V |
| Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero) | 40V |
| Collector-Base Voltage | 45V |
| Reverse Input Voltage | 2V |
| 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) | 300mW |
| Storage Temperature | -55°C to +150°C |
| Operating Free-Air Temperature Range | -55°C to +100°C |
| Lead Solder Temperature (10 seconds max.) | 240°C |

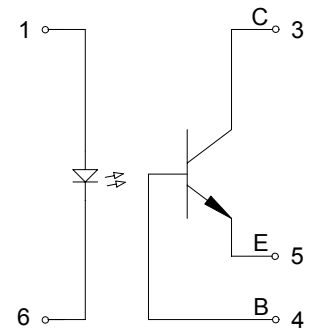
Notes:

1. Derate linearly to 100°C free-air temperature at the rate of 0.80 mW/°C above 25°C.
2. Derate linearly to 100°C free-air temperature at the rate of 3 mW/°C above 25°C.

Package Dimensions



Schematic Diagram



ELECTRICAL CHARACTERISTICST_A = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|---|----------------|-----|-----|-----|-------|-----------------------|------|
| Input Diode Static Reverse Current | I _R | | | 100 | μA | V _R = 3V | |
| Input Diode Static Forward Voltage -55°C | V _F | 1.0 | | 2.2 | V | I _F = 10mA | |
| Input Diode Static Forward Voltage +25°C | V _F | 0.8 | 1.8 | 2.0 | V | I _F = 10mA | |
| Input Diode Static Forward Voltage +100°C | V _F | 0.8 | | 2.2 | V | I _F = 10mA | |

OUTPUT TRANSISTORT_A = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|-------------------------------------|----------------------|-----|-----|-----|-------|--|------|
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | 45 | | | V | I _C = 100μA, I _B = 0, I _F = 0 | |
| Collector-Emitter Breakdown Voltage | V _{(BR)CEO} | 40 | | | V | I _C = 1mA, I _B = 0, I _F = 0 | |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | 2 | | | V | I _C = 0mA, I _E = 100μA, I _F = 0 | |
| Off-State Collector Current | I _{CEO} | | | 100 | nA | V _{CE} = 20V, I _F = 0mA, I _B = 0 | |
| +100°C | I _{CEO} | | | 100 | μA | V _{CE} = 20V, I _F = 0mA, I _B = 0 | |

COUPLED CHARACTERISTICST_A = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|--------------------------------------|----------------------|------------------|-----|-----|-------|--|------|
| On State Collector Current | I _{C(ON)} | 2.0 | | | mA | V _{CE} = 5V, I _F = 1mA, I _B = 0 | |
| On State Collector Current +100°C | I _{C(ON)} | 2.0 | | | mA | V _{CE} = 5.0V, I _F = 2mA, I _B = 0 | |
| On State Collector Current -55°C | I _{C(ON)} | 2.8 | | | mA | V _{CE} = 5V, I _F = 2mA, I _B = 0 | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | | | 0.3 | V | I _F = 2mA, I _C = 2mA | |
| Input to Output Internal Resistance | R _{IO} | 10 ¹¹ | | | Ω | V _{IN-OUT} = 1000V | 1 |
| Input to Output Capacitance | C _{IO} | | 2.5 | 5 | pF | f = 1MHz, V _{IN-OUT} = 1000V | 1 |
| Rise Time-Phototransistor Operation | t _r | | 10 | 25 | μs | V _{CC} = 10V, I _F = 10mA, R _L = 100Ω, I _B = 0 | |
| Fall Time-Phototransistor Operation | t _f | | 10 | 25 | μs | V _{CC} = 10V, I _F = 10mA, R _L = 100Ω, I _B = 0 | |

NOTES:

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
- This parameter must be measured using pulse techniques (t_W = 100μs duty cycle ≤ 1%).

RECOMMENDED OPERATING CONDITIONS:

| PARAMETER | SYMBOL | MIN | MAX | UNITS |
|---------------------------|-----------------|-----|-----|-------|
| Input Current, Low Level | I _{FL} | 0 | 90 | μA |
| Input Current, High Level | I _{FH} | 2 | 10 | mA |
| Supply Voltage | V _{CE} | 5 | 10 | V |
| Operating Temperature | T _A | -55 | 100 | °C |

SELECTION GUIDE

| PART NUMBER | PART DESCRIPTION |
|-------------|---|
| 66183-001 | Single channel proton radiation tolerant optocoupler - commercial |
| 66183-101 | Single channel proton radiation tolerant optocoupler – screened to JAN |
| 66183-103 | Single channel proton radiation tolerant optocoupler – screened to JANTX |
| 66183-105 | Single channel proton radiation tolerant optocoupler – screened to JANTXV |