# 66183

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

10/17/06

**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.

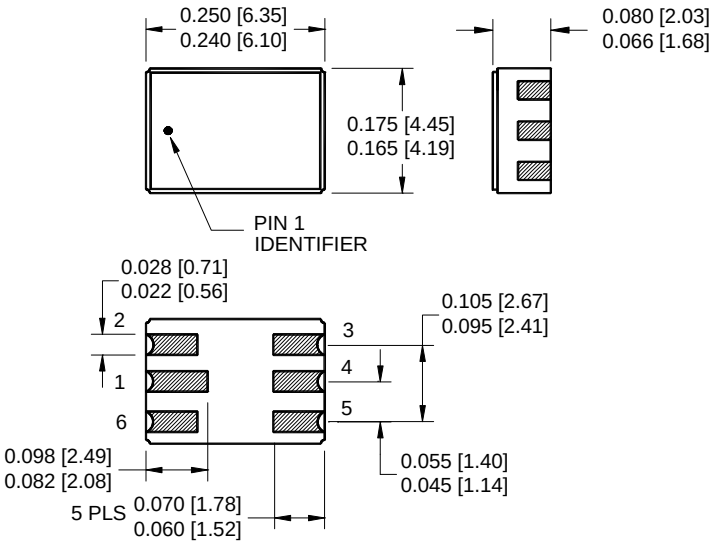
## ABSOLUTE MAXIMUM RATINGS

| | |
|---|---|
| Input to Output Isolation Voltage | 1kV |
| Input Diode Continuous Forward Current | 40 mA |
| Peak Forward Input Current (value applies for tw ≤10µs, PRR < 300 pps) | 1 A |
| Reverse Input Voltage | 2 V |
| Input Power Dissipation (Note 1) | 80 mW |
| Emitter-Base Voltage | 7 V |
| Collector-Emitter Voltage (Value applies to emitter-base open-circuited and the input diode equal to zero) | 60 V |
| Collector-Base Voltage | 60 V |
| Continuous Collector Current | 50 mA |
| Continuous Transistor Power Dissipation (Note 2) | 300 mW |
| Storage Temperature | -65°C to +150°C |
| Operating Free-Air Temperature Range | -55°C to +125°C |
| Lead Solder Temperature (10 seconds max.) | 240°C |

**Notes:**

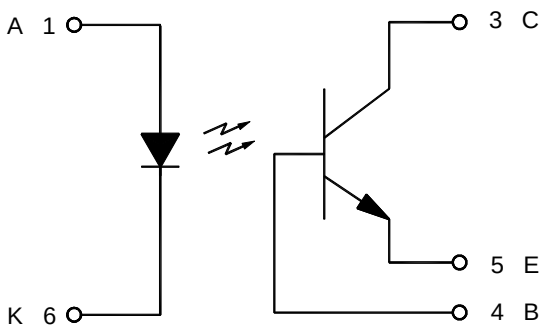
1. Derate linearly at the rate of 1.33 mW/°C above 65°C case.
2. Derate linearly at the rate of 3 mW/°C above 25°C case.

**Package Dimensions**




ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

**Schematic Diagram**





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## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|---|---|---|---|---|---|---|---|
| Input Diode Static Reverse Current | $I_R$ | | | 10 | µA | $V_R$ = 5 V | |
| Input Diode Static Forward Voltage -55°C | $V_F$ | 1.0 | | 2.2 | V | $I_F$ = 10 mA | |
| Input Diode Static Forward Voltage +25°C | $V_F$ | 0.8 | 1.8 | 2.0 | V | $I_F$ = 10 mA | |
| Input Diode Static Forward Voltage +100°C | $V_F$ | 0.8 | | 2.2 | V | $I_F$ = 10 mA | |

## OUTPUT TRANSISTOR

$T_A$ = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage<br>- 011, -108 | $V_{(BR)CBO}$ | 45<br>60 | | | V | $I_C$ = 100 µA, $I_B$ = 0, $I_F$ = 0 | |
| Collector-Emitter Breakdown Voltage<br>- 011, -108 | $V_{(BR)CEO}$ | 40<br>60 | | | V | $I_C$ = 1 mA, $I_B$ = 0, $I_F$ = 0 | |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 7 | | | V | $I_C$ = 0 mA, $I_E$ = 100 µA, $I_F$ = 0 | |
| Off-State Collector Current<br>+100°C | $I_{CEO}$<br>$I_{CEO}$ | | | 100<br>100 | nA<br>µA | $V_{CE}$ = 20 V, $I_F$ = 0 mA, $I_B$ = 0<br>$V_{CE}$ = 20 V, $I_F$ = 0 mA, $I_B$ = 0 | |

## COUPLED CHARACTERISTICS

$T_A$ = 25°C unless otherwise specified.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS | NOTE |
|---|---|---|---|---|---|---|---|
| On State Collector Current | $I_{C(ON)}$ | 2.0 | | | mA | $V_{CE}$ = 5 V, $I_F$ = 1 mA, $I_B$=0 | |
| On State Collector Current +100°C | $I_{C(ON)}$ | 2.0 | | | mA | $V_{CE}$ = 5.0 V, $I_F$ = 2 mA, $I_B$=0 | |
| On State Collector Current -55°C | $I_{C(ON)}$ | 2.8 | | | mA | $V_{CE}$ = 5 V, $I_F$ = 2 mA, $I_B$=0 | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | | | 0.3 | V | $I_F$ = 2 mA, $I_C$= 2 mA | |
| Input to Output Isolation Voltage | $V_{I-O}$ | 1000 | | | V | $I_{I-O}$ = 100 nA | 1 |
| Input to Output Capacitance | $C_{IO}$ | | 2.5 | 5 | pF | f = 1MHz, $V_{I-O}$ = 1000 V | 1 |
| Rise Time-Phototransistor Operation | $t_r$ | | 10 | 25 | µs | $V_{CC}$ = 10 V, $I_F$ = 10 mA,<br>$R_L$ = 100 Ω, $I_B$ = 0 | 2 |
| Fall Time-Phototransistor Operation | $t_f$ | | 10 | 25 | µs | $V_{CC}$ = 10V, $I_F$ = 10mA,<br>$R_L$ = 100 Ω, $I_B$ = 0 | 2 |

**NOTES:**

1. These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
2. 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 |
| 66183-011 | Single channel proton radiation tolerant optocoupler – commercial, 60 Volt Breakdown |
| 66183-101 | Single channel proton radiation tolerant optocoupler - screened to JAN level |
| 66183-103 | Single channel proton radiation tolerant optocoupler - screened to JANTX level |
| 66183-105 | Single channel proton radiation tolerant optocoupler - screened to JANTXV level |
| 66183-108 | Single channel proton radiation tolerant optocoupler - screened to JANTXV level, 60 Volt Breakdown |