

66168

**PROTON RADIATION TOLERANT OPTOCOUPLER
(Pin-for-Pin Replacement for 4N49)**



09/09/03

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 **66168** is a 4N49 using an LED designed to be more tolerant to proton radiation. The 66168 optocoupler is packaged in a hermetically sealed TO-5. This device can be supplied to customer specifications as well as screened to JAN, JANTX, JANTXV and JANS levels.

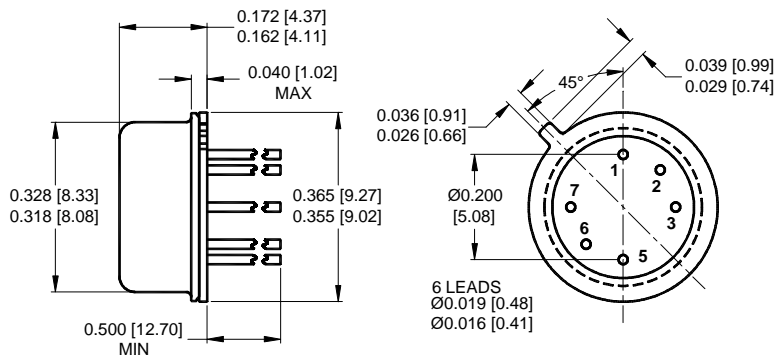
ABSOLUTE MAXIMUM RATINGS

| | |
|-------------------------------------------------------------|-----------------|
| Input to Output Voltage | ±1 kV |
| Emitter-Base Voltage | 7 V |
| Collector-Emitter Voltage | 40 V |
| Collector-Base Voltage | 45 V |
| Reverse Input Voltage | 2V |
| Input Diode Continuous Forward Current (Note 1) | 40 mA |
| Peak Forward Input Current | 1 A |
| Continuous Collector Current | 50 mA |
| Continuous Transistor Power Dissipation (Note 2) | 300 mW |
| Storage Temperature | -65°C to +125°C |
| Operating Free-Air Temperature Range..... | -55°C to +100°C |
| Lead Solder Temperature (10 seconds, 1/16" from case) | 240°C |

Notes:

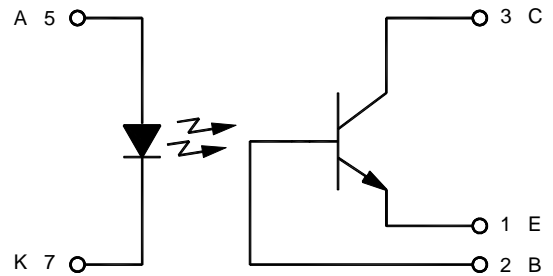
1. Derate linearly to 100°C free-air temperature at the rate of 0.53 mA/°C above 65°C.
2. Derate linearly to 100°C free-air temperature at the rate of 4 mW/°C.

Package Dimensions



ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

Schematic Diagram



COLLECTOR IS COMMON TO CASE

66168

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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 | | | 100 | μA | V _R = 2V | |
| Input Diode Static Forward Voltage -55°C | V _F | 1.0 | | 2.4 | V | I _F = 10mA | |
| Input Diode Static Forward Voltage +25°C | V _F | 0.8 | 1.7 | 2.2 | V | I _F = 10mA | |
| Input Diode Static Forward Voltage +100°C | V _F | 0.7 | | 2.0 | V | I _F = 10mA | |

OUTPUT TRANSISTOR

T_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} | 7 | | | V | I _C = 0mA, I _E = 100μA, I _F = 0 | |
| Off-State Collector Current +25°C | I _{C(OFF)} | | | 100 | nA | V _{CE} = 20V, I _F = 0mA, I _B = 0 | |
| Off-State Collector Current +100°C | I _{C(OFF)} | | | 100 | μA | V _{CE} = 20V, I _F = 0mA, 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} = 5.0 V, I _F = 1mA | |
| On State Collector Current +100°C | I _{C(ON)} | 2.0 | | | mA | V _{CE} = 5.0 V, I _F = 2mA | |
| On State Collector Current -55°C | I _{C(ON)} | 2.8 | | | mA | V _{CE} = 5V, I _F = 2 mA | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | | | 0.3 | V | I _F = 2mA, I _C = 2mA, I _B = 0 | |
| Input to Output Internal Resistance | R _{IO} | 10 ¹¹ | | | Ω | V _{IN-OUT} = 500V | 1 |
| Input to Output Capacitance | C _{IO} | | 2.5 | 5 | pF | f = 1MHz, V _{IN-OUT} = 1kV | 1 |
| Rise Time-Phototransistor Operation | t _r | | 10 | 25 | μs | V _{CC} = 10V, I _F = 5mA, R _L = 100Ω, I _B = 0 | |
| Fall Time-Phototransistor Operation | t _f | | 10 | 25 | μs | V _{CC} = 10V, I _F = 5mA, R _L = 100Ω, I _B = 0 | |
| Rise Time-Photodiode Operation | t _r | | 0.85 | 3 | μs | V _{CC} = 10V, I _F = 5mA, R _L = 100Ω, I _E = 0 | |
| Fall Time-Photodiode Operation | t _f | | 0.85 | 3 | μs | V _{CC} = 10V, I _F = 5mA, R _L = 100Ω, I _E = 0 | |

NOTES:

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.

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 |
|-------------|--------------------------|
| 66168-001 | Commercial |
| 66168-101 | Screened to JAN level |
| 66168-103 | Screened to JANTX level |
| 66168-105 | Screened to JANTXV level |
| 66168-300 | Screened to JANS level |