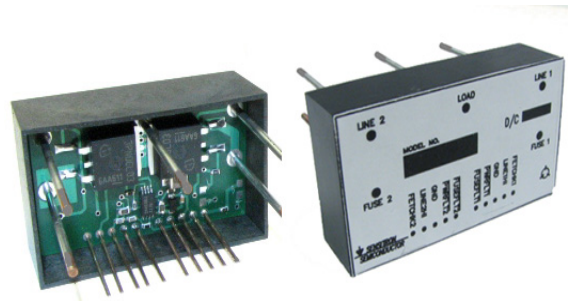


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ACTIVE ORING CONTROLLER MODULE

DESCRIPTION

In fault tolerant, redundant power distribution systems, oring power diodes are commonly used, when paralleling multiple power supplies, to prevent the occurrence of reverse current if an individual power supply voltage falls significantly below the others. Despite of low-cost and easy implementation, the use of oring power diodes suffers from high power dissipation especially in high current applications.



The active oring controller module is designed to replace oring power diodes in high-reliable 28V DC aircraft power systems. Each module is designed to parallel two power supplies with current rated up to 30A on each line. The module uses low on-resistance oring MOSFETs driven by an oring controller. Compared to oring power diodes, this module dissipates very low power loss and can be operated without any heat sink. In addition, the module can detect faults of dead short in the sourcing supply, a blown fuse, over load current, or open-circuit of oring MOSFETs. This module also provides an interface for customers to diagnose the short-circuit fault of oring MOSFETs.

MODULE FEATURES

- Suitable for 28VDC power systems with current rated up to 30A
- No additional heat sinking or external cooling required
- No external bias supply required
- Low power dissipation
- Smooth switchover between two sourcing supply
- 0.5 μ s turn-off time limits peak reverse current
- Ability to reports faults of dead short power supply, blown fuses, over load current, and open-circuit of oring MOSFETs
- Ability to check short-circuit fault of oring MOSFETs
- TTL and COMS compatible control input/output
- Compact design
- Epoxy shell construction

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ELECTRICAL CHARACTERISTICS (Tested under 25°C unless otherwise specified)

| Power | |
|----------------------|-----------------|
| Input Voltage | From 15V to 40V |
| Power Dissipation | See Fig 4 |
| Current | Typical 30A |
| Maximum Voltage Drop | See Fig 3 |

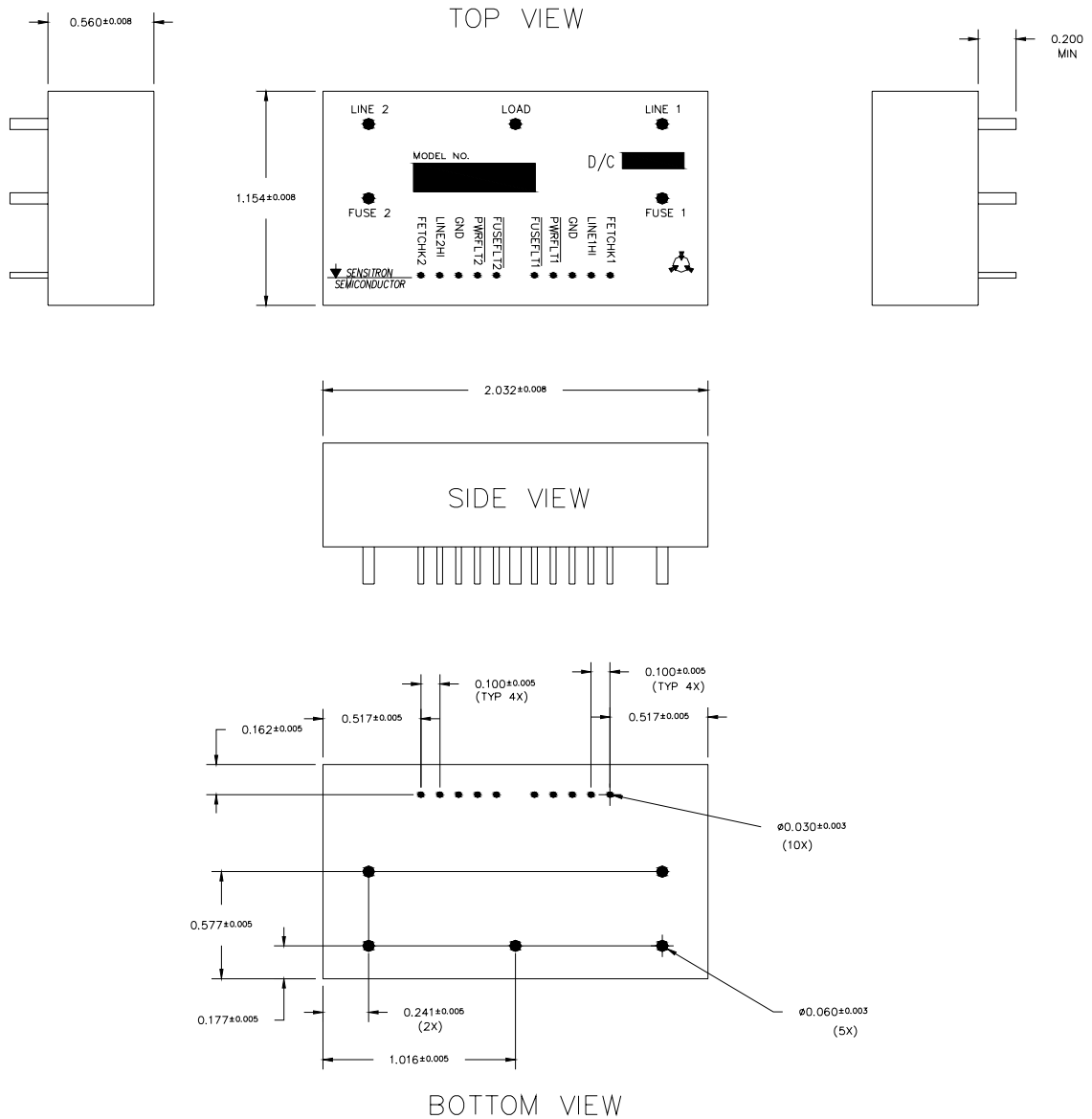
| Control | |
|--|---|
| $\overline{\text{PWRFLT1}}$, $\overline{\text{PWRFLT2}}$ $\overline{\text{FUSEFLE1}}$, $\overline{\text{FUSEFLT2}}$ Pins Output Low | 100mV typical 200mV maximum |
| $\overline{\text{LINE1HI}}$, $\overline{\text{LINE2HI}}$, Pins Output Low | 150mV typical 400mV maximum |
| $\overline{\text{PWRFLT1}}$, $\overline{\text{PWRFLT2}}$ $\overline{\text{FUSEFLE1}}$, $\overline{\text{FUSEFLT2}}$, $\overline{\text{LINE1HI}}$, $\overline{\text{LINE2HI}}$, Pins Leakage Current | 0 typical $\pm 1\mu\text{A}$ maximum |
| $\overline{\text{FETCHK1}}$, $\overline{\text{FETCHK2}}$ Pins Input Current | 80mA maximum |

PHYSICAL CHARACTERISTICS

| TEMPERATURE | |
|-----------------------|--|
| Operating Temperature | $T_A = -40^\circ\text{C}$ To 85°C |
| Storage Temperature | $T_A = -55^\circ\text{C}$ To 125°C |

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MECHANICAL DIMENSIONS (in Inches)



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PIN DEFINITIONS

| Pin Symbol | Pin Description |
|---|--|
| LINE1, LINE2 | 28V line input pins |
| FUSE1, FUSE2 | If fuses are required in the power distribution path, they can be located between LINE1, 2 and FUSE1, 2. Otherwise short LINE1, 2 and FUSE1, 2. |
| Load | Output pin of the module. This pin is used to connect to the load. |
| FETCHK1, FETCHK2 | FET check input pins. Together with PWFLT1, 2 output pins, the FETCHK1, 2 pins can be used to determine the short-circuit fault of oring MOSFETs. |
| LINE1HI, LINE2HI | These two pins indicate which channel has higher line voltage. The pin of higher line voltage gives open drain output, otherwise it is shorted to GND. |
| GND | Ground of the module. This pin should be connected to 28V return. |
| $\overline{PWRFLT1}$, $\overline{PWRFLT2}$ | Output pin of fault detection. (see Fault Table for details) |
| $\overline{FUSEFLT1}$, $\overline{FUSEFLT2}$ | Output pin of blown fuse detection. |

FAULT TABLE¹

| FETCHK | V _{DS} (V) <250mV | V _{FUSE} (V) >3.5V | V _{LINE} (V) >26V | $\overline{FUSEFLT}$ | \overline{PWRFLT} | COMMENTS |
|-------------------|-------------------------------|--------------------------------|-------------------------------|----------------------|---------------------|--|
| Low | True | True | True | Hi-Z | Hi-Z | Normal operation |
| Low | True | True | False | Hi-Z | Pull-Down | V _{LINE1} <26V |
| Low | True | False | True | Pull-Down | Hi-Z | Blown fuse |
| Low | True | False | False | Pull-Down | Pull-Down | V _{LINE1} <3.5V or Combination of proceeding two faults |
| Low | False | True | True | Hi-Z | Pull-Down | Open-circuit fault in MOSFETs or I _{load} >180A |
| High ² | True | True | True | Hi-Z | Hi-Z | Short-circuit fault in MOSFETs |
| High ² | False | True | True | Hi-Z | Pull-Down | Good MOSFETs |

Note1: Fault table is valid for both line1 and line2.

Note2: FETCHK can only be applied on the line with pin LINE1(2)HI high.

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TYPICAL APPLICATIONS

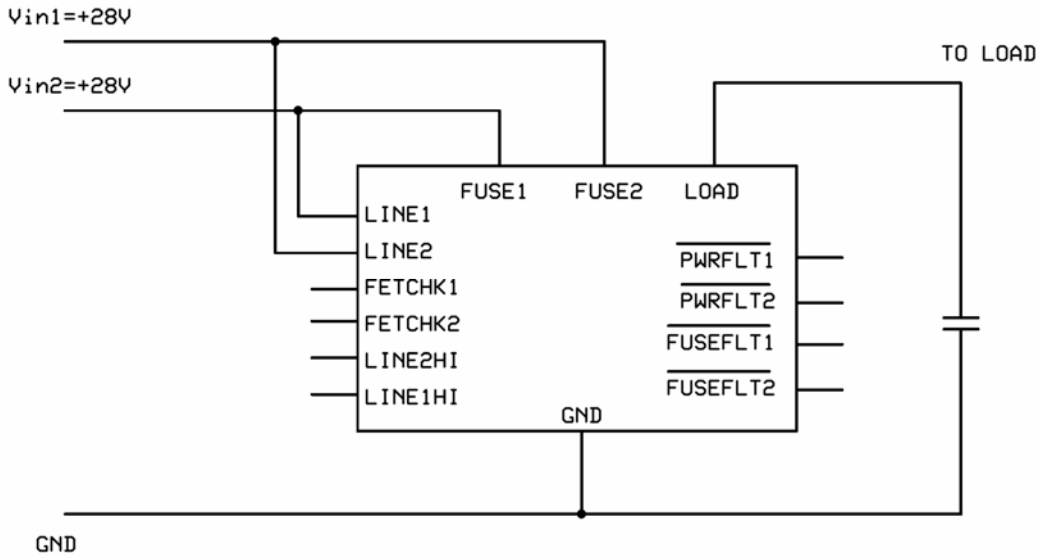


Fig. 1 Basic application

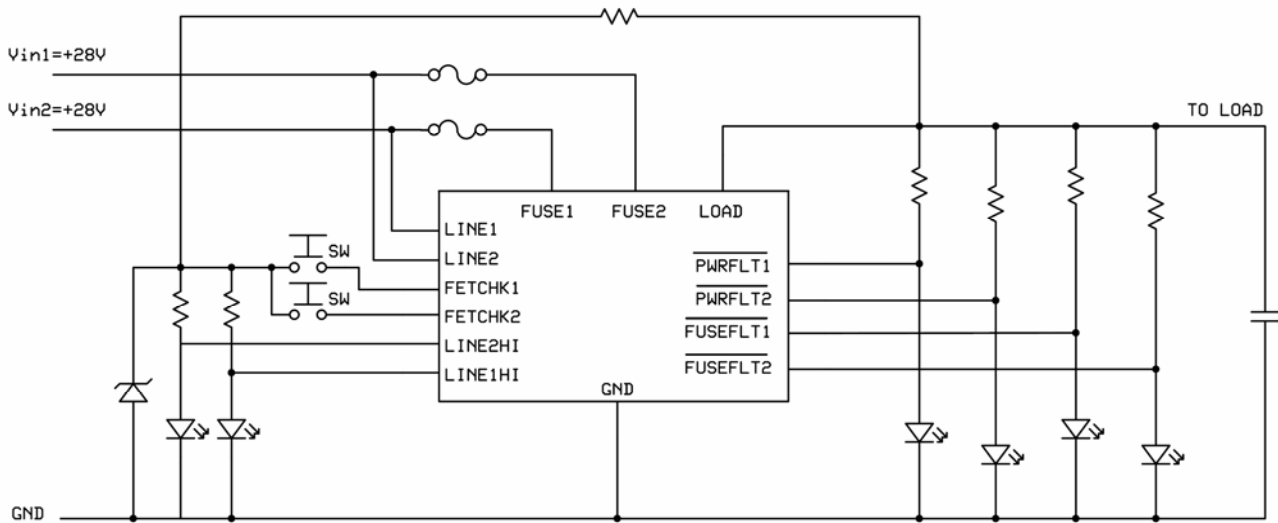


Fig. 2 A design example

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TYPICAL PERFORMANCE CHARACTERISTICS (Tested under 25°C unless otherwise specified)

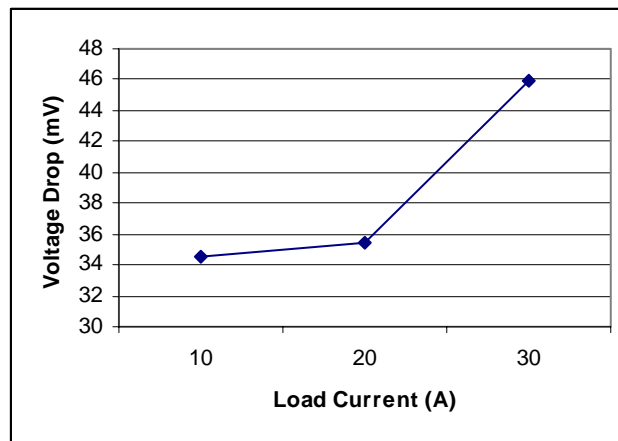


Fig3. Input and output voltage drop versus load current

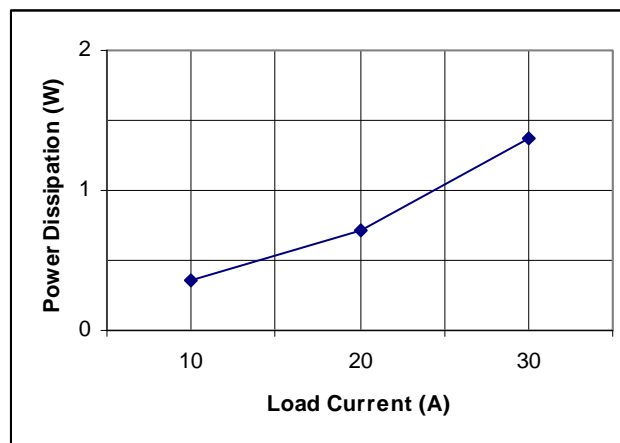


Fig4. Power dissipation loss versus load current

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