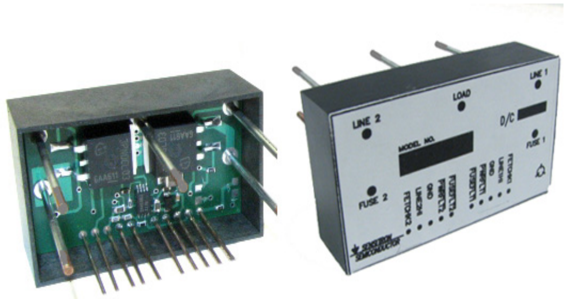
SENSITRON
SEMICONDUCTOR

TECHNICAL DATA
DATA SHEET 5054, REV-

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

PHYSICAL CHARACTERISTICS

TEMPERATURE	
Operating Temperature	$T_A = -40^\circ C$ To $85^\circ C$
Storage Temperature	$T_A = -55^\circ C$ To $125^\circ C$

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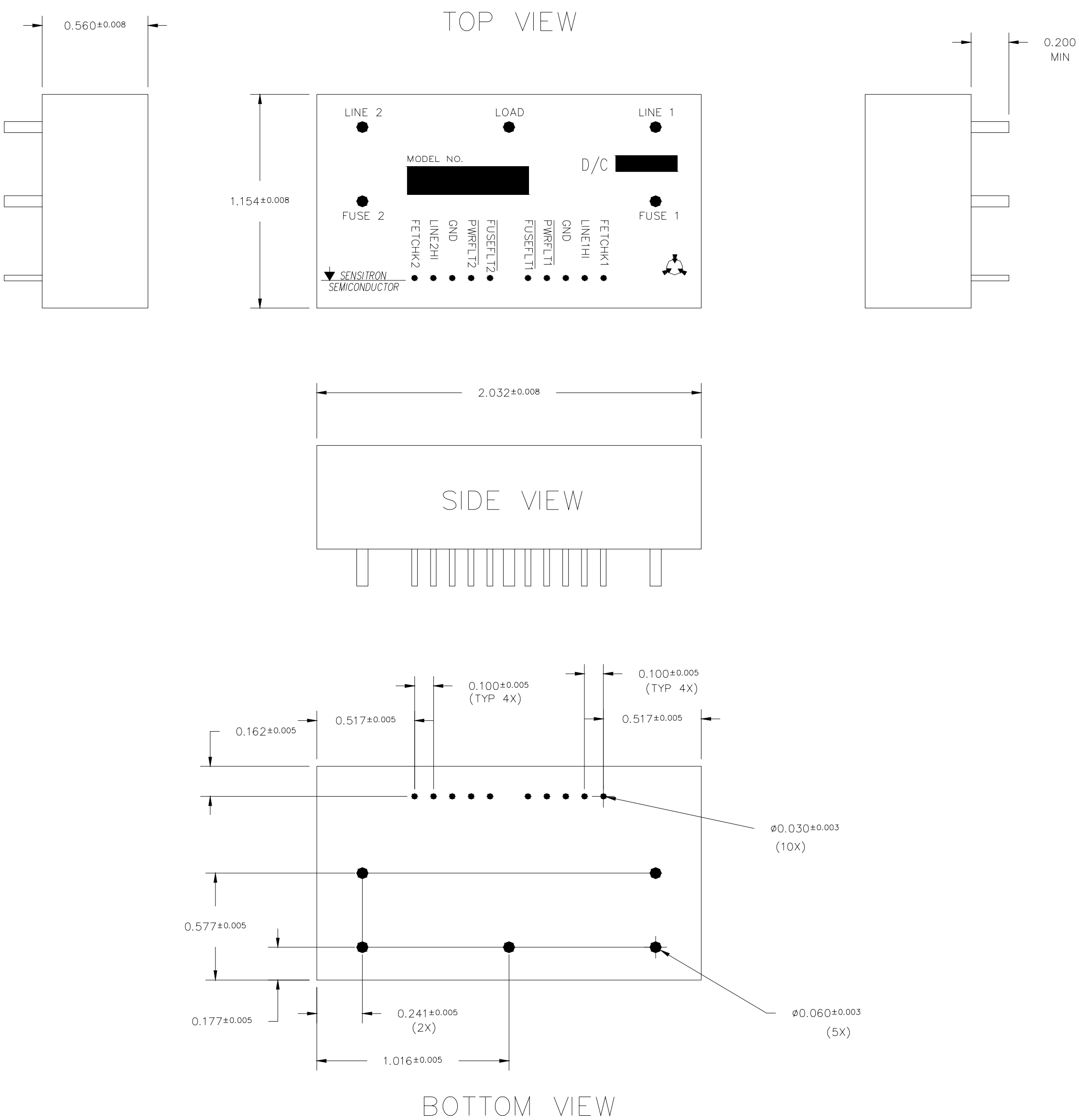
MECHANICAL DIMENSIONS (in Inches)



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)
$\overline{FUSEFLE1}$, $\overline{FUSEFLT2}$	Output pin of blown fuse detection.

FAULT TABLE[1]

FETCHK	V_{DS} (V) <250mV	V_{FUSE} (V) >3.5V	V_{LINE} (V) >26V	$\overline{FUSEFLT}$	$\overline{PWRFLT}$	COMMMENTS
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

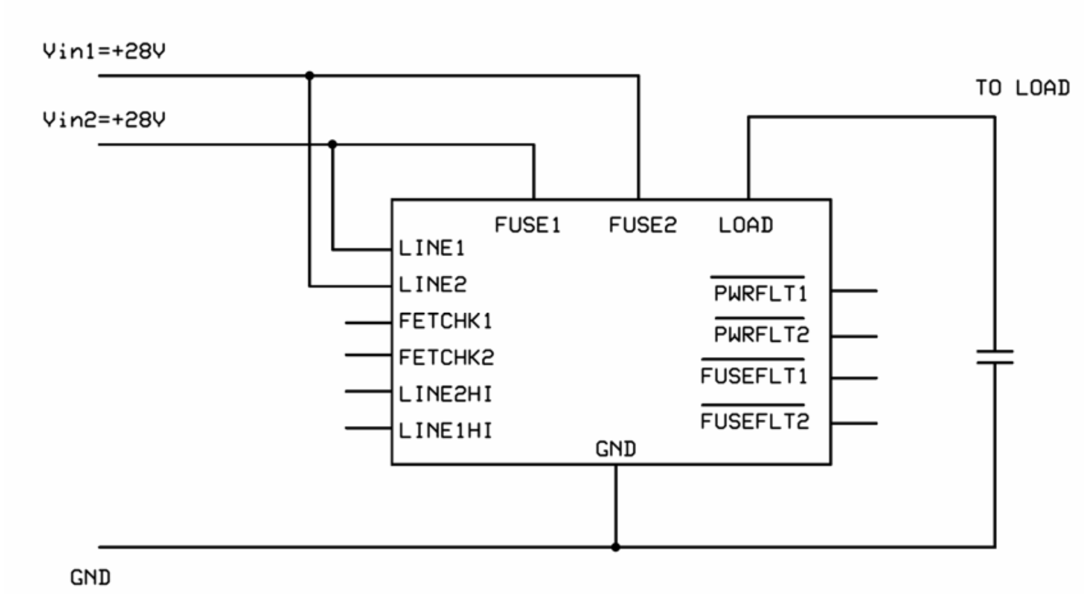

Fig. 1 Basic application

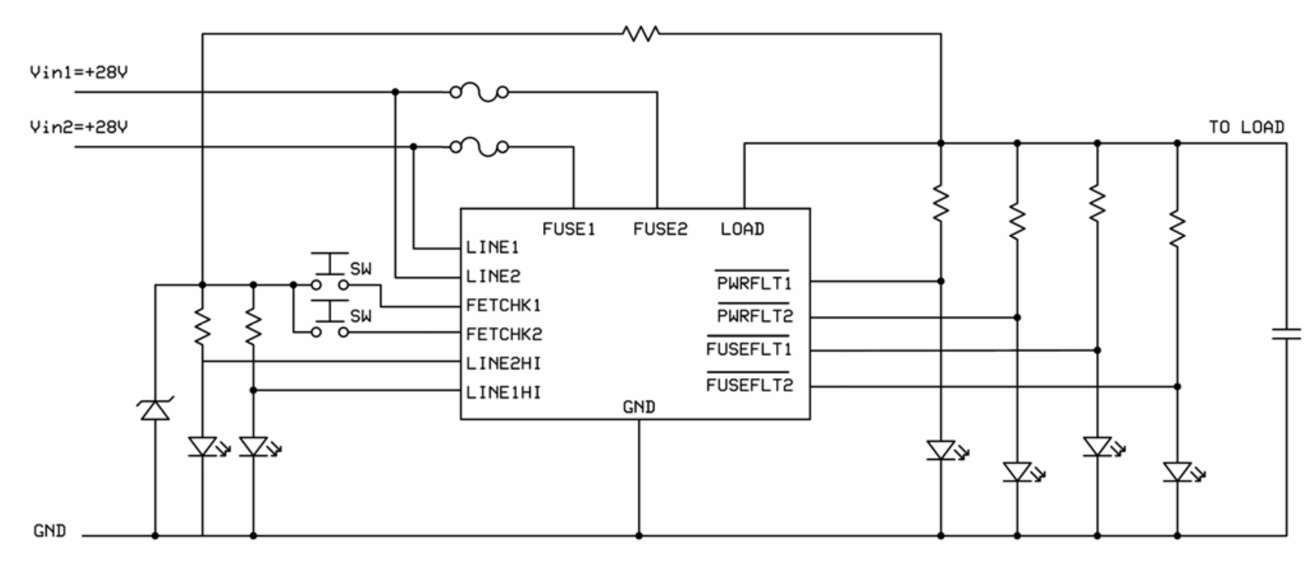

Fig. 2 A design example

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

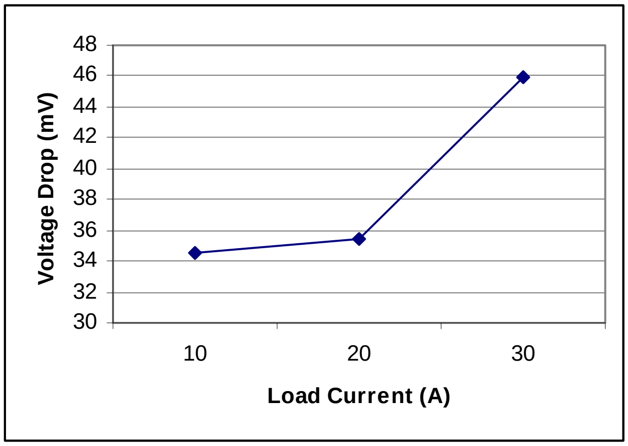

Fig3. Input and output voltage drop versus load current

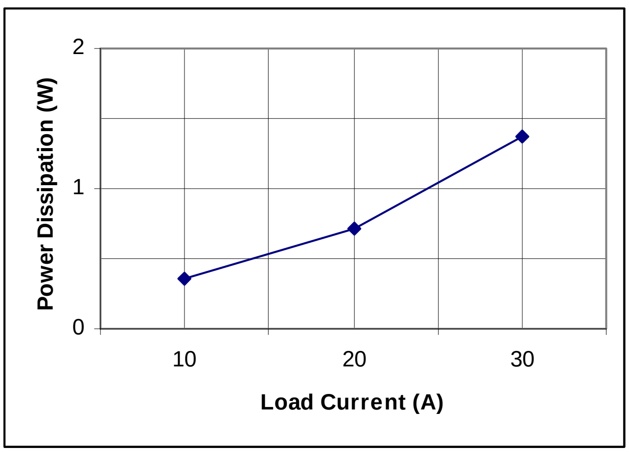

Fig4. Power dissipation loss versus load current

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