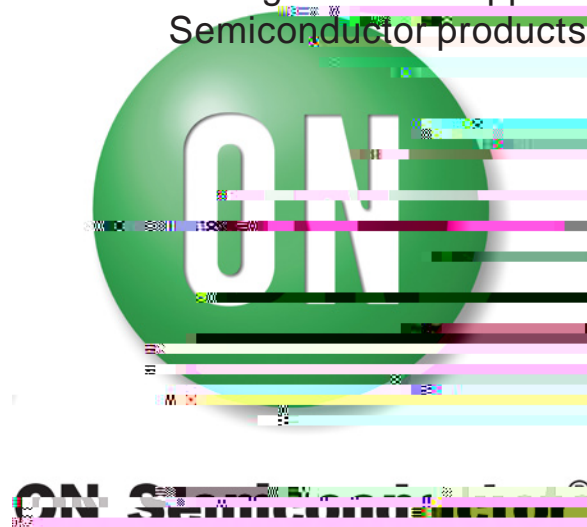


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to make changes without further notice to any products arising out of the application or use of any product or ON Semiconductor products, including compliance with all I



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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (\_), the underscore (\_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (\_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at [www.onsemi.com](http://www.onsemi.com). Please email any questions regarding the system integration to [Fairchild\\_questions@onsemi.com](mailto:Fairchild_questions@onsemi.com).

**FAIRCHILD**

SEMICONDUCTOR



### Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

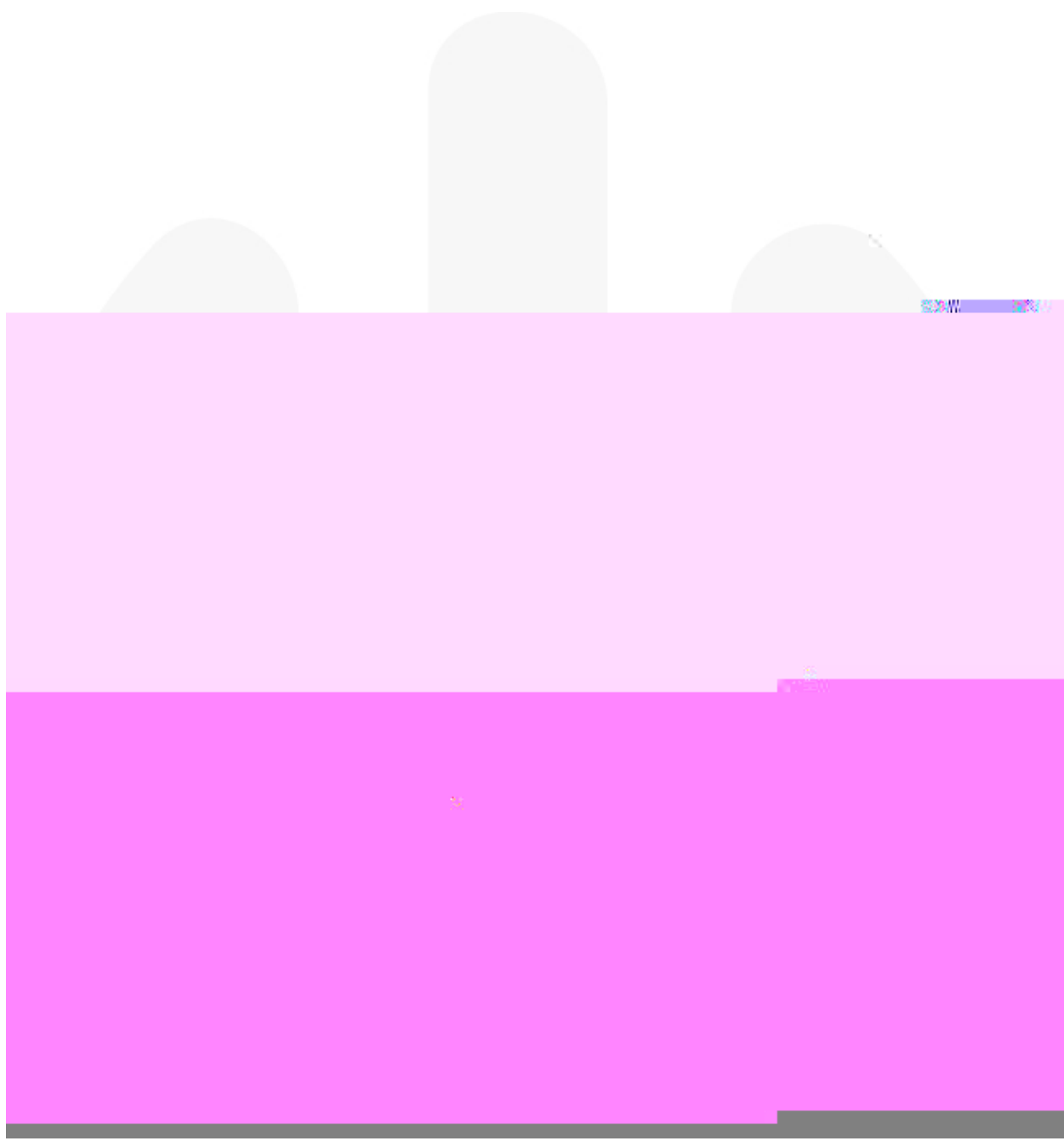
Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Power Supply		10	mA
P <sub>D</sub>	Internal Power Dissipation		500	mW
T <sub>STG</sub>	Storage Temperature Range	-65	+150	°C
T <sub>A</sub>	Operating Temperature Range	-35	+80	°C
T <sub>J</sub>	Junction Temperature		125	°C
T <sub>L</sub>	Lead Soldering Temperature	10 Seconds, SOIC	+100	°C
		60 Seconds, DIP	300	

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
4 <sub>JA</sub>	Thermal Resistance	SOIC	2.0	°C/W
		DIP	160	

### Electrical Characteristics

$I_{LINE} = 1.5mA$  and  $T_A = +25^{\circ}C$ ,  $R_{SET} = 650k$



## Circuit Operation

(Refer to Figure 1 and Figure 3.)

The precision op amp connected to pins 1 through 3 senses the fault current flowing in the secondary of the sense transformer, converting it to a voltage at pin 1. The ratio of secondary current to output voltage is directly proportional to feedback resistor,  $R_{SET}$ .

$R_{SET}$  converts the sense transformer secondary current to a voltage at pin 1. Due to the virtual ground created at the sense amplifier input by its negative feedback loop, the sense transformer's burden is equal to the value of  $R_{IN}$ . From the transformer's point of view, the ideal value for  $R_{IN}$  is 0 . This causes it to operate as a true current transformer with minimal error. However, making  $R_{IN}$  equal to zero creates a large offset voltage at pin 1 due to the sense amplifier's very high DC gain.  $R_{IN}$  should be selected as high as possible, consistent with preserving the transformer's operation as a true current mode transformer. A typical value for  $R_{IN}$  is between 200 and 1000 .

As seen in Equation (1), maximizing  $R_{IN}$  minimizes the DC offset error at the sense amplifier output. The DC offset voltage at pin 1 contributes directly to the trip current error. The offset voltage at pin 1 is:

$$V_{OS} = \mu R_{SET} / (R_{IN} + R_{SEC}) \quad (1)$$

where:

$V_{OS}$  = Input offset voltage of sense amplifier;

$R_{SET}$  = Feedback resistor;

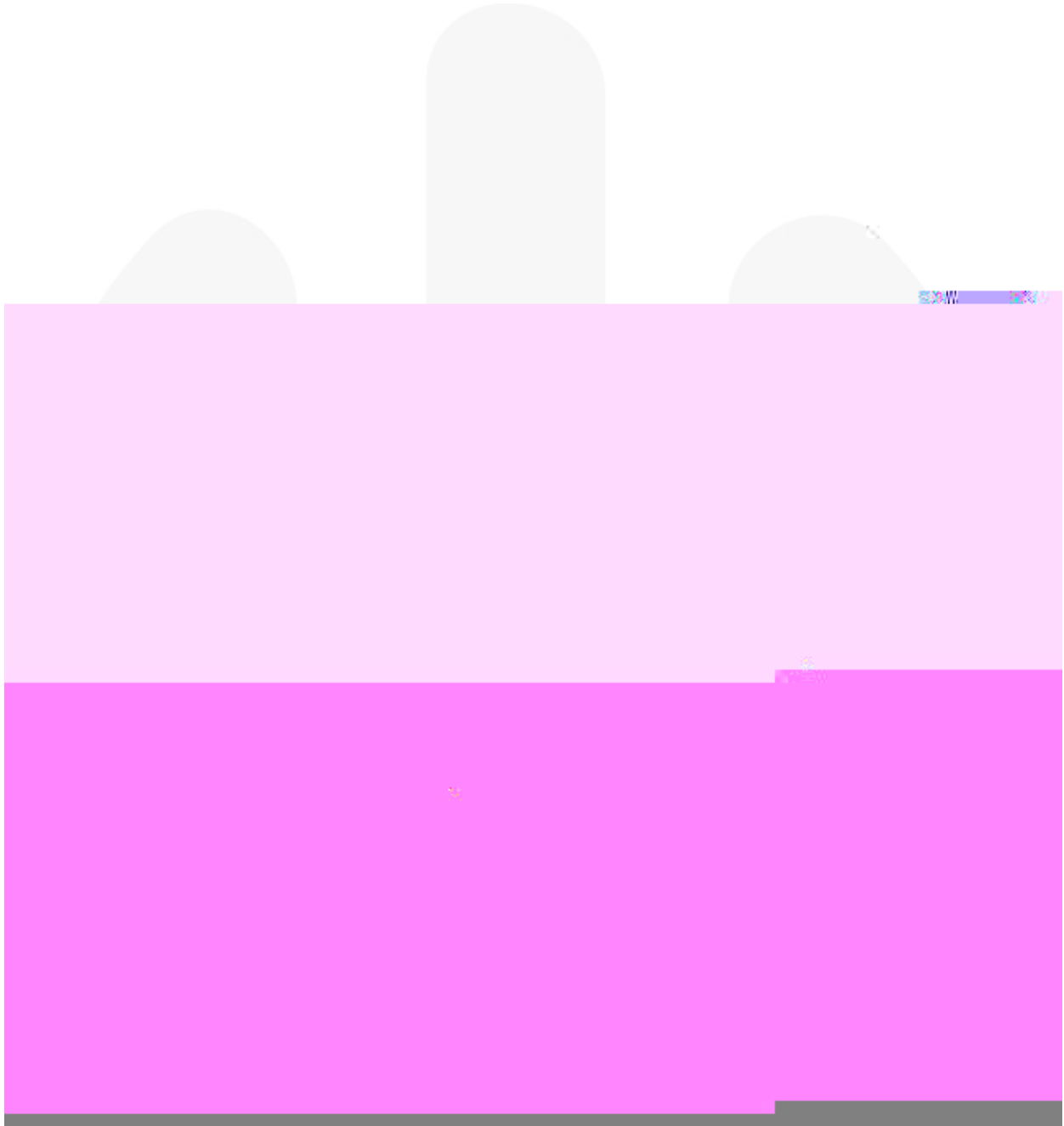
$R_{IN}$  = Input resistor;

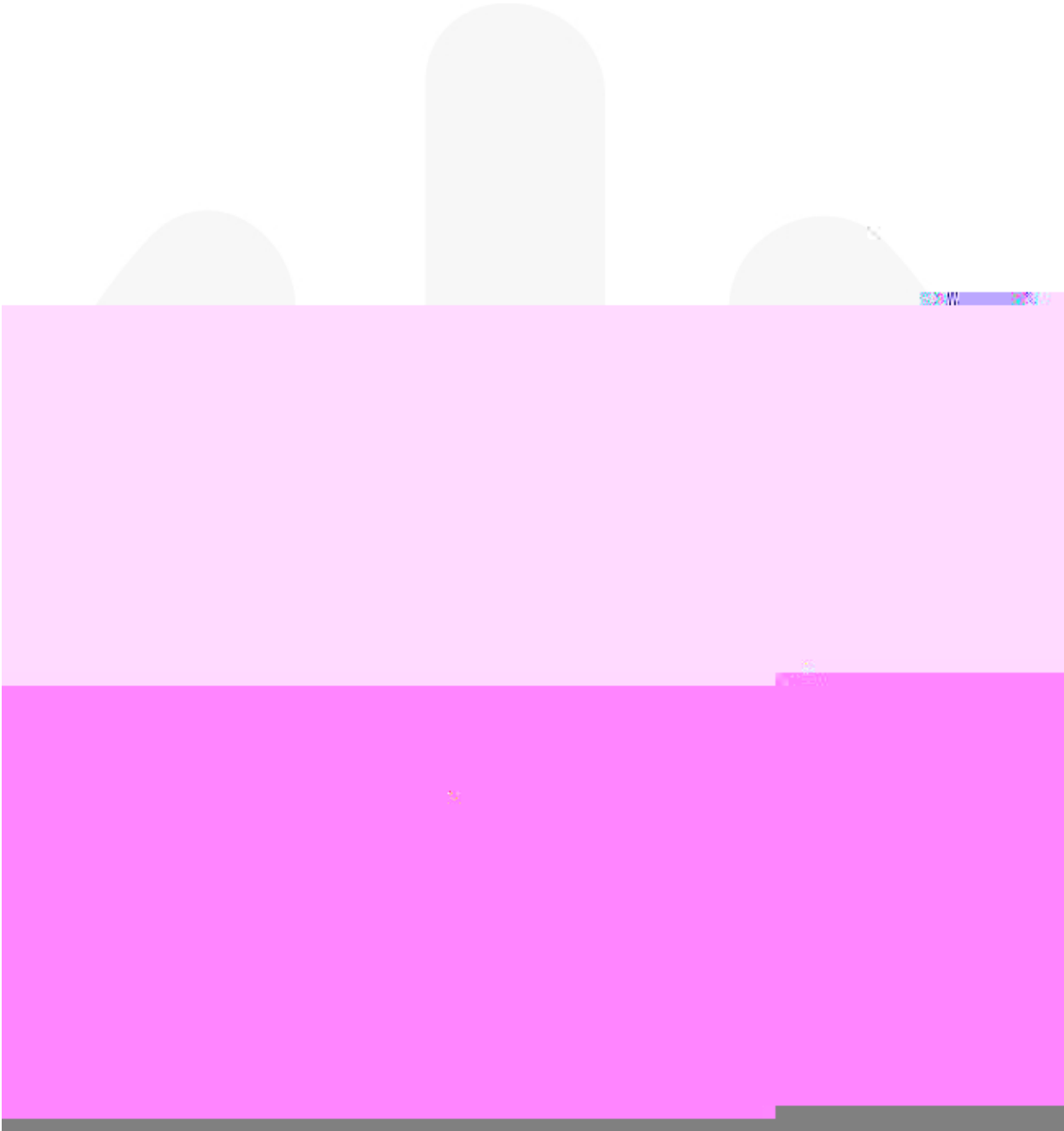
$R_{SEC}$  = Transformer secondary winding resistance.

The sense amplifier has a specified maximum offset voltage of 200  $\mu V$  to minimize trip current errors. Two comparators connected to the sense amplifier output are configured as a window detector, whose references are -6.5V and +6.5V, referred to pin 3. When the sense transformer secondary RMS current exceeds  $4.6/R_{SET}$ , the output of the window detector starts the delay circuit. If the secondary current exceeds the predetermined trip current for longer than the delay time, a current pulse appears at pin 7, triggering the SCR.

The SCR anode is directly connected to a solenoid or

The SCR anode is directly connected to a solenoid or relay coil. It can be tripped only when its anode is more positive than its cathode.



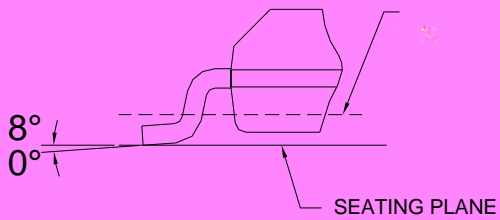
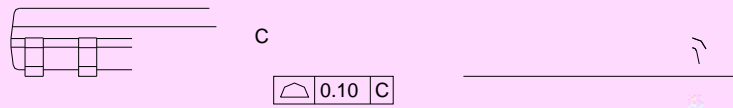




## Physical Dimensions

LAND PATTERN RECOMMENDATION

SEE DETAIL A



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA, ISSUE C,
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) LANDPATTERN STANDARD: SOIC127P600X175-8M.
- E) DRAWING FILENAME: M08AREV13

