



## GF4147

Preliminary

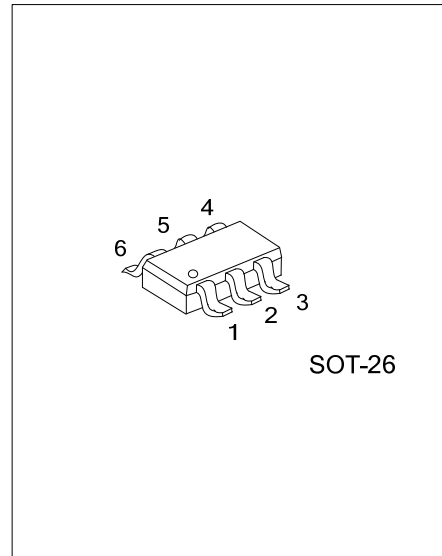
LINEAR INTEGRATED CIRCUIT

### GROUND FAULT INTERRUPTER

#### DESCRIPTION

The UTC **GF4147** is a low-power Ground Fault Interrupter controller for detecting hazardous current paths to ground and ground-to-neutral faults. The UTC **GF4147** application circuit opens the load contacts before a harmful shock occurs.

The UTC **GF4147** circuitry has a built-in rectifier and shunt regulator that operates with a low quiescent current. The low- $V_{OS}$  offset-sense amplifier allows direct coupling of the sense coil to the amplifier's feedback signal. This eliminates the large 50/60Hz AC-coupling capacitor.



#### FEATURES

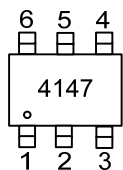
- \* For GFCI and RCD Applications
- \* Built-in AC Rectifier
- \* Built-in Noise Filter
- \* Low-Voltage SCR Disable
- \* Direct DC Coupled to Sense Coil
- \* SCR Gate Driver
- \* Adjustable Sensitivity
- \* Low Quiescent Current
- \* Minimum External Components
- \* Ideal for 120V or 220V Systems

#### ORDERING INFORMATION

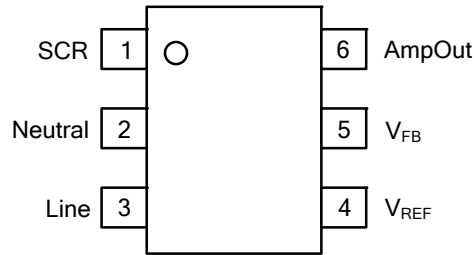
Ordering Number		Package	Packing
Lead Free	Halogen Free		
GF4147L-AG6-R	GF4147G-AG6-R	SOT-26	Tape Reel

<p>GF4147G-AG6-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AG6: SOT-26</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
---	--

#### MARKING



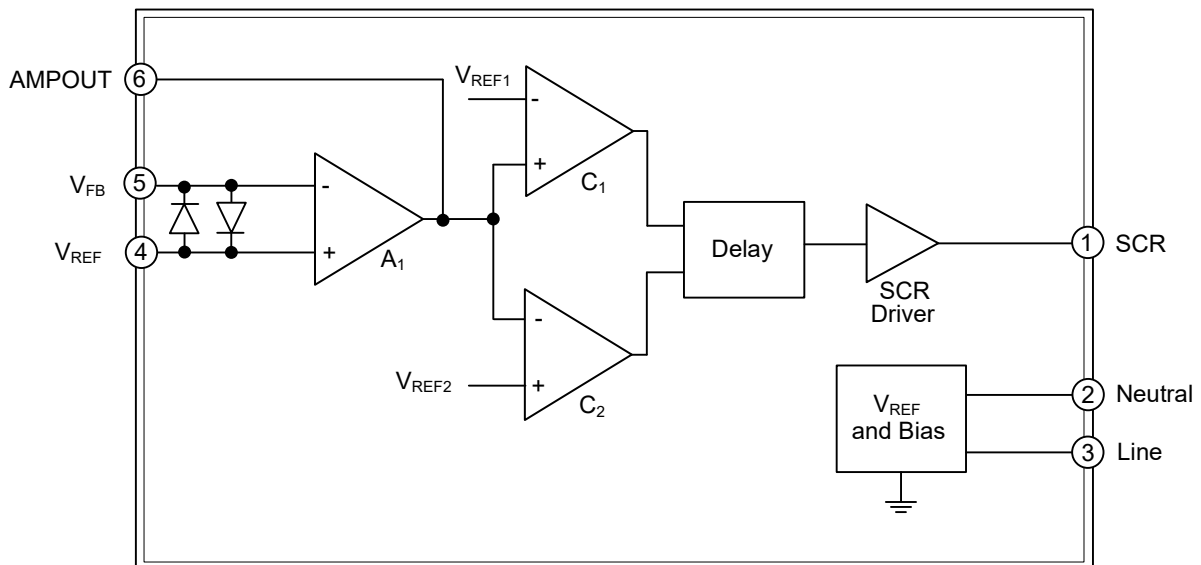
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	SCR	Gate drive for external SCR
2	Neutral	Supply input
3	Line	Supply input
4	$V_{REF}$	Non-inverting input for current-sense amplifier
5	$V_{FB}$	Inverting input for current-sense amplifier
6	AmpOut	current-sense amplifier output

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

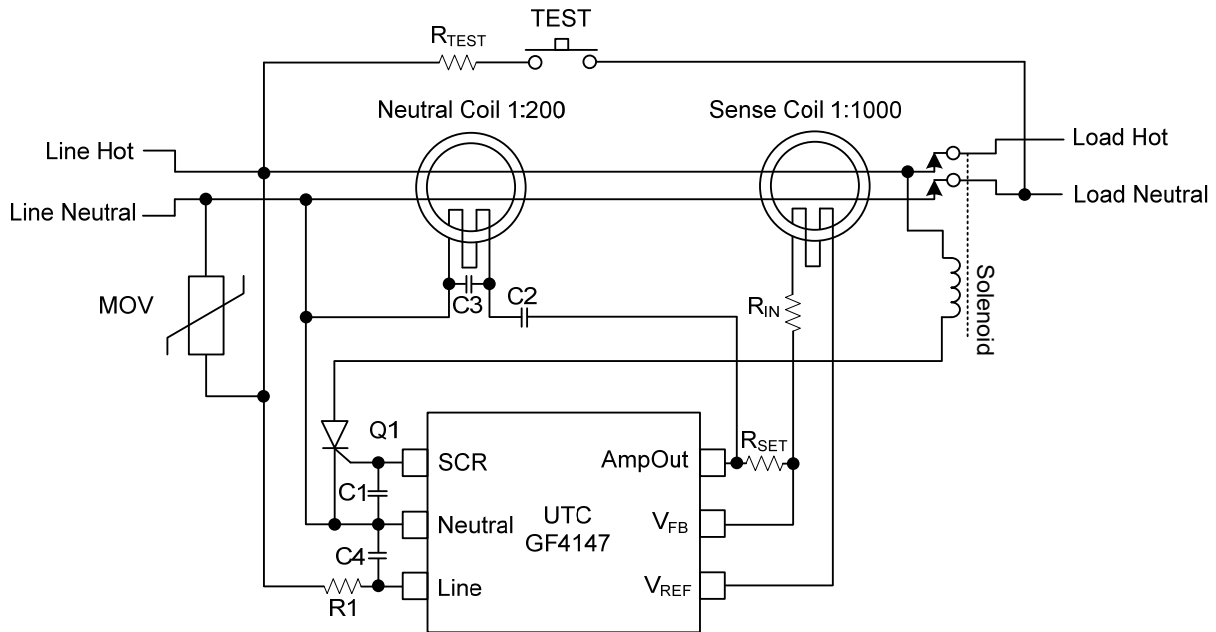
PARAMETER	SYMBOL	RATINGS	UNIT
Continuous Supply Current, Line to Neutral	$I_{CC}$	15	mA
Continuous Supply Voltage, Line to Neutral	$V_{CC}$	16	V
Continuous Voltage to Neutral, All Other Pins		-0.8~15	V
Storage Temperature	$T_{STG}$	-65~+150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ( $I_{LINE}=1.5mA$  and  $T_A=25^\circ C$ ,  $R_{SET}=650k\Omega$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>DC Electrical Parameters (<math>T_A=25^\circ C</math>, <math>I_{shunt}=1mA</math>)</b>						
Power Supply Shunt Regulator Voltage	$V_{REG}$	Line to Neutral	12.2	12.7	13.2	V
		Line to Neutral $I_{shunt}=-2mA$	-0.9	-0.7		V
Quiescent Current	$I_Q$	Line to Neutral=10V	350	415	480	$\mu A$
Reference Voltage	$V_{REF}$	VREF to Neutral	5.8	6.0	6.2	V
Trip Threshold	$V_{TH}$	AmpOut to VREF	3.4	3.5	3.6	V
Amplifier Offset	$V_{OS}$	Gain=1000	-450	0	450	$\mu V$
Amplifier Positive Voltage Swing	$V_{SW+}$	AmpOut to VREF, $I_{FAULT}=10\mu A$	4.0			V
Amplifier Negative Voltage Swing	$V_{SW-}$	VREF to AmpOut, $I_{FAULT}=-10\mu A$	4.0			V
Amplifier Current Sink	$I_{SINK}$	AmpOut= $V_{REF} - 3V$ , $V_{FB}=V_{REF} + 100mV$	400			$\mu A$
Amplifier Current Source	$I_{SRL}$	AmpOut= $V_{REF} + 3V$ , $V_{FB}=V_{REF} - 100mV$	400			$\mu A$
Delay Filter	$t_d$	Delay from $C_1$ trip to SCR L->H	1	1.35	1.7	ms
SCR Output Resistance	$R_{OUT}$	SCR to Neutral=250mV, AmpOut= $V_{REF}$		0.5	1.0	K $\Omega$
SCR Output Voltage	$V_{OUT}$	SCR to Neutral AmpOut= $V_{REF}$		1	10	mV
		SCR to Neutral AmpOut= $V_{REF}+4V$	2.5			V
SCR Output Current	$I_{OUT}$	SCR to Neutral=1V, AmpOut= $V_{REF} + 4V$	350	500		$\mu A$

■ TYPICAL APPLICATION CIRCUIT



**BOM**

Reference	Component	Reference	Component
C1	22nF	R <sub>TEST</sub>	15KΩ
C2	10nF	R <sub>IN</sub>	470Ω
C3	1nF	R <sub>SET</sub>	511KΩ
C4	10nF	R1	91KΩ

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.