



## GF4149

Preliminary

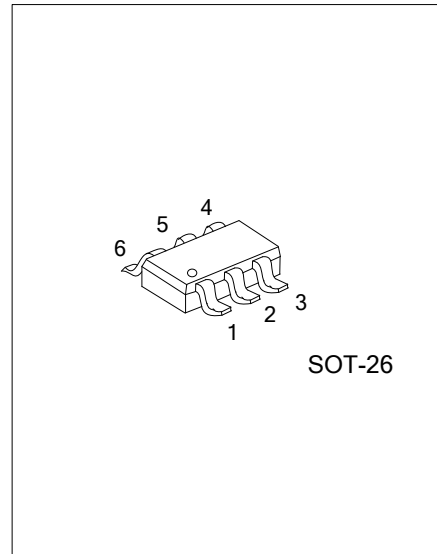
LINEAR INTEGRATED CIRCUIT

# GROUND FAULT INTERRUPTER

### DESCRIPTION

The UTC **GF4149** is a low-power controller for detecting hazardous current paths to ground and ground-to-neutral faults. The UTC **GF4149** application circuit opens the load contacts before a harmful shock occurs.

The UTC **GF4149** contains a precision bandgap 14V shunt regulator, precision low- $V_{OS}$  sense amplifier, time-delay noise filter, window-detection comparators, and an SCR driver. The SCR driver provides increased current and temperature compensation to allow for a wider selection of external SCRs.



SOT-26

### FEATURES

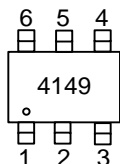
- \* Precision Sense Amplifier and Bandgap Reference
- \* Low- $V_{OS}$  Offset
- \* Built-in Noise Filter
- \* High-Current SCR Gate Driver
- \* Adjustable Sensitivity
- \* Low Quiescent Current
- \* Minimum External Components
- \* Ideal for 120V or 220V Systems

### ORDERING INFORMATION

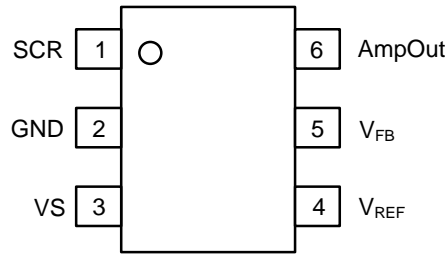
Ordering Number		Package	Packing
Lead Free	Halogen Free		
GF4149L-AG6-R	GF4149G-AG6-R	SOT-26	Tape Reel

<p>GF4149G-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>
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### MARKING



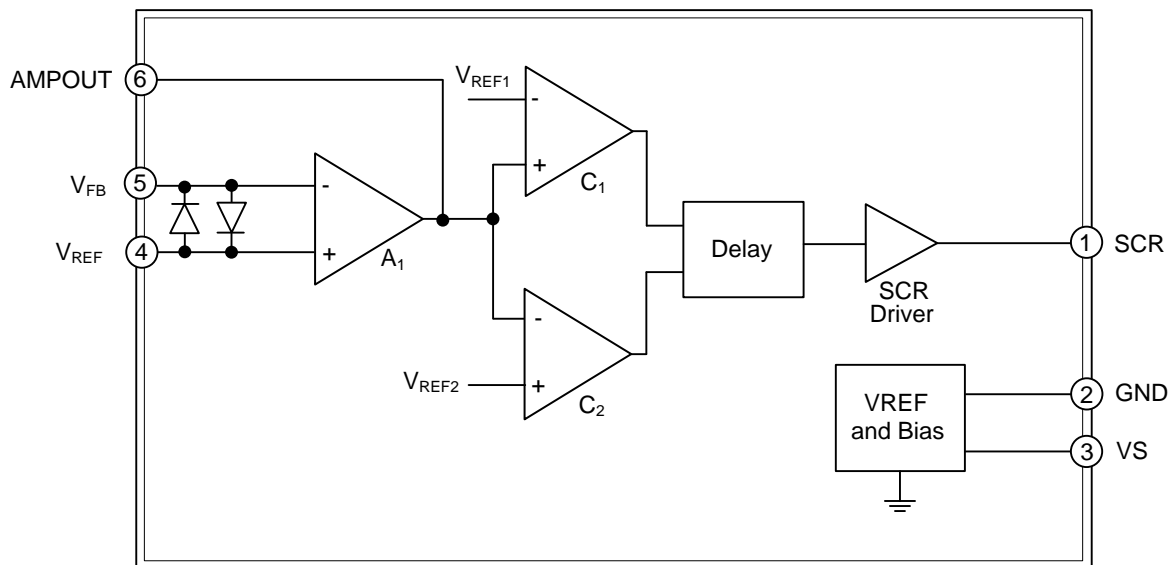
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	SCR	Gate drive for external SCR
2	GND	Supply input
3	VS	Supply input
4	V <sub>REF</sub>	Non-inverting input
5	V <sub>FB</sub>	Inverting input
6	Amp Out	Current-sense amplifier output

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

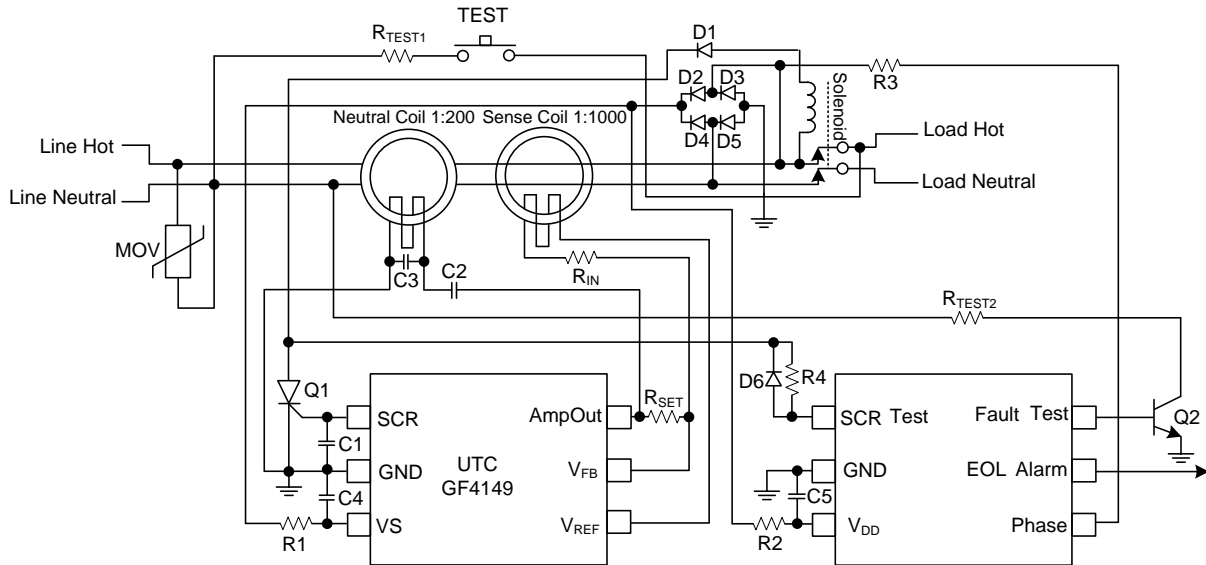
PARAMETER	SYMBOL	RATINGS	UNIT
Continuous Supply Current, VS to GND	$I_{CC}$	15	mA
Continuous Supply Voltage to GND, All Pins	$V_{CC}$	-0.8~16	V
Storage Temperature	$T_{STG}$	-65~+150	°C

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.

### ■ DC ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_A=25^{\circ}\text{C}$ , $I_{shunt}=1\text{mA}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Supply Shunt Regulator Voltage	$V_{REG}$	VS to GND	13.7	14.0	14.3	V
Quiescent Current	$I_Q$	Line to GND=10V	425	500	575	$\mu\text{A}$
Reference Voltage	$V_{REF}$	VREF to GND	6.85	7.00	7.15	V
Trip Threshold	$V_{TH}$	Amp Out to VREF	4.35	4.50	4.65	V
Amplifier Offset	$V_{OS}$	Gain=1000	-175	$\pm 50$	175	$\mu\text{V}$
Amplifier Positive Voltage Swing	$V_{SW+}$	Amp Out to VREF, $I_{FAULT}=10\mu\text{A}$	5.5			V
Amplifier Negative Voltage Swing	$V_{SW-}$	VREF to Amp Out, $I_{FAULT}=-10\mu\text{A}$	5.5			V
Amplifier Current Sink	$I_{SINK}$	Amp Out= $V_{REF} - 3\text{V}$ , $V_{FB}=V_{REF} + 100\text{mV}$	400			$\mu\text{A}$
Amplifier Current Source	$I_{SRL}$	Amp Out= $V_{REF} + 3\text{V}$ , $V_{FB}=V_{REF} - 100\text{mV}$	400			$\mu\text{A}$
Delay Filter	$t_d$	Delay from $C_1$ trip to SCR L->H	0.65	1.5		ms
SCR Output Resistance	$R_{OUT}$	SCR to GND=250mV, Amp Out= $V_{REF}$		0.5	1.0	K $\Omega$
SCR Output Voltage	$V_{OUT}$	SCR to GND Amp Out= $V_{REF}$ SCR to GND Amp Out= $V_{REF}+5\text{V}$		1	10	mV V
SCR Output Current	$I_{OUT}$	SCR to GND =1V, Amp Out= $V_{REF} + 5\text{V}$ , $I_{SHUNT}=2\text{mA}$	650	725		$\mu\text{A}$

■ TYPICAL APPLICATION CIRCUIT



BOM

Reference	Component	Reference	Component
C1	22nF	R <sub>TEST1</sub>	15KΩ
C2	10nF	R <sub>TEST2</sub>	10KΩ
C3	5.6nF	R <sub>IN</sub>	470Ω
C4	220nF	R <sub>SET</sub>	750KΩ
C5	1μF	R1	75KΩ
		R2	75KΩ
		R3	1MΩ
		R4	909KΩ

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