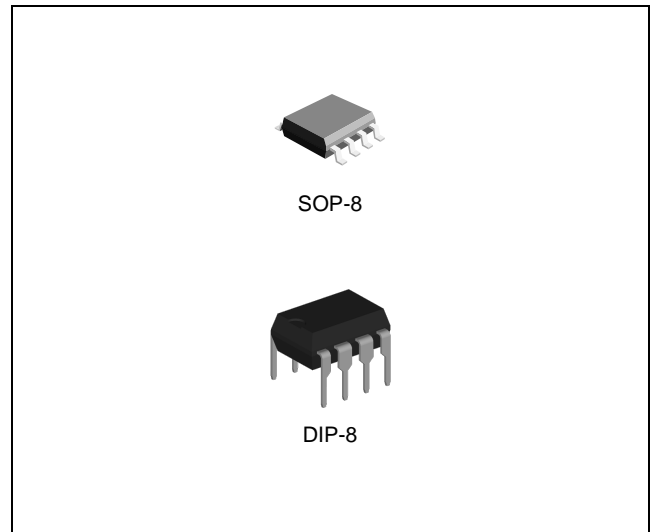


## FEATURES

- Low Power Consumption ( $P_D=5\text{mW}$  Typ.)
- 100V/ 200V Common Built-In Voltage Regulator
- High Gain Differential Amplifier
- High Input Sensitivity
- Minimum External Parts
- Large Surge Margin
- Wide Operating Temperature Range
- High Noise Immunity

## APPLICATIONS

- High Speed Earth Leakage Circuit Breaker



## ORDERING INFORMATION

Device	Package
GL7101SD	SOP-8
GL7101AD	SOP-8
GL7101SN	DIP-8
GL7101AN	DIP-8

## DESCRIPTION

The GL7101 is designed for use in earth leakage circuit interrupters for operation directly off the AC line in breakers. It contains pre-regulator, main regulator, after regulator, differential amplifier, level comparator, and latch circuit. The input in the differential amplifier is connected to the secondary node of zero current transformer. The level comparator generates high level when earth leakage current is greater than some level.

## ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage	$V_S$	-	20	V
Power Supply Current	$I_S$	-	8	mA

Note1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## RECOMMENDED OPERATING CONDITIONS (Note 2)

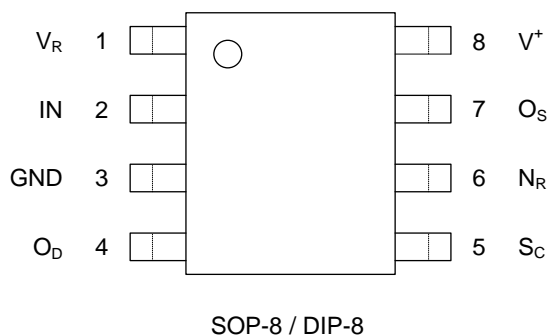
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage	$V_S$	12	-	V
$V_S$ -GND Capacitor	$C_{VS}$	1	-	$\mu F$
$O_S$ -GND Capacitor	$C_{OS}$	-	1	$\mu F$
Operating Ambient Temperature Range	$T_A$	-30	85	$^{\circ}C$

Note 2. The device is not guaranteed to function outside its operating ratings.

## ORDERING INFORMATION

Order No.	Package	Description	Supplied As	Status
GL7101SD	SOP-8	Trip Voltage: 11.5mV to 13.86mV	Reel & Tape	Active
GL7101SN	DIP-8	Trip Voltage: 11.5mV to 13.86mV	Tube	Active
GL7101AD	SOP-8	Trip Voltage: 13.86mV to 15.6mV	Reel & Tape	Active
GL7101AN	DIP-8	Trip Voltage: 13.86mV to 15.6mV	Tube	Active

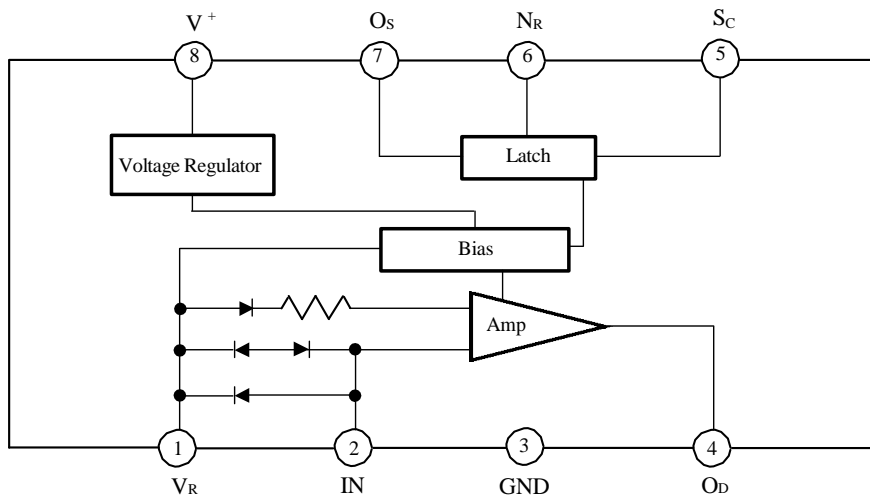
## PIN CONFIGURATION



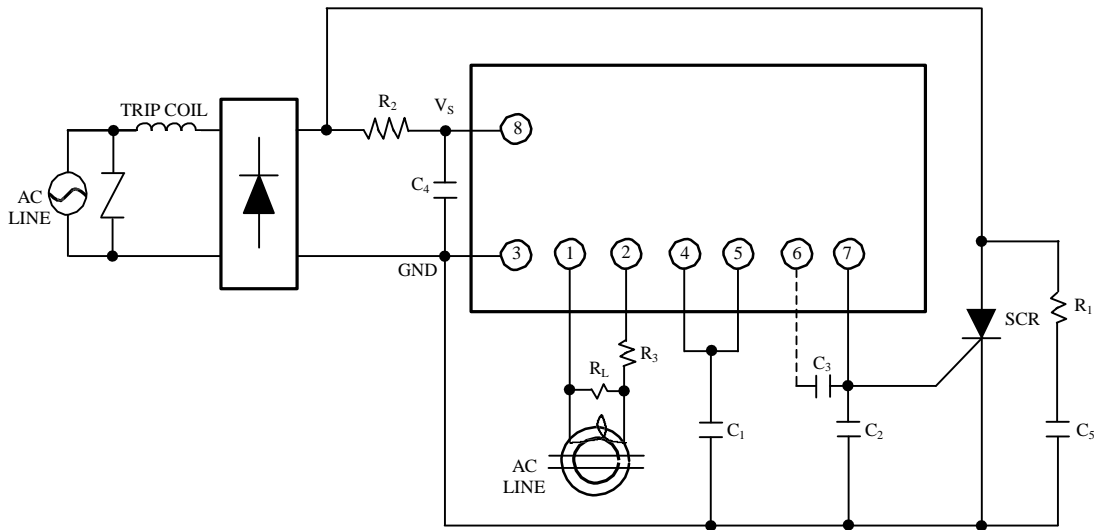
## PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
SOP-8	DIP-8		
1	1	V <sub>R</sub>	Reference Voltage
2	2	IN	Input
3	3	GND	Ground
4	4	O <sub>D</sub>	Differential Amplifier Output
5	5	S <sub>C</sub>	Latch Input
6	6	N <sub>R</sub>	Terminal for Noise Absorption
7	7	O <sub>S</sub>	Output
8	8	V <sup>+</sup>	Power Supply (V <sub>S</sub> )

## BLOCK DIAGRAM



## TYPICAL APPLICATION CIRCUIT



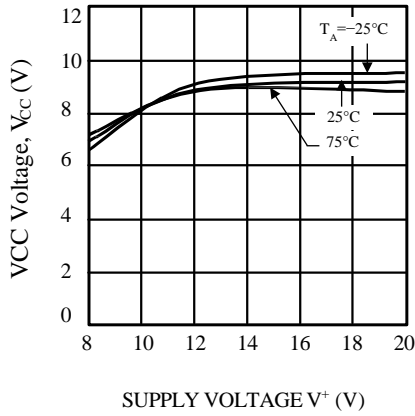
## ELECTRICAL CHARACTERISTICS

Specifications with standard typeface are for  $T_A = 25^\circ\text{C}$ , and specifications in **boldface type** apply over **full operating temperature range** ( $T_A = -30^\circ\text{C}$  to  $85^\circ\text{C}$ ) unless otherwise noted.

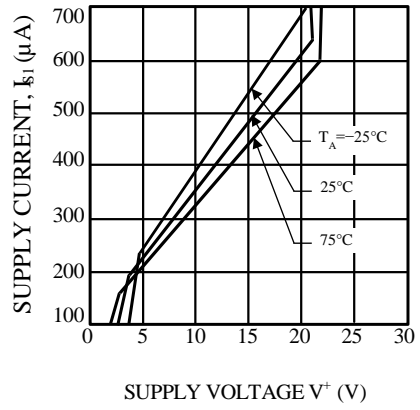
SYMBOL	PARAMETER	TEST CONDITION		TEST CIRCUIT	MIN	TYP	MAX	UNIT
$I_{S1}$	Supply Current 1	$V_S=12\text{V}$ , $V_R-V_I=30\text{mV}$	$T_A=-30^\circ\text{C}$	1	-	-	580	$\mu\text{A}$
			$T_A=25^\circ\text{C}$		-	400	530	
			$T_A=85^\circ\text{C}$		-	-	480	
$V_T$	Trip Voltage	$V_S=16\text{V}$ , $V_R-V_I=X$	S Version	2	<b>11.50</b>	-	<b>13.86</b>	mV rms
			A Version		<b>13.86</b>	-	<b>15.60</b>	mV rms
$I_{TD1}$	Differential Amplifier Output Current 1	$V_S=16\text{V}$ , $V_R-V_I=30\text{mV}$ , $V_{OD}=1.2\text{V}$		3	-12	-	-30	$\mu\text{A}$
$I_{TD2}$	Differential Amplifier Output Current 2	$V_S=6\text{V}$ , $V_R-V_I=\text{short}$ , $V_{OD}=0.8\text{V}$		4	17	-	37	$\mu\text{A}$
$I_O$	Output Current	$V_{SC}=1.4\text{V}$ , $V_{OS}=0.8\text{V}$	$I_{S1}=580\mu\text{A}$ , $T_A=-30^\circ\text{C}$	5	-200	-	-	$\mu\text{A}$
			$I_{S1}=530\mu\text{A}$ , $T_A=25^\circ\text{C}$		-100	-	-	
			$I_{S1}=480\mu\text{A}$ , $T_A=85^\circ\text{C}$		-75	-	-	
$V_{SCON}$	SC On Voltage	$V_S=16\text{V}$		6	0.7	-	1.4	V
$I_{SCON}$	SC Input Current	$V_S=12\text{V}$		7	-	-	5	$\mu\text{A}$
$I_{SOL}$	Output L Current	$V_S=12\text{V}$ , $V_{OSL}=0.2\text{V}$		8	<b>200</b>	-	-	$\mu\text{A}$
$V_{IC}$	Input Clamp Voltage	$V_S=12\text{V}$ , $I_{IC}=20\text{mA}$		9	<b>4.3</b>	-	<b>6.7</b>	V
$V_{IDC}$	Differential Input Clamp Voltage	$I_{IDC}=100\text{mA}$		10	<b>0.4</b>	-	<b>2</b>	V
$V_{SM}$	Max. Current Voltage	$I_{SM}=7\text{mA}$		11	20	-	28	V
$I_{S2}$	Supply Current 2	$V_{OS}=0.5\text{V}$ , $V_R-V_I=X$		12	-	-	<b>1200</b>	$\mu\text{A}$
$V_{SOFF}$	Latch Circuit Off Supply Voltage			13	0.5	-	-	V
$t_{ON}$	Response Time	$V_S=16\text{V}$ , $V_R-V_I=0.3\text{V}$		14	1		4	ms

## TYPICAL OPERATING CHARACTERISTICS

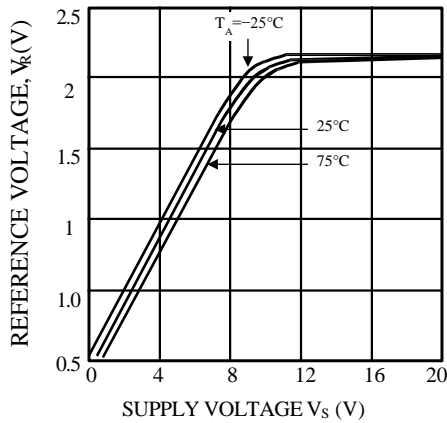
VCC VOLTAGE vs. SUPPLY VOLTAGE



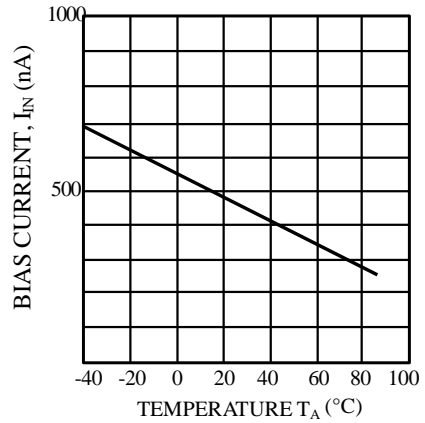
SUPPLY CURRENT vs. SUPPLY VOLTAGE



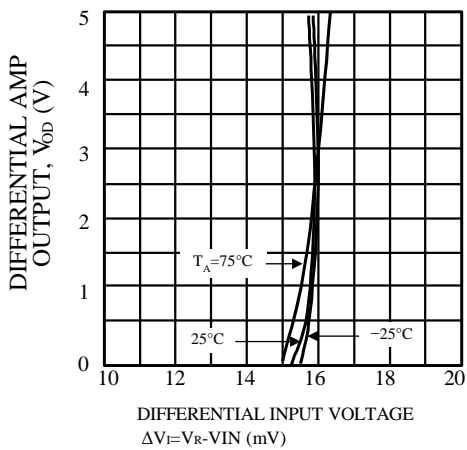
REFERENCE VOLTAGE vs. SUPPLY VOLTAGE



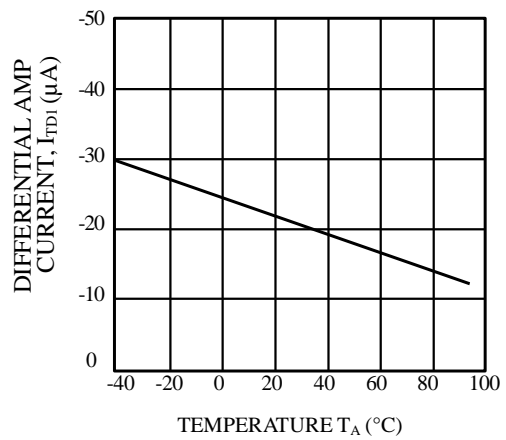
BIAS CURRENT vs. TEMPERATURE



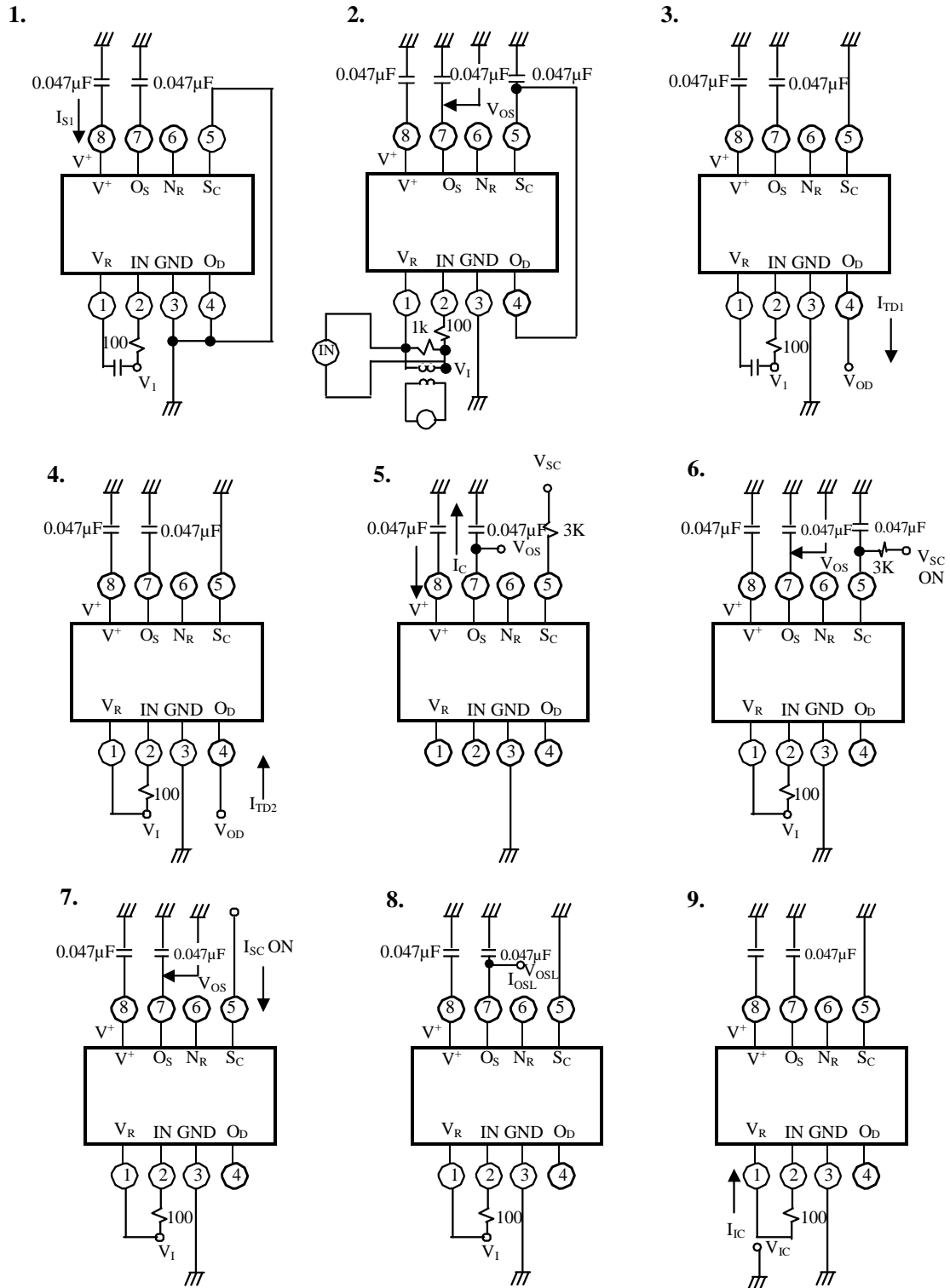
DIFFERENTIAL AMPLIFIER OUTPUT VOLTAGE vs. DIFFERENTIAL INPUT VOLTAGE



DIFFERENTIAL AMPLIFIER OUTPUT CURRENT vs. TEMPERATURE

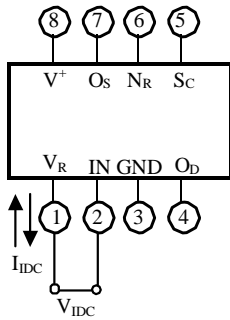


## TEST CIRCUITS

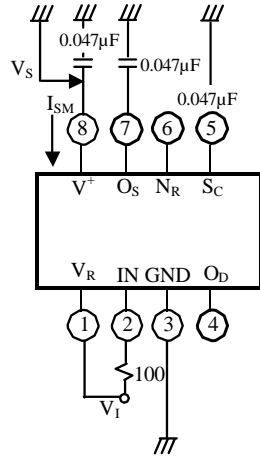




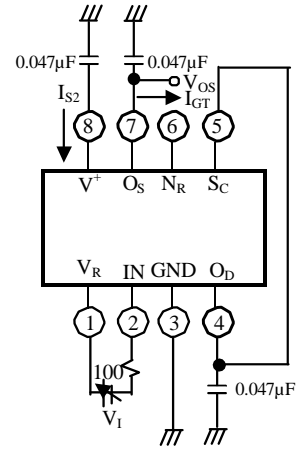
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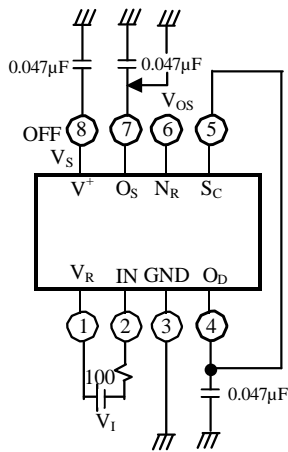
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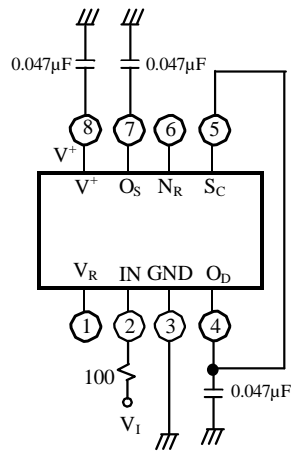
12.



13.



14.



## APPLICATION INFORMATION

T.B.D.

## REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.