GL7101

EARTH LEAKAGE CURRENT DETECTOR

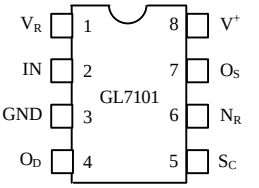
Description

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, latch circuit. The input in the differential amplifier is connect to the secondary node of zero current transformer.

The level comparator generates high level when earth leakage current is greater than some level.

(Top view)



Feature

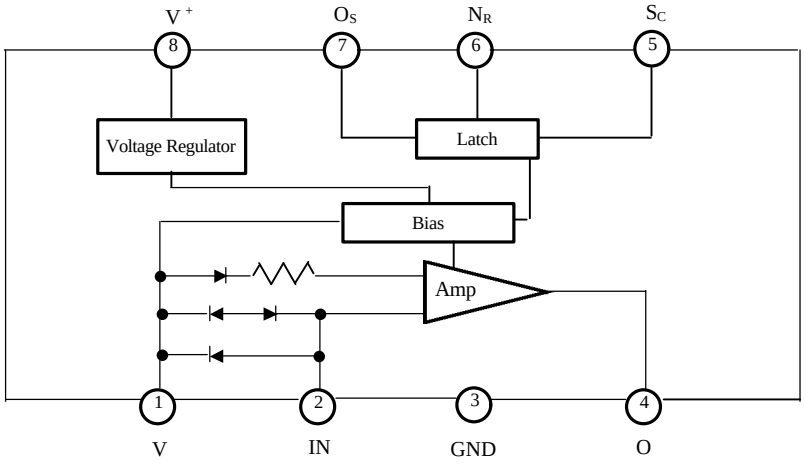
- Low Power consumption (P_D = 5mW) 100V/ 200V
- 100V/200V Common Built-in Voltage Regulator
- High Gain Differential Amplifier
- High Input Sensitivity
- Minimum External Parts
- Large Surge Margin
- Wide Operating Temperature Range (T_A = -30 to 85¡ É
- High Noise Immunity

Absolute Maximum Rating (T_A = 25¡ É

Supply voltage	20	V
Supply Current	8	mA
Power Dissipation	200	mW
Operating Temperature	-30 to 85	¡ É
Storage Temperature	-55 to 125	¡ É

Pin Configuration

Block diagram



Recommended Operating Condition : Ta = -30¡ Éto 80¡ É

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V^+	12			V
V_S-GND Capacitor	C_{VS}	1			µF
O_S-GND Capacitor	C_{OS}			1	µF

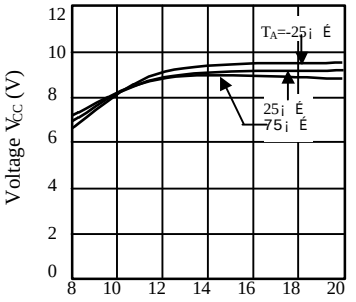
Electrical Characteristics

PARAMETER	SYMBOL	CONDITIONS	TEMP (¡ É)	MIN.	TYP.	MAX	UNIT	TEST CIRCUIT
Supply Current 1	I_{S1}	V^+=12V, V_R-V_I=30mV	-30	-	-	580	µA	1
			25	-	400	530		
			85	-	-	480		
* Trip Voltage	V_T	V^+=16V, V_R-V_I=X	-30 85	9	13.5	18	mV(rms)	2
Differential Amplifier Output Current 1	I_{TD1}	V^+=16V, V_R-V_I=30mV V_{OD}=1.2V	25	-12	-	-30	µA	3
Differential Amplifier Output Current 2	I_{TD2}	V^+=6V, V_R-V_I=short V_{OD}=0.8V	25	17	-	37	µA	4
Output Current	I_O	V_{SC}=1.4V, V_{OS}=0.8V, I_{SI}=580 µA	-30	-200	-		µA	5
		V_{SC}=1.4V, V_{OS}=0.8V, I_{SI}=530 µA	25	-100	-			
		V_{SC}=1.4V, V_{OS}=0.8V, I_{SI}=480 µA	85	-75	-			
S_C On Voltage	V_{SC} ON	V^+=16V	25	0.7	-	1.4	V	6
S_C Input Current	I_{SC} ON	V^+=12V	25	-	-	5	µA	7
Output "L" Current	I_{OSL}	V^+=12V, V_{OSL}0.2V	-30 85	200	-	-	µA	8
Input Clamp Voltage	V_{IC}	V^+=12V, V_{IC}=20mA	-30 85	4.3	-	6.7	V	9
Differential Input Clamp Voltage	V_{IDC}	I_{IDC}=100mV	-30 85	0.4	-	2	V	10
Max. Current voltage	V_{SM}	I_{SM}=7mA	25	20	-	28	V	11
Supply Current 2	I_{S2}	V_{OS}=0.5V, V_R-V_I=X	-30 85	-	-	900	µA	12
Latch Circuit Off Supply Voltage	V_+OFF		25	0.5	-		V	13
Response Time	T_{ON}	V^+=16V, V_R-V_I=0.3V	25	1	-	4	ms	14

* A: 9 ~ 12.55 B: 11.5 ~ 15.5 C: 14.5 ~ 18

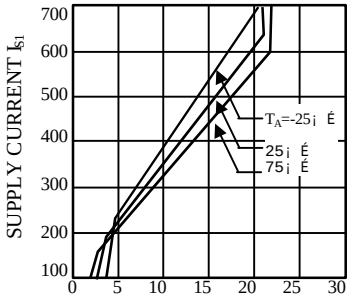
Typical Performance Curves

VOLTAE-SUPPLY VOLTAGE



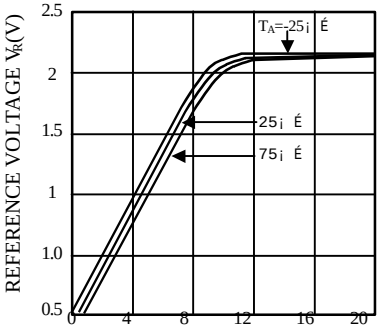
SUPPLY VOLTAGE V^+ (V)

SUPPLY CURRENT-SUPPLY VOLTAGE



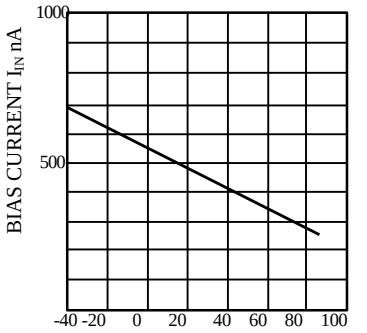
SUPPLY VOLTAGE V^+ (V)

REFERENCE VOLTAGE-SUPPLY VOLTAGE



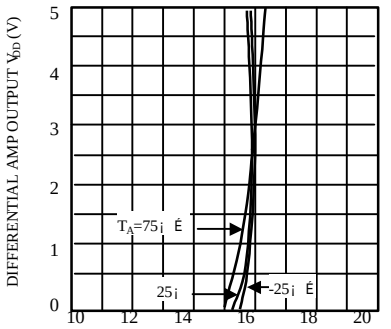
SUPPLY VOLTAGE V_S (V)

BIAS CURRENT-TEMPERATURE



TEMPERATURE T_A (¡ É)

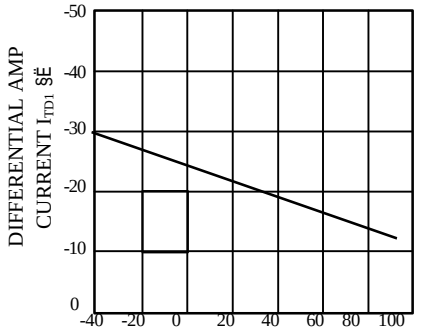
DIFFERENTIAL AMPLIFIER OUTPUT VOLTAGE - DIFFERENTIAL INPUT VOLTAGE



DIFFERENTIAL INPUT VOLTAGE

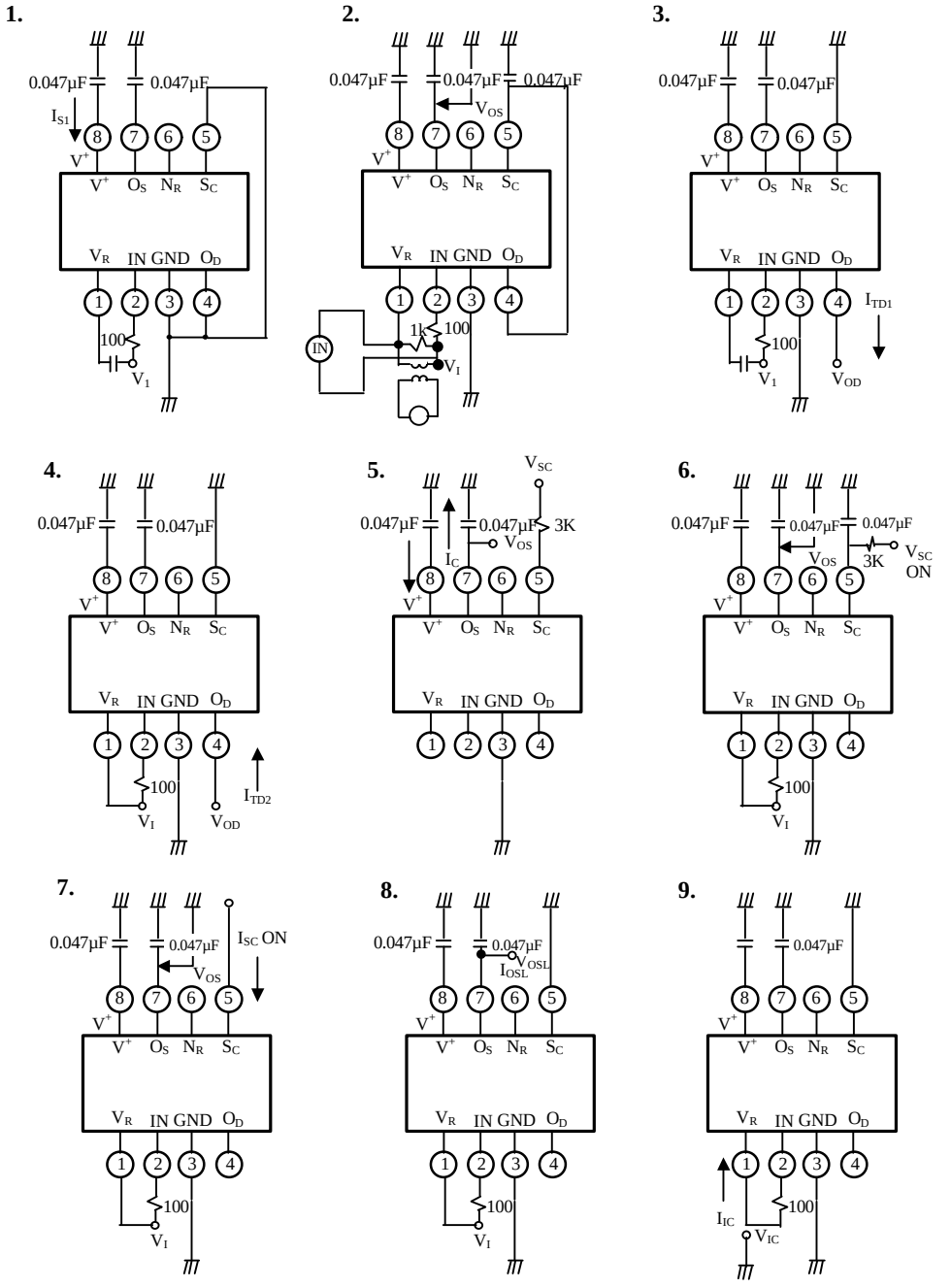
¡ ¨VI=VR-VIN (mV)

DIFFERENTIAL AMPLIFIER OUTPUT CURRENT-TEMP

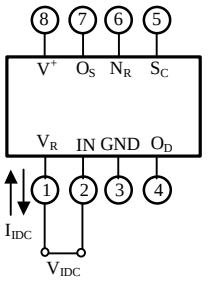


TEMPERATURE T_A (¡ É)

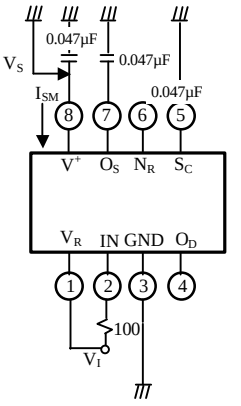
Test Circuit



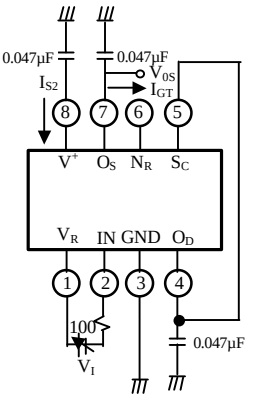
10.


8 7 6 5
V+ OS NR SC
VR IN GND OD
1 2 3 4
IIDC
VIDC

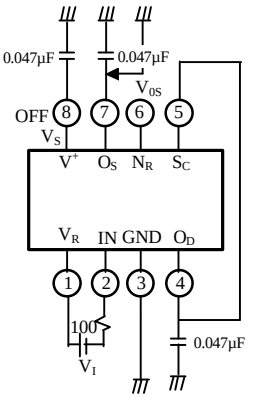
11.


0.047μF
0.047μF
VS
ISM
0.047μF
8 7 6 5
V+ OS NR SC
VR IN GND OD
1 2 3 4
100
VI

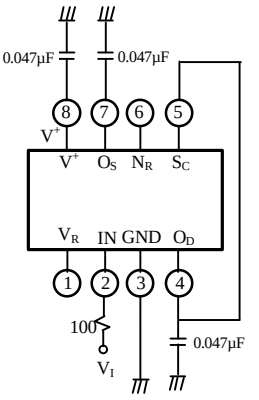
12.


0.047μF
0.047μF
V0S
IS2
IGT
8 7 6 5
V+ OS NR SC
VR IN GND OD
1 2 3 4
100
VI
0.047μF

13.


0.047μF
0.047μF
V0S
OFF
8 7 6 5
VS
V+ OS NR SC
VR IN GND OD
1 2 3 4
100
VI
0.047μF

14.


0.047μF
0.047μF
8 7 6 5
V+
V+ OS NR SC
VR IN GND OD
1 2 3 4
100
VI
0.047μF

Typical Application