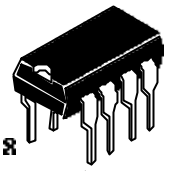
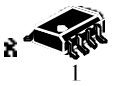
EARTH LEAKAGE CURRENT DETECTOR

Description

The SL7101 is designed for use in earth leakage circuit interrupters for operation directly of 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.

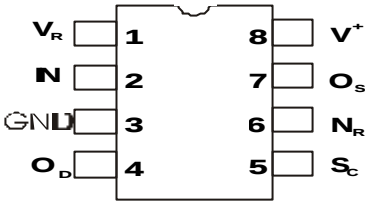


N SUFFIX
PLASTIC



D SUFFIX
SOIC

Pin Configuration
(Top View)



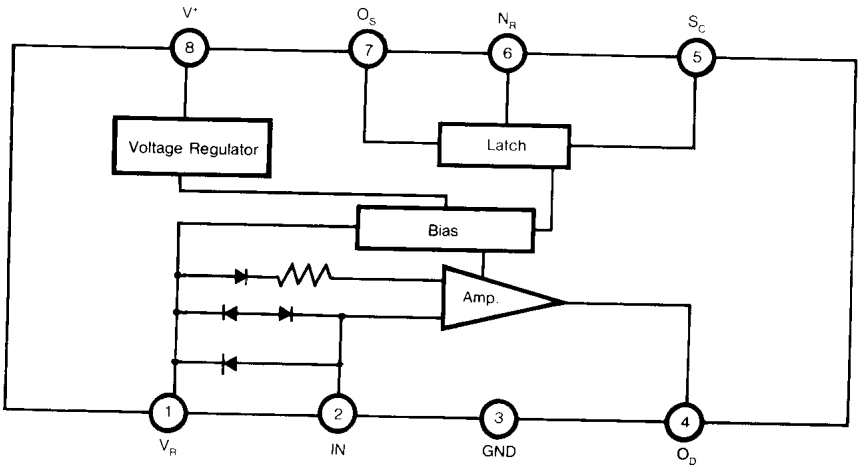
Feature

- 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°C)
- High Noise Immunity

Absolute Maximum Ratings (T^=25° c)

▪ Supply Voltage	20V
▪ Supply Current	8mA
▪ Power Dissipation	200mW
▪ Operating Temperature	- 30 to 85°C
▪ Storage Temperature	- 55 to 125°C

Block Diagram



Recomended Operating Condition: T_A=-30°C to 80°C

PARAMETER	SYMBOL	MIN.	TYP.	MAX	UNIT
Supply Voltage	V^+	12			V
Vs-GND Capacitor	Cvs	1			µF
O_S-GND Capacitor	Cos			1	µF

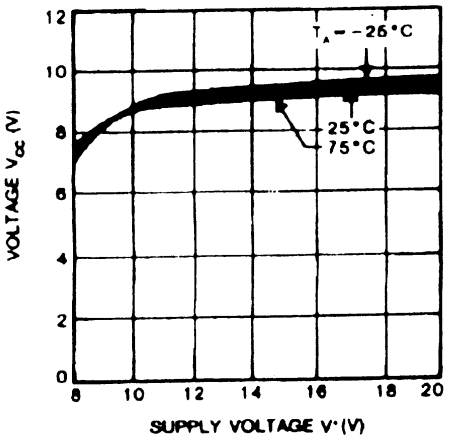
Electrical Characteristics

PARAMETER	SYMBOL	CONDTIONS	TEMP. (°C)	MIN.	TYP.	MAX.	UNIT
Supply Current 1	I_{S1}	V^+=12V, $V_R - V_I$ = 30 mV	-30	-	-	580	µA
			25	300	400	530	
			85	-	-	480	
* Trip Voltage	V_T	V^+ = 16V, $V_R - V_I$ = X	-30 85	9	13.5	18	mV (rms)
Differential Amplifier Output Current 1	I_{TD1}	V^+ = 16 V, $V_R - V_I$ = 30 mV V_{OD} = 1.2 V	25	-12	-20	-30	µA
Differential Amplifier Output current 2	I_{TD2}	V^+ = 16 V, $V_R - V_I$ = short V_{OD} = 0.8 V	25	17	27	37	µA
Output Current	I_O	V_{SC} = 1.4 V, V_{OS} = 0.8 V, I_{SI} = 580µA	-30	-200	-		µA
		I_{SI} = 530µA	25	-100	-		
		I_{SI} = 480µA	85	-75	-		
S_C ON Voltage	V_{SC} ON	V^+ = 16 V	25	0.7	1.0	1.4	V
S_C Input Current	I_{SC} ON	V^+ = l2V	25	-	-	5	µA
Output "L" Current	I_{OSL}	V^+ = 12 V, V_{OSL} = 0.2 V	-30 85	200	800	1400	µA
Input Clamp Voltage	V_{IC}	V^+ = 12 V, I_{IC} = 20 mA	-30 85	4.3	-	6.7	V
Differential Input Clamp Voltage	V_{IDC}	I_{IDC} = 100mA	-30 85	0.4	1.2	2	V
Max. Current Voltage	V_{SM}	I_{SM} = 7 mA	25	20	24	28	V
Supply Current 2	I_{S2}	V_{OS} = 0.5 V, $V_R - V_I$ = X	-30 85	-	-	1200	µA
Latch Circuit Off Supply Votage	V+ OFF		25	0.5			V
Response Time	T_{ON}	V^+ = 16 V, $V_R - V_I$ = 0.3 V	25	1	3	4	ms

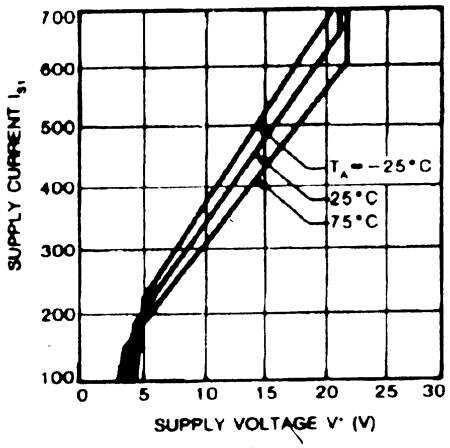
* A: 9 ~12.5 B: 11.5~15.5 C: 14.5~18

Typical Performance Curves

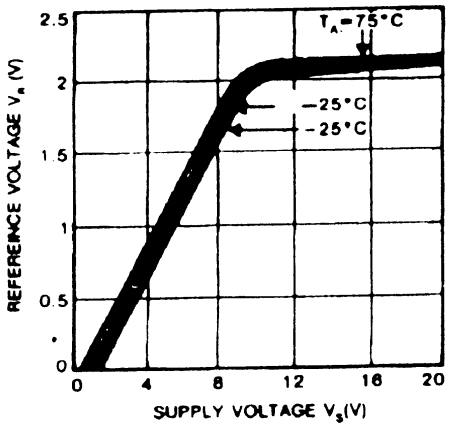
VOLTAE-SUPPLY VOLTAGE



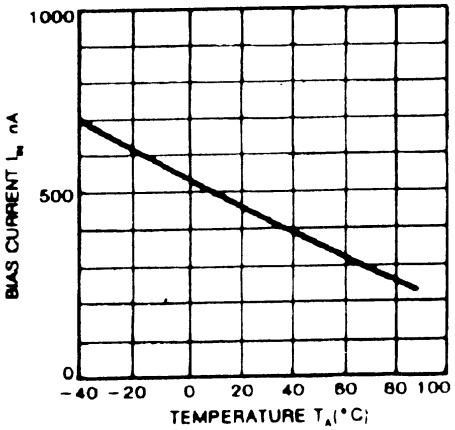
SUPPLY CURRENT-SUPPLY VOLTAGE



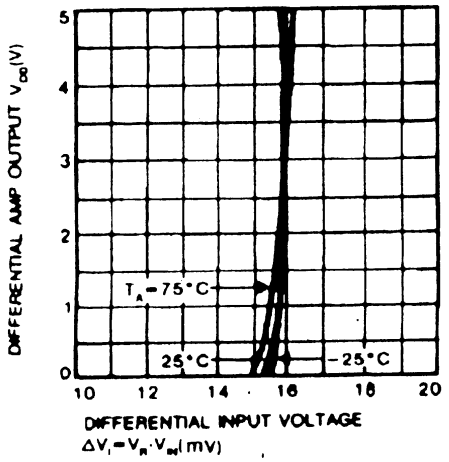
REFERENCE VOLTAGE-SUPPLY VOLTAGE



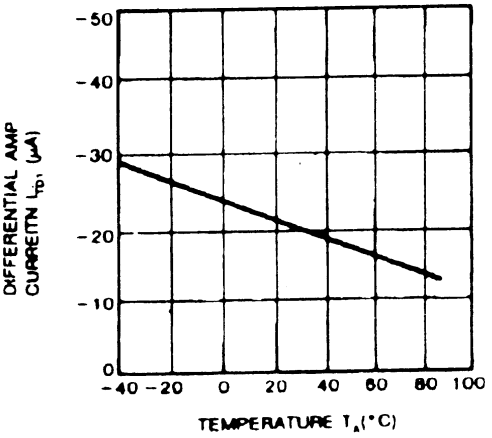
BIAS CURRENT-TEMPERATURE



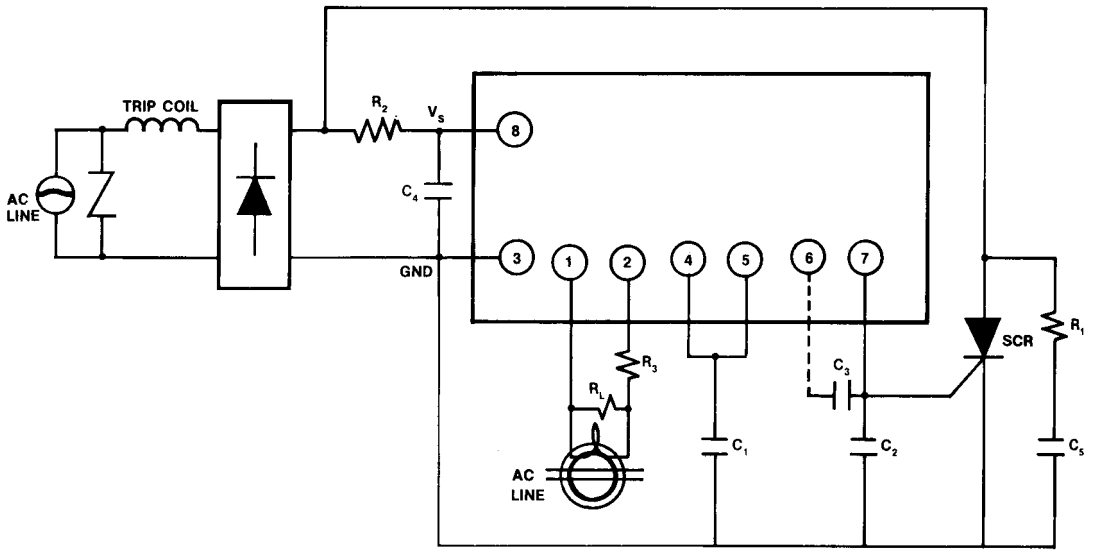
DIFFERENTIAL AMPLIFIER OUTPUT VOLTAGE—DIFFERENTIAL INPUT VOLTAGE



DIFFERENTIAL AMPLIFIER OUTPUT CURRENT-TEMP



Typical Application



Description of elements of application diagram

1. The resistance of R1 resistor is chosen in such a way so that to limit IC's consumption current (not more than 8 mA), and here the voltage drop is around 21-28V.

2. R2 resistor provides the necessary bias of the differential cascade.

3. R3 resistor is a loading one per input.

4. R4 resistor limits the charging current of C4 electrolytic capacitor are required to maintain IC performance until the fuse is completely burn out. Its value is chosen correspondingly.

5. C1 electrolytic capacitor is a filtering one as per supply (around 1 – 10 μF).

6. Ñ2 and C3 capacitors are filtering ones (not more than 1 μF)