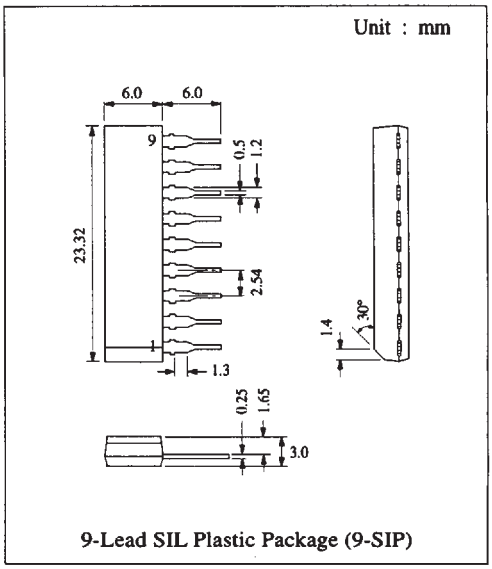
AN6884

5-Dot LED Driver Circuit

■ Description

The AN6884 is a monolithic integrated circuit driving 5-LED and is capable of logarithmic (dB) bar graph display for input signal. Incorporating high gain rectification amp. enable to apply AC (UV meter, etc.) / DC (signal meter, etc.) level meter widely.

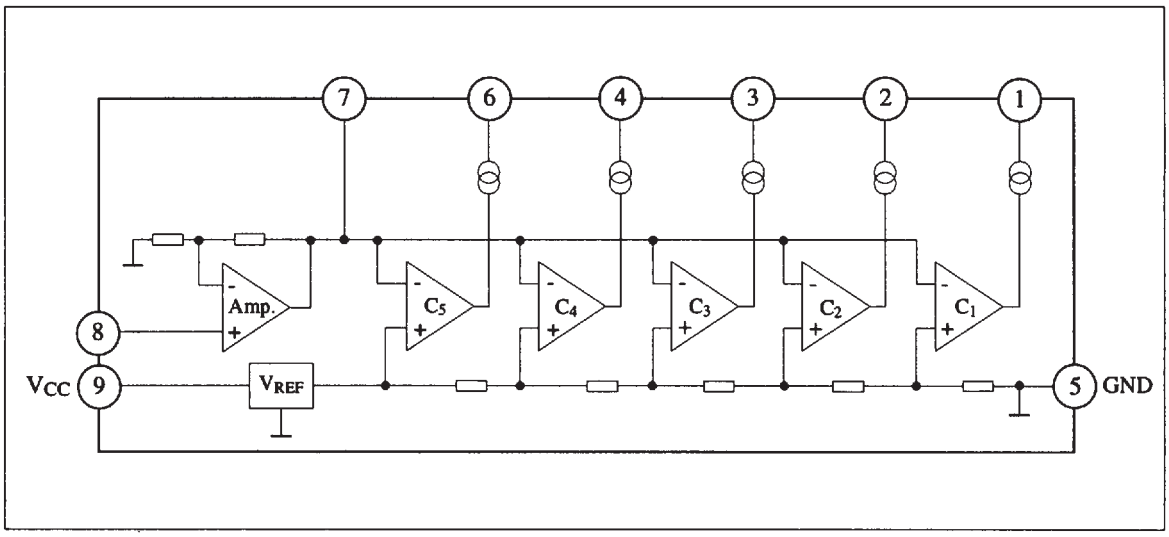


9-Lead SIL Plastic Package (9-SIP)

■ Features

- Wide range of operating voltage: $V_{CC(opr.)}$ = 3.5V ~ 16V
- Constant current output: I_{LED} =15mA
- Built-in high gain amp.: G_V = 26dB typ.
- Low noise when LED ON
- 5-dot LED bar logarithmic response: -10, -5, 0, 3, 6dB
- Fewer external components

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V_{CC}	18		V
	Circuit Voltage	V_{7-5}	6		V
	Op. Amp. Input Voltage	V_{8-5}	-0.5	V_{CC}	V
	LED Output Pin Voltage	$V_{1, 2, 3, 4, 6-5}$	V_{CC}		V
Current	Supply Current	I_{CC}	12		mA
	LED Output Pin Current	$I_{1, 2, 3, 4, 6}$	20		mA
Power Dissipation *		P_D	1100		mW
Operating Ambient Temperature		Topr	-25 ~ +75		°C
Storage Temperature		Tstg	-55 ~ +125		°C

Operating Supply Voltage Range: V_{CC} = 3.5V ~ 16.0V
*Under Ta > 25°C, reduce at -11mW/°C

■ Electrical Characteristics (V_{CC}=3V, Ta=25°C)

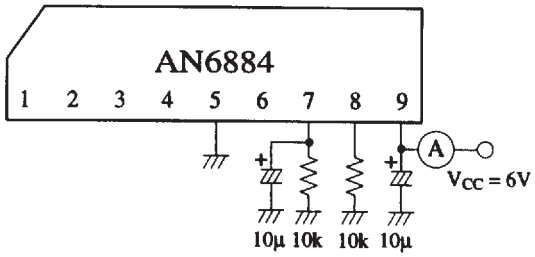
Item	Symbol	Test Circuit	Condition		min.	typ.	max.	Unit
Supply Current	I_{CC}	1	V_{8-5} = 0V			6	8.5	mA
Input Bias Current	I_{Bias8}	2			-1		0	µA
Output Sink Current	$I_{(SINK)1, 2, 3, 4, 6}$	3	V_{8-5} = 0.15V		11	15	18.5	mA
Voltage Gain	G_V	4	V_{8-5} = 0.1V, R_7 = 10kΩ		24	26	28	dB
Comparator Level	GD_1	5	Pin 1	V_{8-5} = 0V	-12	-10	-8	dB
	GD_2	5	Pin 2		-6	-5	-4	dB
	GD_3	5	Pin 3			0		dB
	GD_4	5	Pin 4		2.5	3	3.5	dB
	GD_5	5	Pin 6		5	6	7	dB

*G_{D3} LED ON level adjusting point = 0dB, equivalent to V_{7-5} = 1.1V typ. (V_{8-5} = 57mV)

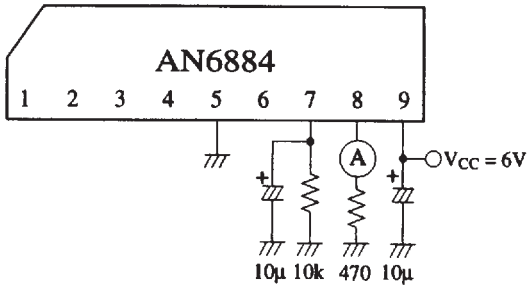
■ Pin

Pin No.	Pin Name
1	LED 1 Output
2	LED 2 output
3	LED 3 Output
4	LED 4 Output
5	GND
6	LED 5 Output
7	AMP. Output
8	AMP. Input
9	V_{CC}

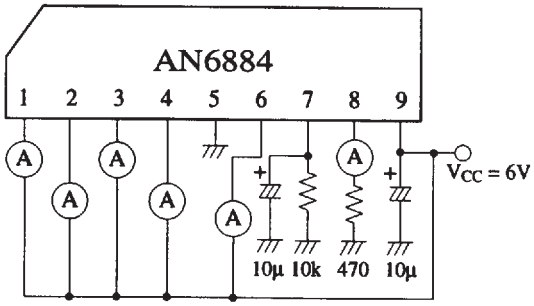
Test Circuit 1 (I_{CC})



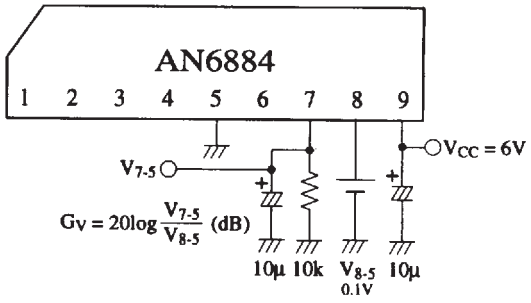
Test Circuit 2 (I_{Bias8})



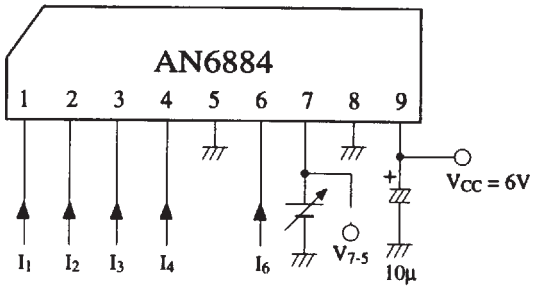
Test Circuit 3 ($I_{(SINK)1, 2, 3, 4, 6}$)



Test Circuit 4 (G_V)

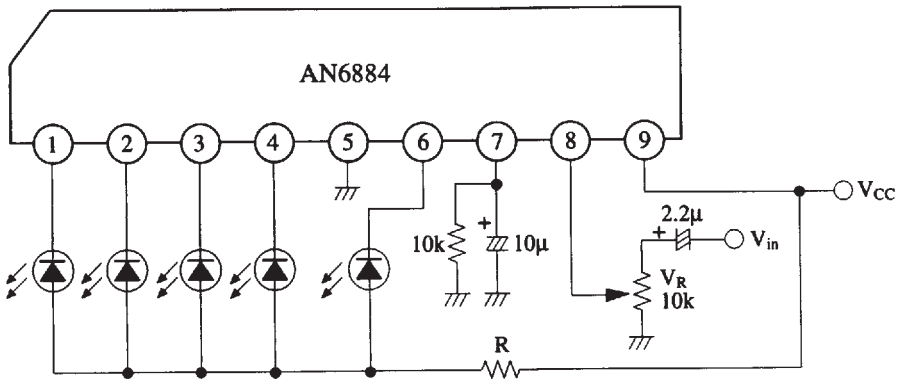


Test Circuit 5 (GD_{1-5})



Note) Measure input voltage V_{7-5} of comparator that I_1-I_5 flow more than 11mA.

■ Application Circuit



In case of Ta(max) = 60°C

V_{CC}(V)	R(Ω)
8 ~ 12	47
10 ~ 14	68
12 ~ 16	91

In case of Ta(max.) = 75°C

V_{CC}(V)	R(Ω)
7 ~ 9	27
8 ~ 10	39
9 ~ 11	51
10 ~ 12	62
11 ~ 13	75
12 ~ 14	82
13 ~ 15	100
14 ~ 16	110

P_D and V_{CC}

When maximun ambient temperature Ta(max.) = 60°C, V_{CC} > 9V / Ta(max.) = 75°C, V_{CC} > 7V, P_D is over at the application circuit above. Select R value from the right list. And determine R watt by resistance value and total LED current.

■ Characteristics Curve