

AN6884

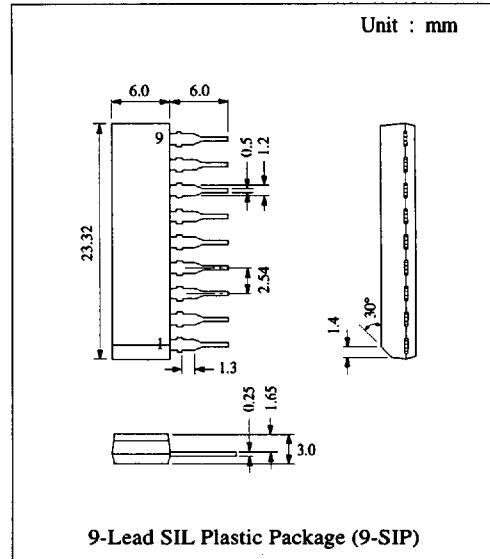
5-Dot LED Driver Circuit

■ Description

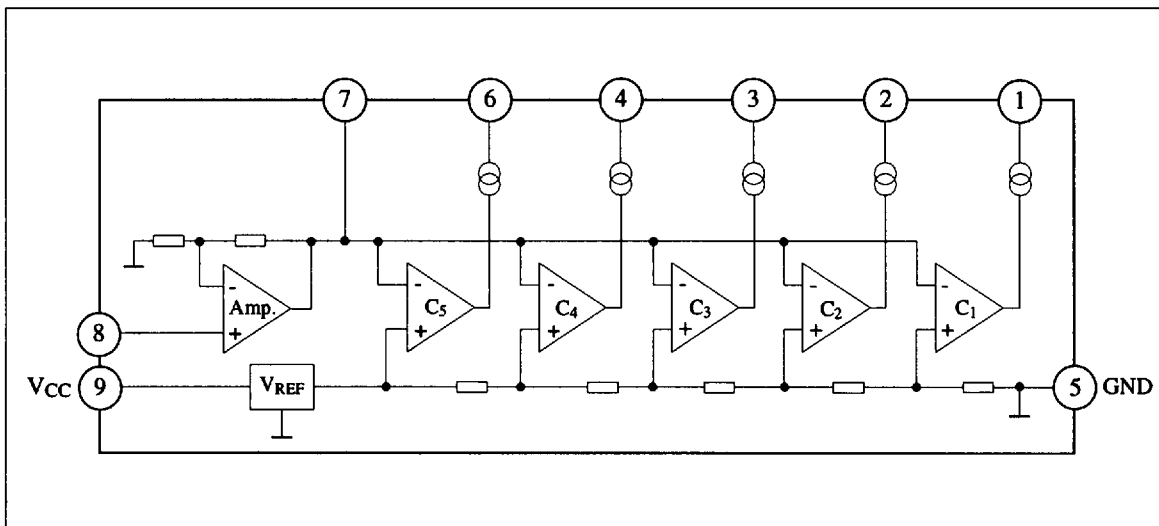
The AN6884 is a monolithic integrated circuit driving 5-LED and is capable of logarithmic (dB) bar graph display for input signal. Incorporating high gain rectification amp. enable to apply AC (UV meter, etc.) / DC (signal meter, etc.) level meter widely.

■ Features

- **Wide range of operating voltage:**
 $V_{CC(opr.)} = 3.5V \sim 16V$
- **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		T_{opr}	-25 ~ +75		°C
Storage Temperature		T_{stg}	-55 ~ +125		°C

Operating Supply Voltage Range: $V_{CC} = 3.5V \sim 16.0V$

*Under $T_a > 25^\circ C$, reduce at $-11mW/^\circ C$

■ Electrical Characteristics ($V_{CC}=3V$, $T_a=25^\circ C$)

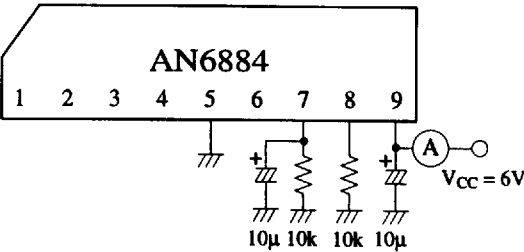
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit	
Supply Current	I _{CC}	1	V _{8.5} = 0V		6	8.5	mA	
Input Bias Current	I _{Bias8}	2		-1		0	μA	
Output Sink Current	I _{(SINK)1, 2, 3, 4, 6}	3	V _{8.5} = 0.15V	11	15	18.5	mA	
Voltage Gain	G _V	4	V _{8.5} = 0.1V, R ₇ = 10kΩ	24	26	28	dB	
Comparator Level	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. ($V_{8.5} = 57mV$)

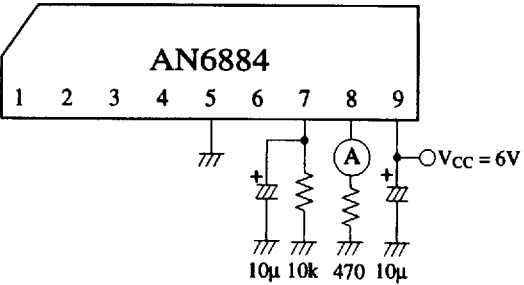
■ Pin

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}

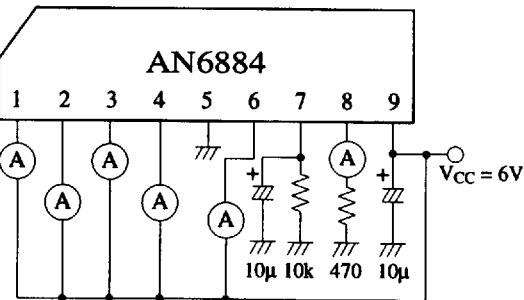
Test Circuit 1 (I_{CC})



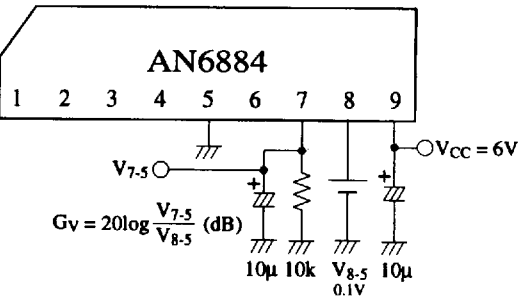
Test Circuit 2 (I_{Bias8})



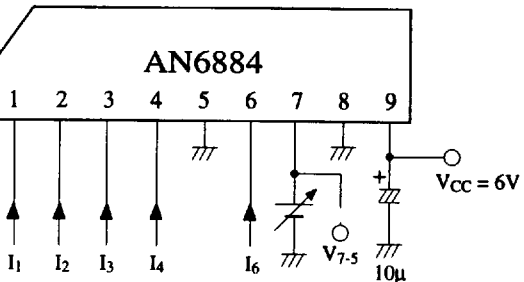
Test Circuit 3 ($I_{(SINK)1, 2, 3, 4, 6}$)



Test Circuit 4 (G_V)

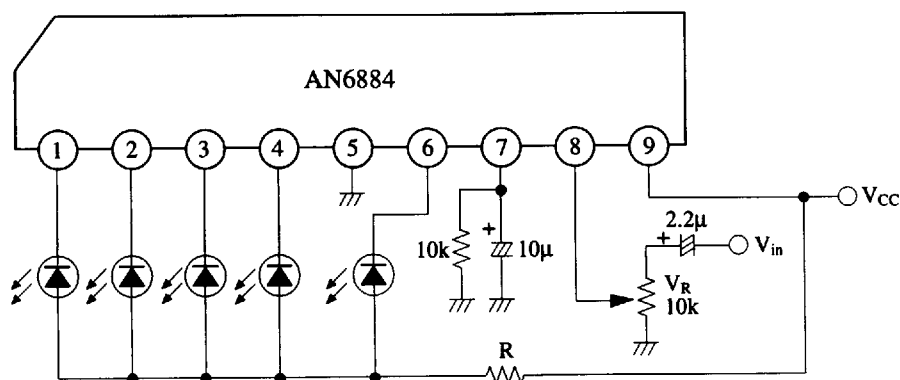


Test Circuit 5 (GD_{1-5})



Note) Measure input voltage $V_{7.5}$ of comparator that I_1 - I_5 flow more than 11mA.

■ Application Circuit



In case of $T_a(\text{max}) = 60^\circ\text{C}$

$V_{CC}(\text{V})$	$R(\Omega)$
8 ~ 12	47
10 ~ 14	68
12 ~ 16	91

In case of $T_a(\text{max.}) = 75^\circ\text{C}$

$V_{CC}(\text{V})$	$R(\Omega)$
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 maximum ambient temperature $T_a(\text{max.}) = 60^\circ\text{C}$, $V_{CC} > 9\text{V}$ / $T_a(\text{max.}) = 75^\circ\text{C}$, $V_{CC} > 7\text{V}$, 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

