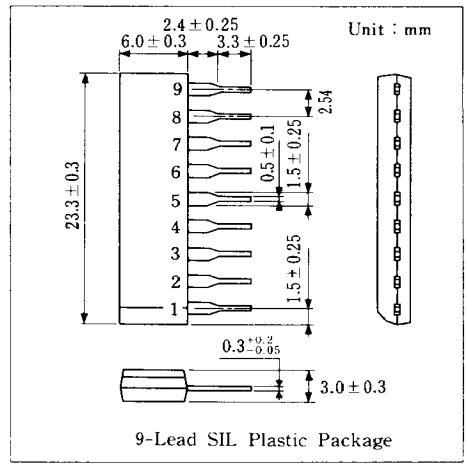
AN6884

5-Dot LED Driver Circuit

■ Outline

The AN6884 is an integrated circuit designed for driving 5-dot LED and enables a logarithmic (dB) bar graph display in response to the input signal. The built-in rectifier Amp. is widely applicable for AC level meter such as VU meter, DC level meter, and signal meter.



9-Lead SIL Plastic Package

■ Features

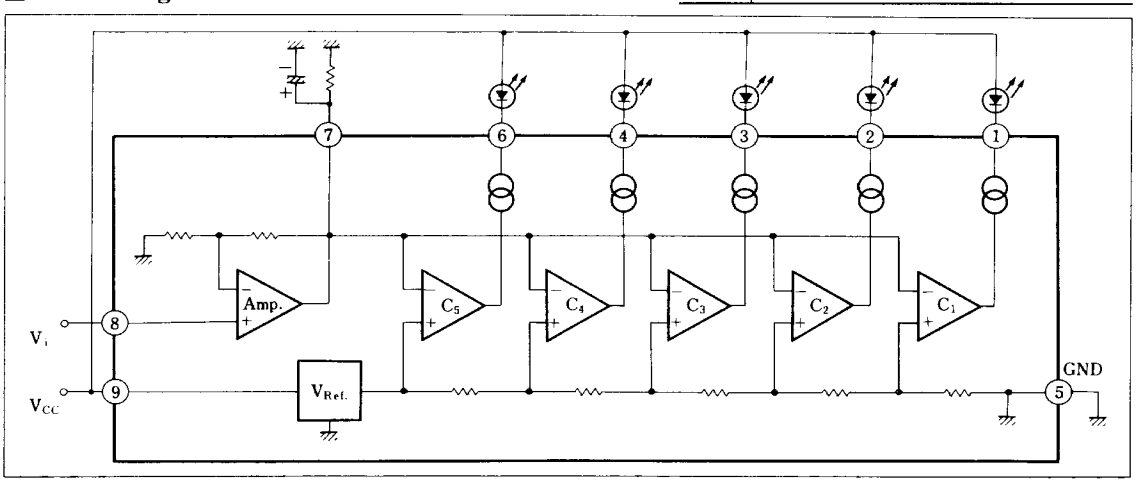
- Built-in high gain amplifier : G_V = 26dB typ.
- Low noise when LED ON
- 5-dot LED bar graph logarithmic response : −10, −5, 0, 3, 6dB
- Fixed current output : I_{LED} = 15mA (typ.)
- Wide range of operating voltages : $V_{CC(opr.)}$ = 3.5 ~ 16V
- Fewer external components

, 0,

■ Pin

Pin No.	Pin Name
1	LED1 Output
2	LED2 Output
3	LED3 Output
4	LED4 Output
5	GND
6	LED5 Output
7	Amp. Output
8	Amp. Input
9	V_{CC}

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V_{CC}	18	V
	Operational 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
	Circuit Voltage	V_{7-5}	6	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
Temperature	Operating Ambient Temperature	T_{opr}	−25~+75	℃
	Storage Temperature	T_{stg}	−55~+150	℃

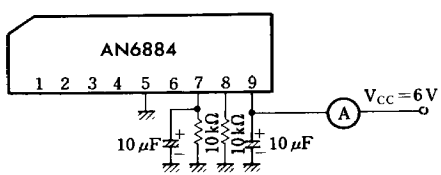
* For T_a>25℃, power is reduced at −11 mW/℃

■ Electrical Characteristics (V_{CC}=6V, Ta=25℃)

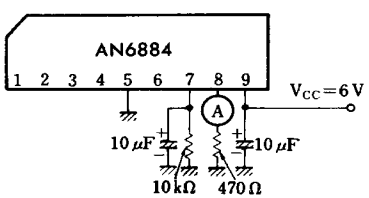
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Current Consumption	I_{tot}	1	V_{8-5}=0V		6	8.5	mA
Input Bias Current	I_{Bias8}	2		−1		0	μA
Output Sink Current	$I_{(SINK)1,2,3,4,6}$	3	V_{8-5}=0.15V	11	15	18.5	mA
Amp. Gain	G_V	4	V_{8-5}=0.1V, R_7=10kΩ	24	26	28	dB
Comparator Level	GD_1	5	Pin①	−12	−10	−8	dB
	GD_2	5	Pin②	−6	−5	−4	dB
	GD_3	5	Pin③ V_{8-5}=0V		0		dB
	GD_4	5	Pin④	2.5	3	3.5	dB
	GD_5	5	Pin⑥	5	6	7	dB

Note) Operating Supply Voltage Range $V_{CC(opr)}$=3.5~16V
* LED-ON level adjusting point of GD_3 is 0 dB (equivalent to V_{7-5}=1.1V typ. (V_{8-5}=57mV)).

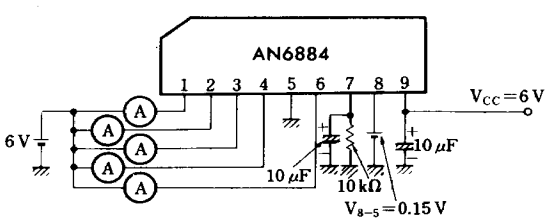
Test Circuit 1 (I_{tot})



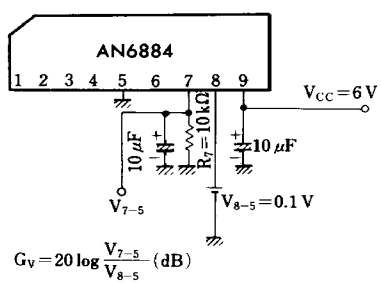
Test Circuit 2 (I_{Bias8})



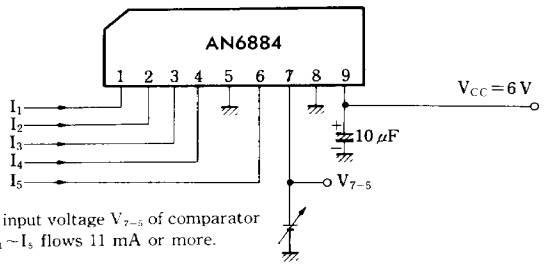
Test Circuit 3 ($I_{(SINK)1,2,3,4,6}$)



Test Circut 4 (G_V)

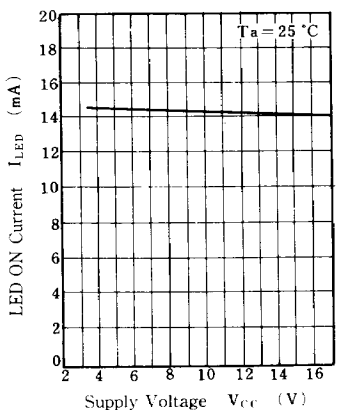


Test Circuit 5 ($GD_{1\sim5}$)

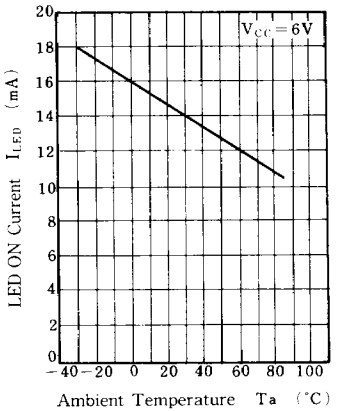


Note) Measure input voltage V_{7-5} of comparator to which $I_1 \sim I_5$ flows 11 mA or more.

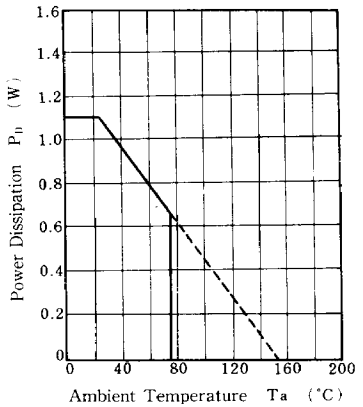
$I_{LED} - V_{CC}$



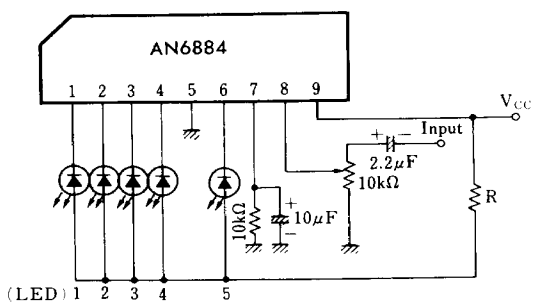
$I_{LED} - Ta$



$P_D - Ta$



■ Application Circuit



In case of Ta (max) = 60℃

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

In case of Ta (max) = 75℃

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 the max. ambient temperature T_a (max.) is 60℃ and V_{CC} > 9 V, or the max. ambient temperature T_a (max.) is 75℃ and V_{CC} > 7 V, P_D will exceed at the application circuit above. Therefore, select the value of R according to the table right. Note that a wattage of R should be determined by the resistor value and total LED current.