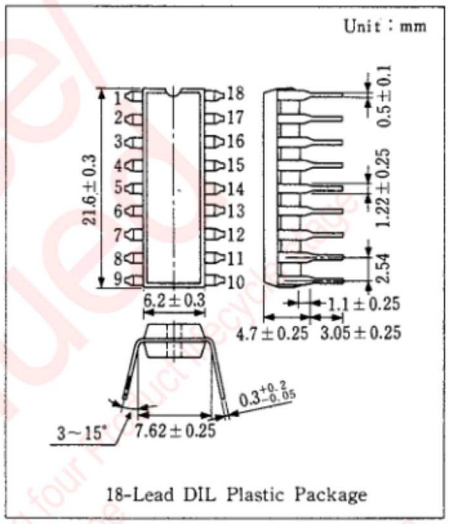
AN6888, AN6889

Dual 5-Dot LED Driver Circuits

■ Outline

The AN6888 and the AN6889 are integrated circuits designed for driving 5-dot×2-channel LED and enable a logarithmic (dB) bar graph display in response to the input signal.
The built-in high gain rectifier Amp. is widely applicable for VU meter, signal meter, etc.
Because the output is the constant-current drawing system, the constant-current value can be varied with the external resistor.
10-dot×2-channel LED can be driven by combining the AN6888 and the AN6889.

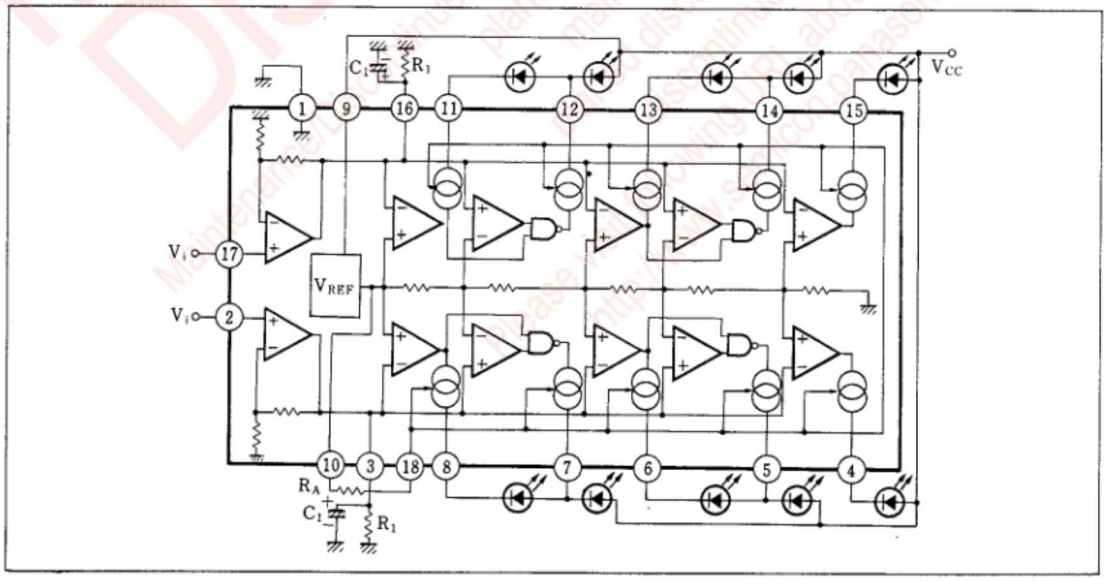


18-Lead DIL Plastic Package

■ Features

- Wide range of operating voltage : $V_{CC(opr.)}$=5~16V
- Power consumption can be reduced due to series connection of LEDs
- Wide range of fixed currents : 5~25mA
- Built-in high gain Amp. : G_V=26dB (typ.)

■ Block Diagram



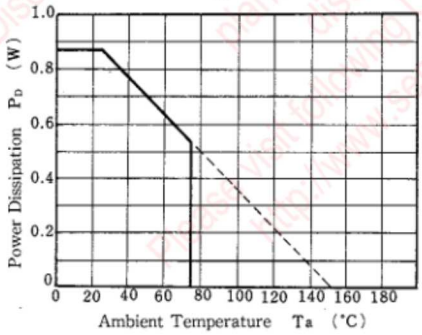
■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	GND	10	Ref. Voltage
2	Amp. 1 Input	11	LED 6 Output
3	Amp. 1 Output	12	LED 7 Output
4	LED 1 Output	13	LED 8 Output
5	LED 2 Output	14	LED 9 Output
6	LED 3 Output	15	LED 10 Output
7	LED 4 Output	16	Amp. 2 Output
8	LED 5 Output	17	Amp. 2 Input
9	V_{CC}	18	LED Current Set Input

■ Absolute Maximum Ratings (Ta=25℃)

Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V_{CC}	18	V
	Operational Amp. Input Voltage	$V_{2,17-1}$	−0.5 ~ V_{CC}	V
	LED Output Pin Voltage	$V_{4\sim8,11\sim15-1}$	V_{CC}	V
	Reference Pin Input Voltage	V_{10-1}	6	V
	Circuit Voltage	$V_{3,16-1}$	6	V
Current	Supply Current	I_{CC}	15	mA
	LED Output Pin Current	$I_{4\sim8,11\sim15}$	30	mA
	Reference Voltage Output Current	I_{10}	−5	mA
	R_A Pin Input Current	I_{18}	10	mA
Power Dissipation ($T_a \leqq 75$℃)		P_D	540	mW
Temperature	Operating Ambient Temperature	T_{opr}	−30 ~ +75	℃
	Storage Temperature	T_{stg}	−55 ~ +150	℃

$P_D - Ta$

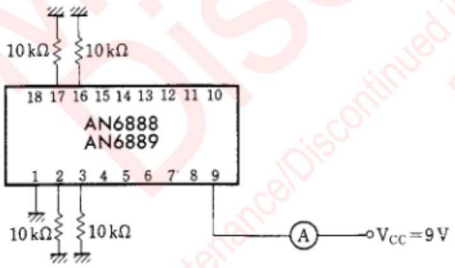


■ Electrical Characteristics (Ta=25℃, V_{CC}=9V)

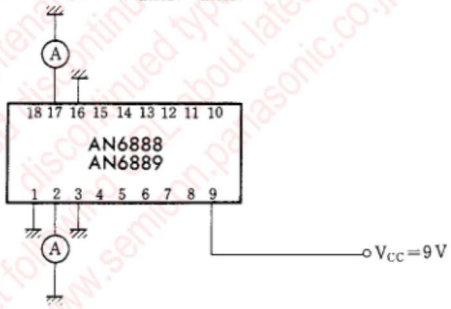
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Current Consumption	I_{tot}	1	$V_{2,17-1}$=0V, R_A=open		5	9	mA
Input Bias Current	I_{Bias2}	2		−1		0	μA
	I_{Bias17}	2		−1		0	μA
	I_{Bias3}	3	V_{2-1}=−0.1V	−3		0	μA
	I_{Bias6}	3	V_{17-1}=−0.1V	−3		0	μA
Reference Voltage	V_{REF}	4		2.5	2.7	2.9	V
Output Sink Current	$I_{S(SINK)4\sim8,11\sim15}$	5	R_A=open	4		9	mA
	$I_{S(SINK)4\sim8,11\sim15}$	6	R_A=5.6kΩ	11		21	mA
Amp. Gain	G_{V1}	7	V_{2-1}=0.1V	24	26	28	dB
	G_{V2}	7	V_{17-1}=0.1V	24	26	28	dB
Comparator Level (AN6888)	GD_1	8	Pin④,⑮	−11	−10	−9	dB
	GD_2	8	Pin⑤,⑭ V_{2-1}=0V	−6	−5	−4	dB
	GD_3	8	Pin⑥,⑬ V_{17-1}=0V	−0.5	0	0.5	dB
	GD_4	8	Pin⑦,⑫ V_{10-1}=3.5V	2.5	3	3.5	dB
	GD_5	8	Pin⑧,⑪	5	6	7	dB
Comparator Level (AN6889)	GD_1	8	Pin④,⑮	−5	−4	−3	dB
	GD_2	8	Pin⑤,⑭ V_{2-1}=0V	−2.5	−2	−1.5	dB
	GD_3	8	Pin⑥,⑬ V_{17-1}=0V	−0.5	0	0.5	dB
	GD_4	8	Pin⑦,⑫ V_{10-1}=3.5V	1.5	2	2.5	dB
	GD_5	8	Pin⑧,⑪	3	4	5	dB

Note) Operating Supply Voltage Range : $V_{CC(opr)}$=5~16V. ＊AN6888 : V_{3-1}, V_{16-1}=1.4V is assumed to be 0dB. ＊AN6889 : V_{3-1}, V_{16-1}=1.76V is assumed to be 0dB.

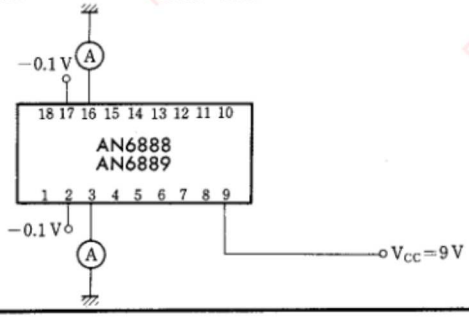
Test Circuit 1 (I_{tot})



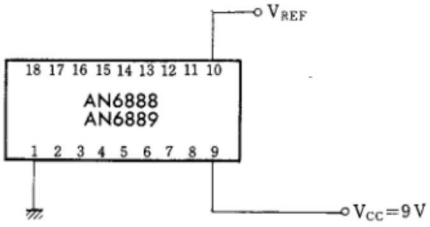
Test Circuit 2 (I_{Bias2}, I_{Bias17})



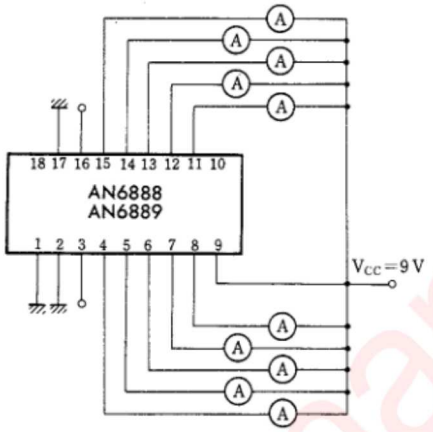
Test Circuit 3 (I_{Bias3}, I_{Bias6})



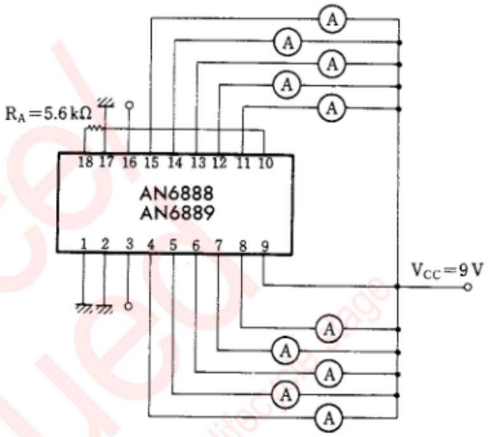
Test Circuit 4 (V_{REF})



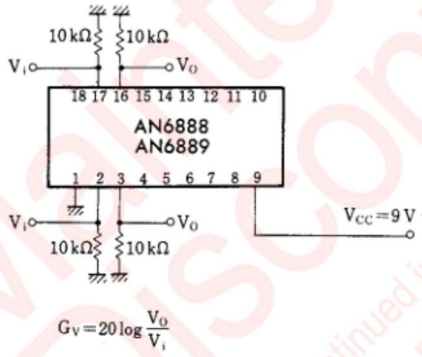
Test Circuit 5 ($I_{(SINK)4\sim8,11\sim15}$)



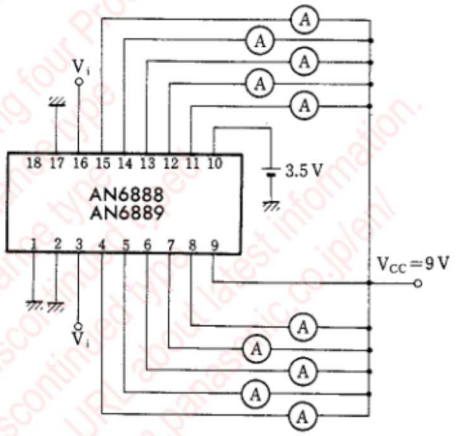
Test Circuit 6 ($I_{(SINK)4\sim8,11\sim15}$)



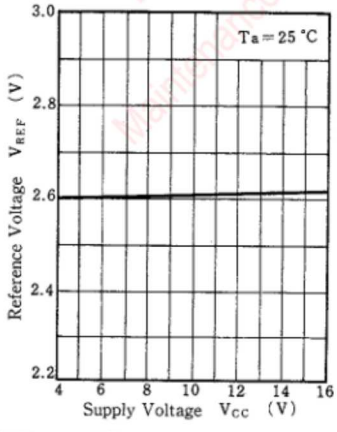
Test Circuit 7 (G_{V1}, G_{V2})



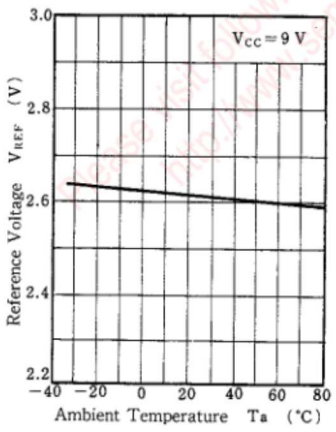
Test Circuit 8 (GD_1, GD_2, GD_3, GD_4, GD_5)



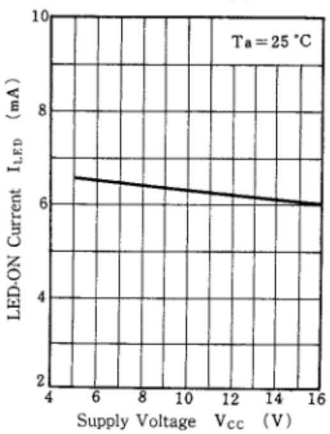
$V_{REF}-V_{CC}$



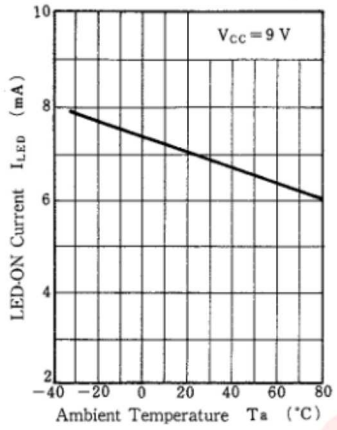
$V_{REF}-Ta$



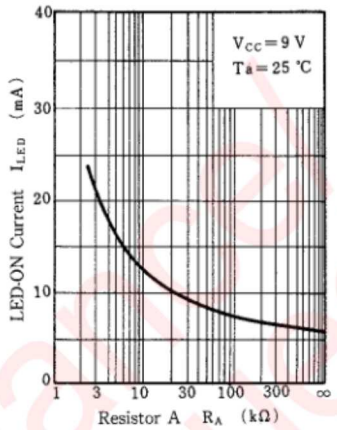
$I_{LED}-V_{CC}$



$I_{LED}-Ta$



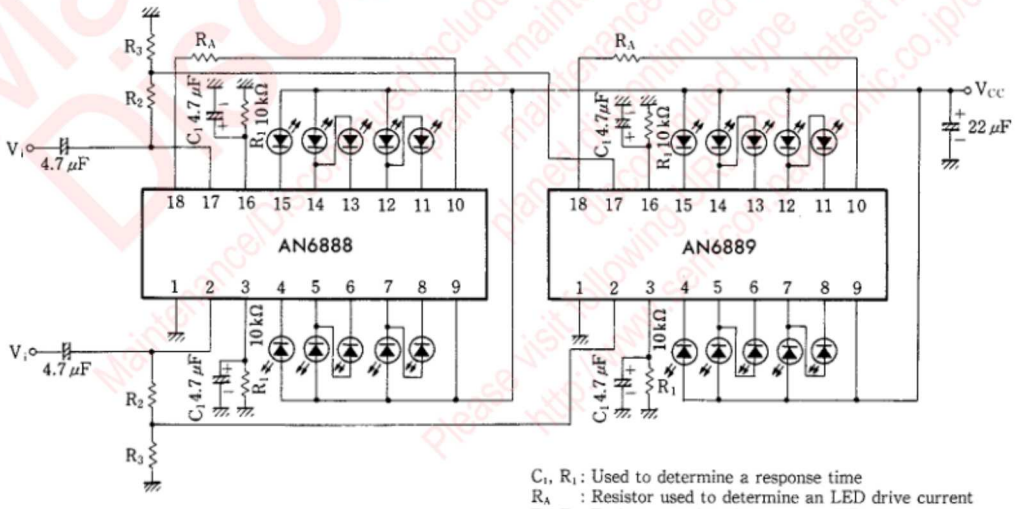
$I_{LED}-R_A$



■ Application Circuit

● **In case of 10-dot×2 (AN6888 and AN6889) application**

LED	1	2	3	4	5	6	7	8	9	10
Level Value	−20	−15	−10	−7	−4	−2	0	2	4	6



C_1, R_1 : Used to determine a response time
R_A : Resistor used to determine an LED drive current
R_2, R_3 : Resistors used to determine an LED level

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