

# AN6877, AN6878

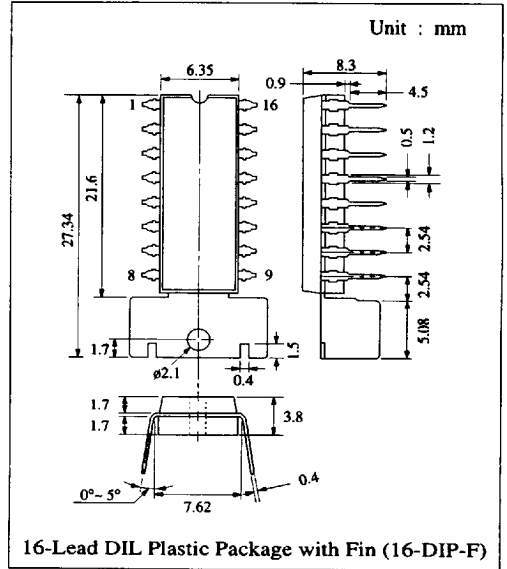
## 7-Dot LED Driver Circuits

### ■ Description

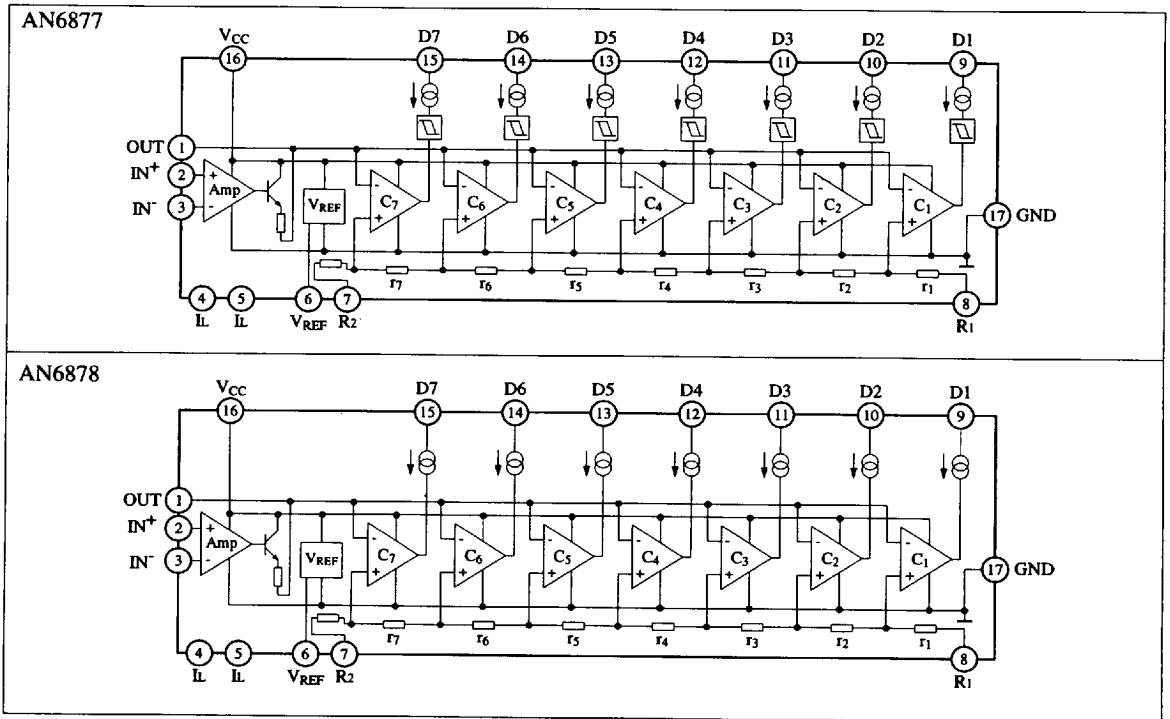
The AN6877 and AN6878 are monolithic integrated circuits driving 7-LEDs. The AN6877 respond linearly and the AN6878 does logarithmically for input signal. As output current adjusting pin is set, it can control LED brightness.

### ■ Features

- 7-LED bar graph display drive
- Linear (AN6877) and Logarithm (AN6878) response
- Brightness externally adjustable
- High output current: 25mA max.
- Series connection available for driving more than 7-dot display
- Incorporating reference supply voltage circuit
- No fluctuation of LED current even if supply voltage changes
- Snap turning on available



### ■ Block Diagram



### ■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V <sub>CC</sub>	18	V
	Circuit Voltage	V <sub>1</sub>	7.5	V
	Input Voltage	V <sub>12,3</sub>	16	V
	Output Voltage	V <sub>O 9-15</sub>	16	V
Current	Supply Current	I <sub>CC</sub>	25	mA
	Output Current	I <sub>O</sub>	25	mA
Power Dissipation (Ta = 25°C)		P <sub>D</sub>	1,800*	mW
Operating Ambient Temperature		Topr	-30 ~ +75	°C
Storage Temperature		Tstg	-55 ~ +150	°C

\* Value of no radiating fin. Refer P<sub>D</sub> - Ta characteristics curve for radiating fin design.  
 Operating Supply Voltage Range: V<sub>CC</sub> = 5.0V ~ 16.0V

### ■ Electrical Characteristics (V<sub>CC</sub>=9V, Ta=25°C)

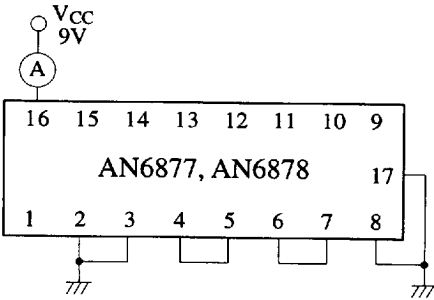
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Supply Current	I <sub>CC</sub>	1	V <sub>2</sub> =V <sub>3</sub> =0V	4		18	mA
Output Inflow Current	I <sub>O 9-15</sub>	2	V <sub>1</sub> =3.55V, V <sub>7</sub> =3.5V	13		25	mA
Reference Voltage	V <sub>REF</sub>	3		3.55	3.75	3.95	V
Output Offset Voltage (Amp.)	V <sub>1</sub>	4	V <sub>CC</sub> =16V, G <sub>V</sub> =20dB, V <sub>2</sub> =0V	-150		150	mV
Voltage Gain (Amp.)	V <sub>G</sub>	4	V <sub>2</sub> =50mV	18	20	22	dB
Output Pin Leak Current	I <sub>9-15</sub>	5	V <sub>CC</sub> =18V	0		20	μA
Input Bias Current (Amp.)	I <sub>Bias2</sub>	6	V <sub>CC</sub> =18V, V <sub>2</sub> =V <sub>3</sub> =0V	-2		0	μA
	I <sub>Bias3</sub>	6	V <sub>CC</sub> =18V, V <sub>2</sub> =V <sub>3</sub> =0V	-2		0	μA
Input Bias Current (Comparator)	I <sub>Bias7</sub>	7	V <sub>CC</sub> =18V, V <sub>2</sub> =10V, V <sub>3</sub> =V <sub>7</sub> =V <sub>8</sub> =0V	-10		0	μA
	I <sub>Bias1</sub>	7	V <sub>CC</sub> =18V, V <sub>3</sub> =10V, V <sub>1</sub> =V <sub>2</sub> =0V, V <sub>6</sub> =V <sub>7</sub> =V <sub>8</sub>	-10		0	μA
Comparator Level (AN6877)	GD <sub>1</sub>	8	V <sub>7</sub> =3.65V, V <sub>8</sub> =0V	0.4	0.5	0.6	V
	GD <sub>2</sub>			0.85	1	1.15	V
	GD <sub>3</sub>			1.35	1.5	1.65	V
	GD <sub>4</sub>			1.85	2	2.15	V
	GD <sub>5</sub>			2.35	2.5	2.65	V
	GD <sub>6</sub>			2.85	3	3.15	V
	GD <sub>7</sub>			3.35	3.5	3.65	V
Comparator Level (AN6878)	GD <sub>1</sub> *	8	V <sub>7</sub> =3.5V, V <sub>8</sub> =0V	-17	-15	-13	dB
	GD <sub>2</sub>			-9	-7	-5	dB
	GD <sub>3</sub>			-4	-3	-2	dB
	GD <sub>4</sub>			-1	0	1	dB
	GD <sub>5</sub>			1.5	2	2.5	dB
	GD <sub>6</sub>			3.5	4	4.5	dB
	GD <sub>7</sub>			4.5	5	5.5	dB

\* Comparator reference voltage = 3.5V, 2.0V = 0dB.

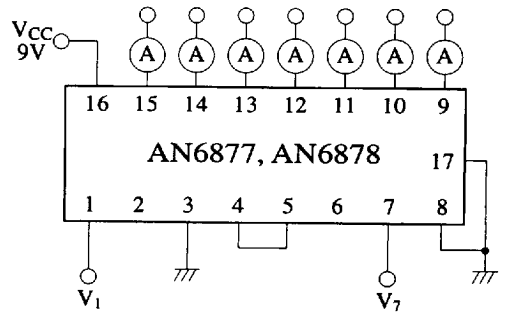
■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	Amp. Output	9	LED 1 Output
2	Non Inverting Input	10	LED 2 Output
3	Inverting Input	11	LED 3 Output
4	LED Current Setting Input	12	LED 4 Output
5	LED Current Setting Input	13	LED 5 Output
6	Reference Voltage	14	LED 6 Output
7	LED ON Level Setting Input	15	LED 7 Output
8	LED ON Level Setting Input	16	V <sub>CC</sub>

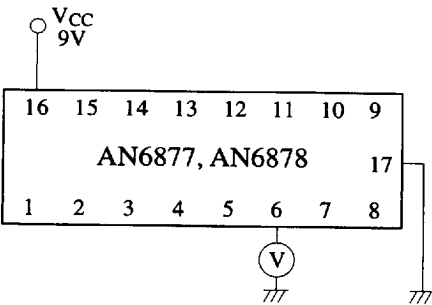
Test Circuit 1 (I<sub>CC</sub>)



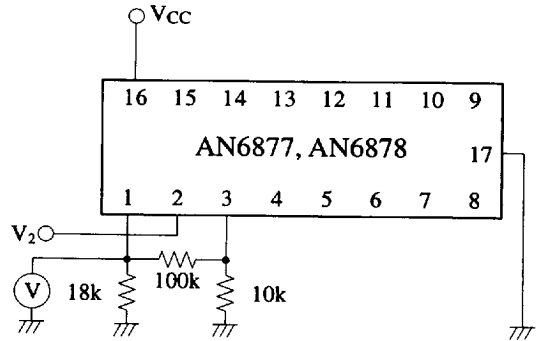
Test Circuit 2 (I<sub>O 9-15</sub>)



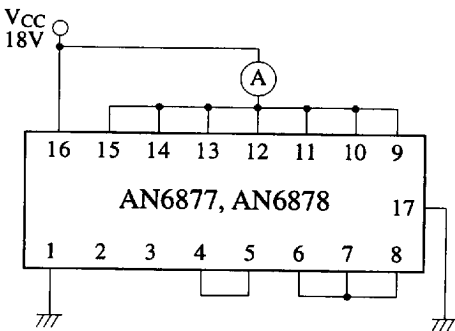
Test Circuit 3 (V<sub>REF</sub>)



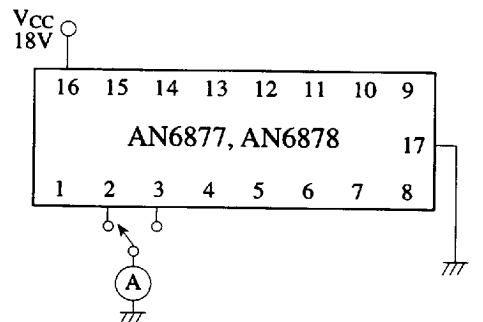
Test Circuit 4 (V<sub>1</sub>, V<sub>G</sub>)



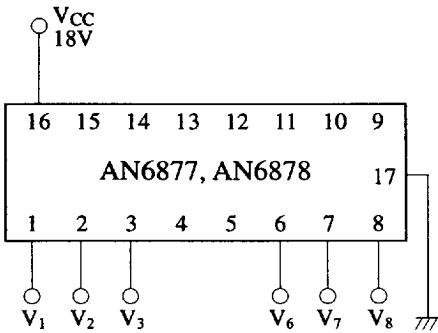
Test Circuit 5 (I<sub>9-15</sub>)



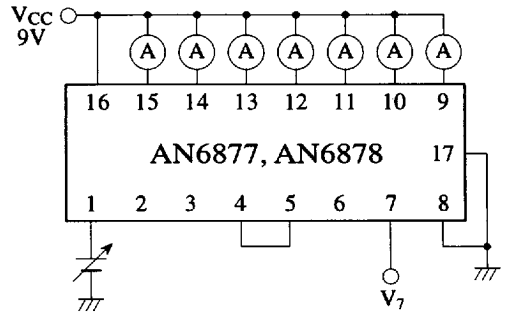
Test Circuit 6 (I<sub>Bias2</sub>, I<sub>Bias3</sub>)



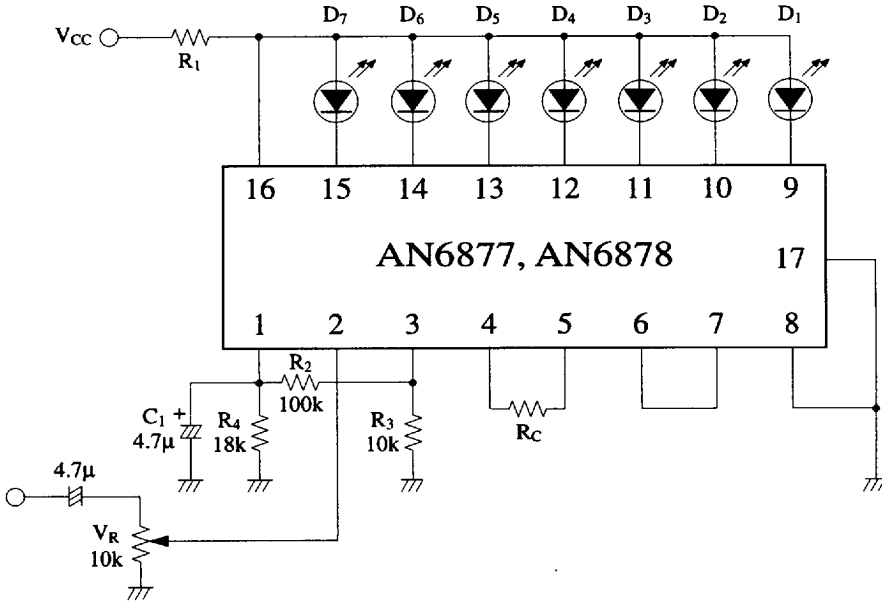
Test Circuit 7 ( $I_{Bias7}$ ,  $I_{Bias1}$ )



Test Circuit 8 ( $GD_{1-7}$ )



■ Application Circuit



- For input amp. gain determination :  $R_2, R_3$
- LED current adjusting resistor :  $R_C$   
 $R_C = 300\Omega \quad I_{LED} = 18mA$   
 $R_C = 3.3k\Omega \quad I_{LED} = 5mA$
- Determine by using [ $P_D - T_a$ ] characteristics data about power supply  $R_1$
- For response time determination :  $C_1, C_4$
- For input level determination :  $V_R$

■ Characteristics Curve

