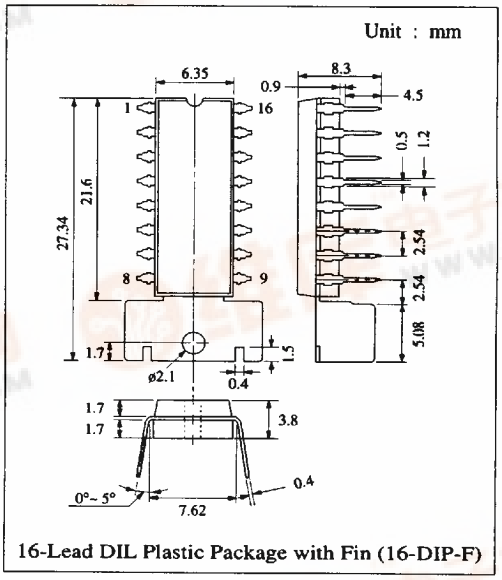
AN6877, AN6878

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.

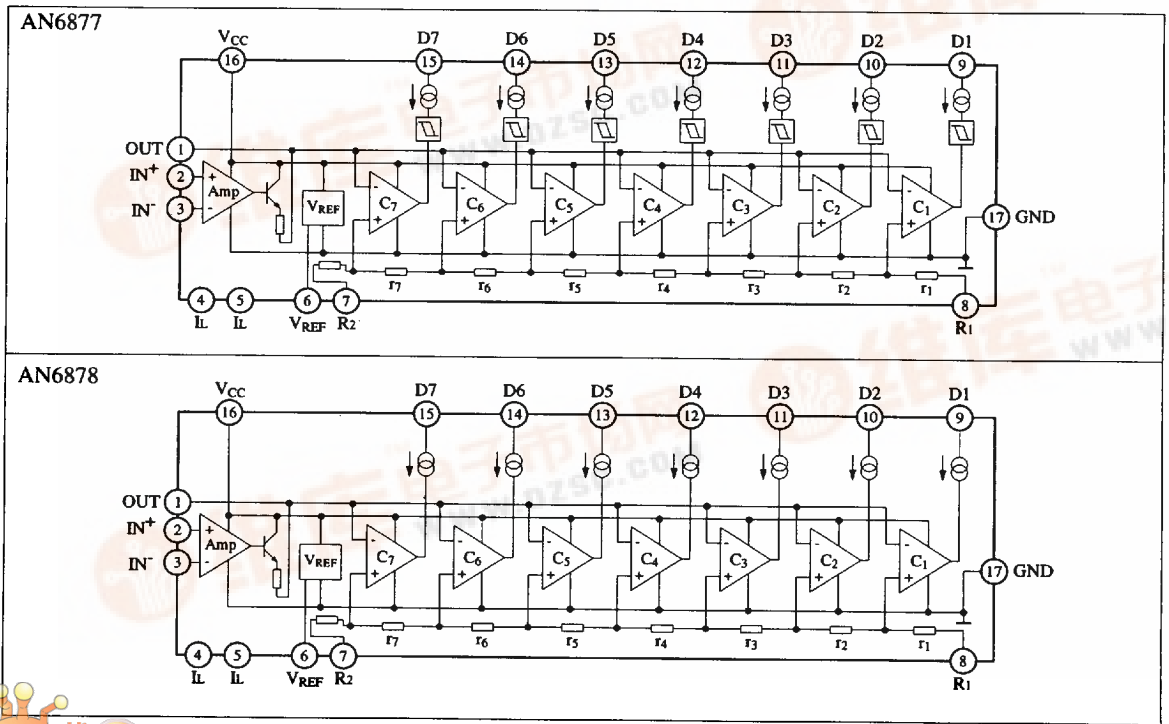


16-Lead DIL Plastic Package with Fin (16-DIP-F)

■ 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_{CC}	18	V
	Circuit Voltage	V_1	7.5	V
	Input Voltage	$V_{12,3}$	16	V
	Output Voltage	$V_{O\ 9\text{-}15}$	16	V
Current	Supply Current	I_{CC}	25	mA
	Output Current	I_O	25	mA
Power Dissipation (Ta = 25°C)		P_D	1,800*	mW
Operating Ambient Temperature		Topr	-30 ~ +75	°C
Storage Temperature		Tstg	-55 ~ +150	°C

* Value of no radiating fin. Refer P_D - Ta characteristics curve for radiating fin design.
Operating Supply Voltage Range: V_{CC} = 5.0V ~ 16.0V

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

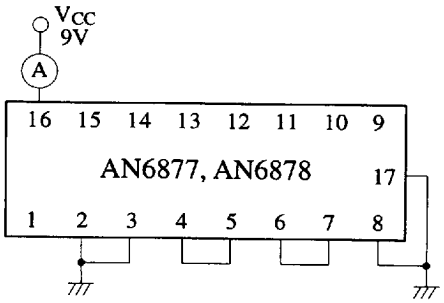
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Supply Current	I_{CC}	1	V_2=V_3=0V	4		18	mA
Output Inflow Current	$I_{O\ 9\text{-}15}$	2	V_1=3.55V, V_7=3.5V	13		25	mA
Reference Voltage	V_{REF}	3		3.55	3.75	3.95	V
Output Offset Voltage (Amp.)	V_I	4	V_{CC}=16V, G_V=20dB, V_2=0V	-150		150	mV
Voltage Gain (Amp.)	V_G	4	V_2=50mV	18	20	22	dB
Output Pin Leak Current	$I_{9\text{-}15}$	5	V_{CC}=18V	0		20	µA
Input Bias Current (Amp.)	I_{Bias2}	6	V_{CC}=18V, V_2=V_3=0V	-2		0	µA
	I_{Bias3}	6	V_{CC}=18V, V_2=V_3=0V	-2		0	µA
Input Bias Current (Comparator)	I_{Bias7}	7	V_{CC}=18V, V_2=10V, V_3=V_7=V_8=0V	-10		0	µA
	I_{Bias1}	7	V_{CC}=18V, V_3=10V, V_1=V_2=0V, V_6=V_7=V_8	-10		0	µA
Comparator Level (AN6877)	GD_1	8	V_7=3.65V, V_8=0V	0.4	0.5	0.6	V
	GD_2			0.85	1	1.15	V
	GD_3			1.35	1.5	1.65	V
	GD_4			1.85	2	2.15	V
	GD_5			2.35	2.5	2.65	V
	GD_6			2.85	3	3.15	V
	GD_7			3.35	3.5	3.65	V
Comparator Level (AN6878)	GD_1*	8	V_7=3.5V, V_8=0V	-17	-15	-13	dB
	GD_2			-9	-7	-5	dB
	GD_3			-4	-3	-2	dB
	GD_4			-1	0	1	dB
	GD_5			1.5	2	2.5	dB
	GD_6			3.5	4	4.5	dB
	GD_7			4.5	5	5.5	dB

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

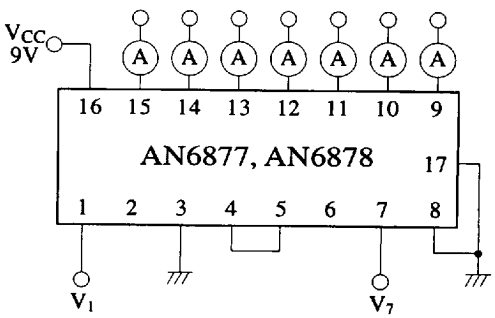
■ Pin

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_{CC}

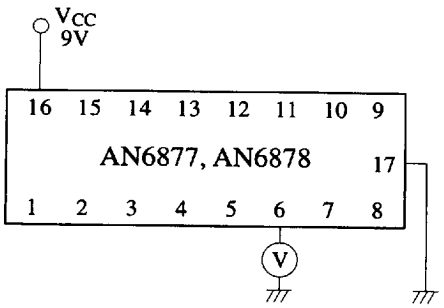
Test Circuit 1 (I_{CC})



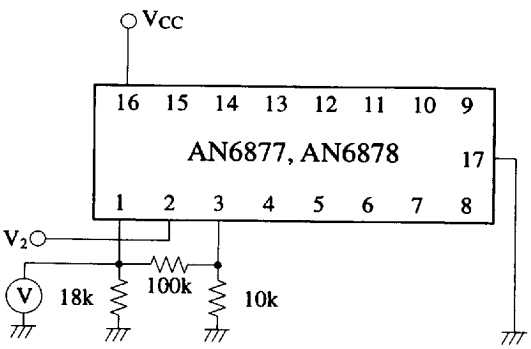
Test Circuit 2 ($I_{O\,9\text{-}15}$)



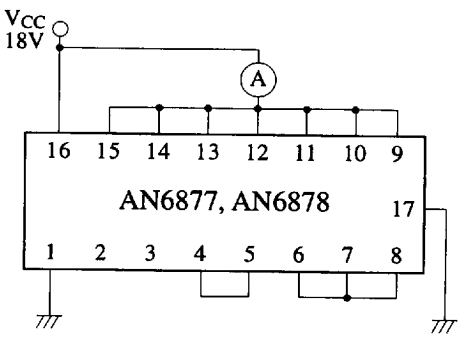
Test Circuit 3 (V_{REF})



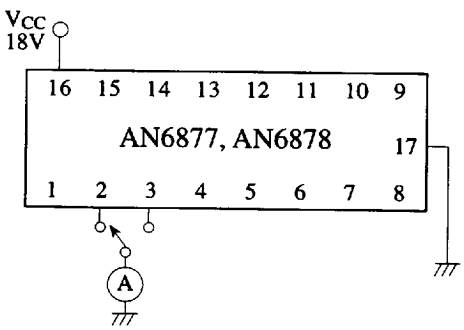
Test Circuit 4 (V_1, V_G)



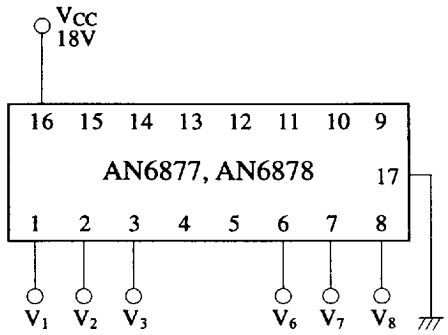
Test Circuit 5 ($I_{9\text{-}15}$)



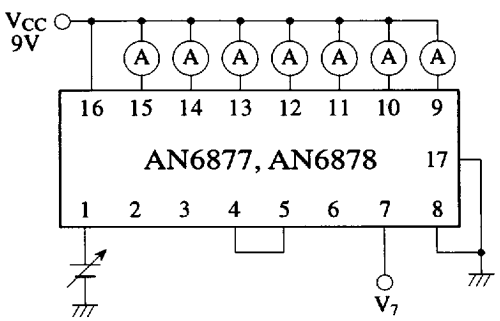
Test Circuit 6 (I_{Bias2}, I_{Bias3})



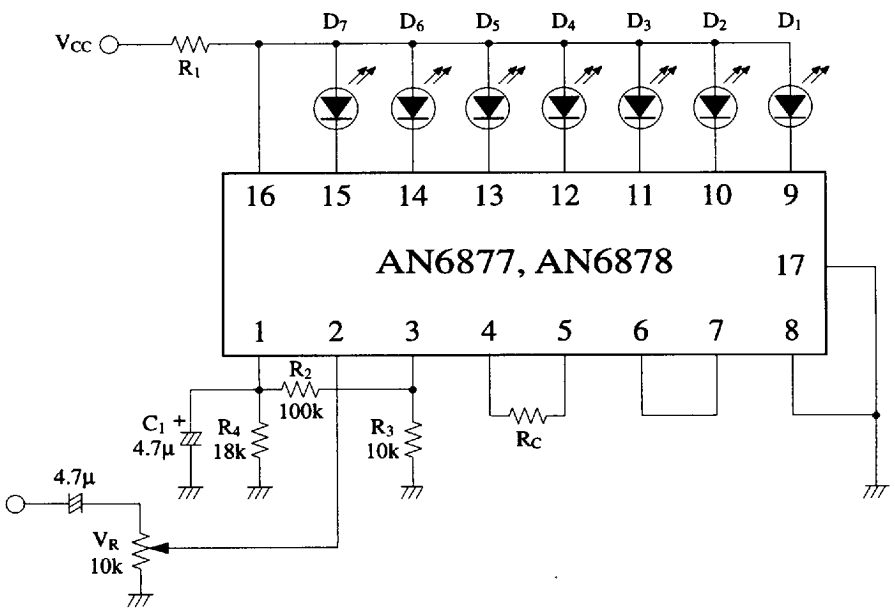
Test Circuit 7 (I_{Bias7}, I_{Bias1})



Test Circuit 8 (GD_{1-7})



■ Application Circuit



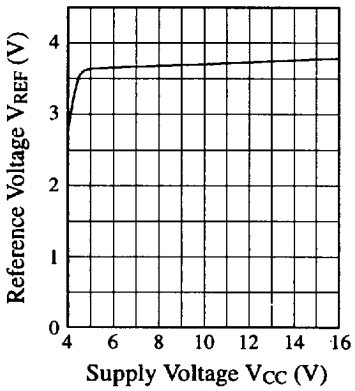
- For input amp. gain determination : R_2, R_3
- LED current adjusting resistor : R_C

  $R_C = 300\Omega$ $I_{LED} = 18mA$

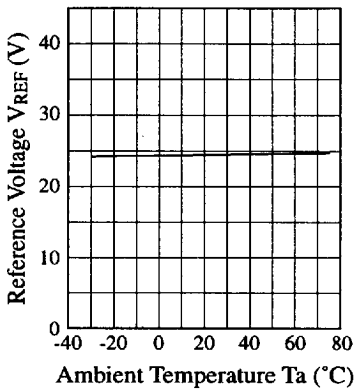
  $R_C = 3.3k\Omega$ $I_{LED} = 5mA$
- Determine by using [P_D - Ta] characteristics data about power supply R_1
- For response time determination : C_1, C_4
- For input level determination : V_R

■ Characteristics Curve

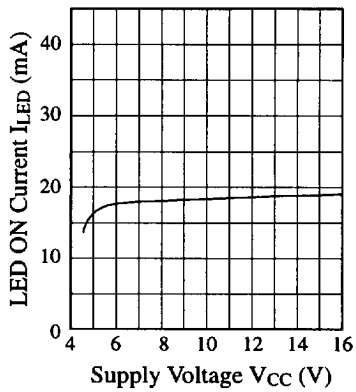
V_{REF} - V_{CC}



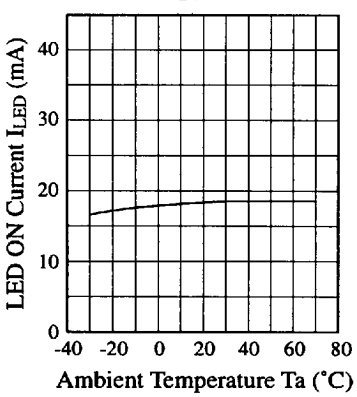
V_{REF} - Ta



I_{LED} - V_{CC}



I_{LED} - Ta



P_D - Ta