

# LED level meter driver, 5-point, VU scale

## BA6144

The BA6144 is a driver IC for LED VU level meters in stereo equipment and other display applications. The IC displays the input level (range:  $-13\text{dB}$  to  $+17\text{dB}$ ) on a 5-point, bar-type LED display. The BA6144 includes a rectifier amplifier allowing direct AC input, and has constant-current outputs, so it can directly drive the LEDs without variations in LED current due to supply voltage fluctuations.

### ●Applications

VU meters, signal meters, and other display devices.

### ●Features

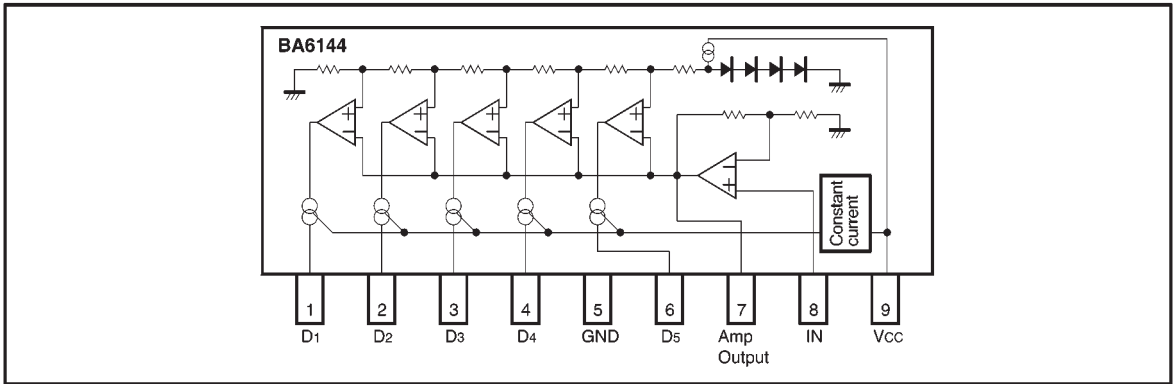
- 1) Rectifier amplifier allows either AC or DC input.
- 2) Wide display level range ( $-13$  to  $+17$ ), so signals with large dynamic range can be displayed.
- 3) Constant-current outputs for constant LED current when the power supply voltage fluctuates.
- 4) Built-in reference voltage means that power supply voltage fluctuations do not effect the display.
- 5) Wide operating power supply voltage range (5.5V to 16V) for a wide range of applications.
- 6) Low PCB space requirements. Comes in a compact 9-pin SIP package and requires few external components.

### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>CC</sub>	18	V
Power dissipation	P <sub>d</sub>	800*	mW
Operating temperature	T <sub>opr</sub>	$-25 \sim +70$	°C
Storage temperature	T <sub>stg</sub>	$-55 \sim +125$	°C
Junction temperature	T <sub>j</sub>	150	°C

\* Reduced by 6.4mW for each increase in Ta of 1°C over 25°C.

●Block diagram



●Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$ , and  $f = 1\text{kHz}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power supply voltage	$V_{CC}$	5.5	12	16	V	—	Fig.1
Quiescent current	$I_Q$	—	7	12	mA	$V_{IN}=0\text{V}$	Fig.1
Comparator level 1	$V_{C1}$	-16	-13	-9	dB	—	Fig.1
Comparator level 2	$V_{C2}$	-9	-7	-4	dB	—	Fig.1
Comparator level 3	$V_{C3}$	—	0	—	dB	Adjustment point	Fig.1
Comparator level 4	$V_{C4}$	7	10	12	dB	—	Fig.1
Comparator level 5	$V_{C5}$	13	17	19	dB	—	Fig.1
Sensitivity	$V_{IN}$	21	47	62	$\text{mV}_{\text{rms}}$	$V_{C3}$ on level	Fig.1
LED current	$I_{LED}$	11	15	18.5	mA	—	Fig.1
Input bias current	$I_{INO}$	—	0.3	1.0	$\mu\text{A}$	—	Fig.1

●Measurement circuit

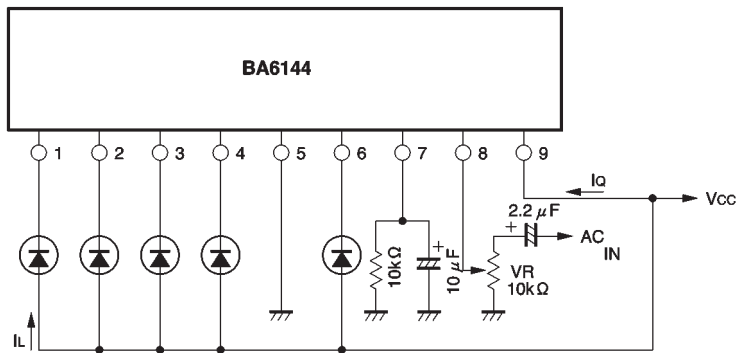


Fig. 1

●Application example

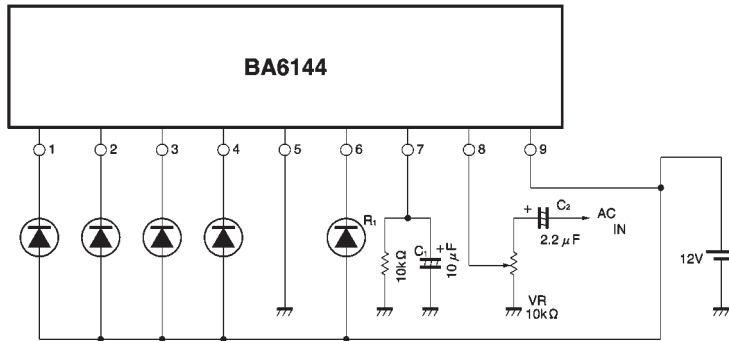


Fig. 2

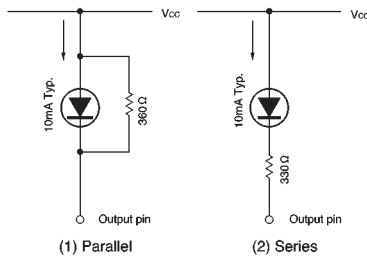


Fig. 3

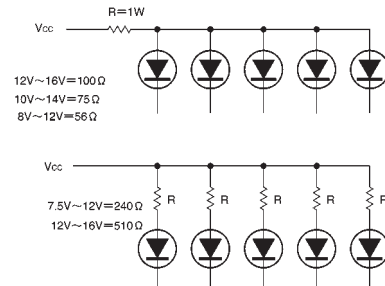


Fig. 4

The response time (attack and release time) can be changed by varying the values of  $C_1$  and  $R_1$  to change the time constant.

$C_2$  is a coupling capacitor, and the potentiometer  $VR$  varies the input level. Input a fixed voltage level and adjust the potentiometer so that the LED lights at 0dB.

To reduce the LED current, connect a resistor either in

parallel (Fig. 3 (1)) or in series (Fig. 3 (2)) with the LED. If a resistor is connected in series with the LED, the LED current will change if the supply voltage fluctuates.

Note: If the power supply voltage exceeds 9V, insert a resistor in series with the LED current supply line, or connect a heat sink so that the maximum power dissipation  $P_{d Max.}$  is not exceeded (see Fig. 4).

●External dimensions (Units: mm)

