

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: -13dB 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

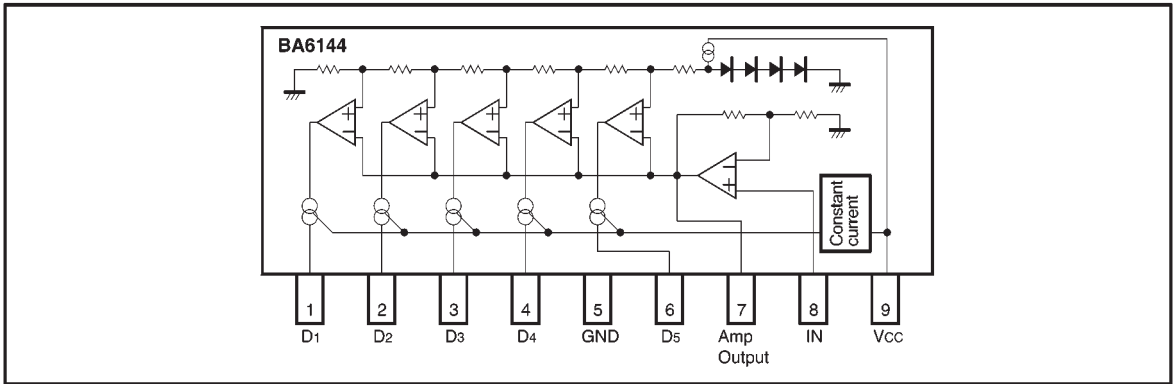
- 1) Rectifier amplifier allows either AC or DC input.
- 2) Wide display level range (-13 to $+17$), so signals with large dynamic range can be displayed.
- 3) Constant-current outputs for constant LED current when the power supply voltage fluctuates.
- 4) Built-in reference voltage means that power 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 _{CC} | 18 | V |
| Power dissipation | P _d | 800* | mW |
| Operating temperature | T _{opr} | $-25 \sim +70$ | °C |
| Storage temperature | T _{stg} | $-55 \sim +125$ | °C |
| Junction temperature | T _j | 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 | mV_{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 | μA | — | Fig.1 |

●Measurement circuit

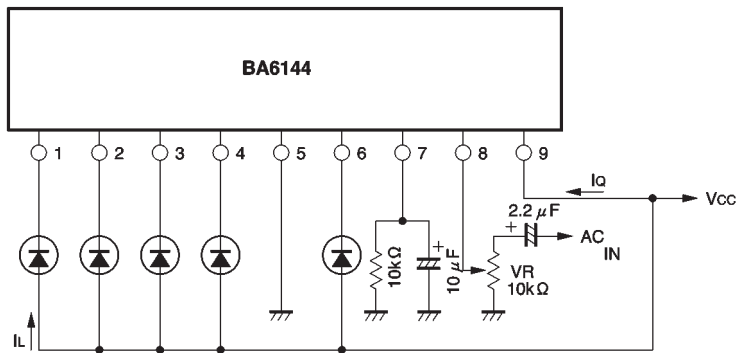


Fig. 1

●Application example

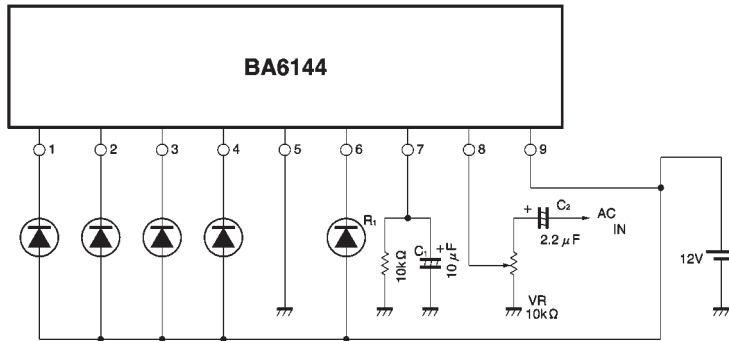


Fig. 2

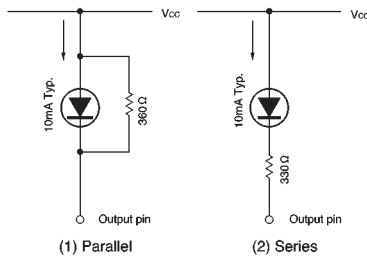


Fig. 3

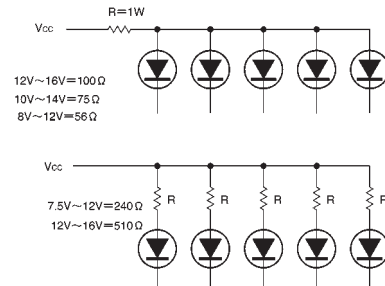


Fig. 4

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 Pd_{Max} is not exceeded (see Fig. 4).

●External dimensions (Units: mm)

