

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

## BA6137

The BA6137 is a driver IC for LED VU level meters in stereo equipment and other display applications. The IC displays the input level (range:  $-10\text{dB}$  to  $+6\text{dB}$ ) on a 5-point, bar-type LED display. The BA6137 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.

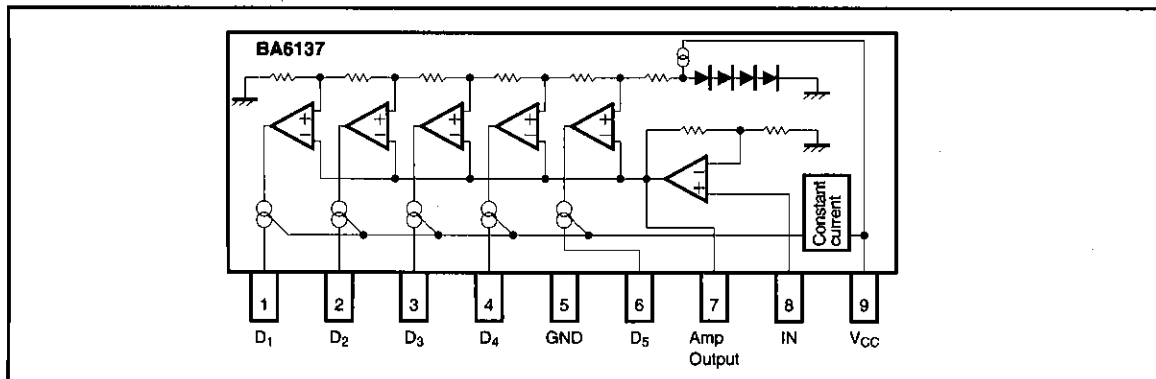
### ● Applications

VU meters, signal meters, and other display devices.

### ● Features

- 1) Rectifier amplifier allows either AC or DC input.
- 2) Constant-current outputs for constant LED current when the supply voltage fluctuates.
- 3) Current output is optimized for red LEDs, for low power consumption.
- 4) Built-in reference voltage means that power supply voltage fluctuations do not effect the display.
- 5) Wide operating voltage range (3.5V 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.

### ● Block diagram



### ● Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter             | Symbol    | Limits         | Unit             |
|-----------------------|-----------|----------------|------------------|
| Supply voltage        | $V_{CC}$  | 18             | V                |
| Power dissipation     | $P_d$     | 800*           | mW               |
| Operating temperature | $T_{opr}$ | $-25 \sim 60$  | $^\circ\text{C}$ |
| Storage temperature   | $T_{stg}$ | $-55 \sim 125$ | $^\circ\text{C}$ |
| Junction temperature  | $T_J$     | 150            | $^\circ\text{C}$ |

\* Reduced by 6.4mW for each increase in  $T_a$  of  $1^\circ\text{C}$  over  $25^\circ\text{C}$ .

●Electrical characteristics (unless otherwise specified  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 6.0\text{V}$ , and  $f = 1\text{kHz}$ )

| Parameter          | Symbol    | Min.  | Typ. | Max. | Unit                     | Conditions         | Measurement Circuit |
|--------------------|-----------|-------|------|------|--------------------------|--------------------|---------------------|
| Supply voltage     | $V_{CC}$  | 3.5   | 6    | 16   | V                        | —                  | Fig.1               |
| Quiescent current  | $I_Q$     | —     | 5    | 8    | mA                       | $V_{IN}=0\text{V}$ | Fig.1               |
| Control level 1    | $V_{C1}$  | -11.5 | -10  | -8.5 | dB                       | —                  | Fig.1               |
| Control level 2    | $V_{C2}$  | -6    | -5   | -4   | dB                       | —                  | Fig.1               |
| Control level 3    | $V_{C3}$  | —     | 0    | —    | dB                       | Adjustment point   | Fig.1               |
| Control level 4    | $V_{C4}$  | 2.5   | 3    | 3.5  | dB                       | —                  | Fig.1               |
| Control level 5    | $V_{C5}$  | 5     | 6    | 7    | dB                       | —                  | Fig.1               |
| Sensitivity        | $V_{IN}$  | 74    | 85   | 96   | $\text{mV}_{\text{rms}}$ | $V_{C3}$ on level  | Fig.1               |
| LED current        | $I_{LED}$ | 5     | 7    | 9.5  | mA                       | —                  | Fig.1               |
| Input bias current | $I_{IN0}$ | —     | 0.3  | 1.0  | $\mu\text{A}$            | —                  | Fig.1               |

●Measurement circuit

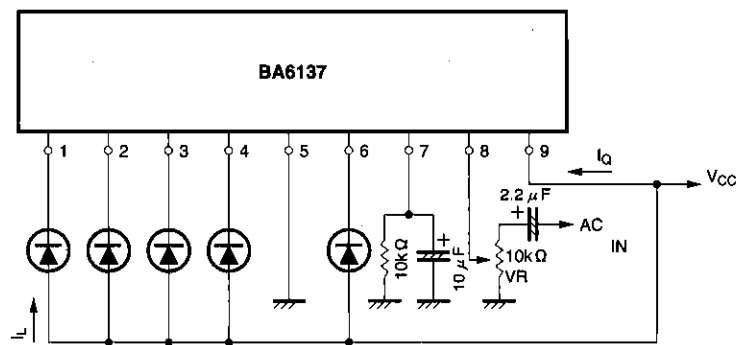


Fig. 1

●Application example

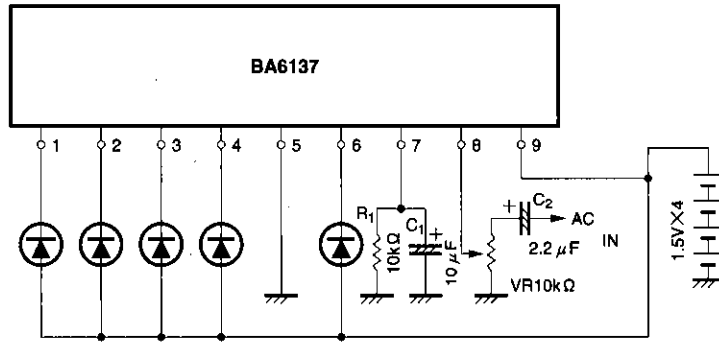


Fig. 2

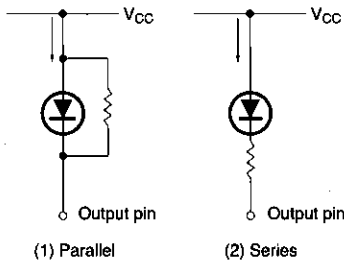


Fig. 3

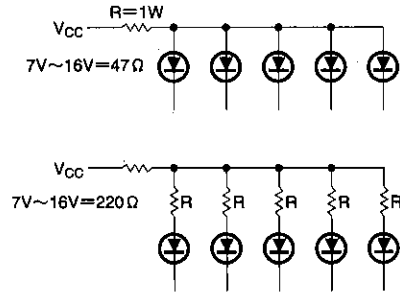


Fig. 4

The response time (attack and release time) can be changed by varying the values of C<sub>1</sub> and C<sub>2</sub> to change the time constant.

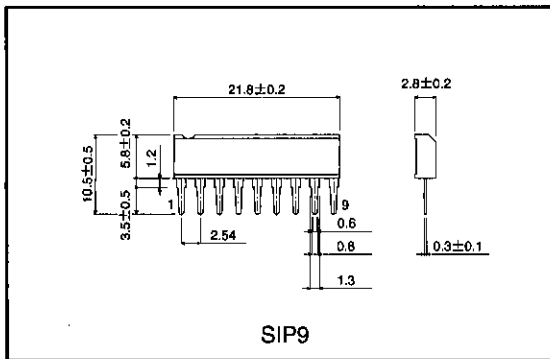
C<sub>2</sub> is a coupling capacitor, and VR varies the input level. Input the desired fixed voltage and adjust VR so that the LED lights at 0dB.

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<sub>Max.</sub> is not exceeded (see Fig. 4).

●External dimensions (Unit: mm)



Level meter drivers  
Audio accessory components