

POWER-SAVER LED LAMP

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This high-intensity, energy-efficient, long-lasting and durable lamp can withstand input voltage fluctuation of up to ± 25 per cent without change in the light output. The lamp consumes only 0.5W power compared to conventional 15W lamps, significantly reducing the energy costs, and can be used as night lamp, path lamp or *mandir* lamp. Also, it has a life of 100,000 hours (11 years of continuous use) against 1000 hours for conventional lamps, thus requiring no replacement for a long time, once fitted.

At the heart of this lamp are seven light-emitting diodes (LEDs). Unlike ordinary incandescent lamps, LEDs don't have a filament that can burn out and are illuminated solely by the movement of electrons in a semiconductor material. So they last much longer. Small size and use of plastic material make them more durable.

But the main advantage of LEDs is efficiency. In traditional incandescent lamps, light is produced by heating the tungsten filament. This results in wastage of energy, as a huge portion of the available electricity isn't used for producing the visible light. LEDs generate little heat. A much higher percentage of the electrical power goes

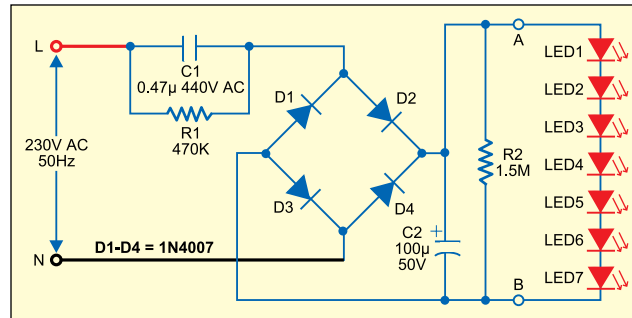


Fig. 1: Circuit diagram of power-saver LED lamps

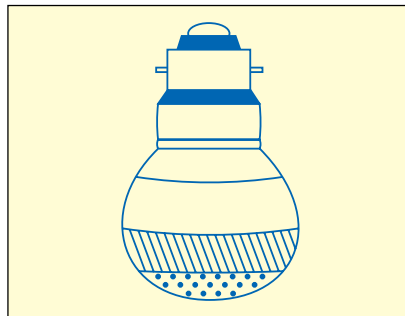


Fig. 2: Proposed enclosure for the lamp

directly to light generation, which cuts down the electricity bill considerably.

Fig. 1 shows the circuit for red LED-based lamp. The LEDs (LED1 through LED7) are powered from mains without the use of a transformer. Here, capacitor C1 is used as the 'AC voltage dropper'—the well-known transformerless solution. It results in the advantages of a smaller size of the circuit and no heat generation (as

the capacitor dissipates negligible power).

The forward-conduction voltage drop required for the LED chain (LED1 through LED7) is provided by C1 alone. C1 discharges through R1 immediately after

the circuit is disconnected from mains, which prevents a fatal shock due to any voltage remaining on the input terminals. The AC mains voltage is rectified by diodes D1 through D4 and filtered by capacitor C2. Resistor R2 acts as a bleeder.

You can make lamps in other colours as well by simply disconnecting all the red LEDs (LED1 through LED7) between points A and B and instead connecting yellow LEDs for yellow lamp, blue LEDs for blue lamp, green LEDs for green lamp and white LEDs for white lamp, as desired.

Capacitor C1 should be rated for at least 440V AC, while mains applications also require use of an X2-class capacitor. The circuit may be assembled on a circular PCB and housed in a bulb-shaped enclosure as shown in Fig. 2. Mount capacitors C1 and C2 on the track side of the PCB to save space. ●