

# Re: Putting Red LED's In Osram Dot it light

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- *From:* John Fields <jfields@xxxxxxxxxxxxxxxxxxxxxx>
  - *Date:* Wed, 20 Feb 2008 07:23:13 -0600
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On Wed, 20 Feb 2008 03:28:14 -0800 (PST), "Dave.H" <the1930s@xxxxxxxxxxxxxx> wrote:

On Feb 20, 9:29 pm, "Dave.H" <the19...@xxxxxxxxxxxxxx> wrote:

I want to put 16,000 mcd red LEDs in an Osram Dot it light for working outside when I don't want my night vision affected, the light in question has 3 white LED's and a resistor (red-yellow-black-gold-brown) voltage measured from the pins of the LED's is 3.122 VDC. How would I go about installing these 2.0 volt red LED's? Do I just change the resistor, if so what value? Unit is powered by 3 AAA batteries.

The resistor is red-GREEN-black-gold-brown not red-yellow-black-gold-brown as I mentioned earlier. I think the difference is only one ohm or so. The green was light in colour making me think it was yellow, but it does measure 25 ohms.

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From your description, (and neglecting the switch) it appears that the flashlight is currently wired like this: (View in Courier)

```

4.5V 3.1V
//
+--[25R]-----[LED>]--+
|||
|+ +--[LED>]--+
[BAT] ||
|+--[LED>]--+
||
+-----+
<-- lled

```

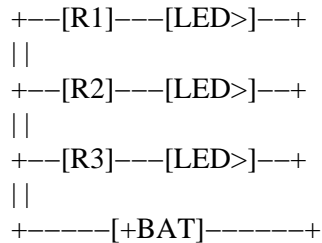
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which means that the current into the LEDs is:

$$V_{bat} - V_{led} = 4.5V - 3.1V$$
$$I_{led} = \frac{V_{bat} - V_{led}}{R_s} = \frac{4.5V - 3.1V}{25\Omega} = 0.056A = 56mA$$

Unfortunately, since  $V_f/I_f$  is different for each LED (unless they were very carefully matched) the current won't split equally, with the result being that one LED may be hogging current beyond its rating, resulting in a shortened life.

I suggest that you rewire the flashlight like this:



In order to determine the value of each of the resistors use:

$$R = \frac{V_{bat} - V_{led}}{I_{led}}$$

Where R is the value of the resistor, in ohms,

$V_{bat}$  is the battery voltage, in volts,

$V_{led}$  is  $V_f(\min)$  for the LED, from the data sheet, and

$I_{led}$  is the nominal forward current, in amperes, also from the data sheet.

For example, If your LEDs are rated for a  $V_f(\min)$  of 2V at 20mA, then you'll have:

$$R = \frac{V_{bat} - V_{led}}{I_{led}} = \frac{4.5V - 2.0V}{0.02A} = 125 \text{ ohms}$$

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The closest standard 5% resistor on the low end is 120 ohms, so the current it would allow through the LED would be:

$$I_{led} = \frac{V_{bat} - V_{led}}{R} = 0.0208A \sim 21mA,$$

Which would be fine.

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JF

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