

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

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*Source:* <http://sci.tech-archive.net/Archive/sci.electronics.basics/2008-02/msg00643.html>

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- *From:* "Dave.H" <the1930s@xxxxxxxxxxxxxxxx>
  - *Date:* Wed, 20 Feb 2008 07:50:54 -0800 (PST)
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On Feb 21, 2:42 am, "Dave.H" <the19...@xxxxxxxxxxxxxxxx> wrote:

On Feb 21, 2:18 am, John Fields <jfie...@xxxxxxxxxxxxxxxxxxxxxxxx> wrote:

On Wed, 20 Feb 2008 05:59:41 -0800 (PST), "Dave.H"

<the19...@xxxxxxxxxxxxxxxx> wrote:

On Feb 21, 12:23 am, John Fields  
<jfie...@xxxxxxxxxxxxxxxxxxxxxxxx>  
wrote:

On Wed, 20 Feb 2008 03:28:14 -0800  
(PST), "Dave.H"

<the19...@xxxxxxxxxxxxxxxx> wrote:

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

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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.

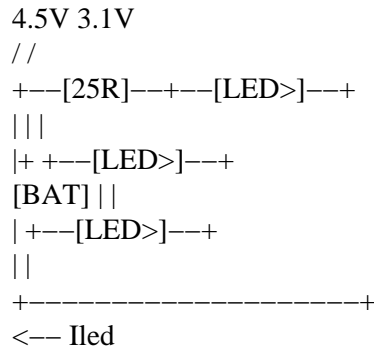
The resistor is  
red-GREEN-black-gold-brown  
not  
red-yellow-black-gold-  
brown as I mentioned  
earlier. I think the difference  
is only one ohm  
or so. The green was light in  
colour making me think it  
was yellow,  
but it does measure 25  
ohms.

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From your description, (and neglecting the  
switch) it appears that

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the flashlight is currently wired like this:  
(View in Courier)

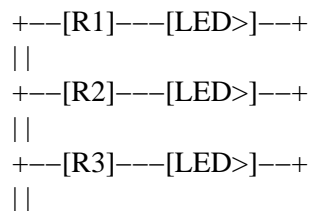


which means that the current into the LEDs  
is:

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

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:



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+-----[+BAT]-----+

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<sub>bat</sub> is the battery voltage, in volts,

V<sub>led</sub> is V<sub>f</sub>(min) for the LED, from the data sheet, and

I<sub>led</sub> is the nominal forward current, in amperes, also from the data sheet.

For example, If your LEDs are rated for a V<sub>f</sub>(min) of 2V at 20mA, then you'll have:

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

= 125 ohms

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

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

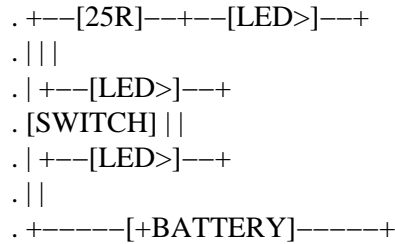
Which would be fine.

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JF

I have linked to a photo of the back of the PCB to make it easier to understand the circuit (I'm not very good at tracing out PCB's), hope this helps.  
<http://s222.photobucket.com/albums/dd237/ozguy89/?action=view&current...>

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Yes, that's what I thought.

Including the switch, it's wired like this:



Looking at the photo, if you wanted to go with my suggestion it seems to me the easiest way of getting there would be to rewire the board, using cuts and jumpers, like this:

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```
. +---[JUMPER]---+---[LED>]---[R]---+  
. || |  
. | +---[LED>]---[R]---+  
. [SWITCH] ||  
. | +---[LED>]---[R]---+  
. || |  
. +-----[+BATTERY]-----+
```

If you have the room on the wiring side of the board it'd be an easy matter to use surface-mount resistors, but if not it doesn't seem that it'd be that much more difficult to use 1/8 or 1/4 watters on the component side of the board.

What do you want to do?

—  
JF

I'm not at all confident on working with PC boards like that, so I might actually make up a whole new unit, point to point construction, leaving the DOT it intact.

I wouldn't mind just installing the red LEDs and a new resistor in place of the old ones, and leave all wiring as-is. I don't mind if the LED's have a shortened life. Not too hard to replace, IMHO. Would I still go with the 47 ohm?

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