

## Re: Current-driving a powerful IR-illuminator array

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- *From:* Fred Bloggs <nospam@xxxxxxxxxxx>
  - *Date:* Sat, 15 Apr 2006 13:56:05 GMT
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BW wrote:

Ok I'm back after some actual lab-work ;)

I studied the current-source design with an NPN with an emitter resistor ( $R_e$ ) to GND and a string of 5 leds between  $V_{cc}$  (12V) and the collector. I tried to make the dimensions so that  $V_e$  is around 500 mV (to leave space for a  $V_{ce}$  of over 1 V and the voltage drops across the LED's which is around 2.1 V per LED at the currents I'm interested in), so for a LED current of  $I_c=250\text{mA}$ , I chose  $R_e=2.2\ \text{ohm}$ . Given the drop over the base-emitter port of the NPN of 0.7V, I'd have to have a  $V_b$  of 1.2 V.

Somewhere here I realised that at a beta of say 30-40, I would have to support an  $I_b$  of around 10 mA (I actually measured this), which is quite much. The trigger source is 5V and I have difficulties of getting those 5V down to the required 1.2V. A resistor-based voltage-divider is not good enough since choosing small R forces a too heavy load on the trigger buffer, and choosing a high R makes the 15 mA create a too big voltage drop (pulling the NPN out of the "easy" feedback model). So I switched the transistor to a darlington NPN with beta > 750 giving an  $I_b$  of about 0.2 mA (measured). Still this did not create a sane configuration with the voltage divider model (the 0.2 mA creates a too big voltage drop nonetheless).

I also tried various combinations of 1N4148 strings to drop the voltage, but it does not work as I think it does (I get voltage drops of only 530mV over each 1N4148 can that be right?). I tried both simply putting the diodes in a series from the trig buffer (5V) down to the transistor base. I also tried a resistor from the trig buffer to the base, and a diode string from the base to GND, but this configuration didn't work as expected either :)

I'd be happy to have some thoughts on this seemingly simple circuit :) Perhaps adding a voltage follower (another buffer) at the input port to

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support the higher currents is enough ? I'll try that in the lab I  
guess...

Your main problem is being sent on a wild-goose chase by a well known newsgroup pest, troll, and ignorant pretentious idiot, "Rich Grease"– the "dreaded" this and that. You will notice the complete fake offered no further suggestions to handling your quandary as is usual with that kind. At 12V you end up with bunches of current source strings, each requiring a bunch of parts overhead and delivering poor accuracy.