

Build a simple linear LED driver

This kit allows you to build a simple linear driver for driving power LEDs at up to 700mA. The driver is based on the ADDtek AMC7140 LED driver IC, which is very simple to use, requiring just two or three external components to operate. Maximum supply voltage for this IC is a huge 50V and the LED output can sustain 75V, so it is a very versatile IC. We highly recommend that you download the datasheet and have a read, go to www.ledsales.com.au/pdf/AMC7140.pdf

C1, the 100nF capacitor, provides a small level of filtering required by the IC for stable operation. The current control resistor (Rset) is made up of a fixed resistor, R1 (866 ohm), and a variable resistor VR1 (10k). It allows you to set the LED current to anywhere from less than 100 to 700mA just by adjusting VR1. The IC drives the LED with a current 500 times the set current. The Iset pin on the IC sits at 1.2 volts, so the Iset current is simply $1.2/R_{set}$.

As an example, assume VR1 is set to the minimum value, so Rset is 866 ohm. This makes $I_{set} = 1.2/866 = 1.39\text{mA}$. Multiply this by 500 and you get a LED current of

690mA. At the other end of the range, with VR1 set to maximum, I_{set} is $1.2/10866 = 0.11\text{mA}$, making the LED current around 55mA (assuming the IC will run down this low - it varies).

One function of this IC is the PWM input. By feeding a PWM (pulse width modulated) signal into this pin you can dim the LEDs from 0% to 100% of brightness. This pin also doubles as the enable pin of the IC and if not used for dimming it can simply be left floating.

Assembly

The kit is very easy to build. The surface mount IC is mounted flat on the PCB. You must position this carefully so that the pins line up with the narrow pads on the board. Tack one pin in place and make sure the IC is still positioned correctly and then solder the rest of the pins, being careful not to bridge any pins with solder. Once this is done you can solder the IC's tab to the PCB. You will need a fair bit of heat for this, so set your iron to around 360 degrees, but don't heat the IC for more than around 5 seconds.

Now just do the rest of the components

and the terminal blocks.

Testing

There is not much to test really, just adjust VR1 to minimum, connect a current limited power supply and your desired LED and check to make sure the current through the LED varies across the correct range with adjustment of VR1.

If it doesn't, disconnect and check to make sure there are no solder bridges between pins on the IC.

A note on heatsinking

The PCB is designed so that the IC end of the board can be mounted on a heatsink if necessary. Just make sure you put thermal compound between the PCB and the heatsink for good heat conduction. You might want to remove some of the solder mask to expose the bare tinned copper PCB.

Also, remember that if there is a large voltage drop across the regulator then it will be dissipating a lot of power and producing a lot of heat, so make sure you use a power supply close to the voltage that your LEDs will require.

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