

4000 Lumen 120V AC LED light engine

Why is this a breakthrough?

Up until this point in time all AC LED light engines were controlled by high voltage IC chips which dissipated power in themselves in order to control the light output. Since these chips have limited possible power dissipation, then this put a cap on the possible power dissipation of the resulting light engine. In general terms, the maximum possible power level was around 30W. To go beyond this, multiple light engines had to be built on the same board, each with its own control chip. Double the power meant double the number of LEDs. With Photalume AC LED technology, as described in US Pat 9585212, there is no control chip and thus a higher power design simply involves using the same number of bigger, higher current LEDs. The 4000 lumen design described here has decisively broken the 30W power dissipation barrier. Future light engines can be designed for 10,000 lumens as used for many street lights. The advantage of these AC LED light engines is that they are completely flat, and need no LED driver – the board is simply connected directly to the AC power line. Previous generations of AC LED light engine had a flicker index as high as 0.34. The design described here has a dramatically lower flicker index of 0.23. Power factor and THD are comparable to what can be achieved with a switch mode power supply LED driver. Since all that is required is to join up the power wires, assembly cost is minimized. The entire light engine product can be produced in one operation using a chip shooter and reflow oven, minimizing manufacturing cost. For a license to produce this design contact PShackle@photalume.com.

DESIGN PARAMETERS

Input power	42W
Light output at 75C LED temperature	4400 lumens
Power Factor	0.93
THD	18%
Flicker index	0.23
Input voltage range	108V-132V
Efficacy	106 lumens/W
BOM cost estimate	\$15.57

See details of the design [here](#) (This links to a multi sheet workbook using Microsoft Excel.)