



### 20.45W-Non-Isolated LED Driver- Tubelight /T8

AC Input Voltage Range	LED DC Output Voltage/Current	Output Power
180V <sub>AC</sub> /50Hz ~ 285V <sub>AC</sub> /50Hz	75V/240mA	18W

#### Key Features

- Input from 180V<sub>AC</sub>/60Hz to 285V<sub>AC</sub>/50Hz, DC 75V/240mA output for LED tubes
- Fixed frequency mode and max. efficiency  $\geq 88\%$
- Power Factor  $\geq 0.89$
- Dimension : 60mm×18mm×15mm

#### Introduction

This application note describes a compact module that is able to drive LEDs up to 18W @240mA. A demo board based on SQ9910, with dimension at L60mm \* W18mm\* T15mm, is presented in terms of schematics, PCB diagram, Bill of Materials (BOM) and typical performance characteristics.

#### Specification

The Table 1 below represents related specification that can be achieved. Actual performance is described in the results section.

#### Performance

It is to drive output at 75V/240mA targeting to achieve high efficiency ( $\eta_{MAX} > 89\%$ ) for AC input voltage range 180V<sub>AC</sub> ~ 285V<sub>AC</sub>. Actual performance is shown on Figure 2, 3, 4 and 5 respectively depict efficiency, output current, current variation and power factor versus input line voltage for this module that system designer can adopt it to achieve corresponding performance.

#### Components

Based on non-isolation buck topology, the SQ9910 is able to achieve high efficiency. Figure 1 shows the circuit in details with all related components.

#### BOM

BOM is shown in Table 3.

#### PCB Layout

The PCB layout has dimension at 60mm×18mm×1.6mm in order to fit T8 retrofit space.

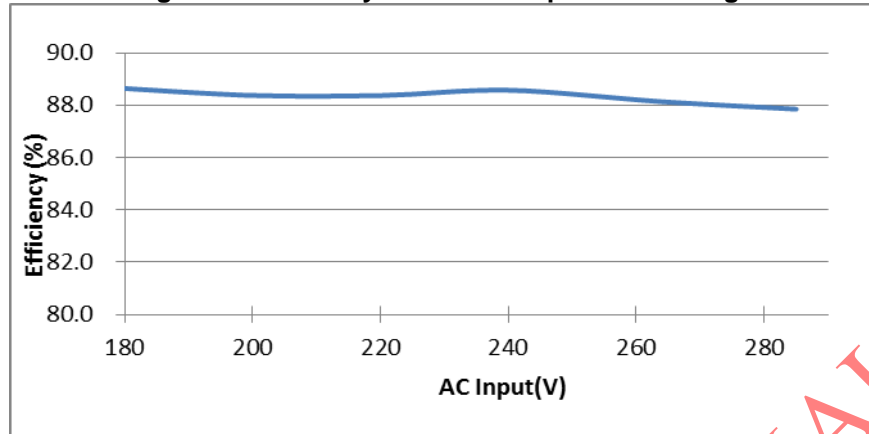
#### Power Module Photo

Top and bottom view of this power module are shown in Figure 6 ~ 7.

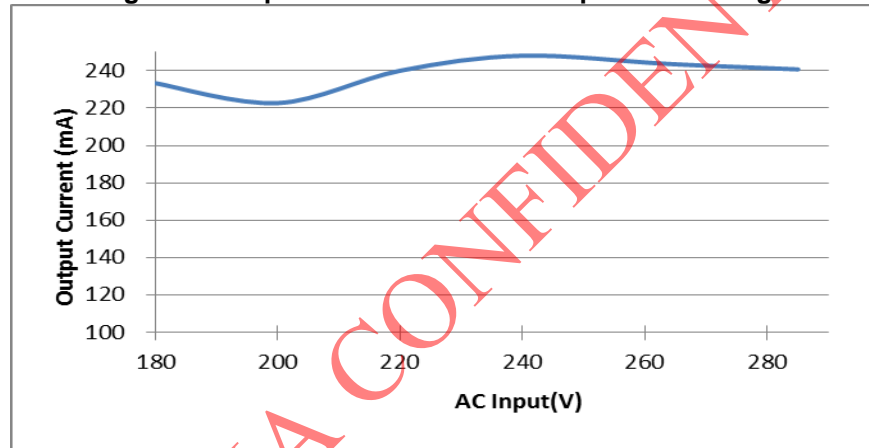




**Figure 2. Efficiency versus AC Input Line Voltage**



**Figure 3. Output Current versus AC Input Line Voltage**



**Figure 4. Current Variation versus AC Input Line Voltage**

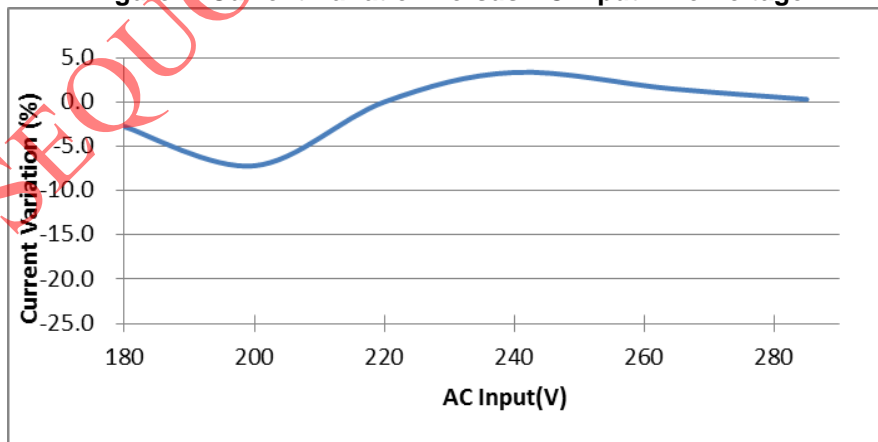




Figure 5. Power Factor versus AC Input Line Voltage

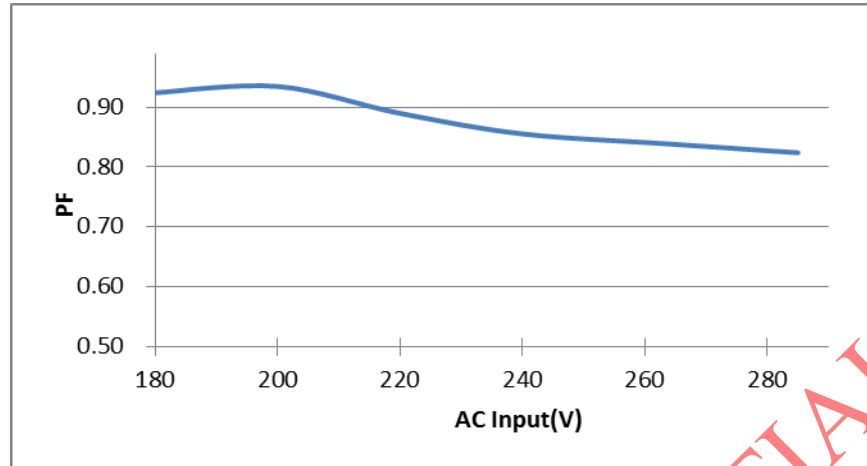


Table 3 : Bill of Material

Item	Symbol	Description	Category	Qty	Note
1	R3	390K/0805/F	Resistor	1	
2	R6	2.0R/1206/F	Resistor	1	
3	R7	1.2R/1206/F	Resistor	1	
4	R5	680R/0805/J	Resistor	1	
5	R8	10R/1206/J	Resistor	1	
6	C4	4.7uF 0805 16V	Capacitor	1	
7	C1	103/400V CBB PIN:10mm	Capacitor	1	
8	C2 C3	22uF/250V 10*20mm 105°C ±20%	Capacitor	2	
9	BD1	MB6S 1A 600V	Diode	1	
10	D1	ES1J 1A/600V SMA	Diode	1	
11	D2 D3 D4	M7 1A/1000V SMA	Diode	3	
12	Q1	mosfet 4N60 4A/600V TO-252	MOSFET	1	
13	L1	DR8*10 φ 0.15mm 1.0mH±5%	Choke	1	
14	L2	RM6 φ 0.27mm 3.5mH±5%	Choke	1	
15	F1	1A/250V Slow 3.6*10	FUSE	1	
16	PCB	010-025-02 FR-4	PCB	1	
17	U1	SQ9910 SOT-8	IC	1	
Total				20	



Figure 6. Top View of this Power Module

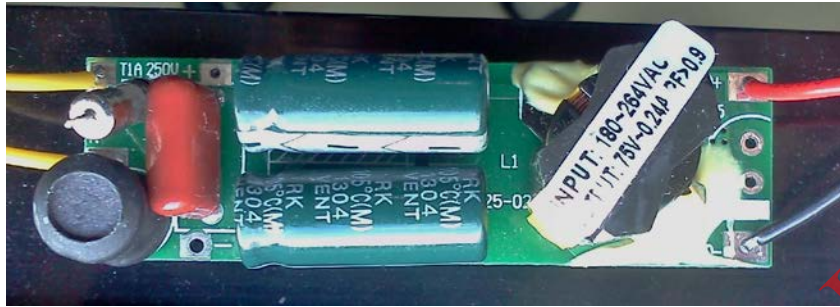
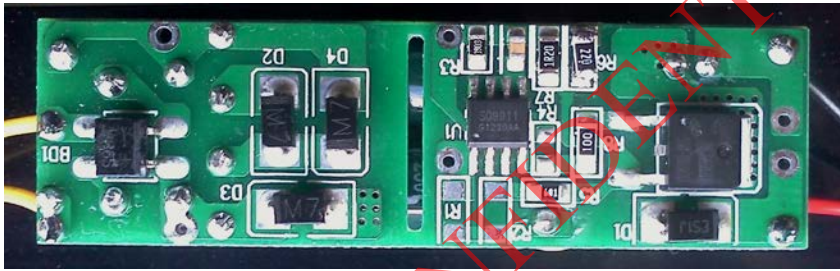


Figure 7. Bottom View of this Power Module



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