

## Fairchild Reference Design

The following user guide supports the demonstration kit for the FL7730. It should be used in conjunction with the FL7730 datasheet as well as Fairchild's application notes and technical support team. Please visit Fairchild's website at [www.fairchildsemi.com](http://www.fairchildsemi.com)

Application	Fairchild Device	Input Voltage Range	Output Power	Output Voltage (Rated Current)
LED SMPS	FL7730	180-265VAC	8.4W	22V(0.38A)

### Key Features

- ✓ Compatible with traditional TRIAC control
- ✓ Cost effective solution without input bulk capacitor and feedback circuitry
- ✓ Line voltage compensation
- ✓ Linear frequency control for better efficiency and easy design
- ✓ Constant current regulation vs output voltage change (10~28V) : <+/- 3.1%
- ✓ Constant current regulation vs line voltage change (180~265Vac) : <+/- 1.9%
- ✓ Output open & short circuit protection with auto restart
- ✓ Flicker-free TRIAC dimming control
- ✓ System efficiency up to 84.5%
- ✓ PF and THD at nominal voltages (220 ~ 230Vac): PF(>0.92), THD(<18%)
- ✓ All components' temperature (at room temp.): less than 55°C

# 1. Schematics

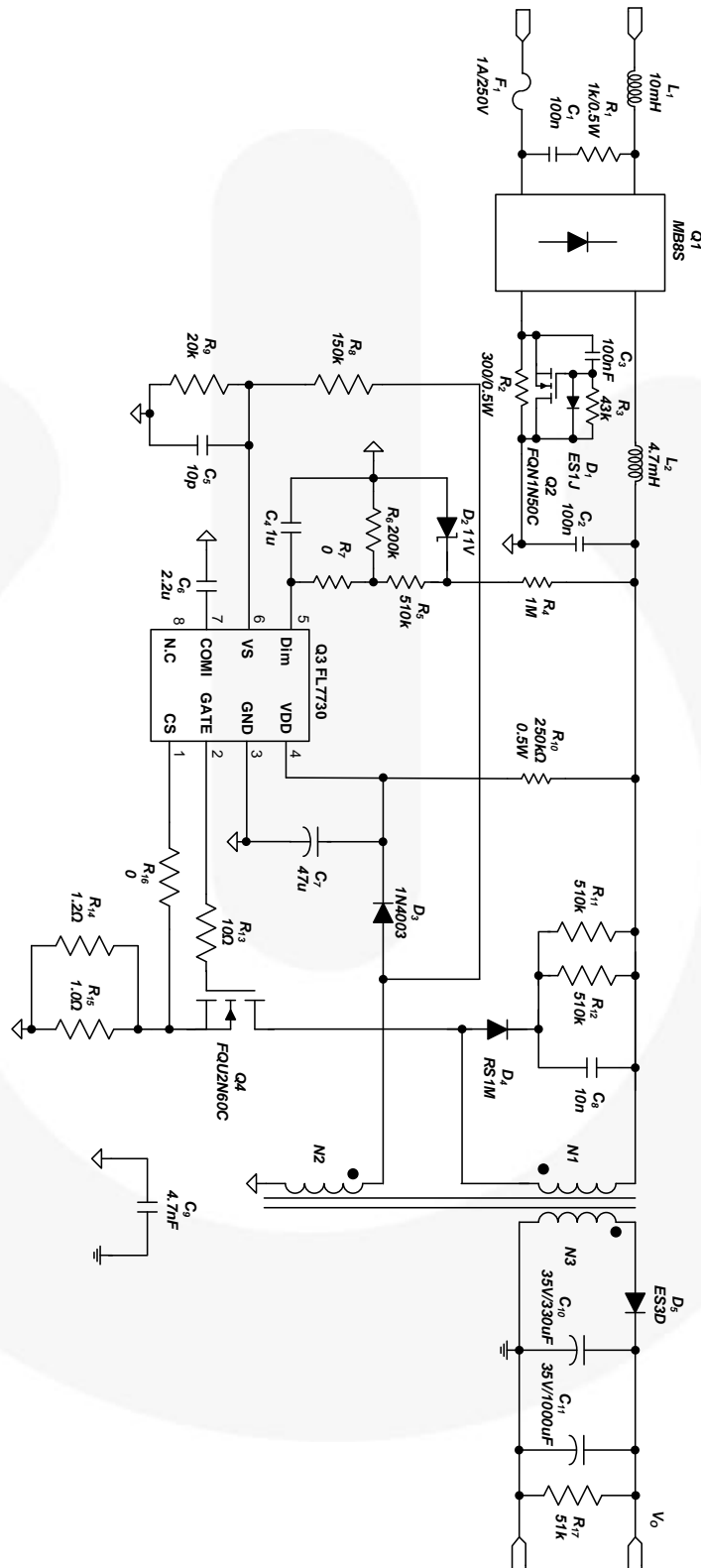


Figure 1. Schematic

## 2. Transformer

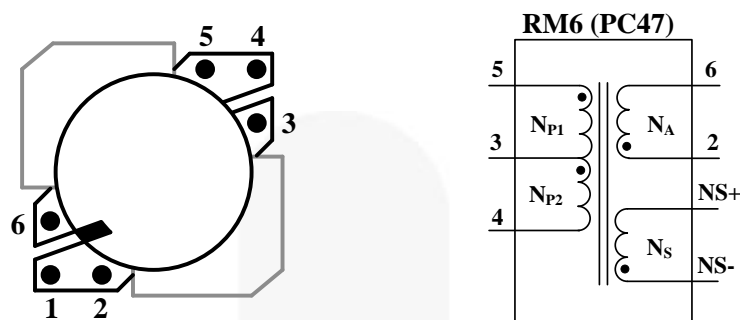


Figure 2. Transformer Bobbin Structure and Pin Configuration

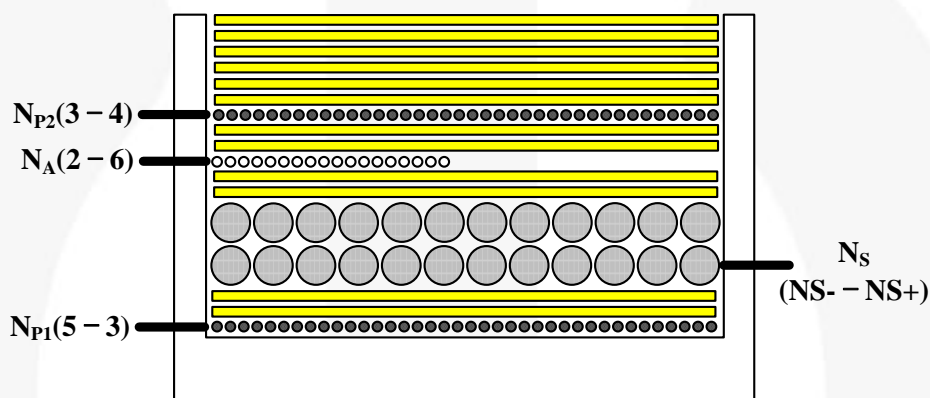


Figure 3. Transformer Winding Structure

Table 1. Winding specifications.

No	Winding	Pin(S → F)	Wire	Turns	Winding Method
1	NP1	5 → 3	0.13φ	38 Ts	Solenoid winding
2	Insulation : Polyester Tape t = 0.025mm, 2Layers				
3	NS	NS- → NS+	0.3φ (TIW)	24 Ts	Solenoid winding
4	Insulation : Polyester Tape t = 0.025mm, 2Layers				
5	NA	2 → 6	0.13φ	18 Ts	Solenoid winding
6	Insulation : Polyester Tape t = 0.025mm, 2Layers				
7	NP2	3 → 4	0.13φ	38 Ts	Solenoid winding
8	Insulation : Polyester Tape t = 0.025mm, 6Layers				

Table 2. Electrical Characteristics.

	Pin	Spec.	Remark
Inductance	1-2	1 mH ± 10%	50kHz, 1V
Leakage	1-2	8 uH	50kHz, 1V Short all output pins

### 3. Performance

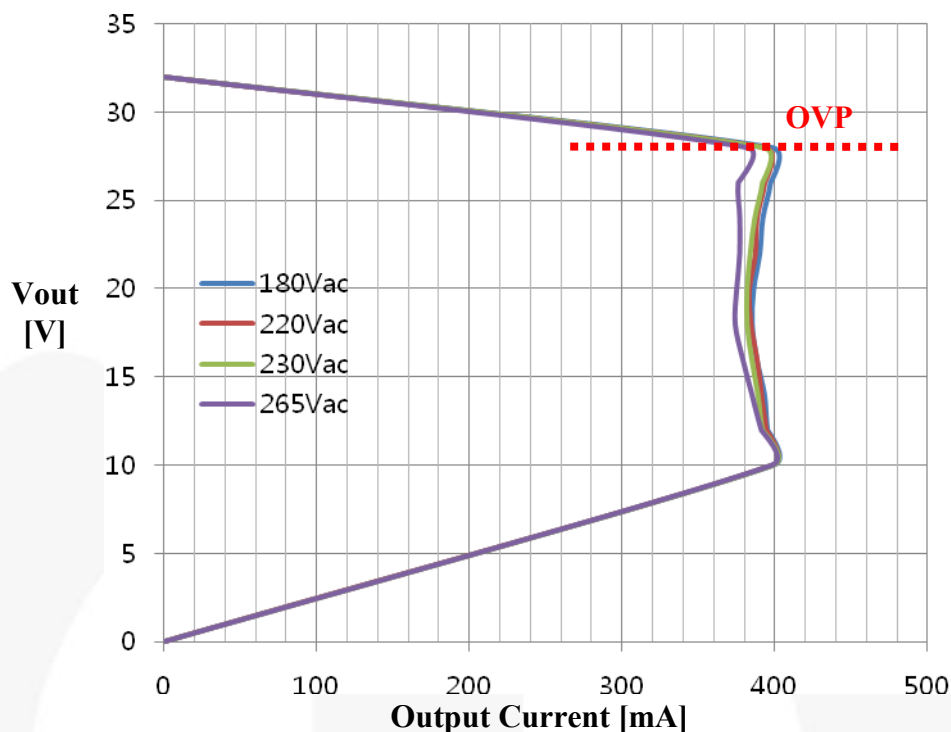


Figure 4. Constant Current Regulation – Measured by E-load[CR mode]

Table 3. Constant Current Regulation by Output Voltage Change (10~28V)

Input Voltage	Min Current	Max Current	Tolerance
180V <sub>AC</sub> /60Hz	385mA	399mA	+/- 1.8%
220V <sub>AC</sub> /60Hz	383mA	398mA	+/- 1.9%
230V <sub>AC</sub> /60Hz	382mA	399mA	+/- 2.2%
265V <sub>AC</sub> /60Hz	374mA	398mA	+/- 3.1%

Table 4. Constant Current Regulation by Line Voltage Change (180~265Vac)

Output Voltage	180Vac	220Vac	230Vac	265Vac	Tolerance
20V	392mA	388mA	387mA	377mA	+/- 1.9%
22V	390mA	387mA	384mA	377mA	+/- 1.7%
24V	386mA	383mA	382mA	375mA	+/- 1.4%

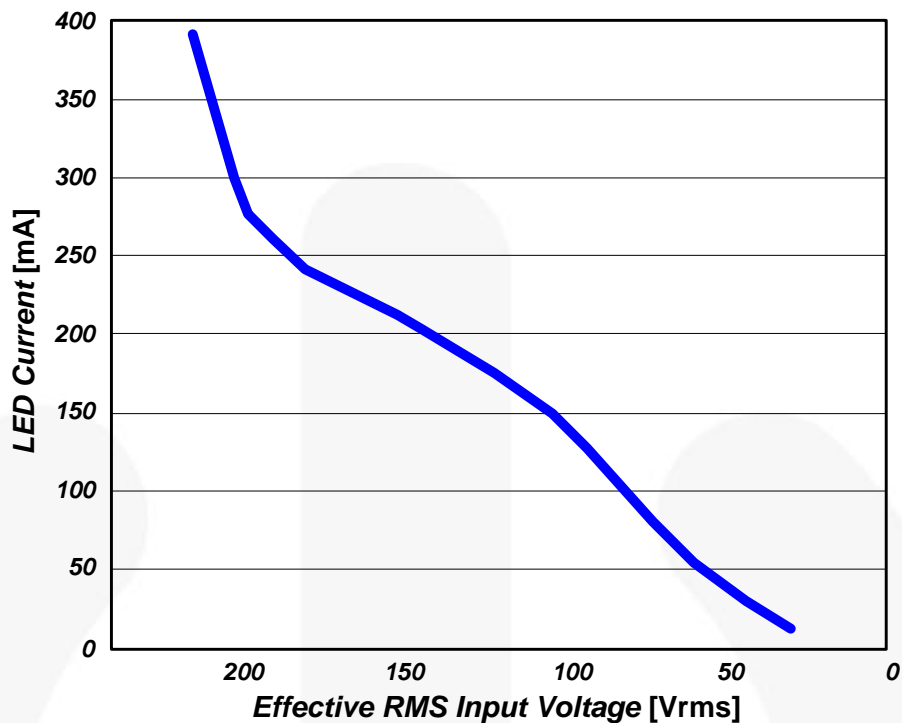


Figure 5. Dimming Curve (Effective RMS Input voltage vs. Output current) – Line voltage [220Vac]

Table 5. TRIAC Dimmer Compatibility

Manufacturer	Dimmer	Condition	Max Current	Min Current	Flicker
NANO	SKD-500	220V/60Hz	365mA	24mA (7%)	No
JIN HEUNG	SA04003	220V/60Hz	364mA	53mA (15%)	No
ANAM	D-500	220V/60Hz	350mA	58mA (17%)	No
OPPLE	P068102	220V/60Hz	378mA	6mA (2%)	No
DAESUNG	SKD-500	220V/60Hz	366mA	6mA (2%)	No

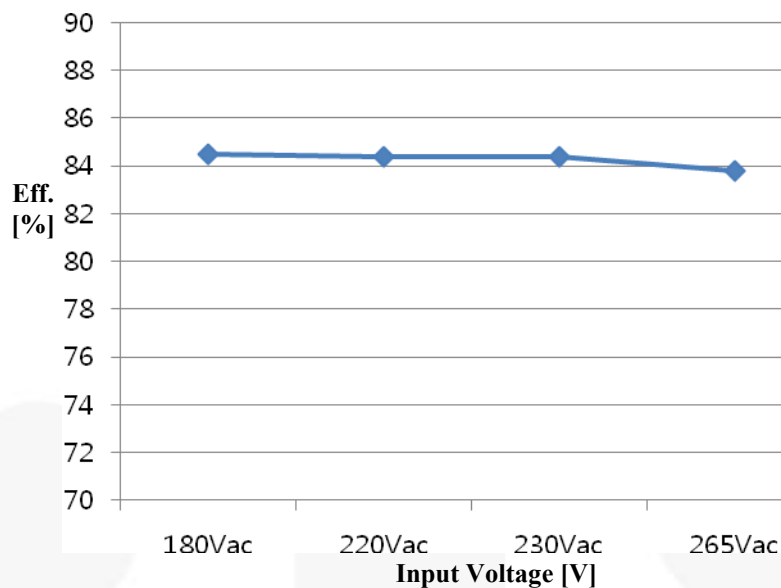


Figure 6. Power Efficiency (Input voltage vs. Efficiency)

Table 6. System Efficiency

Input Voltage	Input Power	Output Current	Output Voltage	Output Power	Efficiency
180Vac	10.13W	392mA	21.84V	8.56W	84.5%
220Vac	9.97W	386mA	21.80V	8.41W	84.4%
230Vac	9.94W	385mA	21.79V	8.39W	84.4%
265Vac	9.76W	376mA	21.75V	8.18W	83.8%

Table 7. Power Factor and THD

Input Voltage	Output Current	Output Voltage	PF	THD
180Vac	392mA	21.84V	0.97	13.7%
220Vac	386mA	21.80V	0.93	16.6%
230Vac	385mA	21.79V	0.92	17.3%
265Vac	376mA	21.75V	0.87	19.7%

## 4. Related Resources

[Datasheet link FL7730](#)

<http://www.fairchildsemi.com/referencedesign/>



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