Fairchild Reference Design

The following user guide supports the reference design for the FL7732. It should be used in conjunction with the FL7732 datasheet as well as Fairchild's application notes and technical support team. Please visit Fairchild's website at www.fairchildsemi.com.

Application	Fairchild Device	Input Voltage Range	Output Power	Output Voltage (Rated Current)
LED SMPS	FL7732	90-265V_{AC}	16.8W	24V(0.7A)

Key Features

- Cost-Effective Solution: No Input Bulk Capacitor or Feedback Circuitry
- Power Factor Correction (PFC)
- Accurate Constant-Current (CC) Control
- Linear Frequency Control Improves Efficiency and Simplifies Design
- Constant Current Regulation vs. Output Voltage Change (11~28V): <±2.38%
- Constant Current Regulation vs. line voltage change (90~265V_{AC}): <±2.79%
- Output-Open & Short-Circuit Protection with Auto Restart
- System Efficiency Up to 89%
- PF and THD at Nominal Voltages (90 ~ 265V_{AC}): PF (>0.90), THD (<20%)

1. Schematic

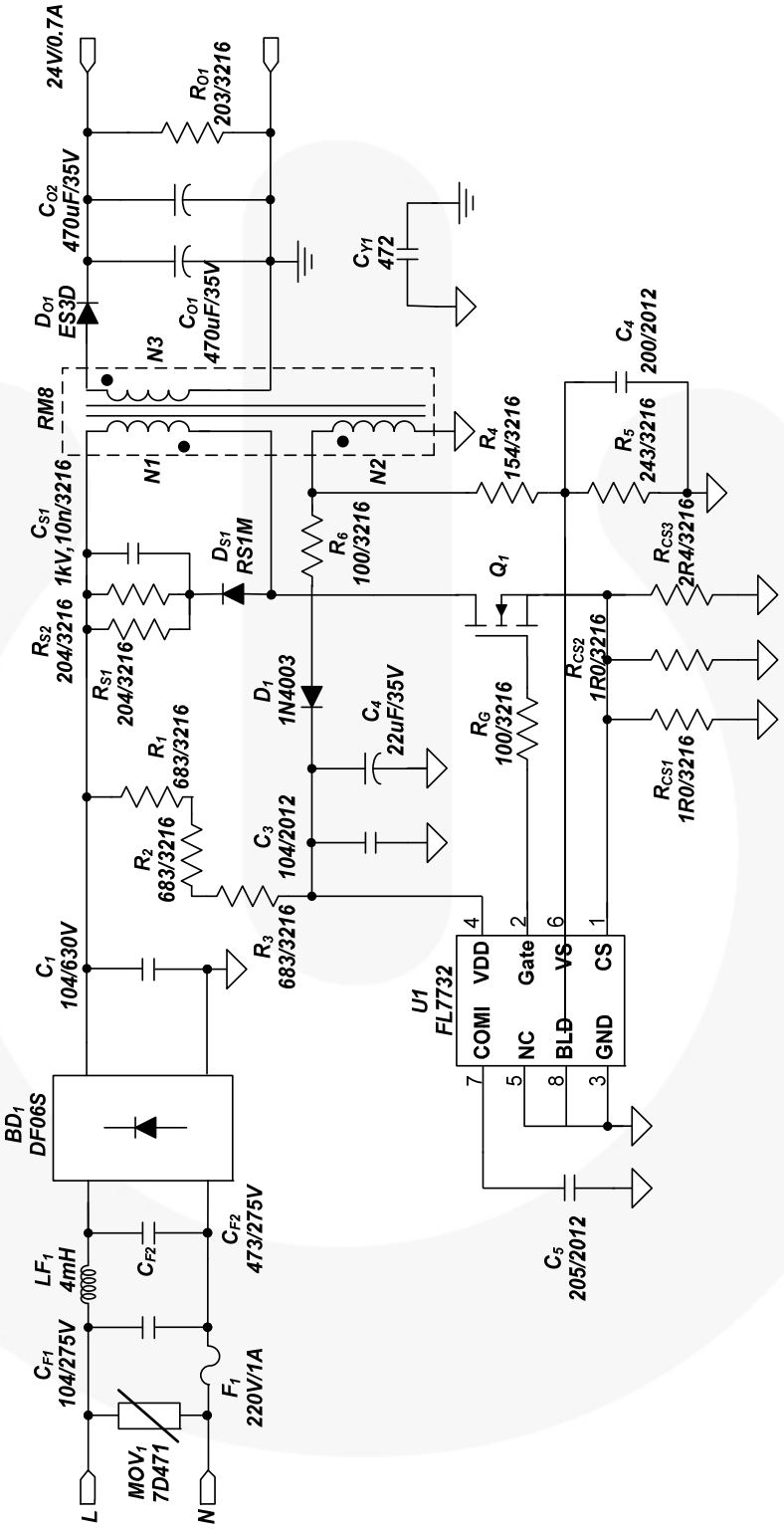

Figure 1. Schematic

2. Bill of Material

Item No.	Part Reference	Value	Qty.	Description (Manufacturer)
1	BD1	DF06S	1	Bridge Diode (Fairchild Semiconductor)
2	CF1	104/275V	1	X-Capacitor
3	CF2	473/275V	1	X-Capacitor
4	CS1	103 /1kV	1	SMD Capacitor 3216
5	CY1	472/250V	1	Y-Capacitor
6	CO1,CO2	470µF/35V	2	Electrolytic Capacitor
7	C1	104/630V	1	MPE Film Capacitor
8	C2	22µF/35V	1	Electrolytic Capacitor
9	C3	104/2012	1	SMD Capacitor 2012
10	C4	200/2012	1	SMD Capacitor 2012
11	C5	225/2012	1	SMD Capacitor 2012
12	DS1	RS1M	1	1000V/1A Ultra Fast Recovery Diode (Fairchild Semiconductor)
13	DO1	ES3D	1	200V/3A, Fast Rectifier (Fairchild Semiconductor)
14	D1	1N4003	1	200V/1A, General Purpose Rectifier (Fairchild Semiconductor)
15	F1	250V/1A	1	Fuse
16	LF1	4mH	1	Inductor, 10Ø
17	MOV1	7D471	1	Varistor
18	Q1	FDD5N60NZ	1	600V/5A, N-Channel MOSFET (Fairchild Semiconductor)
19	RG1, R6	100/3216	2	SMD Resistor 3216
20	RS1,RS2	204/3216	2	SMD Resistor 3216
21	RCS1,RCS2	1R0/3216	2	SMD Resistor 3216
22	RCS3	2R4/3216	1	SMD Resistor 3216
23	RO1	203/3216	1	SMD Resistor 3216
24	R4	154/3216	1	SMD Resistor 3216
25	R1,R2,R3	683/3216	3	SMD Resistor 3216
26	R5	243/3216	1	SMD Resistor 3216
27	T1	RM8	1	12pin, Transformer
28	U1	FL7732M	1	High Frequency PSR PWM Controller (Fairchild Semiconductor)

3. Transformer

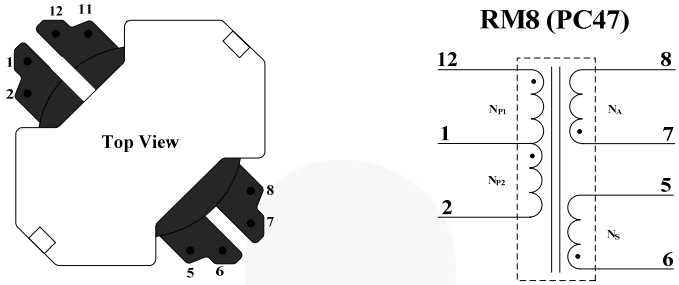

Figure 2. Transformer Bobbin Structure and Pin Configuration

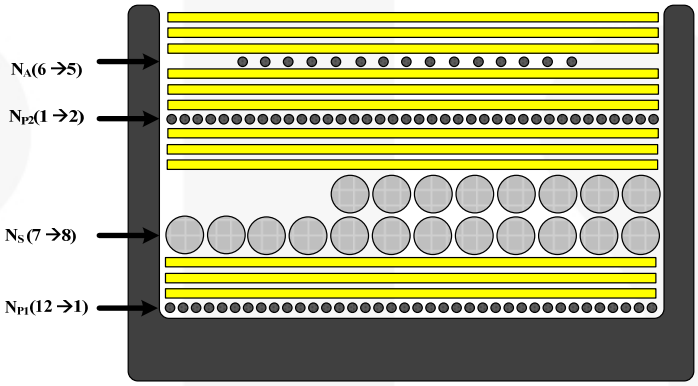

Figure 3. Transformer Winding Structure

Table 1. Winding Specification

No.	Winding	Pin(S → F)	Wire	Turns	Winding Method
1	N_{P1}	12 → 1	0.25φ	30 Ts	Solenoid Winding
2	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
3	N_S	7- → 8	0.5φ (TIW)	20 Ts	Solenoid Winding
4	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
5	N_{P2}	1 → 2	0.25φ	30 Ts	Solenoid Winding
6	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
7	N_A	6 → 5	0.25φ	15 Ts	Solenoid Winding
8	Insulation: Polyester Tape t = 0.025mm, 3-Layer				

Table 2. Electrical Characteristics

	Pin	Specification	Remark
Inductance	12– 2	750μH ± 10%	60kHz, 1V
Leakage	1– 2	6μH	60kHz, 1V Short All Output Pins

4. Performance

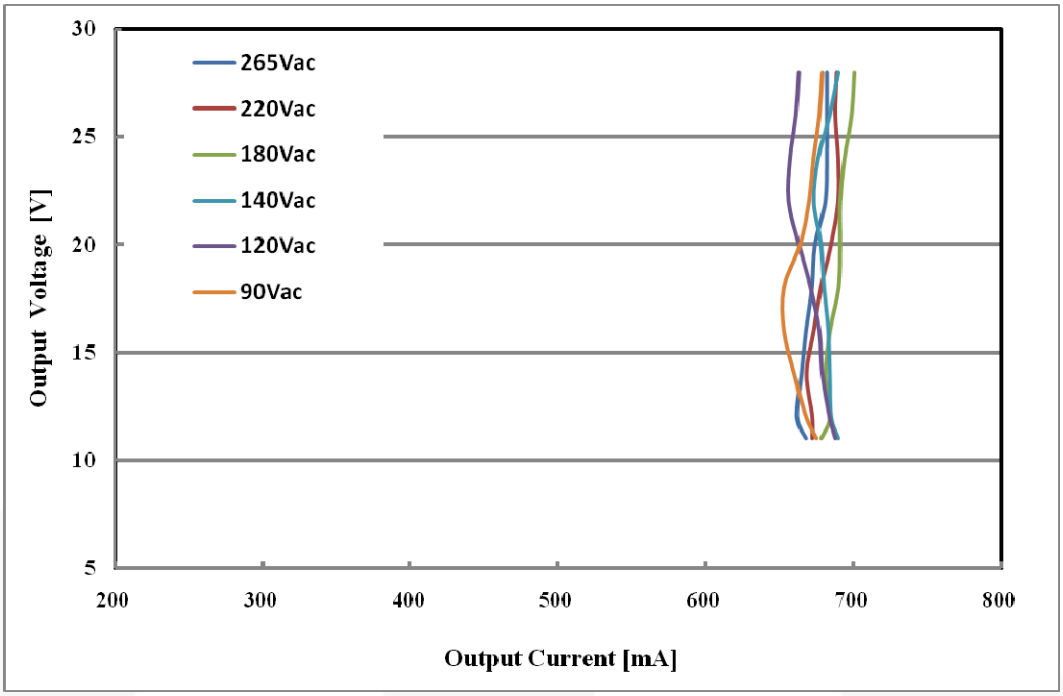

Figure 4. Constant Current Regulation – Measured by E-Load [LED Mode]

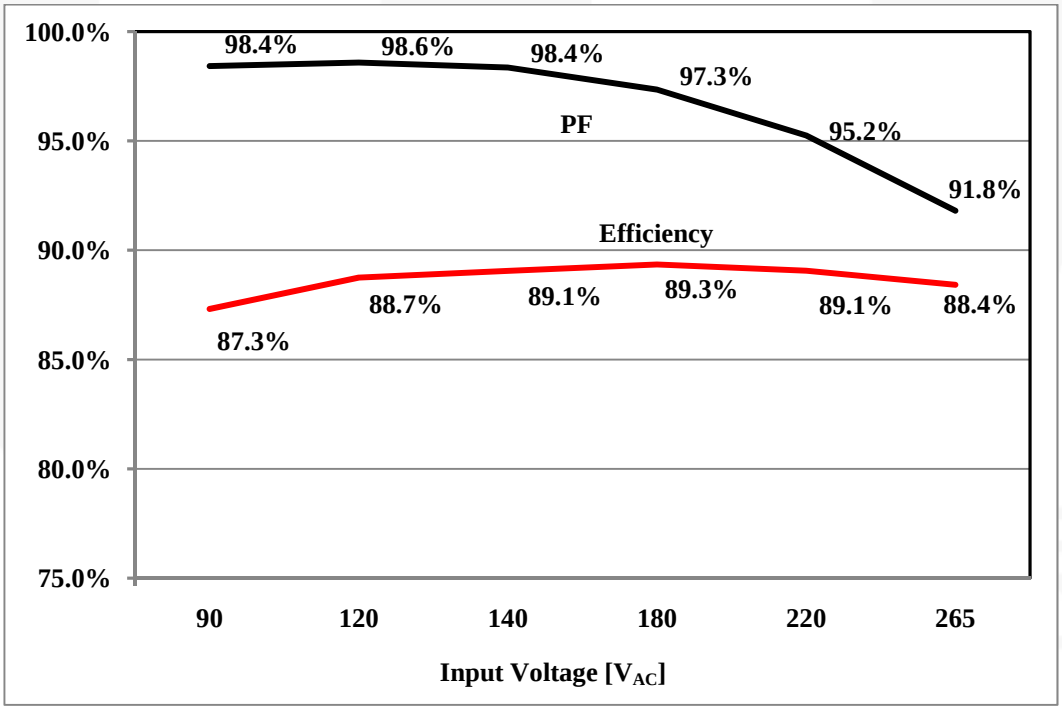

Figure 5. Power Factor and System Efficiency

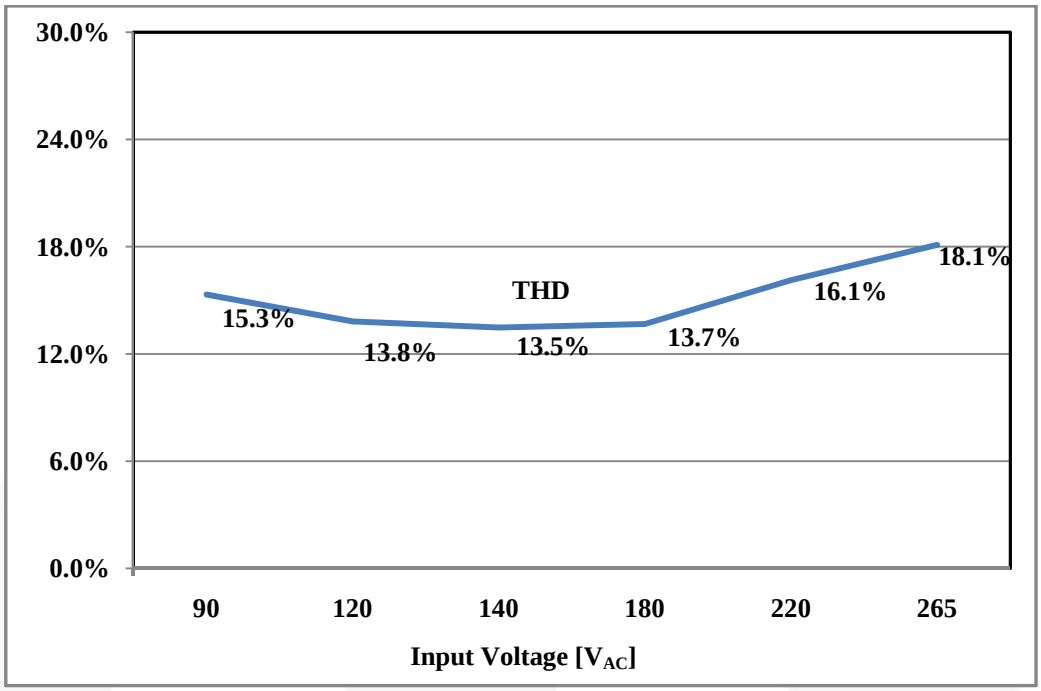

Figure 6. Total Harmonic Distortion

5. Related Resources

FL7732 — Single-Stage FPC Primary-Side-Regulation Offline LED Driver

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