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}	8.4W	24V(0.35A)

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): <±2.1%
- Constant Current Regulation vs. Line Voltage Change (90~265V_{AC}): <±3.5%
- Output-Open & Short-Circuit Protection with Auto restart
- System Efficiency up to 87.6%
- PF and THD at Nominal Voltages (90 ~ 265V_{AC}): PF (>0.90), THD (<25%)

1. Schematic

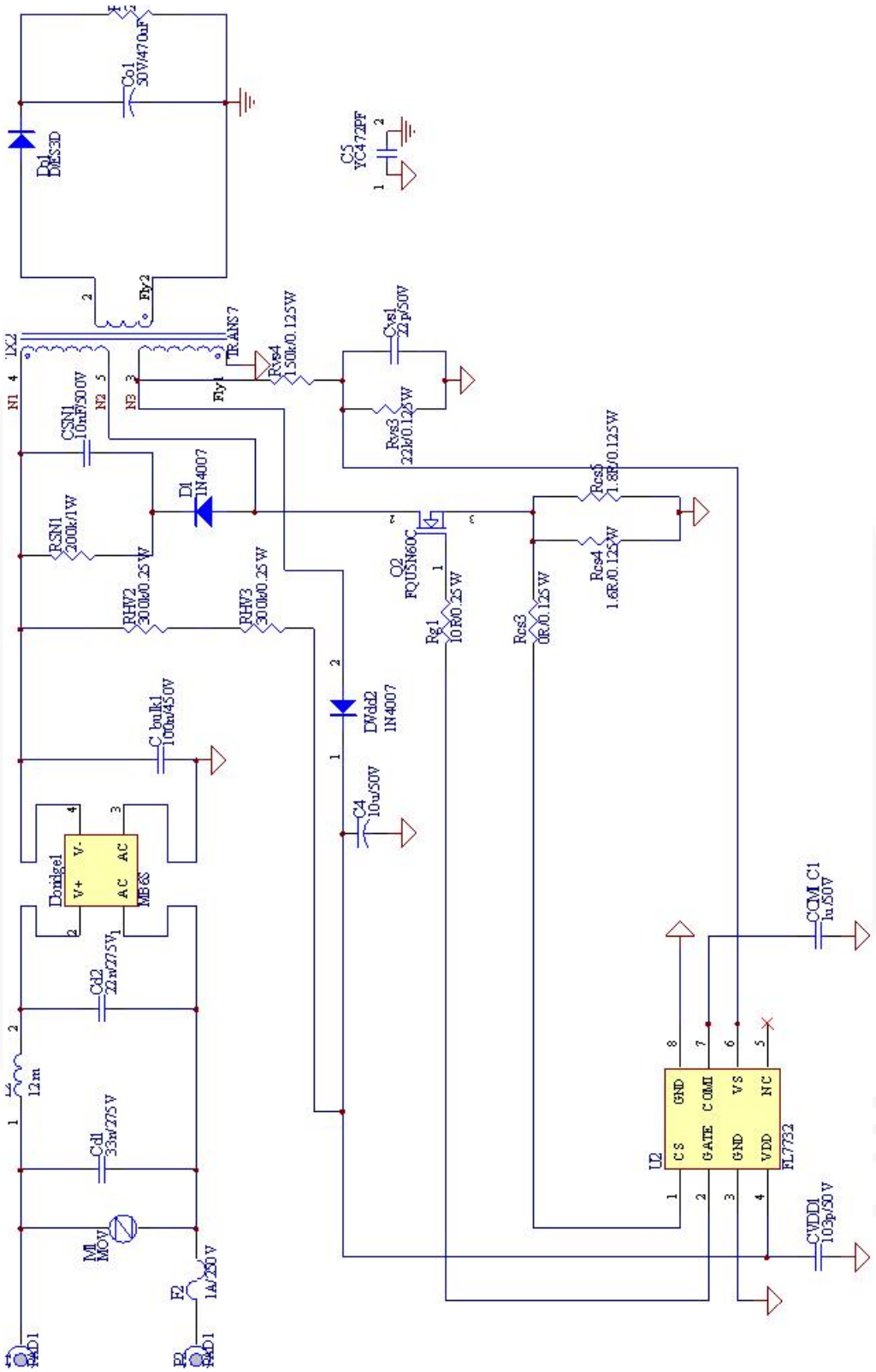

Figure 1. Schematic

2. Bill of Material

Item No.	Part Reference	Value	Qty	Description (Manufacturer)
1	Dbridge1	MB6S	1	Bridge Diode (Fairchild Semiconductor)
2	Q2	FQU5N60CTU	1	2.8A/600V Main Switch (Fairchild Semiconductor)
3	U2	FL7732	1	Main Controller (Fairchild Semiconductor)
4	F2	1A/250V	1	Fuse
5	M1	7Ø 470V	1	Metal Oxide Varistors
6	L2	12mH	2	Filter Inductor
7	DVDD2, D1	1N4007	2	1A/1000V Diode (Fairchild Semiconductor)
8	Do1	ES3D	1	3A/200V Fast Rectifier (Fairchild Semiconductor)
9	RSN1	200K/1W	1	Metal Oxide Film Resistor
10	C5	472P/250V	1	Y2 Capacitor
11	CD1	22nF/275V	1	X2 Capacitor
12	CD2	33nF/275V	1	X2 Capacitor
13	C_bulk1	104/450V	1	Film Capacitor
14	CSN1	103/500V	1	SMD Capacitor 1206
15	CVS1	22P/50V	1	SMD Capacitor 0805
16	COMI_C1	105/25V	1	SMD Capacitor 0805
17	CVDD1	103/50V	1	SMD Capacitor 0805
18	RHV2, RHV3	300KΩ	2	SMD Resistor 1206
19	Rdummy1	24KΩ	1	SMD Resistor 1206
20	RG1	10Ω	1	SMD Resistor 1206
21	CO1	470μF/35V	1	Electrolytic Capacitor
22	C4	10μF/50V	1	Electrolytic Capacitor
23	RVS3	22KΩ	1	SMD Resistor 0805
24	RCS4	1.6Ω	1	SMD Resistor 0805
25	RSS5	1.8Ω	1	SMD Resistor 0805
26	RVS4	150KΩ	1	SMD Resistor 0805
27	RCS3	0Ω	1	SMD Resistor 0805
28	TX2	1mH	1	RM6 Transformer

3. Transformer

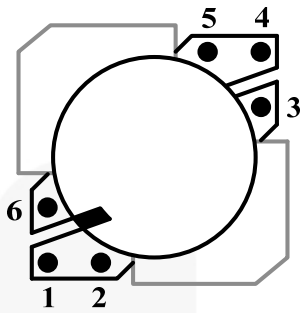

Figure 2. Transformer Bobbin Structure

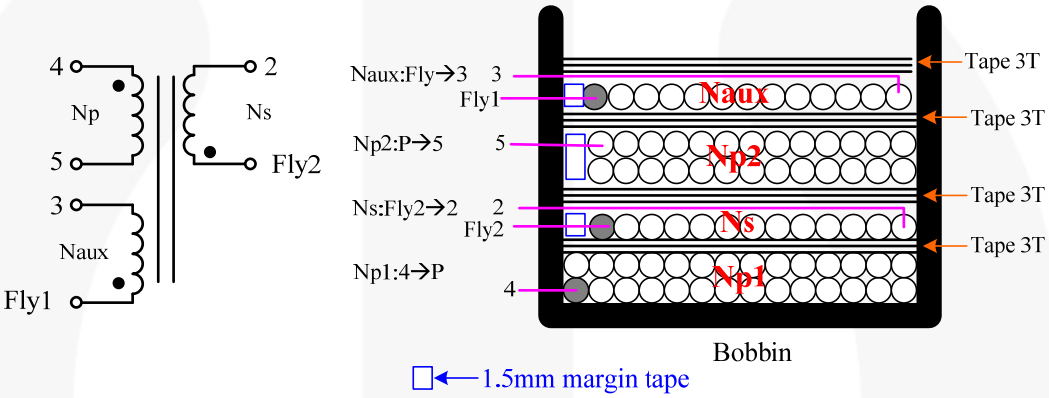

Figure 3. Pin Configuration and Transformer Winding Structure

Table 1. Winding Specifications

No	Winding	Pin (S → F)	Wire	Turns	Winding Method
1	N_{P1}	4 → P	0.2φ	36 Ts	Solenoid Winding
2	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
3	N_S	Fly2 → 2	0.32φ	24 Ts	Solenoid Winding
4	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
5	N_{P2}	P → 5	0.2φ	36 Ts	Solenoid Winding
6	Insulation: Polyester Tape t = 0.025mm, 3-Layer				
7	NA	Fly1 → 3	0.12φ	18 Ts	Solenoid Winding
8	Insulation: Polyester Tape t = 0.025mm, 3-Layer				

Table 2. Electrical Characteristics

	Pin	Specifications	Remark
Inductance	4– 5	1mH ±10%	50kHz, 1V
Leakage	4– 5	13μH	50kHz, 1V Short All Output Pins

4. Performance

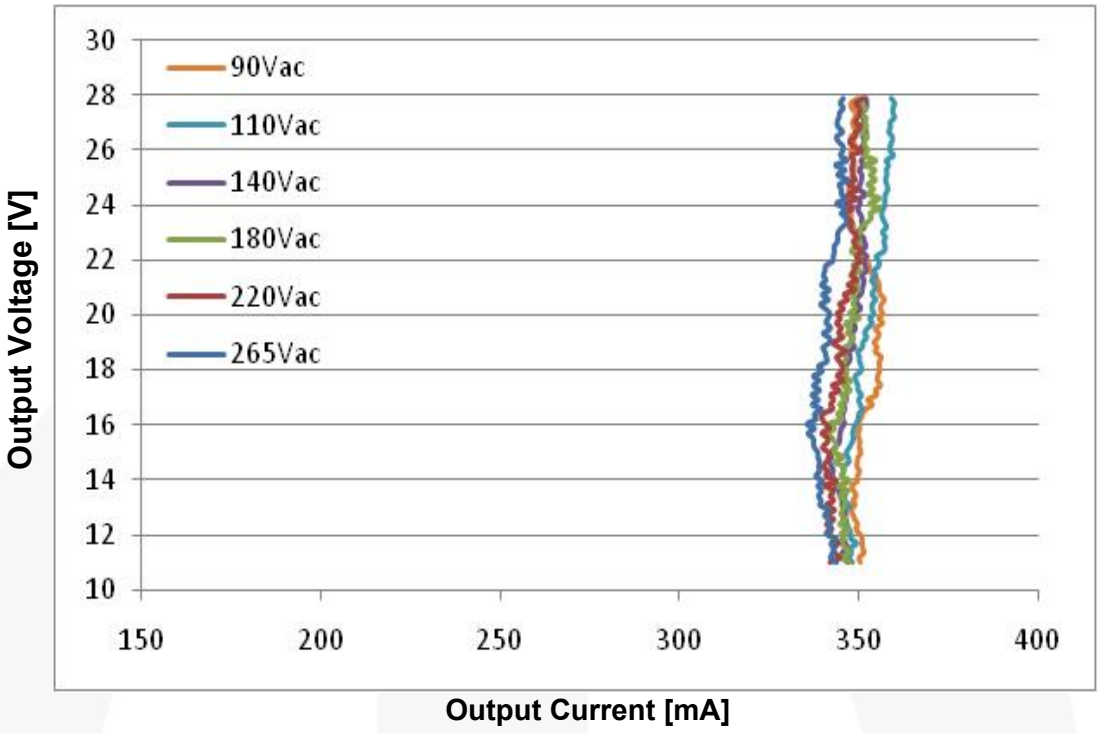

Figure 4. Constant Current Regulation – Measured by E-Load [LED Mode]

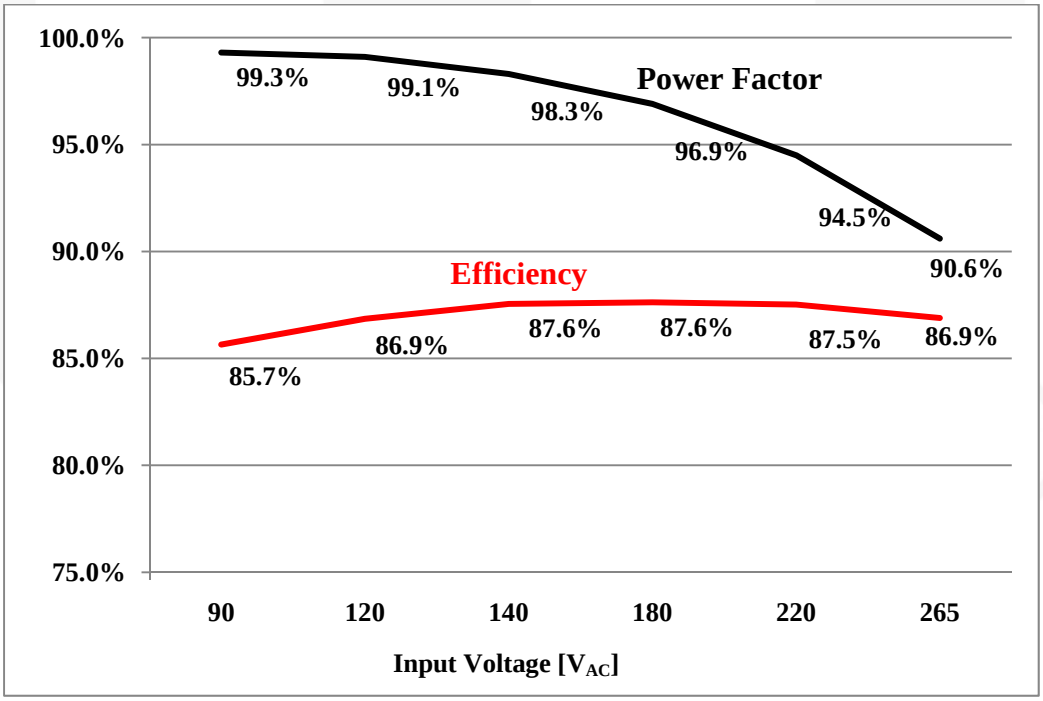

Figure 5. Power Factor and System Efficiency

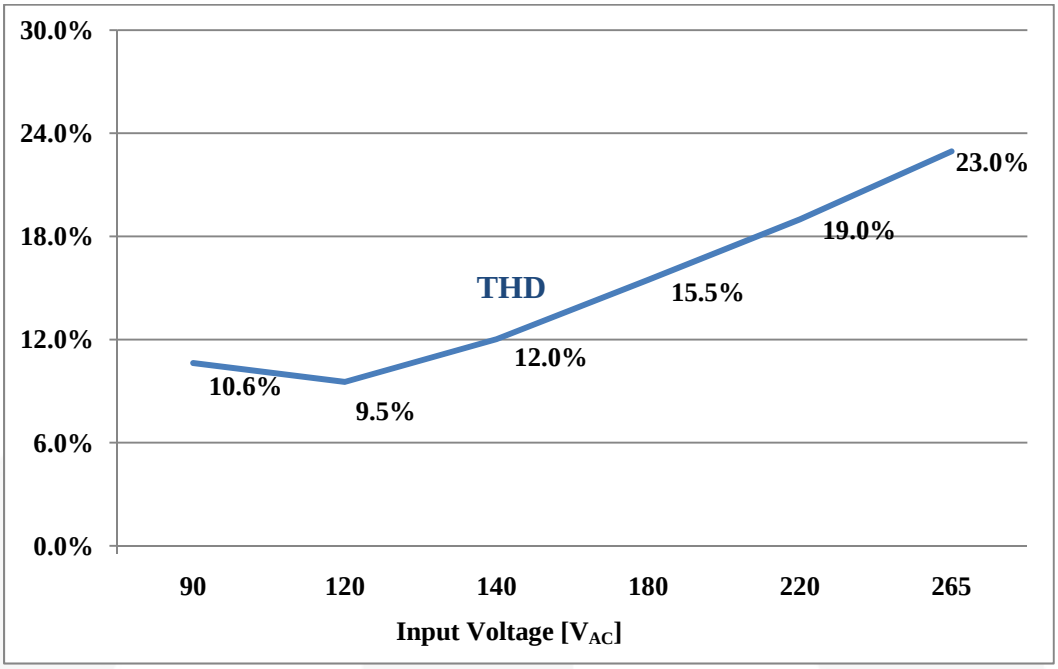

Figure 6. Total Harmonic Distortion

5. Related Resources

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

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