Fairchild Reference Design

The following Reference Design supports the demonstration kit for the FL6961 and FL6300A. It should be used in conjunction with the FL6961 and FL6300A 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	Rated Output Power	Output Voltage (Rated Current)
LED Illumination	FL6961, FL6300A	$90V_{AC}$ - $277V_{AC}$	70W	24V (2.9A)

Key Features of FL6961

- Boundary Mode PFC Controller
- Low Input Current THD
- Controlled On-time PWM
- Zero Current Detection
- Cycle-by-cycle Current Limiting
- Leading-edge blanking instead of RC filtering
- Low Start-up Current: 10uA (typical)
- Low Operating Current: 4.5mA (typical)
- Feedback Open-Loop Protection
- Programmable Maximum On-Time (MOT)
- Output Over-Voltage Clamping Protection
- Clamped Gate Output Voltage 16.5V

Key Features of FL6300A

- Internal high-voltage start-up
- Quasi-resonant operation
- Cycle-by-cycle current limiting
- Peak current mode control
- Leading-edge blanking
- Internal minimum t_{OFF}
- Internal 2ms soft-start
- Over-power compensation
- Gate output maximum voltage
- Auto-recovery short-circuit protection (FB pin)
- Auto-recovery open-loop protection (FB pin)
- VDD pin & output voltage(DET pin) latch OVP

1. Schematics

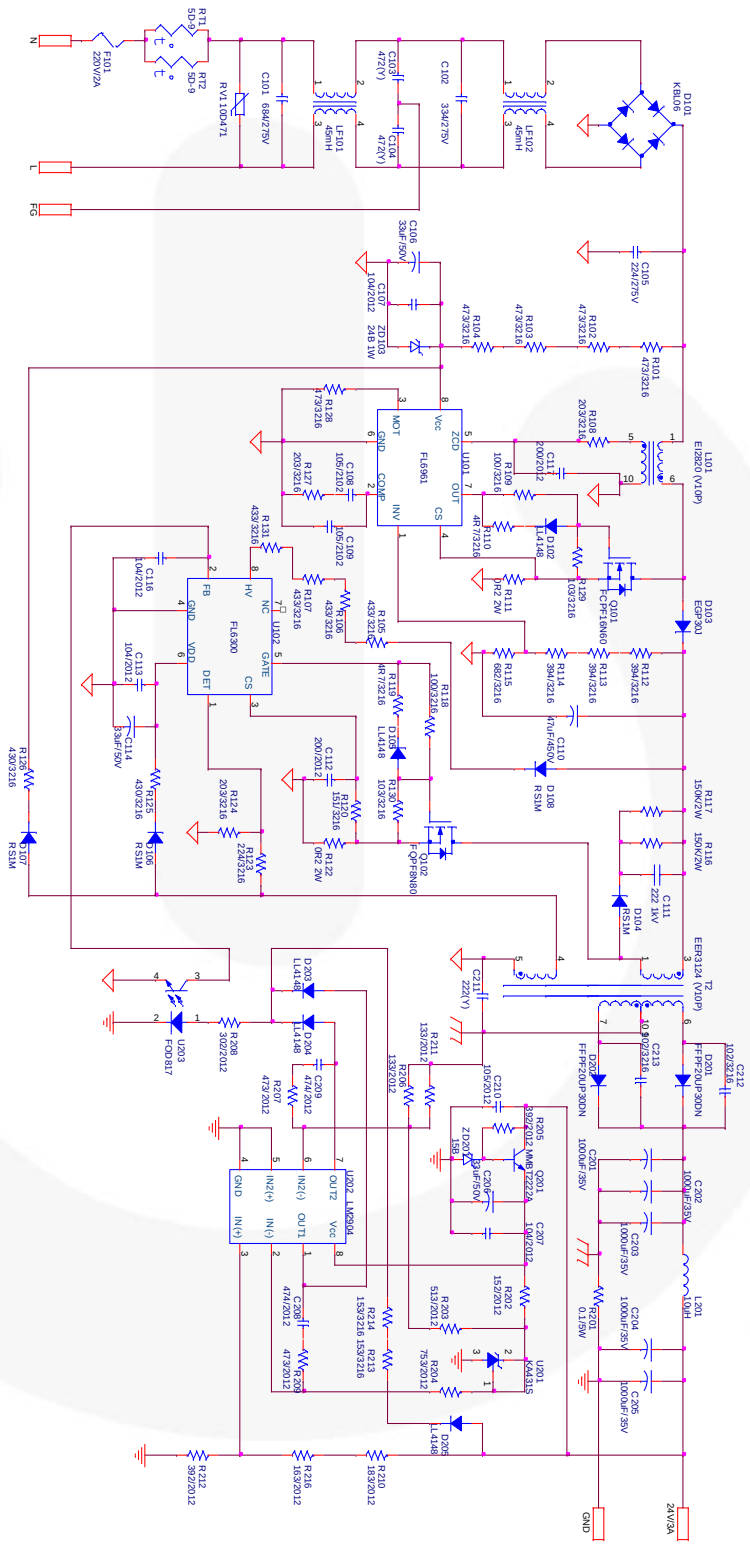

Figure 1. Schematic

2. Transformer and Inductor specification

- **Transformer**

Core : EER3124

Bobbin : 10pin

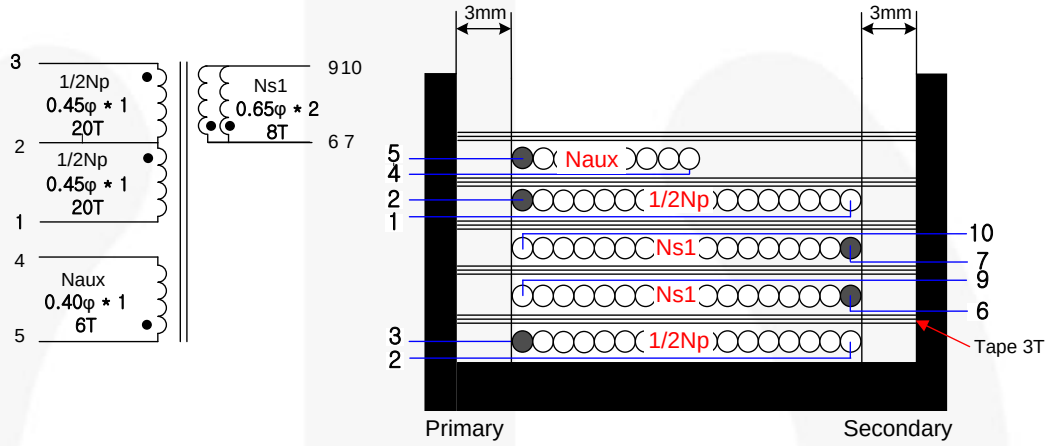

Figure 2. Transformer specifications & construction. [EER3124]

Table 1. Winding specifications.

No	Winding	Pin(S→F)	Wire	Turns	Winding Method
1	1/2Np	3 → 2	0.12φ×25	20 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 3Layers				
2	Ns1	6 → 9	0.1φ×60	8 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 1Layers				
3	Ns2	7 → 10	0.1φ×60	8 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 3Layers				
4	1/2Np	2→ 1	0.12φ×25	20 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 2Layers				
6	Naux	5 → 4	0.1φ×12	6 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 3Layers				

Table 2. Electrical Characteristics.

	Pin	Spec.	Remark
Inductance	1– 3	500 uH ±7%	1kHz, 1V
Leakage	1– 3	14 uH Max	Short all output pins

- **PFC Inductor**

Core : EI2820

Bobbin : 10pin

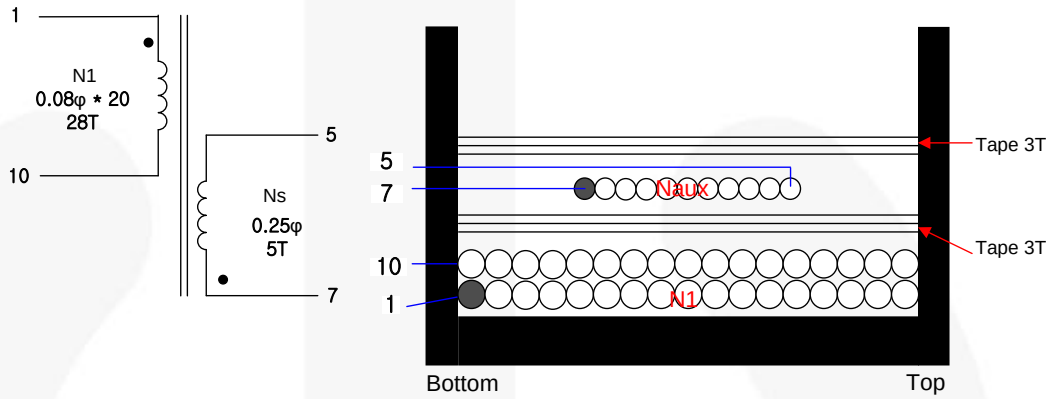

Figure 3. Transformer specifications & construction. [EER3124]

Table 3. Winding specifications.

No	Winding	Pin(S→F)	Wire	Turns	Winding Method
1	N1	1 → 10	0.12φ×25	44 Ts	Solenoid winding
	Insulation : Polyester Tape t = 0.025mm, 3Layers				
2	Ns1	7 → 5	0.1φ×12	6 Ts	Space winding
	Insulation : Polyester Tape t = 0.025mm, 3Layers				

Table 4. Electrical Characteristics.

	Pin	Spec.	Remark
Inductance	1 – 10	450uH	1kHz, 1V
Leakage	1 – 10	10 uH Max	Short all output pins

2.1. Performance

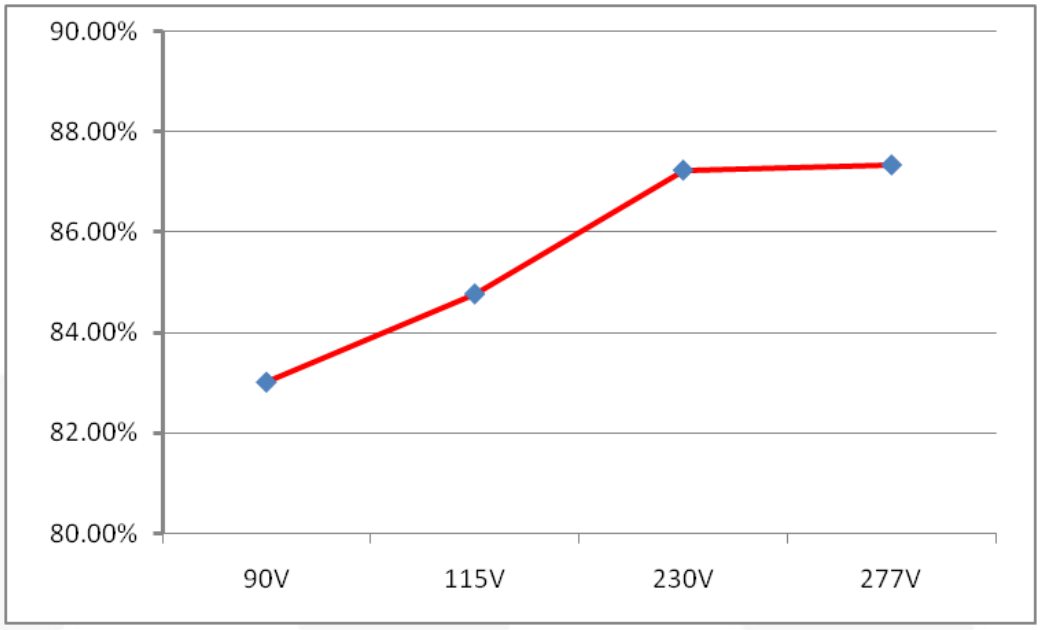

Figure 4. System Efficiency

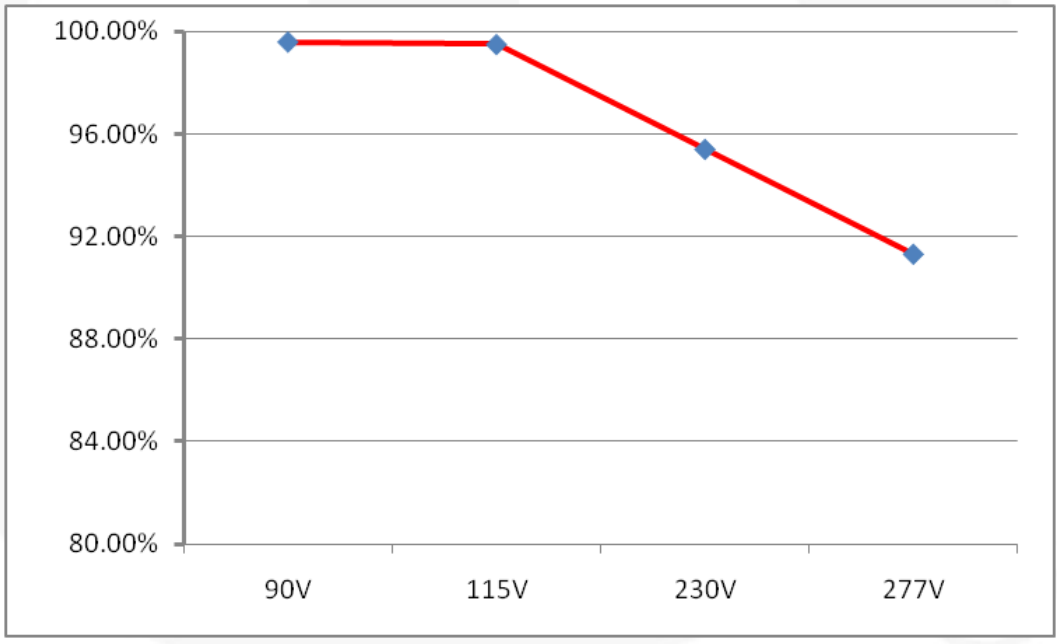

Figure 5. Power Factor Performance

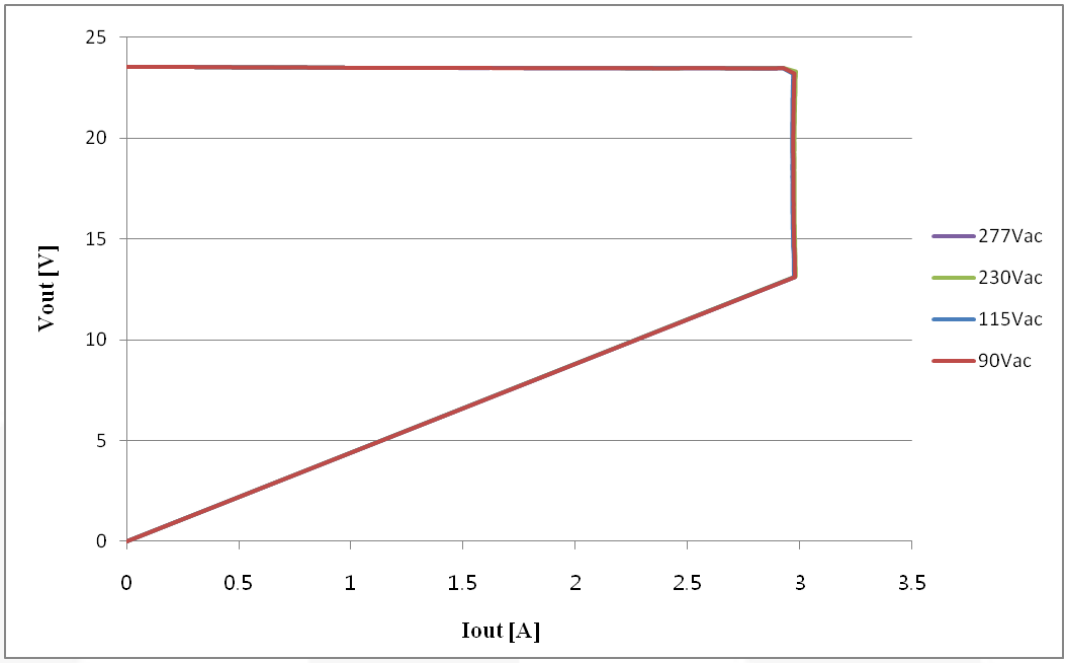

Figure 6. CC/CV Curve

3. Related Resources

Datasheet link FL6961

Datasheet link FL6300A

Application Note link FL6961

Application Note link FL6300A

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