Fairchild Reference Design

The following reference design supports inclusion of **FL6961** in design of LED illumination. It should be used in conjunction with the FL6961 datasheet as well as Fairchild's application notes and technical support team. Please visit Fairchild's website at http://www.fairchildsemi.com.

Application	Fairchild Device	Input Voltage Range	Rated Output Power	Output Voltage (Rated Current)
LED Illumination	FL6961	90-265V_{AC}	16.8W	24V (0.7A)

Key Features

- 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

1. Schematics

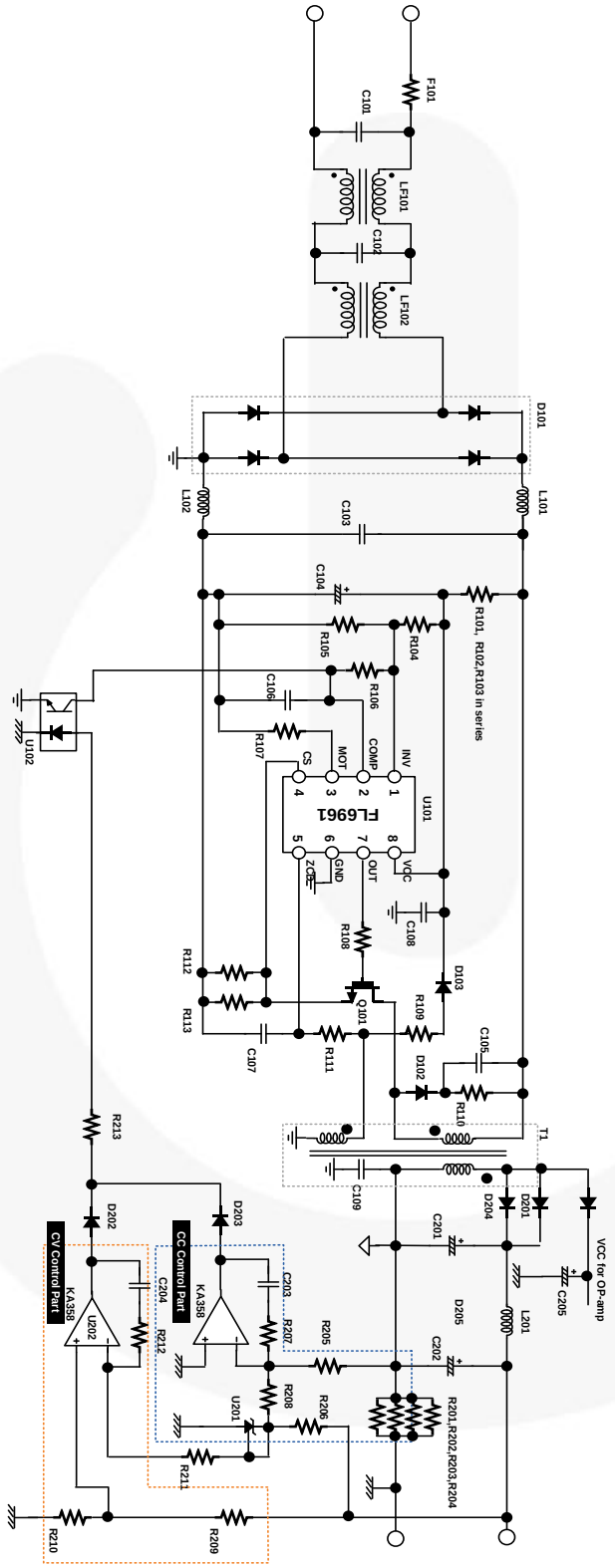

Figure 1. Schematic

2. Transformer

2.1. Transformer Schematic Diagram

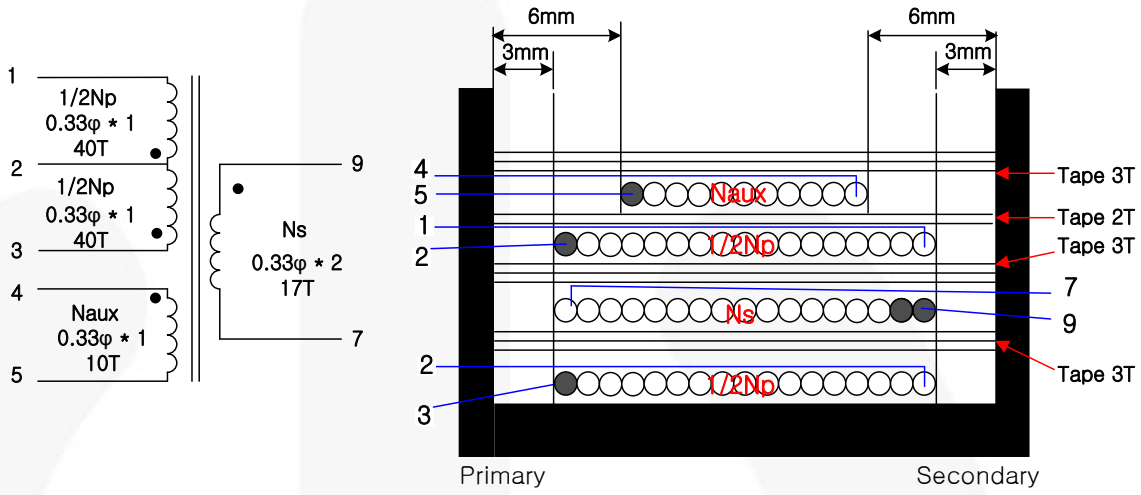

Figure 2. Transformer specifications & construction. [EE2525]

Table 1. Winding specifications.

No	Winding	Pin(S → F)	Wire	Turns	Winding Method
1	1/2Np	3 → 2	0.33φ×1	40Ts	Solenoid winding
2	Insulation : Polyester Tape t = 0.025mm, 1Layers				
3	Ns	9 → 7	0.33φ×2	17Ts	Solenoid winding
4	Insulation : Polyester Tape t = 0.025mm, 3Layers				
5	1/2Np	2→ 1	0.33φ×1	40 Ts	Solenoid winding
6	Insulation : Polyester Tape t = 0.025mm, 3Layers				
7	Naux	4 →5	0.33φ×1	10 Ts	Center Solenoid winding
8	Insulation : Polyester Tape t = 0.025mm, 3Layers				

Table 2. Electrical Characteristics.

	Pin	Spec.	Remark
Inductance	3– 1	1mH ±7%	1kHz, 1V
Leakage	3- 1	10 uH Max	Short all output pins

2.2. Performance

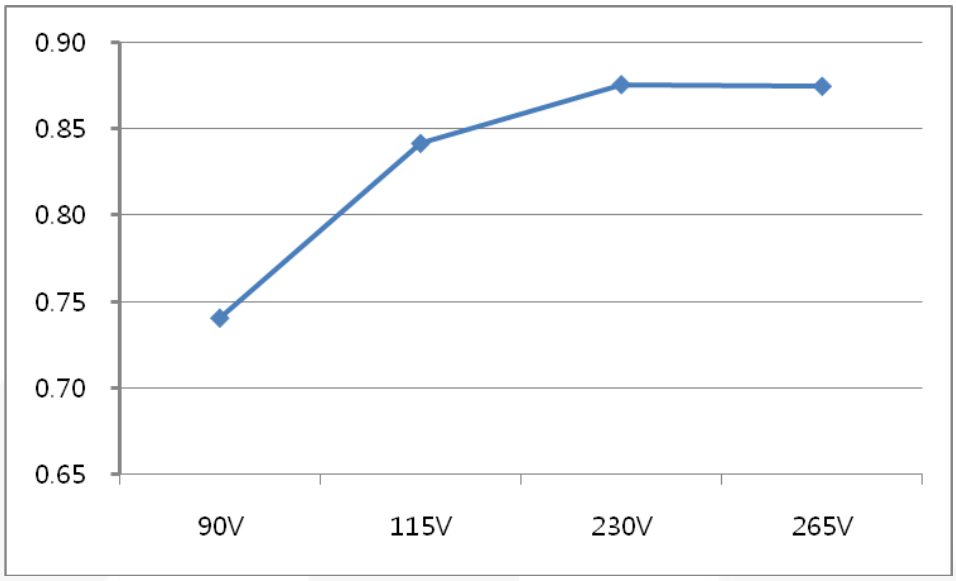

Figure 3. Efficiency Curve

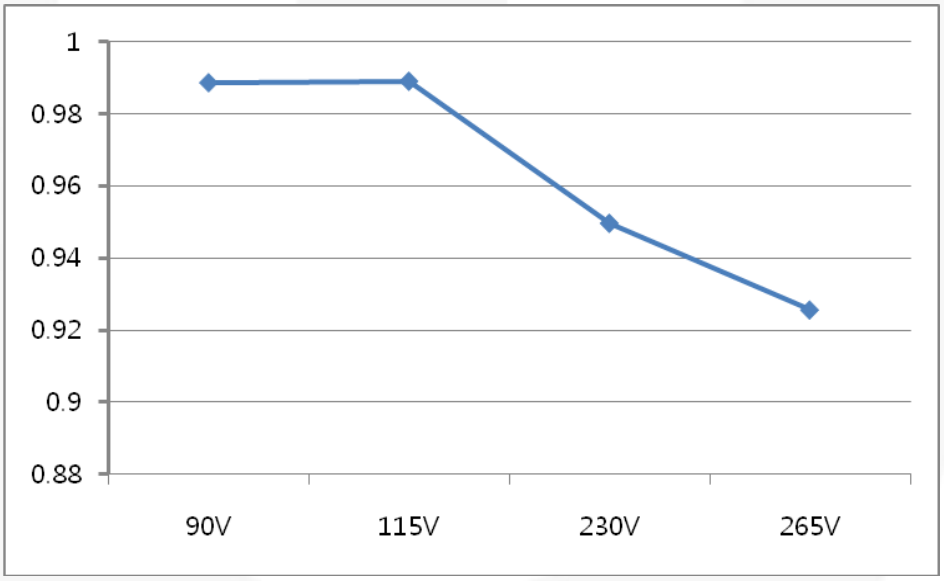

Figure 4. Power Factor Performance

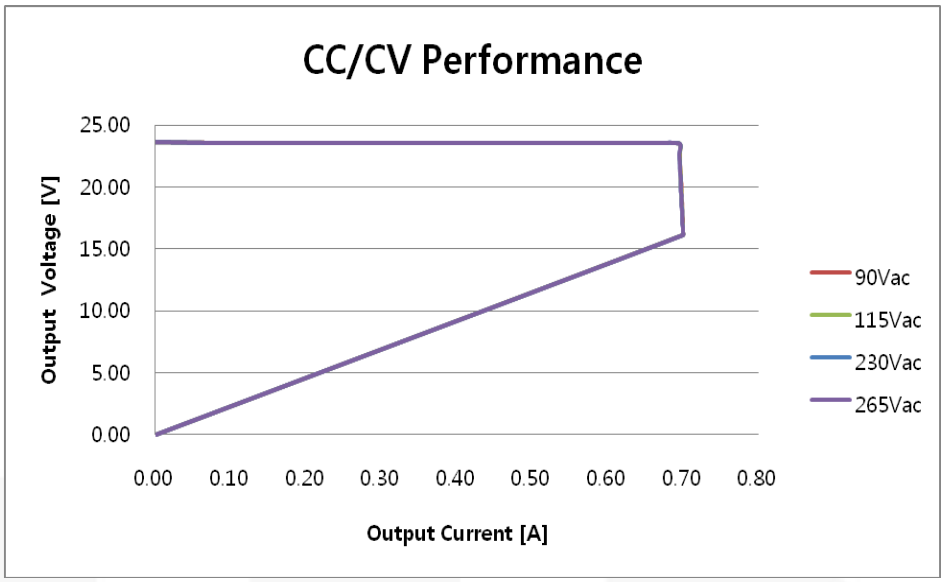

Figure 5. CC/CV Curve

3. Related Resources

Datasheet link FL6961

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

Reference Design Disclaimer

Fairchild Semiconductor Corporation ("Fairchild") provides these reference design services as a benefit to our customers. Fairchild has made a good faith attempt to build for the specifications provided or needed by the customer. Fairchild provides this product "as is" and without "recourse" and MAKES NO WARRANTY, EXPRESSED, IMPLIED OR OTHERWISE, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Customer agrees to do its own testing of any Fairchild reference designs in order to ensure design meets the customer needs. Neither Fairchild nor Customer shall be liable for incidental or consequential damages, including but not limited to, the cost of labor, requalifications, rework charges, delay, lost profits, or loss of goodwill arising out of the sale, installation or use of any Fairchild product.

Subject to the limitations herein, Fairchild will defend any suit or proceeding brought against Customer if it is based on a claim that any product furnished hereunder constitutes an infringement of any intellectual property rights. Fairchild must be notified promptly in writing and given full and complete authority, information and assistance (at Fairchild's expense) for defense of the suit. Fairchild will pay damages and costs therein awarded against Customer but shall not be responsible for any compromise made without its consent. In no event shall Fairchild's liability for all damages and costs (including the costs of the defense by Fairchild) exceed the contractual value of the products or services that are the subject of the lawsuit. In providing such defense, or in the event that such product is held to constitute infringement and the use of the product is enjoined, Fairchild, in its discretion, shall procure the right to continue using such product, or modify it so that it becomes noninfringing, or remove it and grant Customer a credit for the depreciated value thereof. Fairchild's indemnity does not extend to claims of infringement arising from Fairchild's compliance with Customer's design, specifications and/or instructions, or the use of any product in combination with other products or in connection with a manufacturing or other process. The foregoing remedy is exclusive and constitutes Fairchild's sole obligation for any claim of intellectual property infringement and Fairchild makes no warranty that products sold hereunder will not infringe any intellectual property rights.

All solutions, designs, schematics, drawings, boards or other information provided by Fairchild to Customer are confidential and provided for Customer's own use. Customer may not share any Fairchild materials with other semiconductor suppliers.