

LED Power Supply WebDesigner

www.fairchildsemi.com/support/design-tools

Non-Isolated PFC Buck (AC Input) and Buck (DC Input) Driver Designs in Under a Minute

Now you can design an optimum LED power supply solution in less than a minute, without the need of a hardware prototype, at no expense. The industry's most advanced and complete flyback circuit design tool—Power Supply WebDesigner—has been expanded to include Fairchild's leading LED drivers. Whether you are a power expert or not, you can specify, simulate and analyze your design faster and easier than ever before. And it is the industry's first LED online tool that helps design EMI filters and predicts PF and THD.

Power Supply WebDesigner

Design

Analysis

BOM

Report

Click on one of the following to begin: ⓘ

Primary-Side Regulated Flyback Converter

up to 30W

Featuring FSEZ13x7 controller+FET & FAN103 controller

Secondary-Side Regulated Flyback Converter

up to 100W

Featuring FSGM & FSL series controller+FET

LED Buck Driver

Featuring FL7701 controller+FET & FLS0116 controller

1 Log in or register for MyFairchild at www.fairchildsemi.com

2 Select Design Tools

3 Choose LED buck driver IC option

4 See how simple LED designs can be



Fairchild Means LED Simplicity

Every LED power range comes with its own unique design challenges, including: cost, space, efficiency, design complexity, power factor, reliability, etc. Fairchild's new generation of LED driver topologies offers industry-leading solutions for every power range. Furthermore, our MOSFETs combine excellent efficiency and rugged reliability—and can be specified separately or integrated with the driver. Unlike other online tools, you don't have to be familiar with Fairchild components to use this tool or to have them integrated into your power supply design.

- Power high-brightness LEDs
- Lamp sizes and types such as T8, A19, GU10/candlelight
- For dimming and non-dimming designs
- Eliminate components, design time and costs

Visit our website at: www.fairchildsemi.com/powersupplywebdesigner

Enter Design Requirements

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LED Buck Driver

Step 1: Design Requirements

1. Design Requirements

Input Output

LED Driver Requirements & LED Ratings

System Design Rules

Manual Select or Auto Complete for Recommended Part

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LED Buck Driver

Step 2: Operating Condition

1. Design Requirements | 2. Operation Condition | 3. Inductor Design | 4. EMI, PF & THD | 5. Efficiency

2d: MOSFET & Control IC

MOSFET Min Current Rating (Idc, rms) 1.00 A

MOSFET Min Voltage Rating (Vds, pk) 400 V

Recommended Power Switcher ☐ Use Recommended Part * Choose Different Part

Recommended MOSFET Q1 ☐ FDS8952

Buck Controller IC ☐ PL7700

MOSFET Turn On Resistor Rg_on 100 Ω 100 Ω

MOSFET Turn Off Resistor Rg_off 131 Ω 131 Ω

Auxiliary Power Supply Voltage 15.5 V

FL7700 OUT

EMI Filter Design, Predict PF & THD

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LED Buck Driver

Step 4: EMI, PF & THD

1. Design Requirements | 2. Operation Condition | 3. Inductor Design | 4. EMI, PF & THD | 5. Efficiency

4a: EMI Filter

Inductor Lin162 Parasitic Capacitance 100 pF 100 pF

EMI Filter Q Factor 1 1

EMI Filter Cap Cin1 30 μ F 30 μ F

EMI Filter Cap Cin2 30 μ F 30 μ F

EMI Filter Differential Mode Inductor 14.0 mH 14.0 mH

EMI Inductor Lin1&2 Min Current Rating 1420 A 1420 A

EMI Filter Damping Resistor Rint1 & Rint2 454 Ω 454 Ω

EMI Filter

PF and THD

Review Efficiency

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LED Buck Driver

Step 5: Efficiency

1. Design Requirements | 2. Operation Condition | 3. Inductor Design | 4. EMI, PF & THD | 5. Efficiency

5a: Efficiency

Input Voltage Range(V)	23.59	26.75	23.59	26.75
Output Voltage Range v full Current(V)	1.172	1.179	1.135	1.165
Total Power Loss (W)	0.25	0.25	0.66	0.63
MOSFET(Q1) Power Loss (W)	0.32	0.25	0.41	0.37
Inductor (Ld) Power Loss (W)	0.59	0.52	0.54	0.49
Current Sense (Rds) Power Loss (W)	0.02	0.02	0.01	0.01
Control IC (U1) Power Loss (W)	0.08	0.08	0.13	0.14
Passive Bridge (S2) Power Loss (W)	0.02	0.02	0.07	0.08
Total Output Power (W)	7.592	9.470	7.422	9.204
Driver Efficiency	86.6	88.9	82.9	85.9
Max MOSFET Temp (C)	114.15	@Max MOSFET Ambient Temp	55.00	
Desired MOSFET Case to Ambient Thermal Impedance			90.000	C/W

Loss Summary for Min Input and Min Output

Loss Summary for Min Input and Max Output

Loss Summary for Max Input and Min Output

Loss Summary for Max Input and Max Output

System Behavior Simulation & Optimization

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LED Buck Driver - FL7701

AC Input Voltage Configuration

Nominal line voltage 115 V rms

LED Current for Dimmable LED lighting application

AC Input Transient Steady State

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LED Buck Driver - FL7701

Bill of Materials Schematic Design Report

Analysis Simulation Results

Design Requirements

Requirements	
Input Mode	AC
Min line frequency	60Hz
Min input voltage (rms)	85V
Max input voltage (rms)	265V
LED Operation Current per String (rms)	300mA
Dimming Option	0
Line Regulation	5%
LED testing Current (rms)	300mA
Max LED Forward Voltage at testing current, 25C	3V
Min LED Forward Voltage at testing current, 25C	2.55V
LED Dynamic Resistance at Operation current	1.5 Ω
Max LED String Number in parallel	1
Min LED Numbers per String	10
Max LED Numbers per String	10
Temperature coefficient of LED forward voltage	0.10%/C
Max LED Operation Temperature	100C
Min LED Ambient Temperature	0C
Max Control IC Ambient Temperature	55C
Min Output Voltage @ specified LED operation	24V