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AN-7701

FL7701 设计工具流程

概述

本文档的写作目的在于，为正确使用飞兆半导体产品 FL7701 设计工具提供有深度的指南。使用该设计工具时，有必要参考该产品的使用说明书。

步骤

1. 给定输入电压
2. 输入LED特征参数（正向电压）
3. 输入LED数目
4. 输入LED电流峰值
5. 输入LED电流有效值
6. 输入目标系统效率
7. 输入期望开关频率

Example:

- 220V输入电压
- 3.5V正向电压
- 10只 LED串联
- 500mA电流峰值
- 300mA电流有效值
- 效率85%
- 开关频率45kHz

Table 1. 输入设计值

项目		值	单位
输入电压最大值	$V_{IN,MAX,AC}$	220	V
LED正向电压	V_f	3.5	V
LED数目	Number_LED	10	EA
LED电流峰值	$I_{LED,peak}$	500	mA
LED电流有效值	$I_{VAE,rms}$	300	mA
效率	E_{ff}	85	%
开关频率	f_{SW}	45	kHz

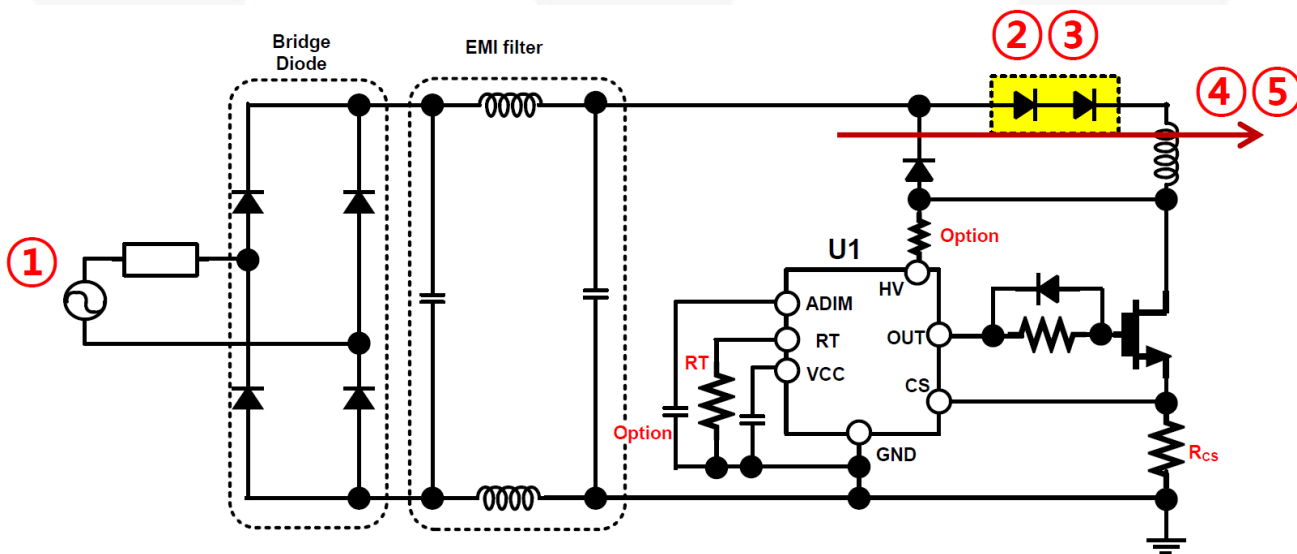


Figure 2. 输出电容选型指南图

计算结果

Table 2. 内部过程

项目	值	单位
电流纹波	$\Delta I =$ 151.5	mA
LED电流最小值	$I_{MIN} =$ 348.53	mA
LED电流平均峰值	$(I_{MAX} + I_{MIN}) / 2 =$ 424	mA
占空比最小值	$D_{MIN} =$ 13.237	%
输出电压	$V_O =$ 35.000	V

Table 3. 结果

项目	值	单位
电感	$L_M =$ 4.455	mH
电流检测电阻	$R_{CS} =$ 1.000	Ω
频率设置电阻	$R_f =$ 44.919	k Ω

Table 4. 预期功率

项目	值	单位
预期输出功率	$P_{OUT} =$ 10.500	W
预期输出功率	$P_{IN} =$ 12.353	W

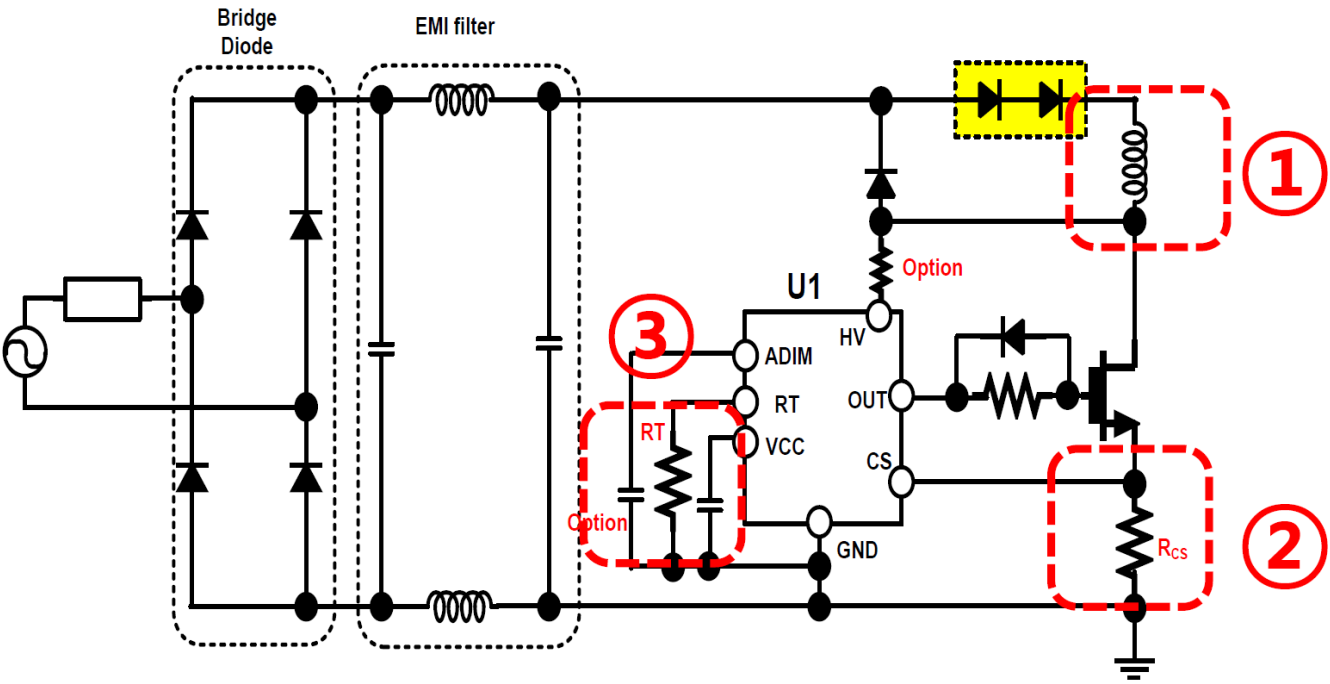


Figure 3. 输出电容选型指南图表

Notes:

1. 电感值。
2. 检测电阻取值(R_{CS})。
3. R_T 值。
4. 如果 f_{SW} 接近45kHz, 可省略 R_T 。

相关资料

查阅设计工具:

http://www.fairchildsemi.com/design_tools/led-driver-design-tool/

查阅产品数据表:

[*FL7701 — Smart Non-isolated PFC Buck LED Driver*](#)

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