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# AN-7732

## FL7732 设计工具流程

### 概述

本文档旨在提供飞兆半导体 FL7732 设计工具的详细指南。使用该设计工具时请参考相关产品手册。

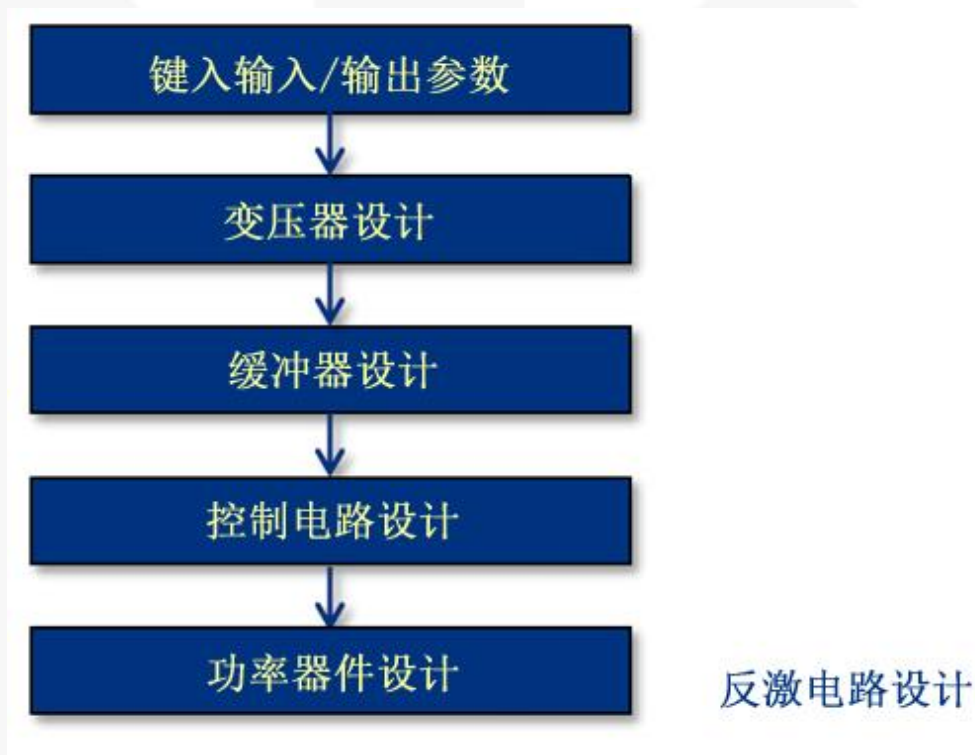


图 1. 设计流程

## 步骤1 — 键入输入输出参数

输入  
输出

蓝色框内为用户输入，  
红色框内为计算输出

输入参数

最小值	90	Vac	
最大值	140	Vac	

输出参数

Vout	22	V	
Vout	28	V	
Iout	380	mA	
Pout	8.36	W	

Vout 最大值即 OVP 电平。

## 步骤2 — 变压器设计

Transformer Design		
Max. Duty	39	%
Max. Ton	6.500	us
Switching freq.	60	kHz
Max. Vcs	0.5	V
Efficiency	80	%
Ae	36.6	mm <sup>2</sup>
Bmax	0.3	
Lm	0.982	mH
Nps	3.223	
Nas	0.821	
Nap	0.255	
Np.min	75.347	T
Np	76	T
Ns	23.578	T
Na	19.368	T
Llk	10	uH

最大占空比通常为 20~50%。  
较高最大占空比 ⇒ 低导通损耗，适用于低压电源应用  
较低最大占空比 ⇒ Bmax余量更大，适用于高压电源应用

Ton 最大值应小于 10us。

该开关频率为额定 Vout 条件下的工作频率。  
该开关频率应低于 65kHz。

Max. Vcs 为峰值 CS 电压的最大值。  
输入 Max. Vcs 的值小于 0.67V，因为逐脉冲 CS 电压的限值为 0.67V。  
在原边 CC 调节中，Nps 越高，Max. Vcs 越大。  
因此，若设置了较高的 Max. Vcs，Nps 也会变高。

键入的 Np 取值应大于 Np.min。  
如果 Np 的取值超过变压器窗口的容量，应减少最大占空比。

根据上述参数设计变压器。  
然后测量 Llk（漏感），并键入表格。

### 步骤3 — 缓冲器设计

缓冲器设计		
Vsn	200	V
$\Delta V_{sn}$	5	V
Rsn	242.7247	kohm
Csn	2.746596	nF

Vsn为缓冲电压。  
Vsn通常设置为Nps.Vo的2~2.5倍。

$\Delta V_{sn}$ 通常设置为Vsn纹波的5%。

### 步骤4 — 控制电路设计

控制电路设计		
Rsense	0.593767	ohm
Rcc	100	ohm
Vin.bnk	50	V
Vf	0.5	V
Rvs1	165.2367	kohm
Rvs2	19.75502	kohm
Cvs	10	pF
Ccomi	1	uF
Cvdd	33	uF
Dvdd Vmax	73.95584	V
Rstr	155.8442	kohm

Rcc 为电源CC补偿电阻  
输入电压较高时，如果Iout升高，应提高Rcc阻值。  
但是，Rcc的取值不得高于500ohm。  
Rcc的取值过高会产生CS噪声，并导致Vcs峰值检测出现误差。

Vin.bnk 为VS消隐电平。  
VS消隐：禁止VS电压检测。  
Vin.bnk 通常设置为30~70V。

Vf为次级二极管的正向压降。

Cvs为VS滤波电容，通常设置为10~30pF。

COMI电容通常设置为0.68~3.3uF。  
在Vin为最大值时检测启动时输出电压过冲。  
如果输出电压过冲过高，应增加Ccomi的值。

Vdd电容通常为10~47uF。  
启动时，如果Vdd跌落至Vdd-off，应提高Cvdd的值。



### 步骤5 — 功率器件设计

功率器件设计		
MOSFET Vmax	397.9899	V
MOSFET Ipk	0.842082	A
二极管Vmax	89.4245	V
二极管Ipk	2.714286	A

Vmax为MOSFET的最大漏源电压。  
Ipk为MOSFET的峰值电流。

Vmax为次级二极管的最大反向电压。  
Ipk为次级二极管的峰值电流。

## 相关资料

查阅设计工具:

[http://www.fairchildsemi.com/design\\_tools/led-driver-design-tool/](http://www.fairchildsemi.com/design_tools/led-driver-design-tool/)

查阅产品数据手册:

[\*FL7732---单级 PFC 初级调节离线 LED 驱动器\*](#)

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