

PFCを備えた汎用型オフライン LEDストリング・ドライバ



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DESIGN NOTE

回路説明

このデザイン・ノートでは、力率補正(PFC)機能を備えた、入力電圧範囲の広いオフラインLEDストリング・ドライバ(最大出力電力10 W)について説明します。NCP1014を用いた小型ブースト力率補正回路(オン・セミコンダクターのデザイン・ノートDN06064で解説)と、オン・セミコンダクターの新たな定電流レギュレータNSI45025とを組み合わせた回路です。NSI45025は2端子の部品であり、LEDストリングに直列に挿入することが可能で、非常に安定した定電流が生成でき、2~45 Vのコンプライアンス電圧に対して耐性があります。

この回路では、PFCの標準出力を400 Vdcと仮定すれば、定格25 mAのLEDを直列接続して全体の直列V_fを375 VにしたLEDストリングに電力が供給できます。この定電流レギュレータと同系統の別の型番を

使用すれば、電流は10~35 mAの範囲で変更が可能です。NSI45025のコンプライアンス電圧は45 Vdcであるため、LEDのV_fのばらつき(ビニングの差違)と温度変動の影響は容易に打ち消されます。

このLEDドライバの設計は、直管蛍光灯をLEDランプに交換する場合や、エリア照明源として多数の小型LEDを使用する線状照明などに理想的です。

主な特長

- 関係機関のコンプライアンスに対応できるよう力率(PF)は0.9超
- 力率補正を実現しながらも、1つの回路で幅広い入力電圧範囲に対応
- LEDビニングのばらつきと温度の影響とに対する広い許容範囲
- 入力EMIフィルタと突入電流制限

Table 1. DEVICE DETAILS

Device	Application	Input Voltage	Output Power	Topology	I/O Isolation
NCP1014 NSI45025	Off-line LED Driver with PFC	90~265 Vac	10 W (14 W max)	Boost PFC + Constant Current Source	None

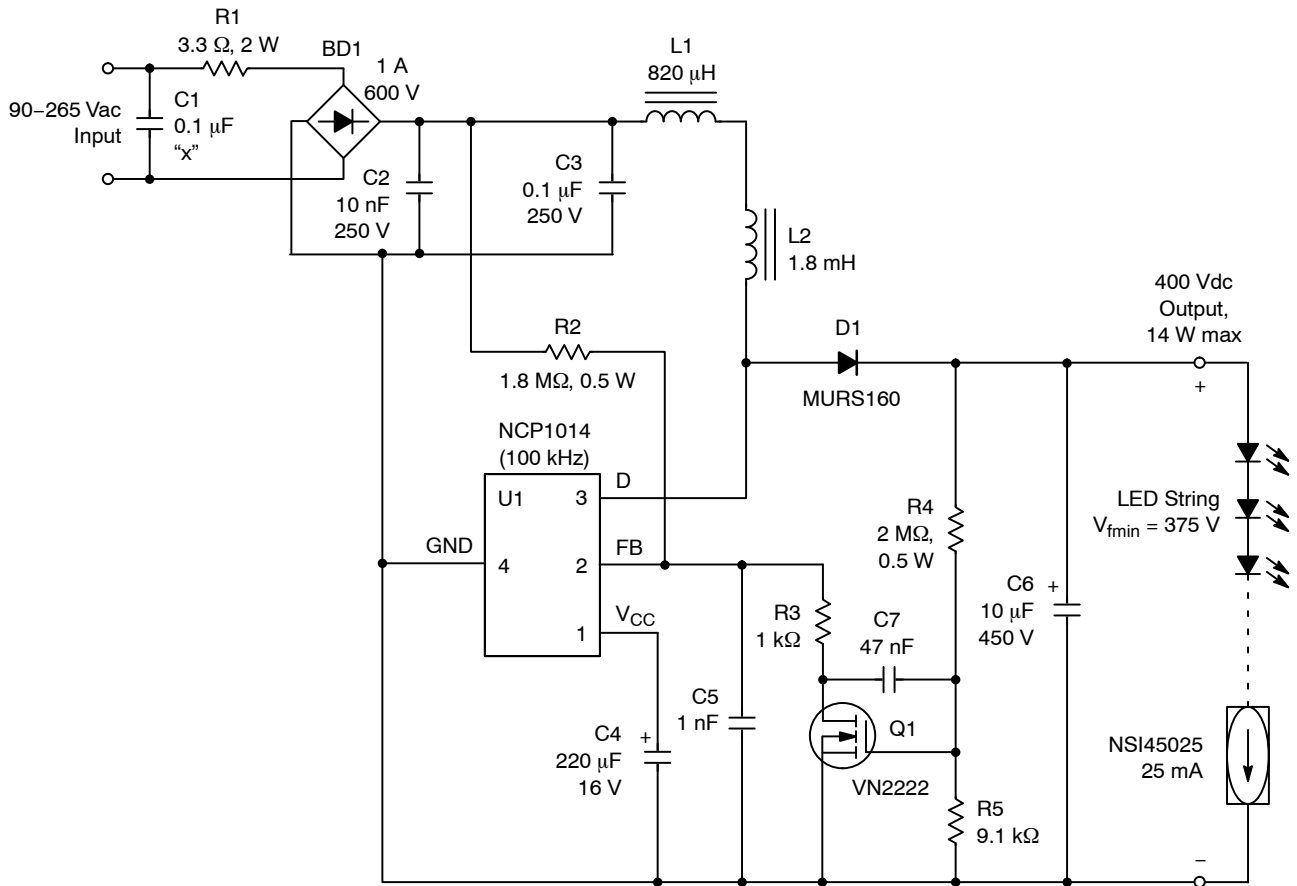
Table 2. OTHER SPECIFICATIONS

	Output 1	Unit
Output Voltage	400	Vdc
Ripple	< 10	%
Nominal Current	25	mA
Max Current	35	mA
Min Current	10	mA

PFC (Yes/No)	Yes
Minimum Efficiency	80%
Inrush Limiting/Fuse	Yes
Operating Temperature Range	0 to +50°C
Cooling Method/Supply Orientation	Convection/NA
Signal Level Control	No

DN06065/D

SCHEMATIC



Notes:


1. Crossed lines on schematic are not connected.
2. L1 is Coilcraft RFB0807-821L (820 μ H, 320 mA).
3. L2 is Coilcraft RFB1010-182L (1.8 mH, 450 mA).
4. R5 sets V_{OUT} nominal.

Figure 1. Schematic

REFERENCES

- [1] ON Semiconductor Design Note DN06064/D:
12 Watt “Mini” Boost Power Factor Corrector for LED applications
- [2] ON Semiconductor Design Note DN06051/D:
Improving the Power Factor of Isolated Flyback Converters for Residential ENERGY STAR® LED Luminaire Power Supplies
- [3] Data sheet NCP1014/D
- [4] Data sheet NSI45025/D

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