AND8224/D

NCP101x LED Flasher with Luxeon V Star LED

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APPLICATION NOTE

This application note describes how to easily design simple, isolated AC−DC converter for powering Luxeon V Star LED in flashing mode. Some examples are: warning lamps, emergency signs, beacon and so on. In comparison with resistive or capacitive dropper with electronic chopper is this solution more comfortable and features some advantages such as:

- Wide Input Voltage Range: 85 – 265 Vac
- Smaller Size, Lower Weight, Lower Total Cost
- Good Line Regulation, No Need of Additional Linear Regulators
- Efficient Design with up to 80% Efficiency
- Overload, Short Circuit and Thermal Protected
- Simple for Mass Production Thanks to SMD Devices
- Universal Design for Variety of LEDs – 1 W, 3 W, 5 W

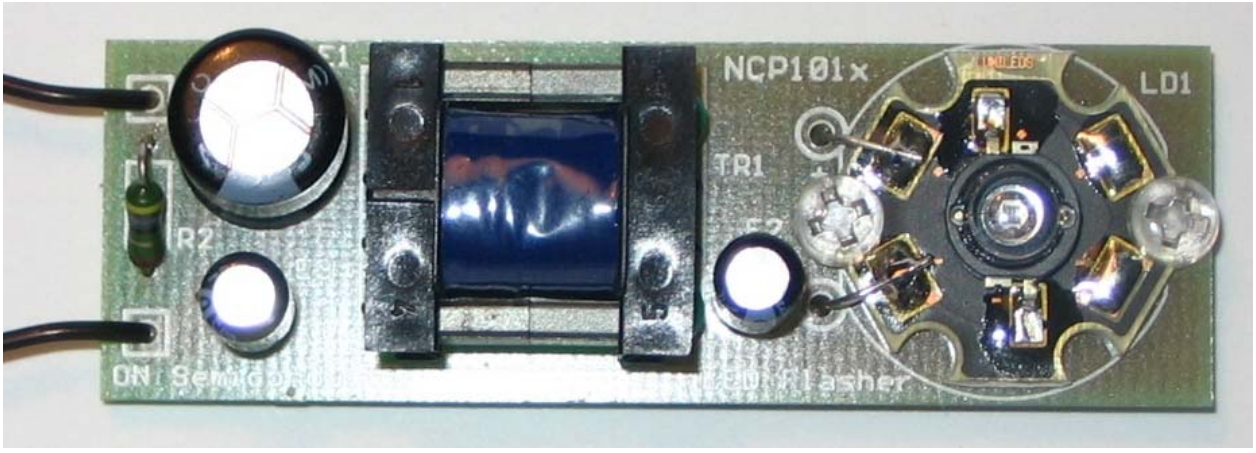

Figure 1. NCP101x LED Flasher

The monolithic power switcher, used in this application, greatly simplifies the total design and reduces time to production. The new line of the Power Switchers NCP1010 – 1014 is ideal for this purpose. This IC in the SOT−223 package reduces size and is suitable for mass production. The output power is given only by proper selection of this Switcher. The design consists of safety resistor, rectifier with filtering capacitor, power stage with switcher and transformer, output ultrafast rectifier, output filtering capacitor and high power Luxeon LED. The only component necessary for proper powering of the IC is the V_{CC} capacitor. The IC is directly powered from the HV Drain circuit via internal voltage regulator. To eliminate the noise at the feedback input, some small ceramic capacitor with value of around 1 nF is necessary to be connected as close to the FB pin, as possible. As the flash function is used special part of the safety circuitry of the NCP101x Switcher. The timing of the flashing period is given by the V_{CC} capacitor E3. The duty cycle is fixed and is given by the internal consumption of the IC.

LED and Switcher Selection

Switcher IC	LED selection
NCP1011ST65	Luxeon Star
NCP1012ST65	Luxeon III Star
NCP1013ST65	Luxeon V Star

SCHEMATIC DIAGRAM

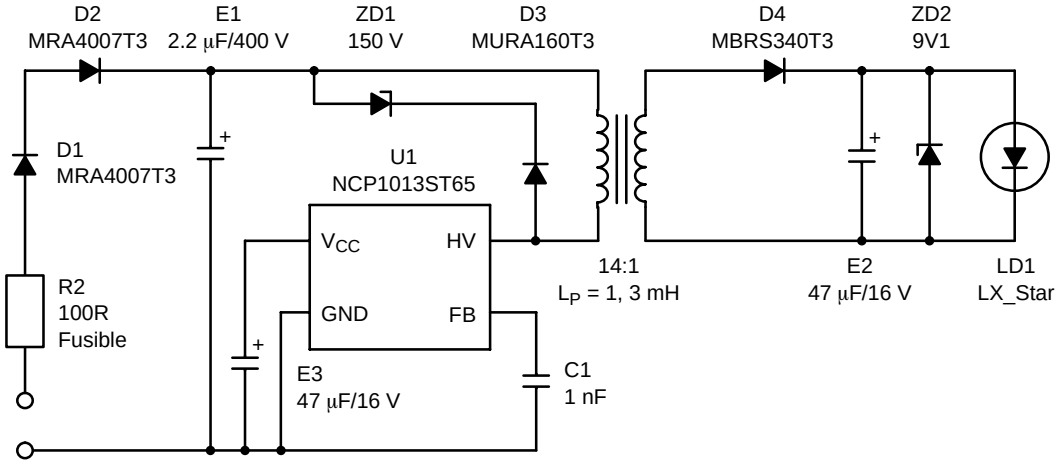

Figure 2. Complete Schematic Diagram of the LED Flasher

COMPONENT LAYOUT

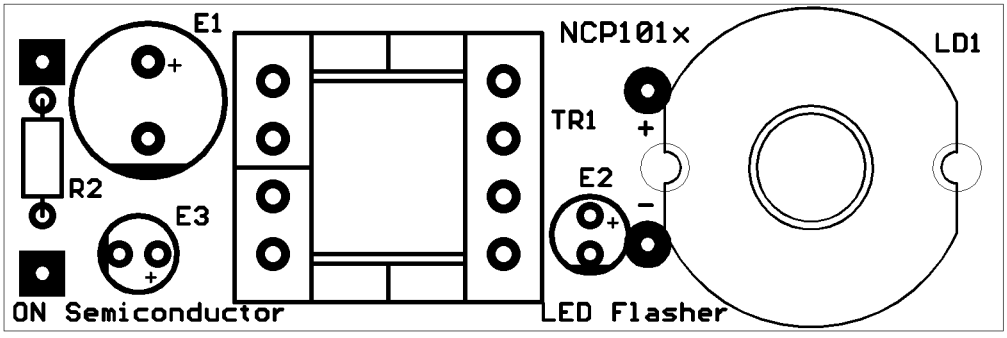

Figure 3. Component Layout – Top Side

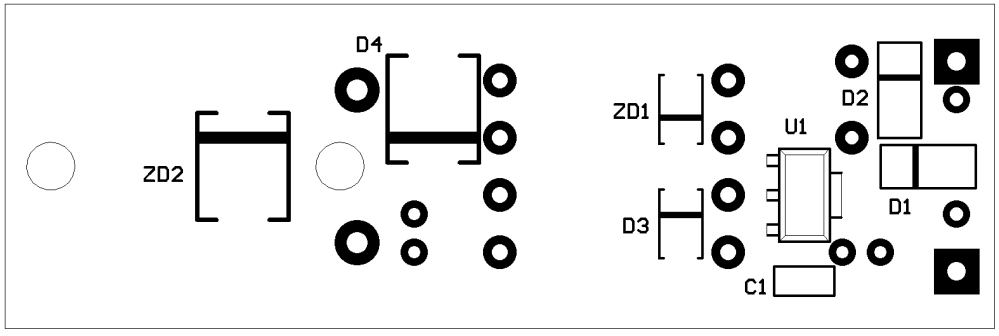

Figure 4. Component Layout – Bottom Side

PCB LAYOUT

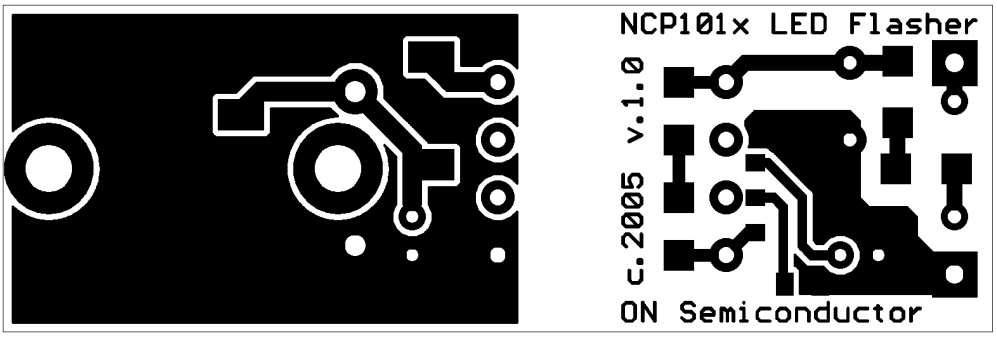

Figure 5. PCB Layout

Bill of Materials

Part	Value	Package
C1	Ceramic 1 nF/50 V	C0805
D1	MRA4007T3	SMA
D2	MRA4007T3	SMA
D3	MURA160T3	SMA
D4	MBRS340T3	SMC
E1	2.2 μF/400 V	E5/10
E2	47 μF/16 V	E2,5/5
E3	47 μF/16 V	E2,5/5
LD1	LXHL−LH3C	LUX−STAR
R2	100 Ω Fusible	R RM7,5
TR1	UNI−EE16	EF16
U1	NCP1013ST65	SOT−223
ZD1	BZG03C150	SMA
ZD2	1.5SMC9.1AT3	SMC

Contact Address of the Transformer Manufacturer:

Order number: Transformer for NCP101x LED Flasher

Manufacturer: P&V Elektronic

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