DN67
ZXSC400 solution for 1W high powered LED

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Description

The ZXSC400, although designed for small LEDs in LCD backlighting, is sufficiently flexible to provide an efficient 1W solution producing a nominal 350mA constant current source from 2 NiMH or NiCd cells.

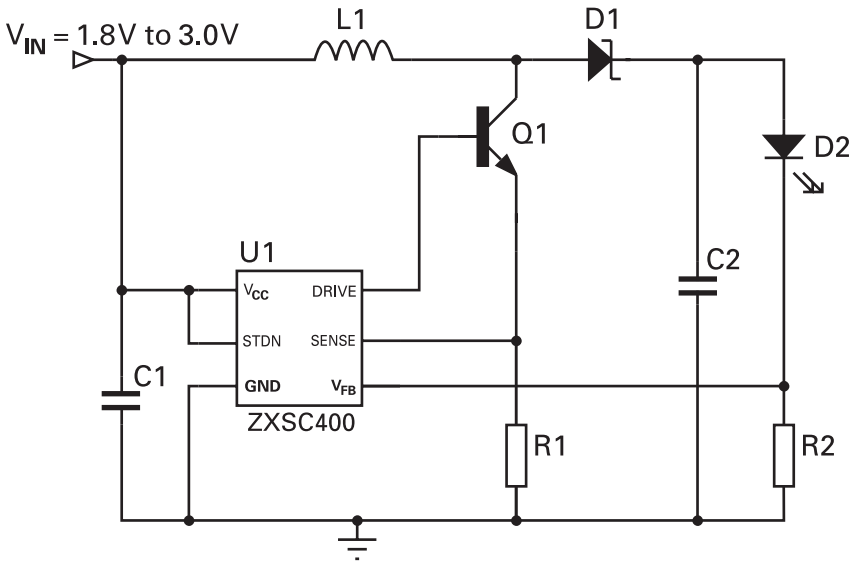

Figure 1 Schematic diagram

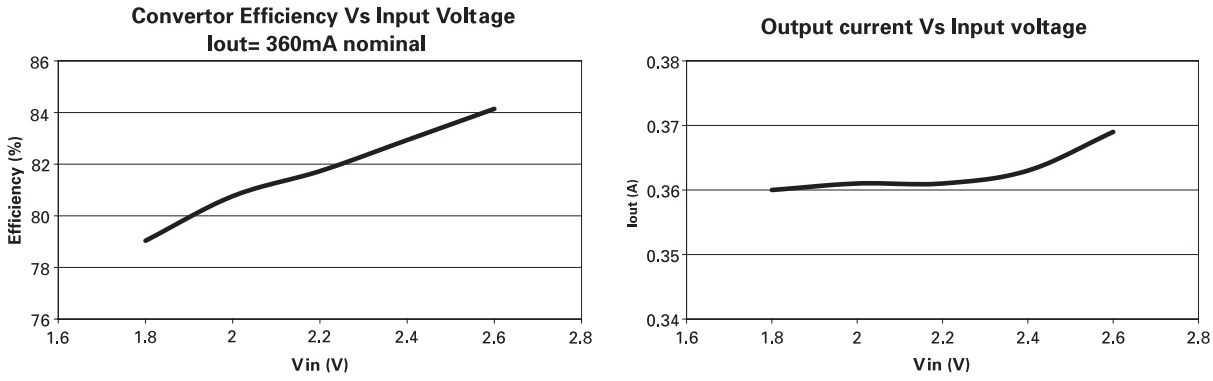

Figure 2 Performance graphs

Reference	Part number	Value	Manufacturer	Contact details
U1	ZXSC400E6		Zetex	www.zetex.com
Q1	FMMT617		Zetex	www.zetex.com
D1	ZHCS2000		Zetex	www.zetex.com
D2	LXHL-NW98		Lumileds	www.lumileds.com
L1	DO1608C-332	3.3μH	Coilcraft	www.coilcraft.com
C1	GRM42-6X5R226K6.3	22μF	Murata	www.murata.com
C2	GRM42-6X5R226K6.3	22μF	Murata	www.murata.com
R1(1)		17mΩ	Generic	NA
R2		0.82Ω	Generic	NA

Table 1 Bill of materials

NOTES:
(1) Actual in-circuit value, see notes overleaf

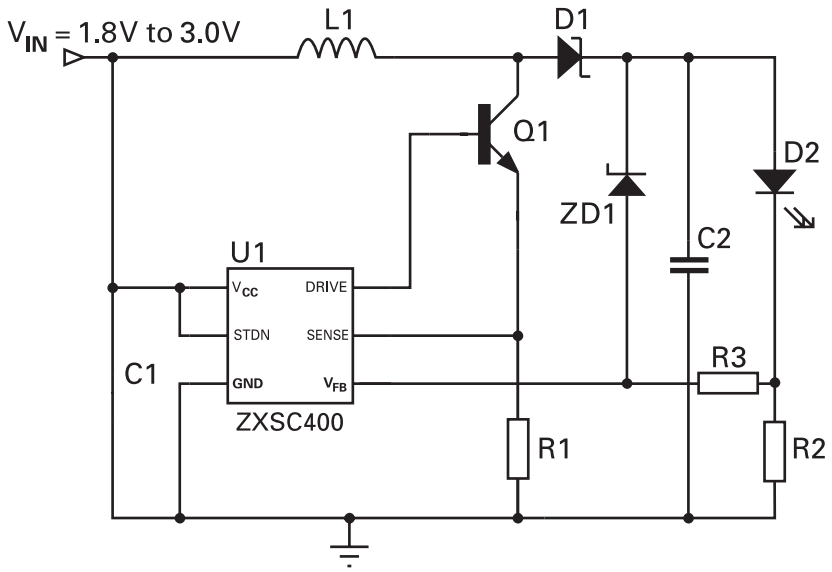

Figure 3 Open circuit protection

Additional BoM

AD1 - 5V6
R3 - 1KΩ

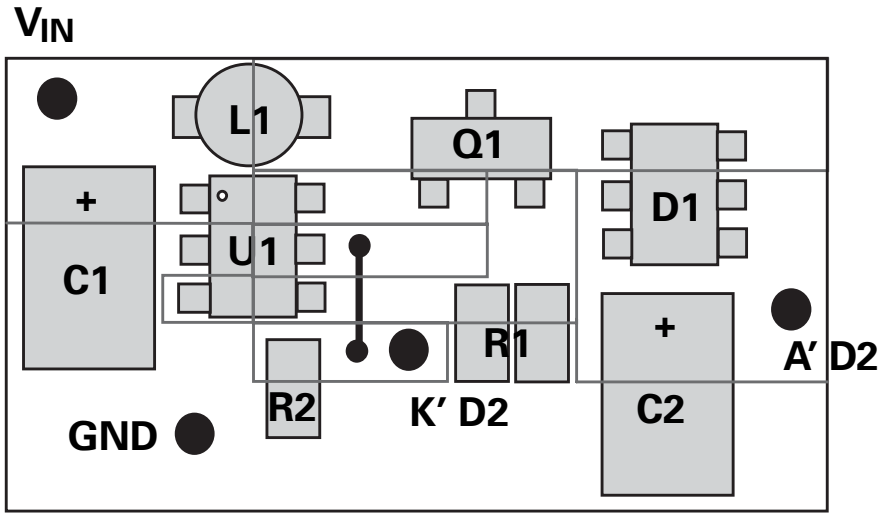

Figure 4 Layout suggestion

Note
For these approximate layout dimensions, R1 is 15mΩ. See note 3.

Notes:

1. D1 can be exchanged with a SOT23 ZHCS1000 with a loss of 5% efficiency.
2. Inductor DCR (DC resistance) strongly influences efficiency, keep below 0.1Ω.
3. R1 is small and it is strongly advised to take track resistance into account. A proven method is to source a 1A current from the Sense pin to the GND pin and check for 16-17mV. This resistor can be made from a 22mΩ in parallel with a 47mΩ (or a single 15mΩ resistor if available) with the PCB trace contributing the difference.
4. Open circuit protection can be added as shown below. The voltage rating of the small signal Zener diode ZD1 is not critical. It must be greater than the maximum forward voltage of the LED and less than the maximum V_{CE} rating of the switching transistor, 15V in the case of the FMMT617. The supply current in the open circuit condition is around 2mA.

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