

## High Efficiency Battery Powered High Brightness LED Driver Using the TPS63000

Driving a HB LED from a battery power source has several design challenges. This design using the TPS63000 is ideal for creating the optimal LED driver that requires constant current to the LED even when the battery voltage drops below the LEDs  $V_f$ .

The TPS6300x series is a family of synchronous Buck-Boost DC/DC Converters that are ideally suited for applications powered from 1-cell Li-Ion/Li-Polymer battery or 2-/3-cell Alkaline/NiCd or NiMH batteries. The TPS6300x is based on a fixed frequency, pulse-width-modulation (PWM) controller using synchronous rectification to obtain maximum efficiency, up to 96%.

With its wide input voltage range starting at 1.8V up to 5.5V, TPS6300x series can support future battery technologies with ultralow battery discharge cycles. Featuring automatic transition between buck and boost mode, the device can provide up to 1200mA output current in buck mode at 3.3V or up to 800mA output current in boost mode at 3.3V.

TPS6300x offers an overall unique combination of features, starting at the highest output current with smallest inductor, and therefore, offers the smallest solution size. Wide Input range (starting as low as 1.8V) and its unique efficiency curve over the wide battery voltage range make the TPS63000 to the leader in the Buck-Boost DC/DC converter market.

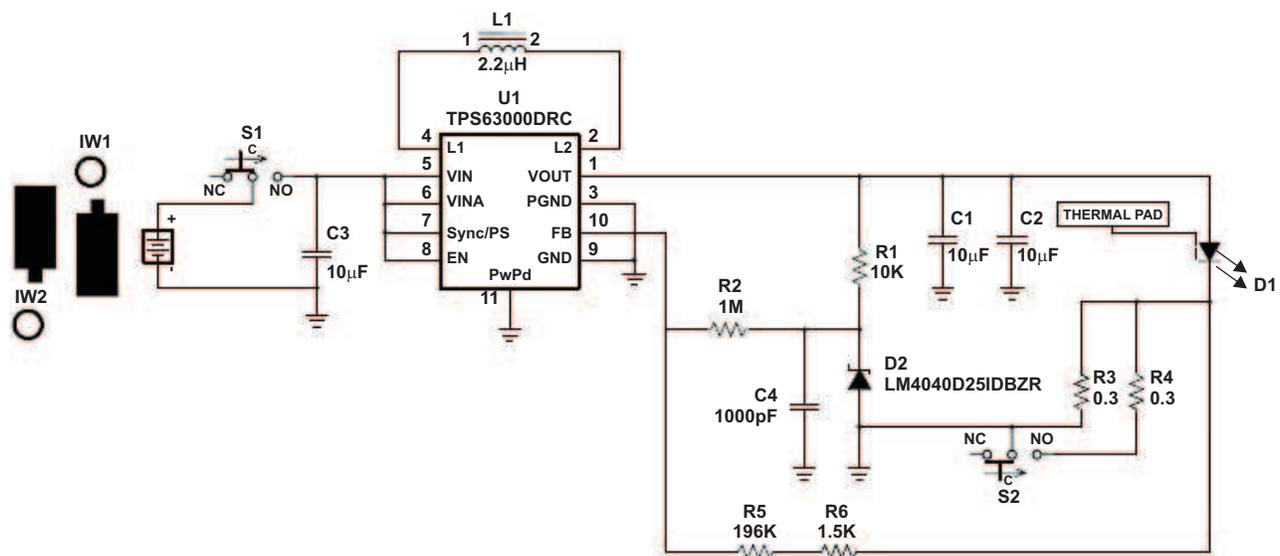


Figure 1. Flashlight Schematic

**Table 1. PMP2186 Bill of Materials**

Count	RefDes	Value	Description	Size	Part Number	MFR
2	BAT1, BAT2		Battery Lithium AA Cell 1.5 Volt			Any
1	BH1	2223	Battery Holder, Double AA size	2.250 × 1.125 inch	2223	Keystone
3	C1, C2, C3	10μF	Capacitor, Ceramic, 6.3V, X5R, 20%	0603	GRM188R60J106ME47D	Murata
1	C4	1000pF	Capacitor, Ceramic, 50V	0603	C0603C102J5GACTU	Kemet
1	D1		LED White, 700mA			Any
1	D2	LM4040D25IDBZR	Diode, Shunt Voltage Reference	SOT-23	LM4040D25IDBZR	TI
2	IW1, IW2		RED Polarizing washer		59	Keystone
1	L1	2.2μH	Inductor, SMT, 8A, 20milliohm	0.255 × 0.27 inch	IHLP2525CZER2R2M01	Vishay
1	R1	10K	Resistor, Chip, 1/16W, 1%	0603	ERJ-3EKF1002V	Panasonic
1	R2	1M	Resistor, Chip, 1/16W, 1%	0603	ERJ-3EKF2003V	Panasonic
2	R3, R4	0.3	Resistor, Chip, 1/10W, 1%	0805	RL1220S-R30-F	Susumu
1	R5	196K	Resistor, Chip, 1/16W, 1%	0603	ERJ-3EKF1004V	Panasonic
1	R6	1.5K	Resistor, Chip, 1/16W, 1%	0603	ERJ-3EKF1004V	Panasonic
2	S1, S2	1101M2S3CQE2	Switch, Actuator SPDT	0.5 × 0.26 inch	1101M2S3CQE2	C & K
1	U1	TPS63000DRC	IC, High Efficiency Single Inductor Buck-Boost Converter	QFN10	TPS63000DRC	TI
			PCB, 4.5 In × 1.5 In × 0.062 In		PMP2186REVC	Any

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