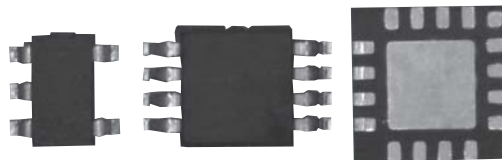


W series

WHITE LED DRIVERS



■ SUMMARY

White LED driver “W series”, these are driver ICs for the purpose of activating white LEDs used for backlight illumination in LCDs found in handheld electronic devices, such as mobile phones and PDAs.

The “W Series” includes not only driver ICs used simply for lighting up white LEDs, but also includes a type that can individually activate 4 separate LEDs and a type that can divide 6 LEDs into groups and activate them, making these ideal products for powering handheld electronic devices.

■ PRODUCT FAMILY

- LCD and keypad backlighting for handheld electronic devices
W-52, W-6137, W-6139, W-6237, W-6238,
W-5200-5, W-5626

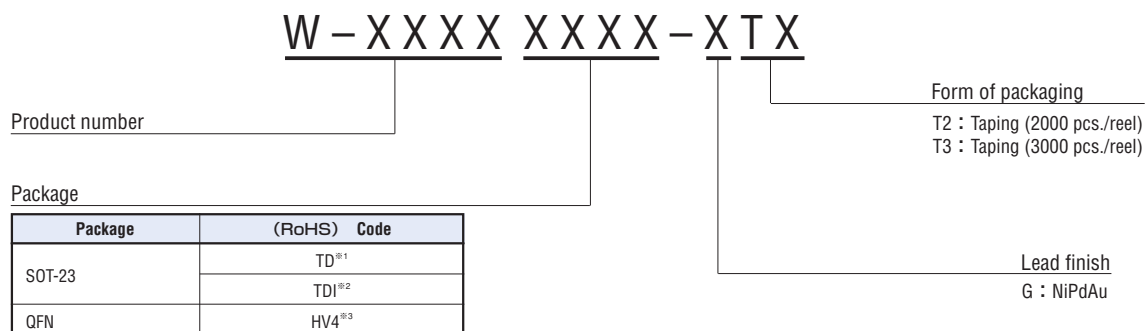
■ FEATURES

- Environmentally friendly “RoHS compliant” (Lead-Free and Halogen-Free)
- Low-cost
- Power efficiency greater than 80 %
- Small size and extremely low-profile package
5, 6pin SOT-23, QFN
- Compatible pinout with conventional white LED drivers
LTC/SC

W series

WHITE LED DRIVERS

■ PART NUMBER DESIGNATION



Taping code and quantity

Package	Taping quantity (pcs./reel)	
	T2	T3
SOT23		○
QFN (4x4)	○	

- ※ 1 : The relevant products are W-6137, W-6237, W-6238.
- ※ 2 : The relevant products are W-52, W-5200-5.
- ※ 3 : The relevant products are W-5626.

■ LIST OF PART NUMBERS

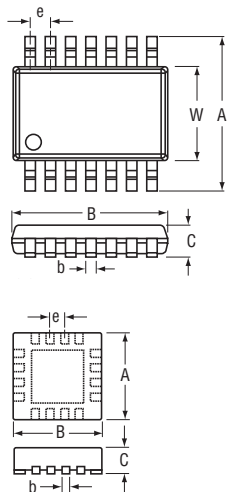
Type for boosting	Product number	Maximum no. of LEDs	Input voltage (V)	Output current (mA)	Efficiency (%)	Package
Boost regulator	W-52	4	2.0 - 7.0	40	83	6-SOT-23
	W-6137	5	2.2 - 5.5	30	87	5-SOT23
	W-6139	27	2.8 - 5.5	180	87	5-SOT23
	W-6237	8	2.8 - 5.5	40	87	5-SOT23
	W-6238	10	- 5.5	30	87	5-SOT23
Charge pump regulator	W-5200-5	6	2.7 - 4.5	100	80	6-SOT23
	W-5626	6	3.0 - 5.5	32/ch	91	QFN16 (4x4)

W series

WHITE LED DRIVERS

PACKAGE DIMENSIONS

(Unit : mm)



● MSOP/SOT-23/SOIC

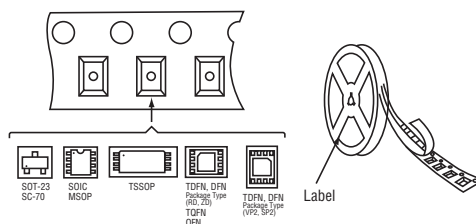
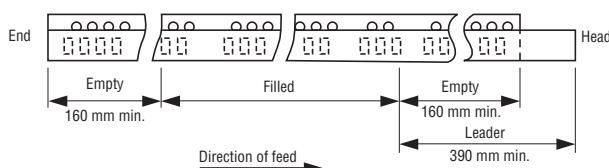
Package	No. of pins	A (Max./Min.)	B (Max./Min.)	W (Max./Min.)	C (Max./Min.)	b (Max./Min.)	e
SOT-23	5	2.80 (Typ. *)	2.90 (Typ. *)	1.60 (Typ. *)	1.0 (max)	0.45/0.30	0.95
	6						

* Typ. = Typical

● TDFN/QFN

Package	No. of pins	A (Max./Min.)	B (Max./Min.)	W (Max./Min.)	C (Max./Min.)	b (Max./Min.)	e
QFN16 (4x4)	16	4.10/3.90	4.10/3.90	—	0.80/0.70	0.35/0.25	0.65

TAPING PACKAGING SPECIFICATIONS



W series

WHITE LED DRIVERS

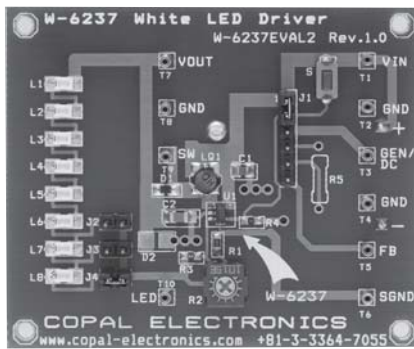
EVALUATION BOARDS

Below are the evaluation boards and demonstration boards that enable the evaluation of various devices in your design phase.

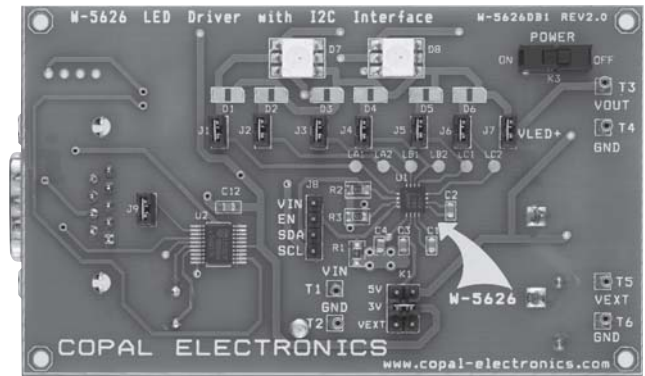
By using these boards, the time that our customers spend on development evaluations may be shortened.

Evaluation boards

W-6237EVAL2



W-5626DB1



Application Notes, Design Notes

No.	Title
AN14	W-52 Evaluation board for white LED drivers W-52EVAL1
AN24	W-6237 Evaluation board for high voltage white LED drivers : W-6237EVAL2
AN26	W-6137 Evaluation board for white LED drivers : W-6137EVAL1
AN30	W-5626 Evaluation and demo board for 6-channel LED drivers : W-5626DB1
AN32	W-6238 Evaluation board for 10-LED boost converter : W-6238EVAL1
DN9	W-52 White LED Driver Efficiency and Inductor value Tradeoffs

BASIC CIRCUITRY METHOD AND FEATURES

WHITE LED DRIVERS

1. Boost regulator Type [using coil]

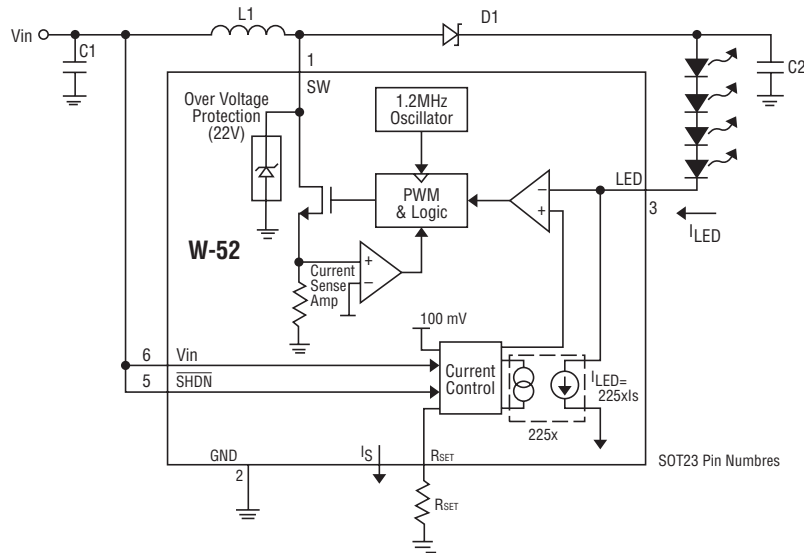


Figure 1: W-52 Block Diagram

FEATURES

- Designed for driving LEDs in series configuration
- High output voltage, high efficiency (over 80%)

Circuitry structure and operation

This will be explained by using W-52 as an example.

It is composed of a PWM modulator for activating switch transistor SW and an oscillator which are inside the IC, as well as current sensor circuitry Current Control and error amplifier for detecting the current flowing through the LED and diode Over Voltage Protection for guarding against excessive voltage.

It operates by setting the LED current (5mA to 40mA) to 225 times the current flowing through the R_{SET} pin. An error signal travels to the PWM modulator so that the current flowing through the LED connected to the output equalizes with the set value, and the switching circuitry, comprised of an external inductor and switch transistor, varies within an ON/OFF range and regulates the (PWM) output current in order to provide a constant amount of current. In irregular circumstances, such as when the output terminal is open, a diode guarding against excessive voltage will prevent the voltage from rising and protect the circuitry.

BASIC CIRCUITRY METHOD AND FEATURES

WHITE LED DRIVERS

2. Charge pump regulator Type [using condenser]

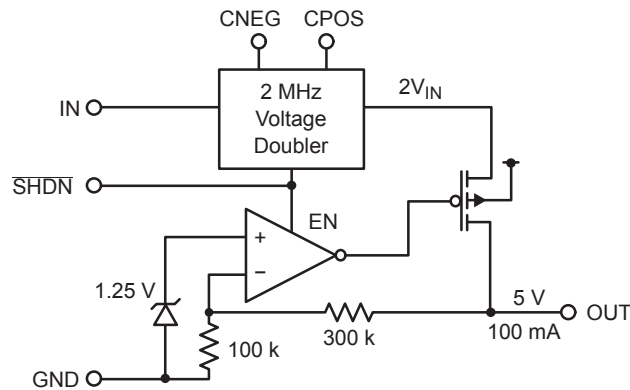


Figure 2

■ FEATURES

- Designed for driving LEDs in parallel configuration
- Low noise

■ Circuitry structure and operation

The W-5200-5 uses a switched capacitor charge pump to boost the voltage at IN to a regulated output voltage. Regulation is achieved by sensing the output voltage through an internal resistor divider and modulating the charge pump output current based on the error signal. A 2-phase non-overlapping clock activates the charge pump switches. The external flying capacitor is charged from the IN voltage on the first phase of the clock. On the second phase of the clock it is stacked in series with the input voltage and connected to OUT. The charging and discharging of the flying capacitor continues at a free running frequency of typically 2 MHz.

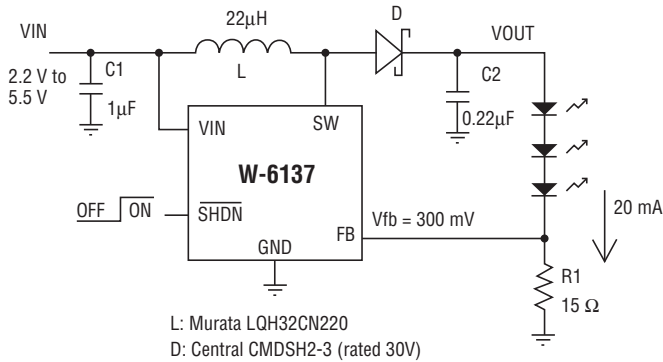
BASIC CIRCUITRY METHOD AND FEATURES

WHITE LED DRIVERS

Example of application in circuitry

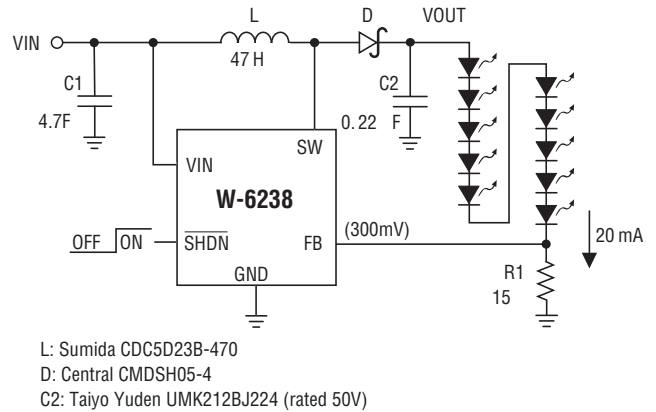
W-6137

Driver to Five (Max.) High-Brightness white LEDs

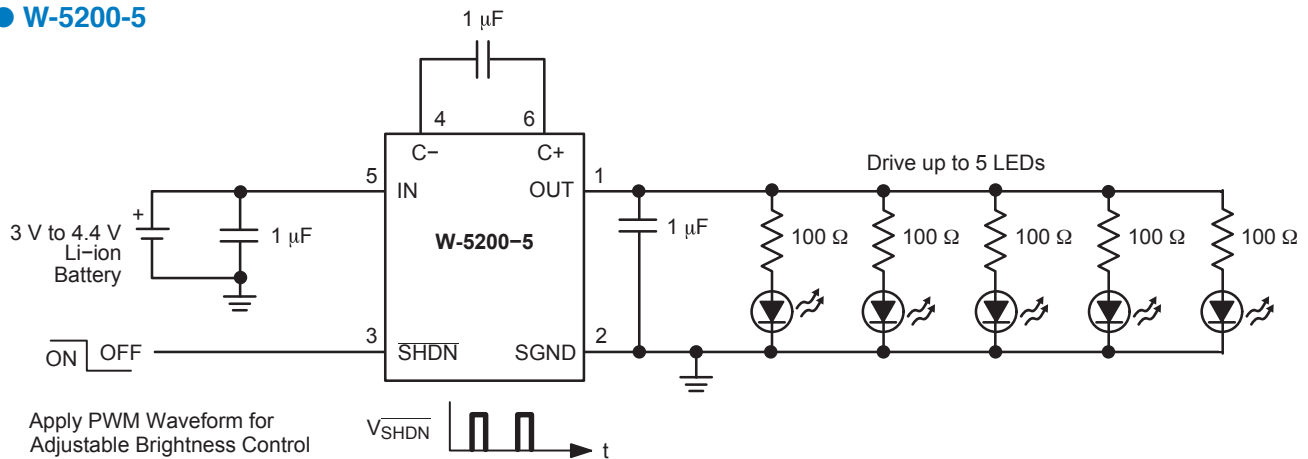


W-6238

Driver to Ten (Max.) High-Brightness white LEDs



W-5200-5



W-5626

Driver to Six High-Brightness White LEDs (I2C control)

