

## CONSTANT CURRENT DC/DC WHITE LED DRIVER

### GENERAL DESCRIPTION

The GM2102 is a member of Gamma Microelectronics's family of white LED drivers.

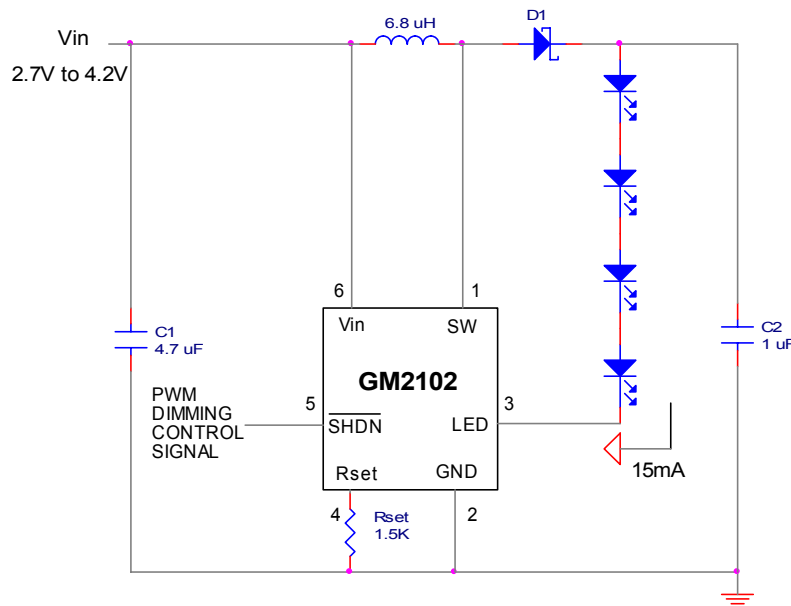
The GM2102 is a fixed frequency step-up DC/DC converter designed to operate as a constant-current source. It is ideal for driving light emitting diodes (LEDs) whose light intensity is proportional to the current passing through them and not on the voltage across their terminals as it directly regulates the output current.

The wide input voltage range allows the device to work from a variety of input sources. A single external resistor sets LED current between 5mA and 40mA, which can then be easily adjusted using either a DC voltage or a PWM signal. In Shutdown mode, the LED's are disconnected from the output with the maximum quiescent current of 1 $\mu$ A for the entire circuit.

### FEATURES

- Drives Six White LED's from 1.8 V
- 1.2Mhz Fixed Frequency Switching
- Minimum operating input voltage 1.2V
- 90% efficiency
- Accurately adjustable LED current
- Current Regulation even when  $V_{in} > V_{out}$
- Disconnects LED's in Shutdown mode
- Available in SOT23 Package ideal for space conscious portable applications

### TYPICAL APPLICATION



### APPLICATIONS

- Cellular Phones
- Digital Cameras
- Handheld Computers
- Portable Audio players
- Pagers
- Other White LED applications

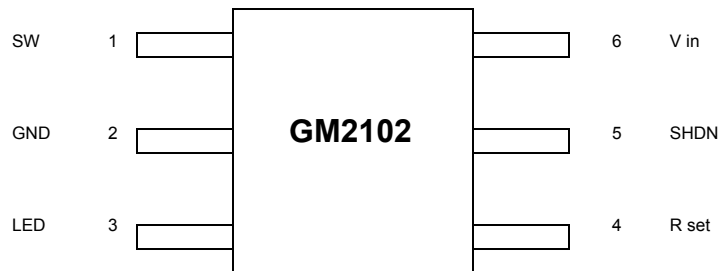
**CONSTANT CURRENT DC/DC WHITE LED DRIVER**
**ELECTRICAL CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	GM2102			UNIT
		MIN	TYP	MAX	
Minimum Input Voltage			1.5	1.2	V
Rset Pin Voltage	Rset = 1.5K		100		mV
LED Pin Voltage	Rset = 1.5K, Vin < Vout		120		mV
Quiescent Current	V <sub>Rset</sub> = 0.2V		1.2	1.5	mA
	V <sub>SHDN</sub> = 0V		0.1	1	μA
Switching Frequency	Vin = 1V		1.2		MHz
Maximum Switch Duty Cycle		85	95		%
Switch Current Limit			500		mA
Switch V <sub>CESAT</sub>	I <sub>SW</sub> = 300 mA		200		mV
SHDN Pin Current	V <sub>SHDN</sub> = 0V			0.1	μA
	V <sub>SHDN</sub> = 2V		20	30	μA
Switch Leakage Current	Switch OFF, V <sub>SW</sub> = 5V		0.1		μA
LED Pin Current	Rset = 562 Ω, Vin = 1.5 V		40		mA
	Rset = 750 Ω, Vin = 1.2 V		30		mA
	Rset = 1.5K Ω, Vin = 1.2 V		15		mA
	Rset = 4.53KΩ, Vin = 1.2 V		5		mA
LED Pin Current Temp Coeff.	I <sub>LED</sub> = 15 mA		-0.02		mA/°C
Start up Threshold (SHDN pin)		0.85			V
Shutdown Threshold (SHDN pin)				0.25	V

All Specification are at 25 °C. Vin = 1.8 V, VSHDN = 1.8 V unless otherwise noted.  
 Specifications subject to change without notice. All performance characteristics based on the use of Gamma Microelectronics inc. application circuits. Functional Operation of the device at conditions beyond those specified here is not implied.

**ABSOLUTE MAXIMUM RATINGS**

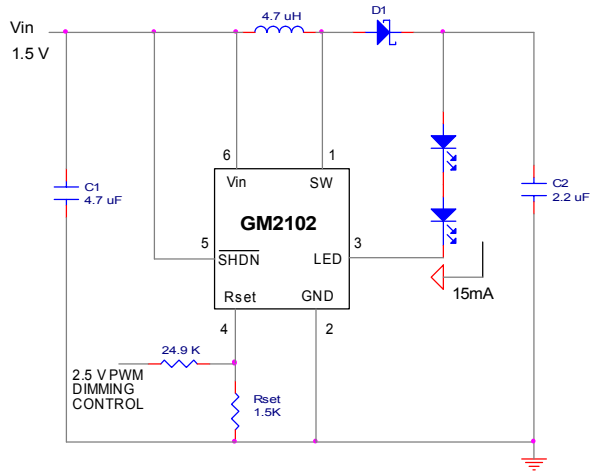
PARAMETER	GM2102	UNIT
Vin Voltage	10	V
Shutdown Voltage	10	V
SW Voltage	40	V
LED Voltage	40	V
Junction Temperature	125	°C
Operating Temperature Range	-40 to 85	°C
Storage Temperature Range	-65 to 150	°C
Lead Temperature	300	°C

**CONSTANT CURRENT DC/DC WHITE LED DRIVER**
**PIN CONFIGURATION**


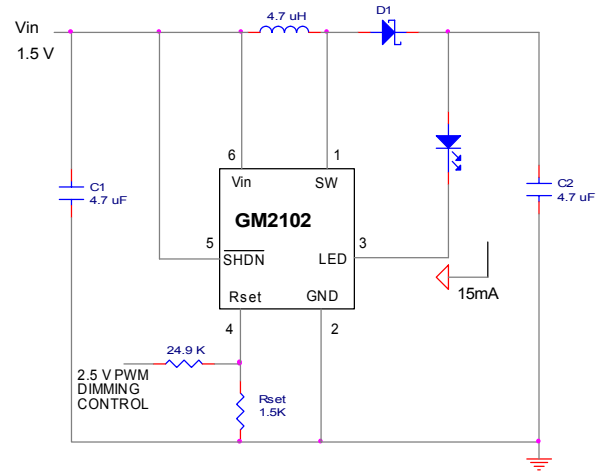
6 Lead Plastic SOT23 Package

**PIN FUNTIONS**

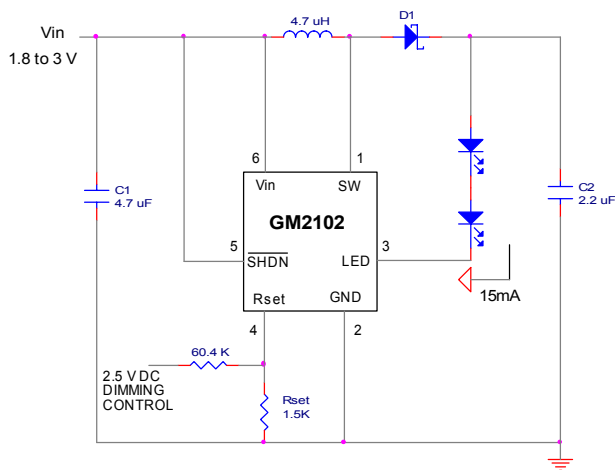
Pin	Function
<b>SW (Pin 1) SWITCH PIN</b>	Collector terminal of the Internal NPN Power Switch
<b>GND (Pin 2) GROUND PIN</b>	Ground Reference Pin for the device
<b>LED (Pin 3) LED PIN</b>	Collector terminal of the Internal NPN LED Switch to be connected to the cathode of the last (bottom most) LED.
<b>Rset (Pin 4) RESISTOR PIN</b>	The terminal that would connect the external resistor to the device to program the current that flows in the LED pin.
<b>SHDN ( Pin 5) SHUTDOWN PIN</b>	Pin used to control the GM2102 to operate in active mode (Set to above $V$ ) or shutdown mode (below $V$ )
<b>Vin (Pin 6) INPUT SUPPLY PIN</b>	Input Pin to provide the input supply voltage to the device.

**CONSTANT CURRENT DC/DC WHITE LED DRIVER**
**TYPICAL APPLICATIONS**


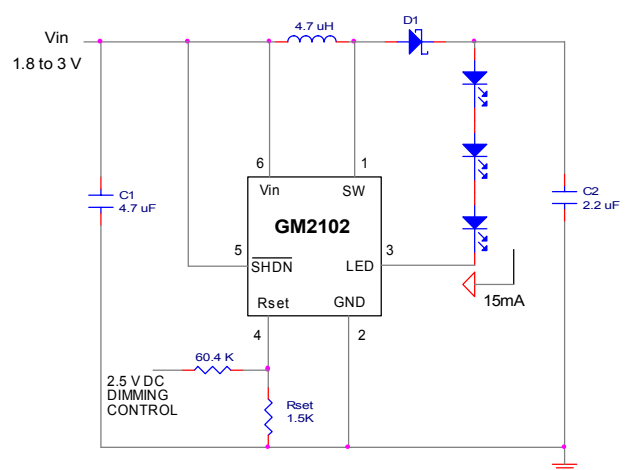
Single Cell Driver for Two White LEDs



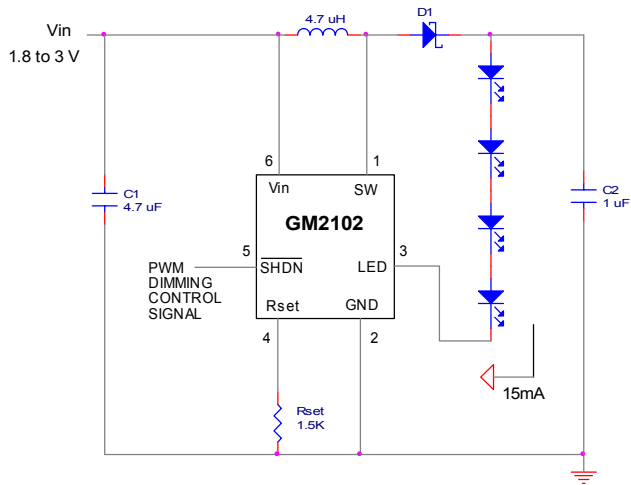
Single Cell Driver for One White LED



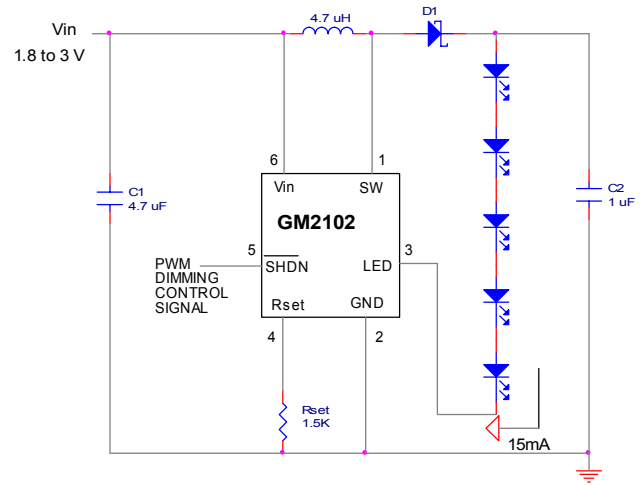
Two Cell Driver for Two White LEDs



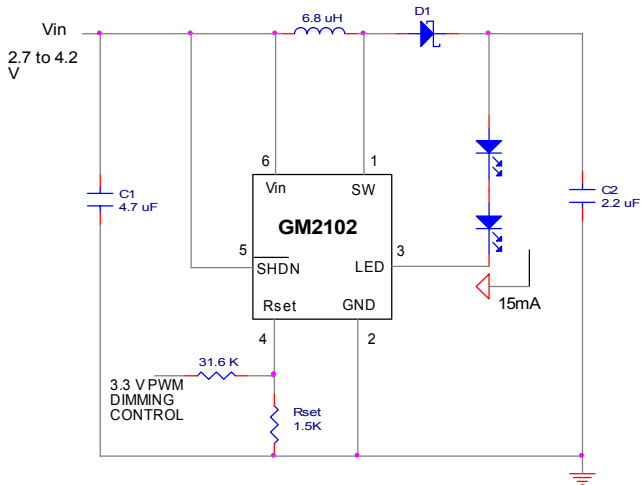
Two Cell Driver for Three White LEDs

**CONSTANT CURRENT DC/DC WHITE LED DRIVER**


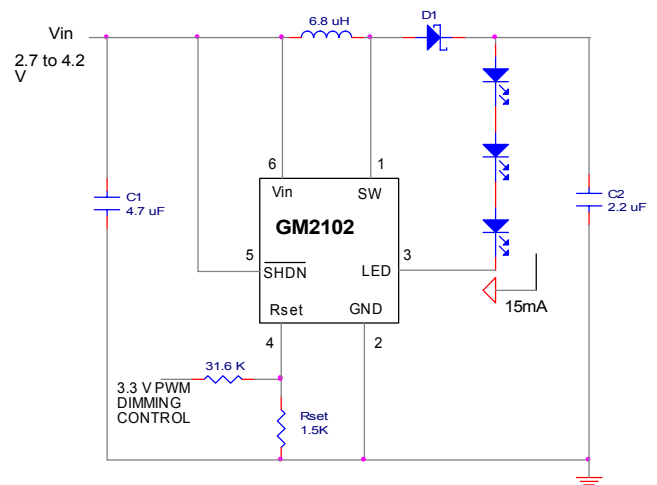
Two Cell Driver for Four White LEDs



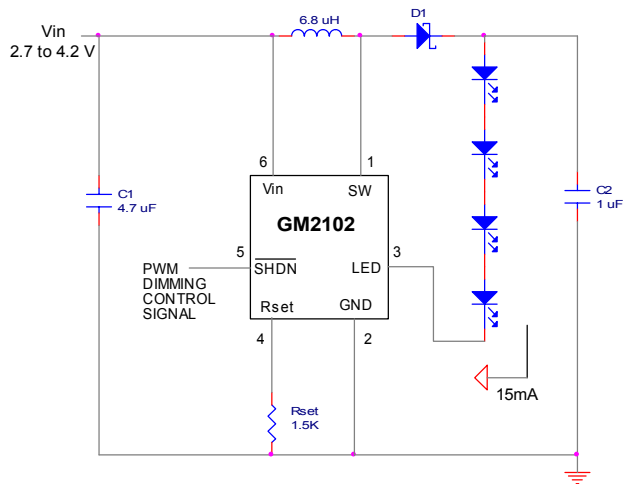
Two Cell Driver for Five White LEDs



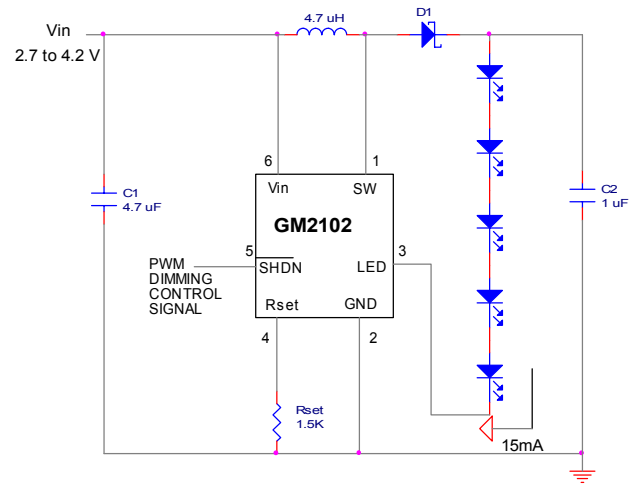
Li-Ion Driver for Two White LEDs



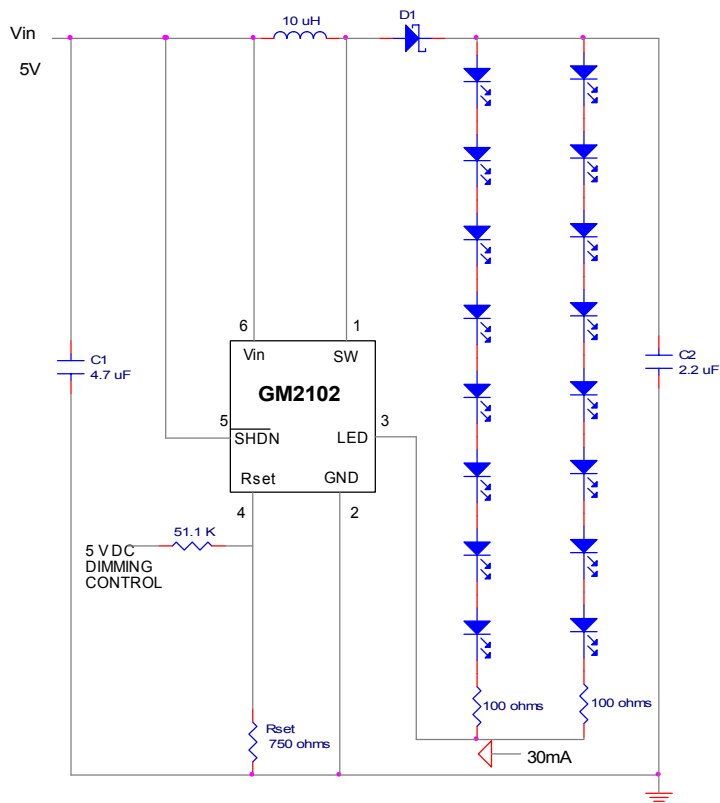
Li-Ion Driver for Three White LEDs

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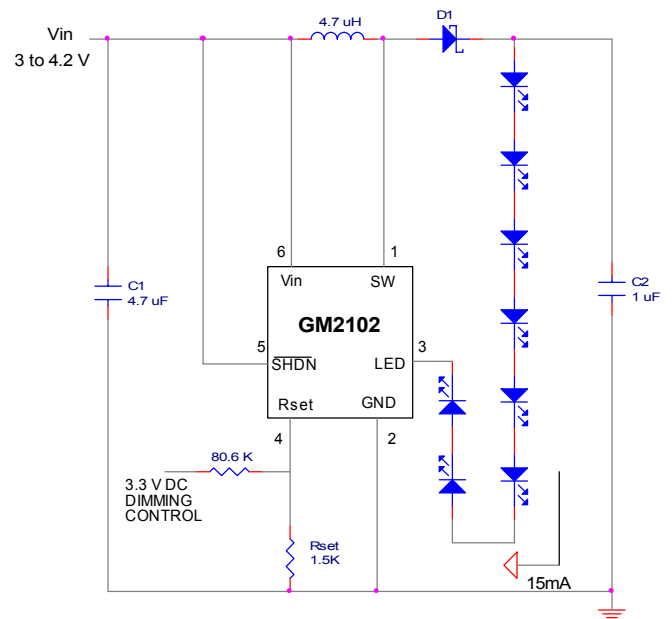
Li-Ion Driver for Four White LEDs



Li-Ion Driver for Five White LEDs



5V Driver for 16 White LEDs



Li-Ion Driver for Eight White LEDs