Description

The GM9910B is a PWM high efficiency control LED driver IC. It allows efficient operation of High Brightness (HB) LEDs from voltage sources ranging from 10VDC up to 500VDC, this feature allows GM9910B can work from a wide range of input voltages without the need for an external low voltage supply.

By using a single resistor, the switching frequency to control the external MOSFET can be fixed up to 300KHz. GM9910B is constant current LED driver, which enhance the reliability. The output current can be programmed between a few milliamps and up to more than 1.0A.

GM9910B uses a rugged high voltage junction isolated process that can withstand an input voltage surge of up to 500V. Output current to an LED string can be programmed to any value between zero and its maximum value by applying an external control voltage at the linear dimming control input of the GM9910B. The GM9910B provides a low-frequency PWM dimming input that can accept an external control signal with a duty ratio of 0-100% and a frequency of up to a few kilohertz.

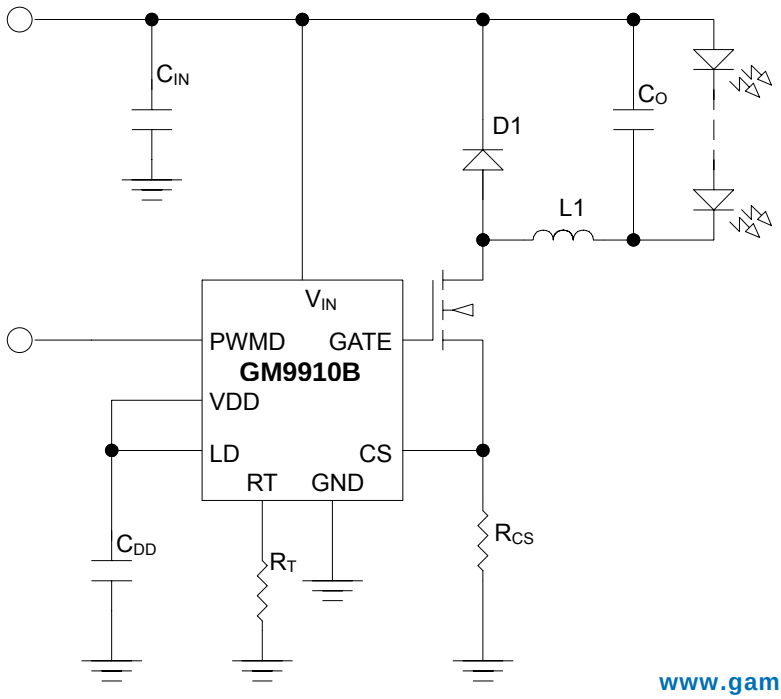
Features

- **> 90% efficiency**
- **Wide input range – 10V to 500V**
- **Constant current LED driver**
- **Applications from a few mA to more than 1A**
- **LED string from one to hundreds of diodes**
- **PWM low frequency dimming via enable pin**
- **Input voltage surge rating up to 500V**

Applications

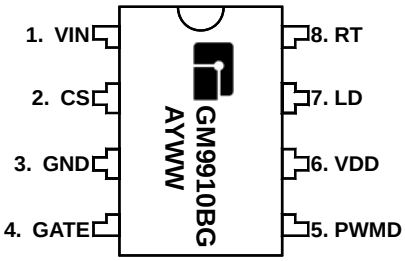
- **AC/DC or DC/DC LED Driver Applications**
- **RGB Backlighting LED Driver**
- **Back Lighting of Flat Panel Displays**
- **General Purpose Constant Current Source**

Typical Application Circuit

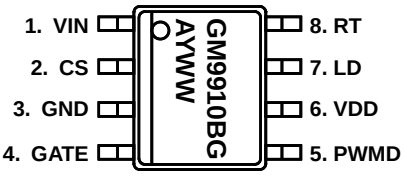


Marking Information and Pin Configurations (Top View)

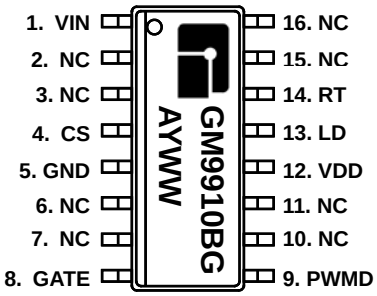
DIP 8



SO 8

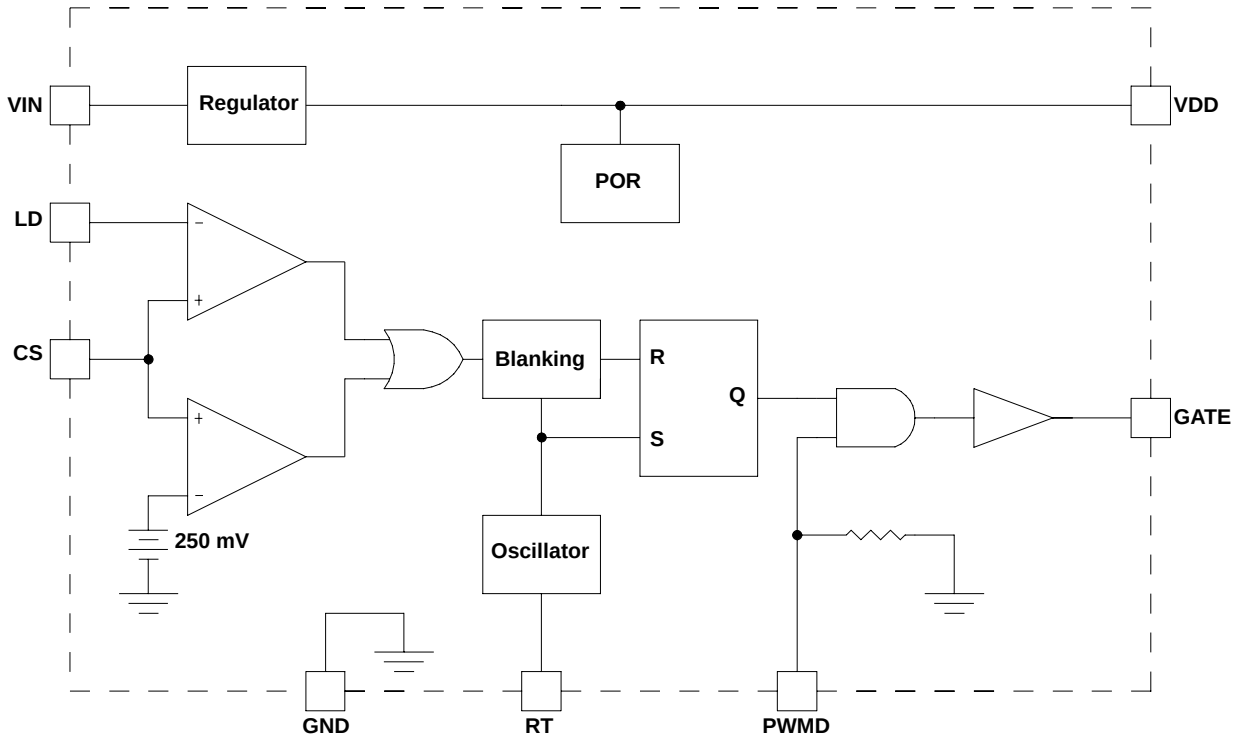


SO16 and DIP16



G: Green Product
A: Assembly / Test site code
Y: Year
WW: Week

Block Diagram



Pin Descriptions

Pin #		Function	Description
8 pin	16 pin		
1	1	VIN	This pin is the input of an 10.0 - 500V linear regulator.
2	4	CS	This pin is the current sense pin used to sense the FET current by an external sense resistor. When this pin exceeds the lower of either the internal 250mV or the voltage at the LD pin, the GATE output goes low.
3	5	GND	This pin must be electrically connected to the ground of the power train.
4	8	GATE	This pin is the output GATE driver for THE external N-channel power MOSFET.
5	9	PWMD	This is the PWM dimming input of the IC. When this pin is pulled to GND, the GATE driver is turned off. When the pin is pulled high, the GATE driver operates normally.
6	12	VDD	Power supply pin for all internal circuits, It must be bypassed with a low ESR capacitor to GND (≥ 0.1μF).
7	13	LD	This pin is the linear dimming input and sets the current sense threshold as long as the voltage at the pin is less than 250mV (typ).
8	14	RT	This pin sets the oscillator frequency. When a resistor is connected between RT and GND, the HV9910B operates in constant frequency mode. When the resistor is connected between RT and GATE, the IC operates in constant off-time mode.
	2, 3, 6, 7, 10, 11, 15, 16	NC	No connection

Ordering Information

Ordering Number	Package	Shipping
GM9910BD8TG	DIP-8	60 Units / Tube
GM9910BS8TG	SOP-8	100 Units / Tube
GM9910BS8RG	SOP-8	2,500 Units / Reel
GM9910BS16TG	SO16	50 Units / Tube
GM9910BS16RG	SO16	2500 Units / Reel
GM9910BD16TG	DIP16	25 Units / Tube

Absolute Maximum Ratings

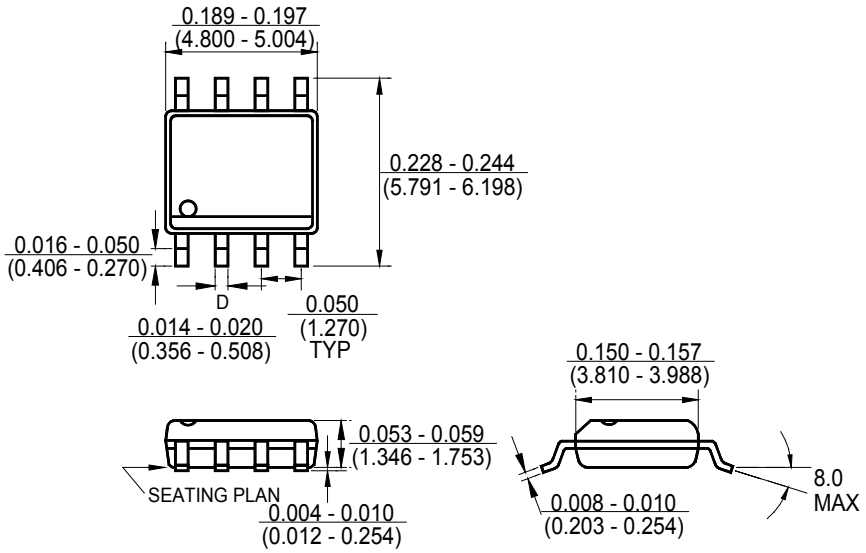
PARAMETER	RATINGS
VIN to GND	-0.5V to + 500V
CS	-0.3V to VDD + 0.3V
LD, PWMD to GND	-0.3V to VDD - 0.3V
GATE to GND	-0.3V to VDD + 0.3V
Operating Temperature Range	- 40°C to + 85°C
Junction Temperature	+125°C
Continuous Power Dissipation (T_A = 25°C)	
DIP 8	900mW
SO 8	630mW
SO 16	1300mW
Storage Temperature	- 65°C to + 150°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

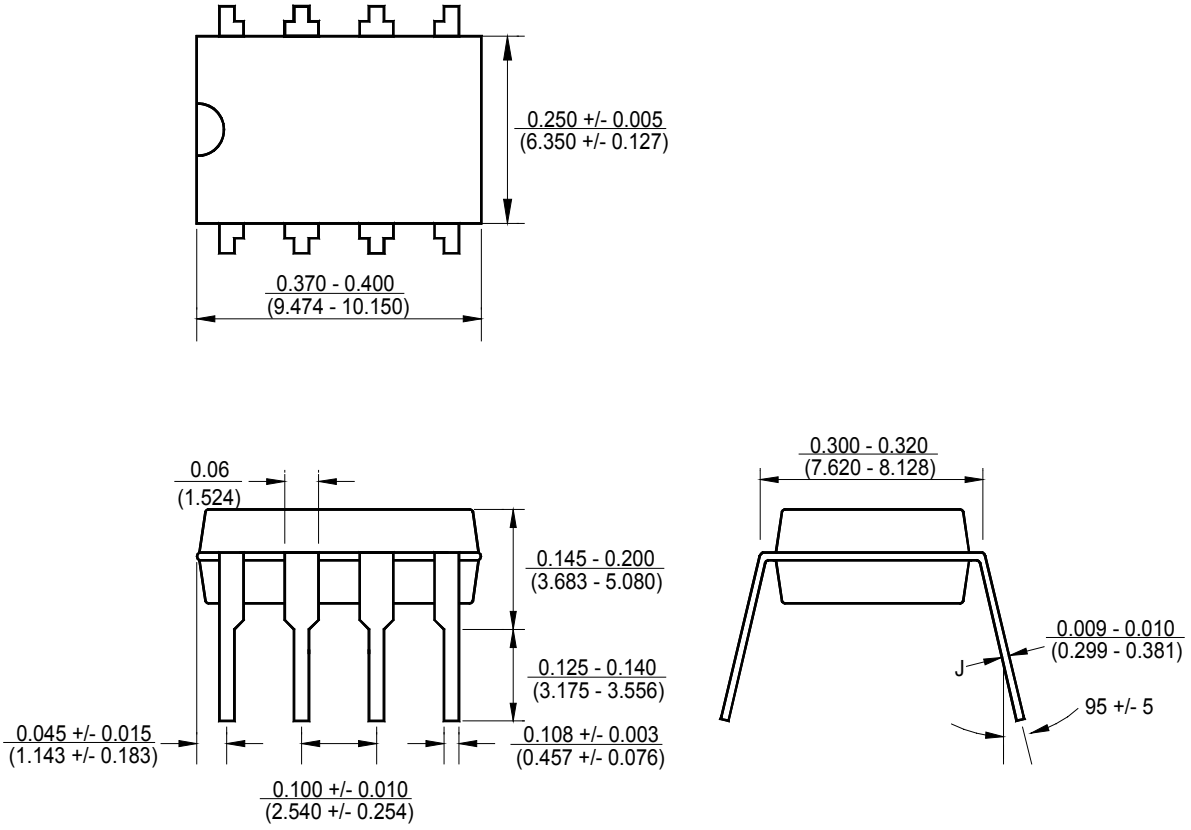
Electrical Characteristics (T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input DC supply voltage range	V_{INDC}	DC Input Voltage	10		500	V
Shut-Down mode supply current	I_{INSD}	Pin PWMD to GND, VIN = 8V	0.5		1.0	mA
Internally regulated voltage	VDD	VIN = 10 to 500V, IDD(ext)=0, pin GATE is open	7.0	7.5	8.0	V
Maximum VDD voltage	VDD_{max}	When an external voltage applied to pin VDD			10	V
VDD current available for external circuitry	IDD(ext)	VIN = 10–100V			1.0	mA
VDD under voltage lockout threshold	UVLO	VIN rising	6.45	6.7	6.95	V
VDD under voltage lockout hysteresis	ΔUVLO	VIN falling		500		mV
Pin PWMD input low voltage	VEN(lo)	VIN = 10–500V			1.0	V
Pin PWMD input high voltage	VEN(hi)	VIN = 10–500V	2.4			V
Pin PWMD pull-down resistance	REN	Pin PWMD = 5V	50	100	150	kΩ
Current sense pull-in threshold	VCS(hi)	T_A = -40°C to +85°C	243.5	250	257.5	mV
GATE high output voltage	VGATE(hi)	I_{OUT} = 10mA	VDD-0.3		VDD	V
GATE low output voltage	VGATE(lo)	I_{OUT} = -10mA	0		0.3	V
Oscillator frequency	f_{OSC}	R_T = 1.00MΩ	20	25	30	kHz
		R_T = 226kΩ	80	100	120	
Maximum Oscillator PWM Duty Cycle	D_{MAXhf}	f_{PWMhf} = 25kHz, at GATE, CS to GND.			100%	
Linear Dimming pin voltage range	VLD	T_A ≤ 85°C, VIN = 12V	0		250	mV
Current sense blanking interval	t_{BLANK}	VCS = 0.55VLD, VLD = VDD	150	215	280	ns
Delay from CS trip to GATE lo	t_{DELAY}	VIN = 12V, VLD = 0.15, VCS = 0 to 0.22V after t_{BLANK}			300	ns
GATE output rise time	t_{RISE}	C_{GATE} = 500pF	30		50	ns
GATE output fall time	t_{FALL}	C_{GATE} = 500pF	30		50	ns
Thermal Shutdown Temperature	T_{TST}			150		°C
Thermal Shutdown Hysteresis	T_{HYS}			40		°C

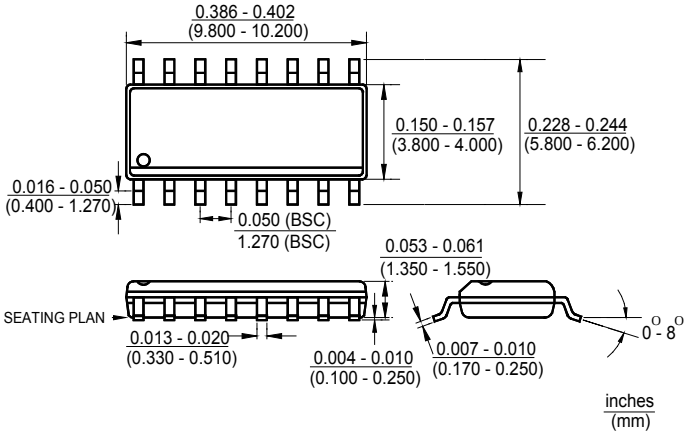
Package Outline Dimensions – SO 8



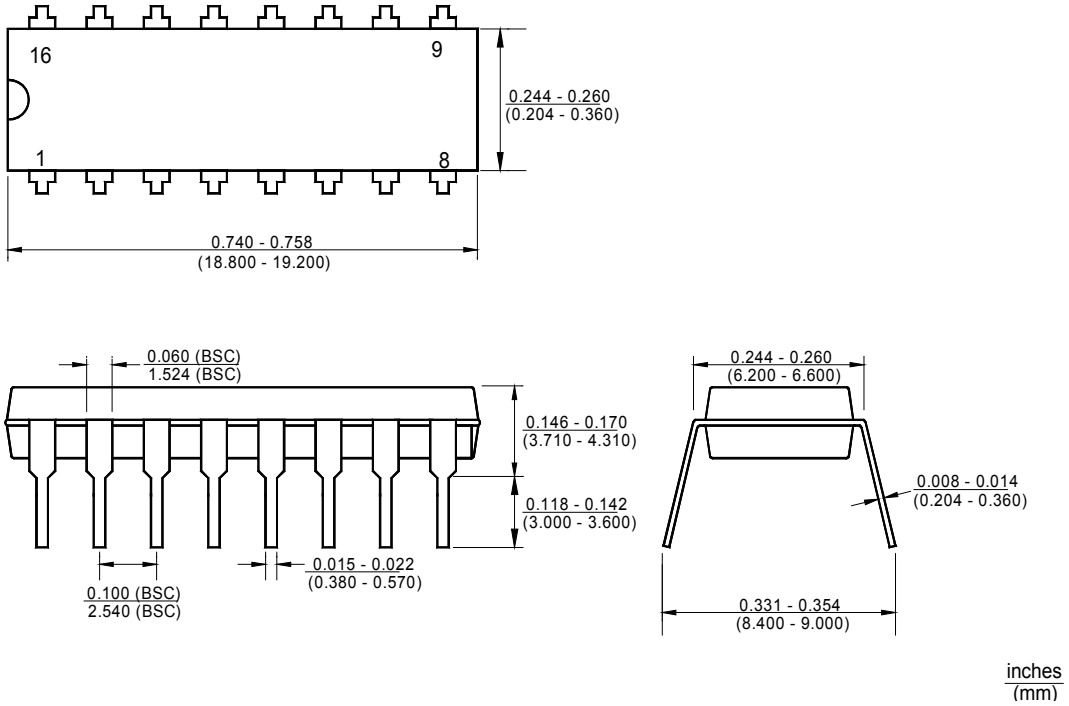
Package Outline Dimensions – DIP 8



Package Outline Dimensions – SO 16



Package Outline Dimensions – DIP 16



Ordering Number

GM	9910B	S8	R	G
APM Gamma Micro	Circuit Type	Package Type D16: DIP 16 S16: SO 16 D8: DIP 8 S8:SO 8	Shipping Type R: Taping & Reel T: Tube	Blank: Pb-free G:Green

Note:

Pb-free products:

- RoHS compliant and compatible with the current require-ments of IPC/JEDEC J-STD-020.
- Suitable for use in SnPb or Pb-free soldering processes with 100% matte tin (Sn) plating.

Green products:

- Lead-free (RoHS compliant)
- Halogen free(Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)