

## Description

The IP9910 is a high efficient LED driver control IC. It is a universal control LED driver. The input and output voltage can be extended beyond 450V.

The IP9910 uses a fixed off-time and 2MHz switching frequency can be achieved. The minimum off-time can be set by an external capacitor and resistor.

The LED current is programmable and is set from 20mA to 2.0A by an external resistor.

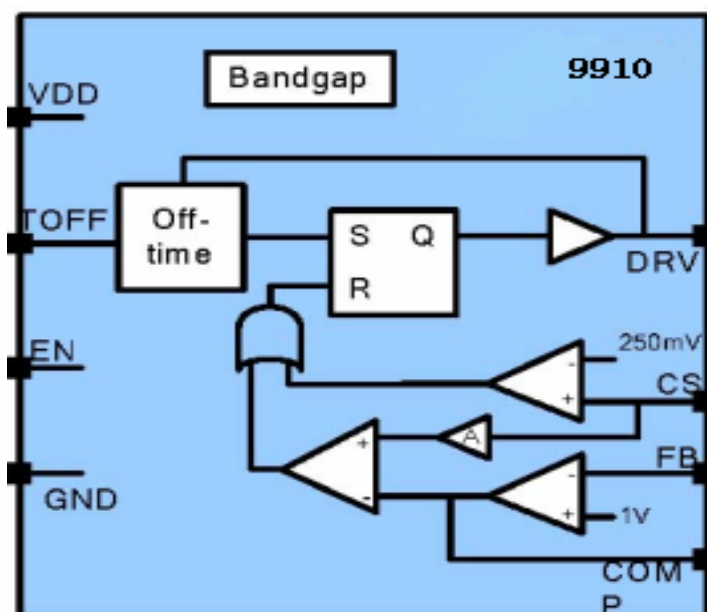
## Features

- Constant current LED driver: 20mA to 2A programmable
- High Efficiency: Up to 90%
- Input and output voltage: 2.5V to 450V
- Up to 2MHz switching frequency
- SOP-8L Package

## Applications

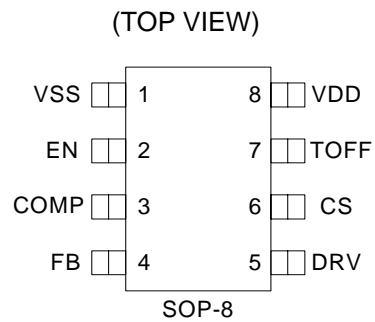
- DC/DC or AC/DC LED Driver applications
- RGB Backlighting LED Driver
- Back Lighting of Flat Panel Displays
- Signage and Decorative LED Lighting
- Automotive

## Block Diagram



# IP9910

## Pin Configuration



## Pin Description

Pin Name	Pin NO.	Description
VSS	1	Ground
EN	2	Chip Enable
COMP	3	Compensation
FB	4	Voltage feedback
DRV	5	Driver
CS	6	Current sensing
TOFF	7	Off time selection
VDD	8	Power supply (2V-6.5V)

## Absolute Maximum Ratings

Type	Symbol	Description	Value	Unit
Voltage	Vmax	Maximum voltage on VDD pins	8	V
	Vmin-max	Voltage range on EN, CS and FB pins	-0.3-VDD+0.3	V
Thermal	Tmin-max	Operation temperature range	-20-85	oC
	Tstorage	Storage temperature range	-40-165	oC
ESD	VESD	ESD voltage for human body model	2000	V

## Electrical Characteristics (T<sub>A</sub> = 25°C)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Power supply	VDD		2.5		6.5	V
CS pin feedback voltage	VCS		240	250	260	mV
FB pin feedback voltage	VFB		970	1000	1030	mV
Operation current	IDD			0.5	1	mA
Off time (without ROFF and COFF)	TOFF0			640		ns
Standby current	IDDQ				1	uA
EN pin high level voltage	VENH		2.0			V
EN pin low level voltage	VENL				0.8	V
DRV Rising Time	TRISE	500pF cap on DRV pin			50	ns
DRV Falling Time	TFALL	500pF cap on DRV pin			50	ns

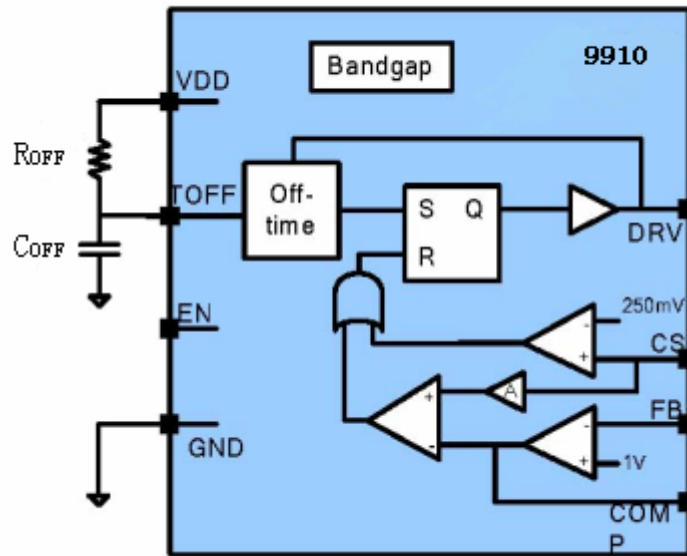
# IP9910

## Detail Description Fixed Off-Time

The off time period of 9910 can be fixed. The fixed off time  $T_{OFF}$  is determined by  $R_{OFF}$  and  $C_{OFF}$  as:

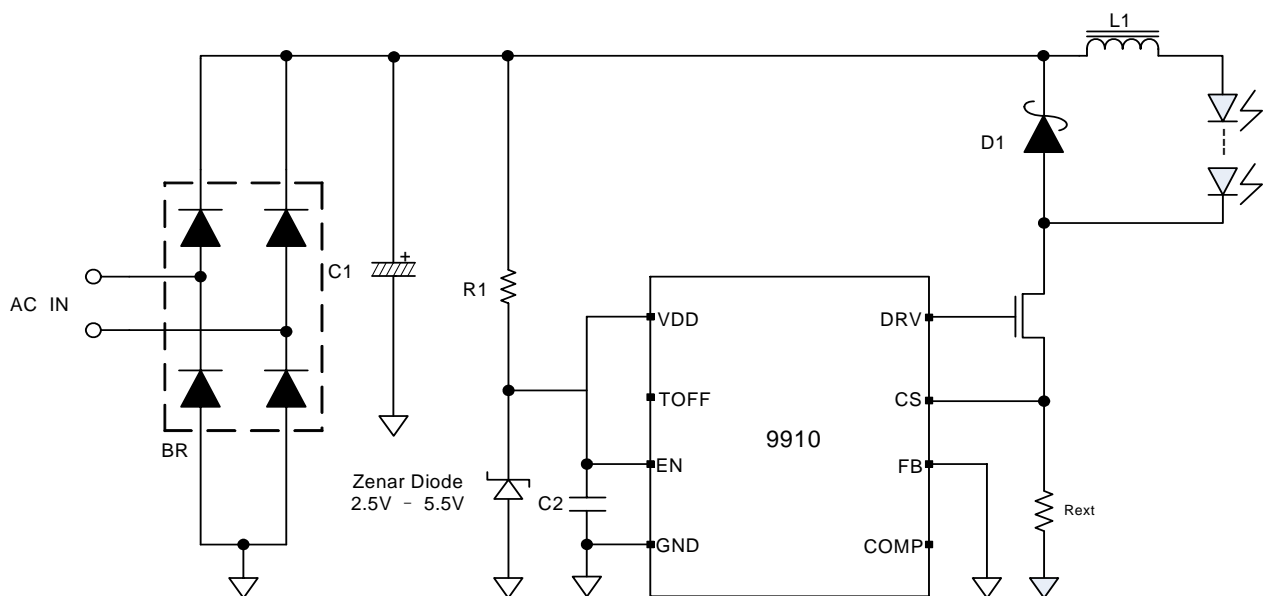
$$T_{OFF} = 0.51 \cdot \frac{100K\Omega \cdot R_{OFF}}{R_{OFF} + 100K\Omega} \cdot (C_{OFF} + 12pF)$$

If  $T_{OFF}$  pin is left open, the typical value of  $T_{OFF}$  is:  $T_{OFF} = 612ns$



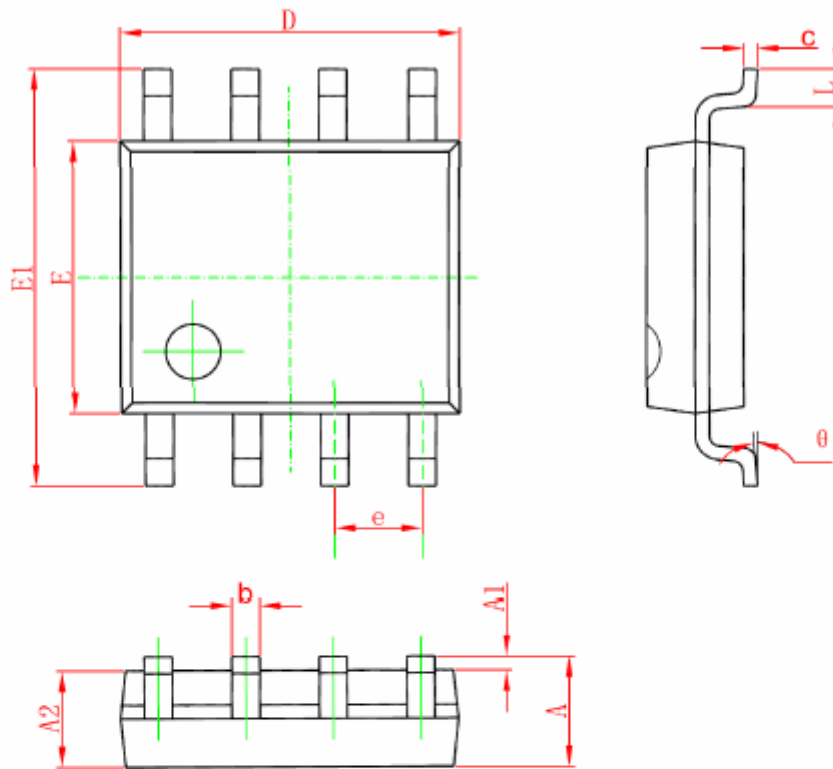
The  $T_{OFF}$  can be reduced by adding  $R_{OFF}$  and be increased by adding  $C_{OFF}$ .

## Typical Application



Package information

SOP8 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°