

## Description

The AS6910 is a high efficient step-up DC-DC converter IC.

The AS6910 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 output voltage can be set by external resistance voltage divider.

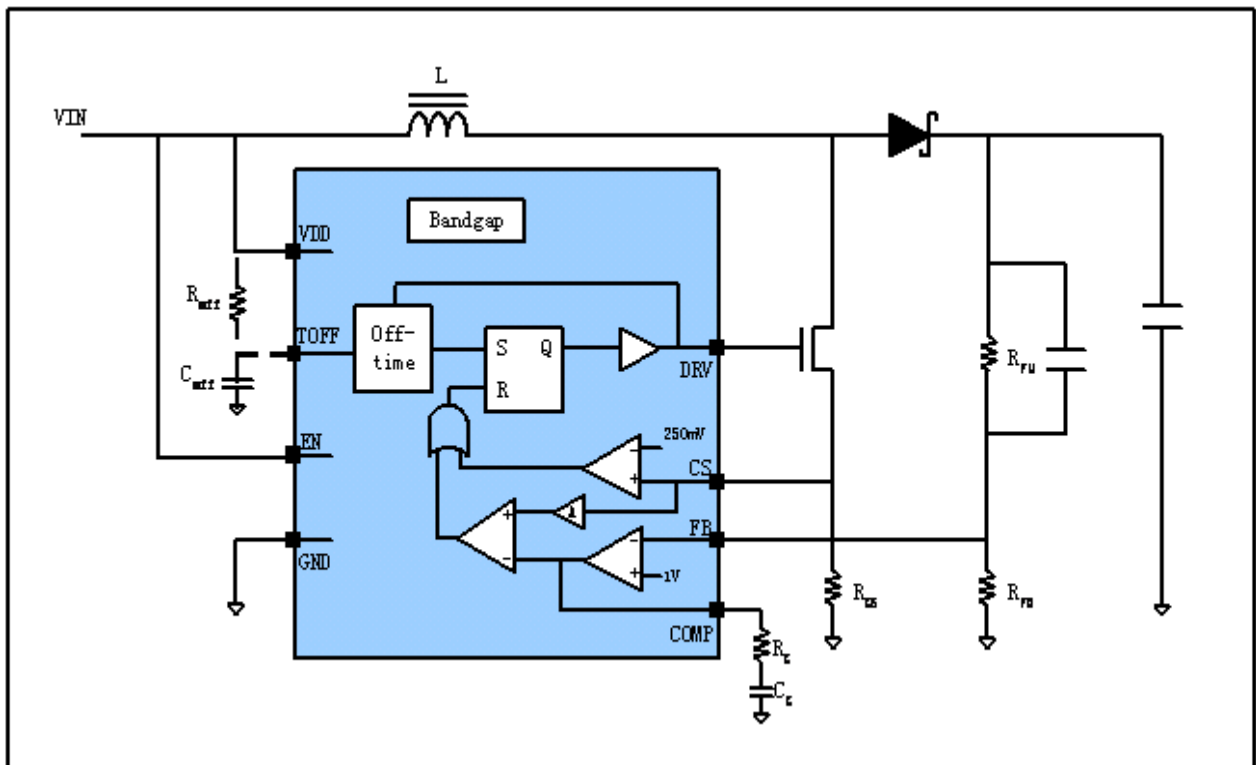
## Features

- High voltage application: 20mA to 2A
- Up to 90% efficiency
- Up to 2MHz switching frequency
- Fixed off-time
- Small External Capacitor and Inductor

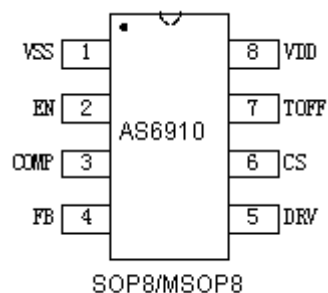
## Applications

- PDA/GPS/DPF/DSC LED Driver
- Portable LED backlight Driver

## Block Diagram



## Package



## Pin Assignment

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

## Order Information

Package	Part Number	Packing
SOP8	AS6910D/TR-LF	Tape&Reel, MPQ=2500
MSOP8	AS6910DM/TR-LF	Tape&Reel, MPQ=3000

## Absolute Maximum Ratings

Type	Symbol	Description	Value	Unit
Voltage	V <sub>max</sub>	Maximum voltage on VDD pins	8	V
	V <sub>min-max</sub>	Voltage range on EN, CS and FB pins	-0.3-VDD+0.3	V
Thermal	T <sub>min-max</sub>	Operation temperature range	-20-85	°C
	T <sub>storage</sub>	Storage temperature range	-40-165	°C
ESD	VESD	ESD voltage for human body model	2000	V

## Electronic Characteristics

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Power supply	VDD		2.5		6.5	V
CS pin feedback voltage	V <sub>CS</sub>		240	250	260	mV
FB pin feedback voltage	V <sub>FB</sub>		970	1000	1030	mV
Operation current	IDD			0.5	1	mA
Off time (without R <sub>OFF</sub> and C <sub>OFF</sub> )	T <sub>OFF0</sub>			640		ns
Standby current	IDDQ				1	uA
EN pin high level voltage	V <sub>ENH</sub>		2.0			V
EN pin low level voltage	V <sub>ENL</sub>				0.8	V
DRV Rising Time	T <sub>RISE</sub>	500pF cap on DRV pin			50	ns
DRV Falling Time	T <sub>FALL</sub>	500pF cap on DRV pin			50	ns

## Detail Description

The AS6910 works in two states:

- **ON State:** the external switch is on until one of the comparators outputs a high level voltage, the AS6910 goes to OFF state.
- **OFF State:** the external switch remains off until a fixed off time and the outputs of the two comparators are low, the AS6910 goes to ON state and repeat the ON and OFF process.

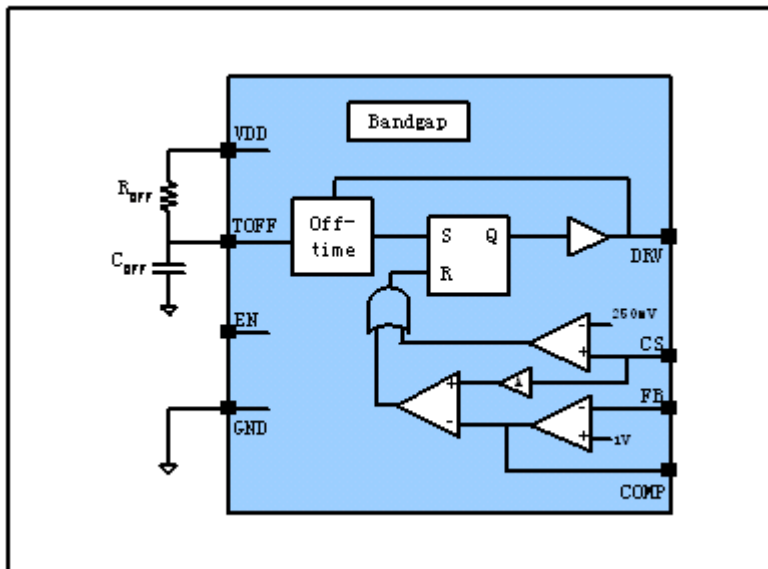
### Fixed Off-Time

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 TOFF 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  $C_{OFF}$ .

It works like a traditional current mode PWM DC-DC converter except that the off time is fixed and the working frequency is variable due to the values of  $V_{IN}$  and  $V_{OUT}$ . The comparator connected to CS pin is used for current limiting and the one connected to FB is used for voltage feedback.

**Compensation**

The output transconductance error amplifier (COMP) is used to compensate the regulator control loop. The system uses two poles and one zero to stabilize the loop.

$$f_{p1} = \frac{1}{\pi \times R_{LOAD} \times C_{OUT}}$$

$$f_{p2} = \frac{G_{EA}}{2 \times \pi \times C_C \times A_{VEA}}$$

$$f_{z1} = \frac{1}{2 \times \pi \times C_C \times R_C}$$

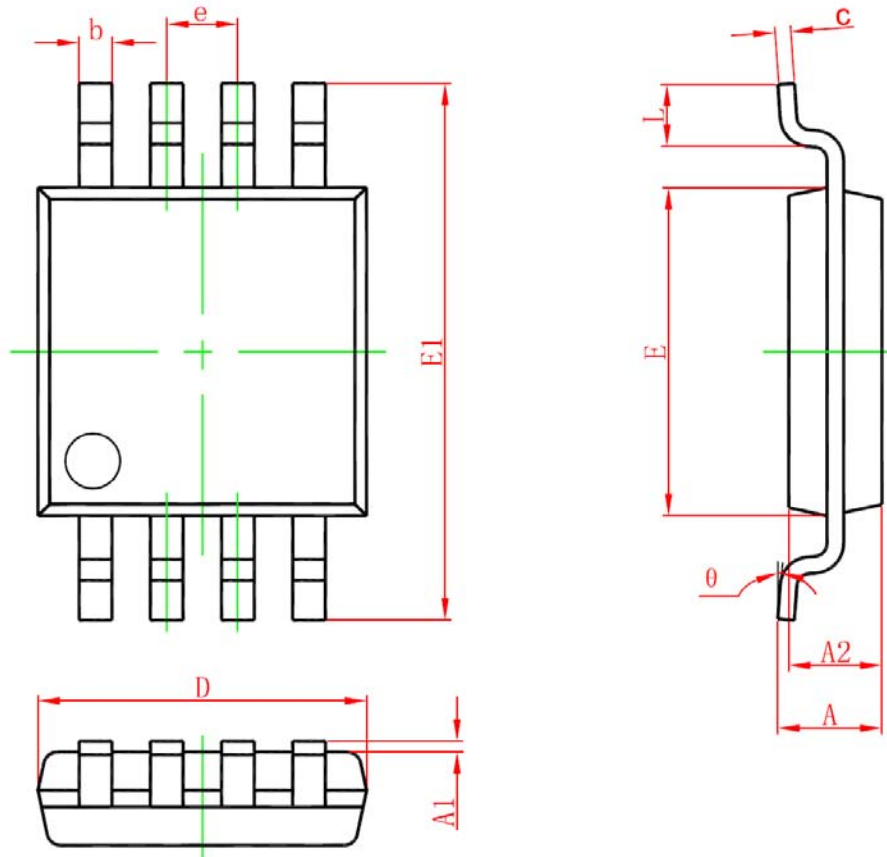
$$AVDC = \frac{1.5 \times A_{VEA} \times VIN \times R_{LOAD} \times V_{FB}}{V_{OUT}^2}$$

Where,  $A_{VEA}=200V/V$  and  $G_{EA}=30\mu V/A$ .

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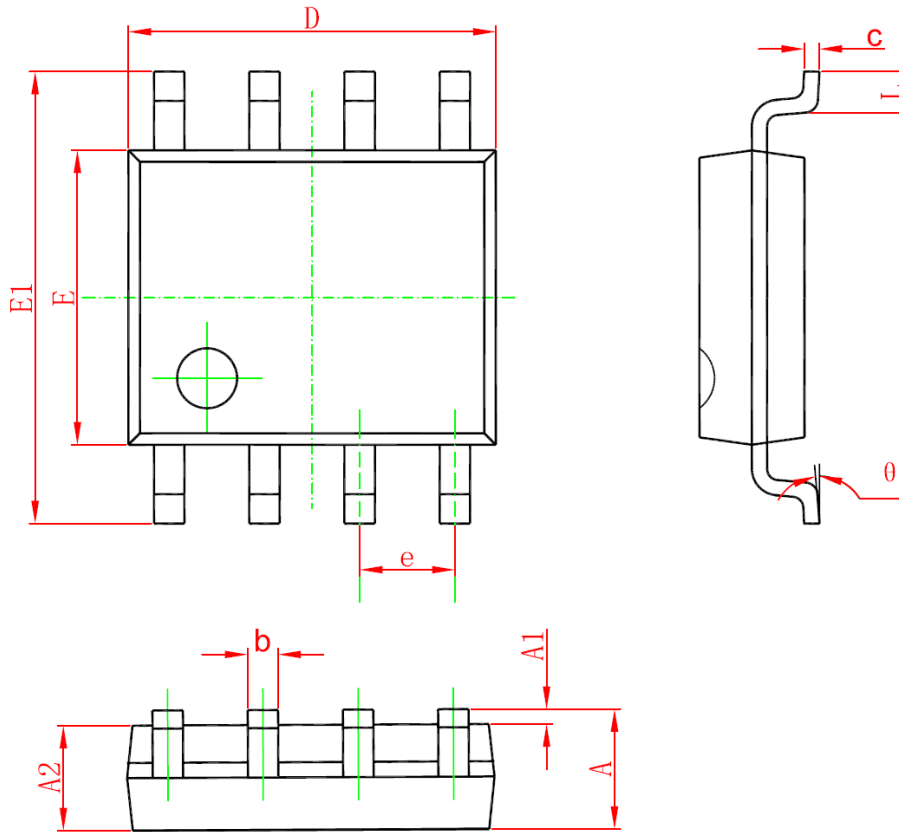
## Package Information

### MSOP8 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

**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°