

Single Stage Buck PFC Controller for LED Lighting

Description

The GP8510 is a single stage Buck PFC controller targeting at LED lighting applications. It drives the Buck converter in the quasi-resonant mode to achieve higher efficiency. It keeps the Buck converter in constant on time operation to achieve high power factor. GP8510 is offered in SOT23-6 package.

Features

- Valley turn-on of the MOSFET to achieve low switching losses.
- 0.3V current sense reference voltage leads to a lower sense resistance thus a lower conduction loss.
- Internal high current MOSFET driver: 0.25A sourcing and 0.5A sinking
- Low start up current: 12 μ A typical
- Reliable short LED and Open LED protection
- Power factor >0.9 with single-stage conversion.

Application

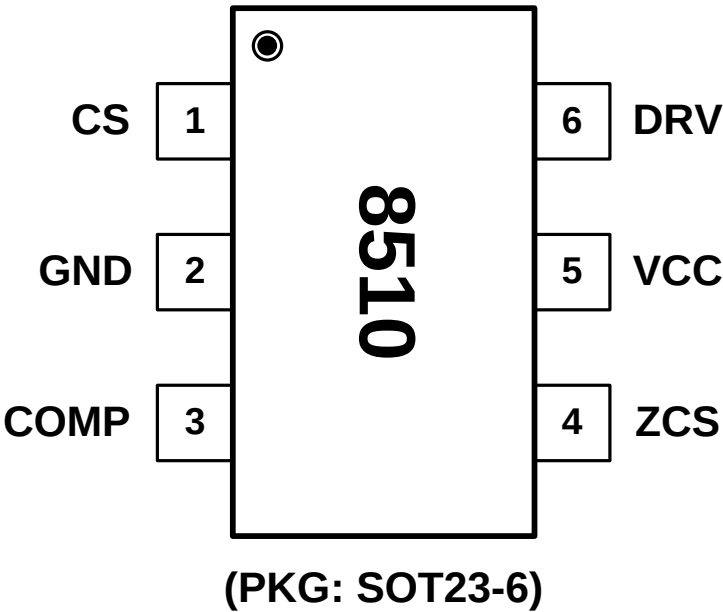
- LED lighting
- Down light
- Tube lamp
- PAR lamp
- Bulb lamp

Ordering Information

Device	Marking	Package
GP8510	8510	SOT23-6



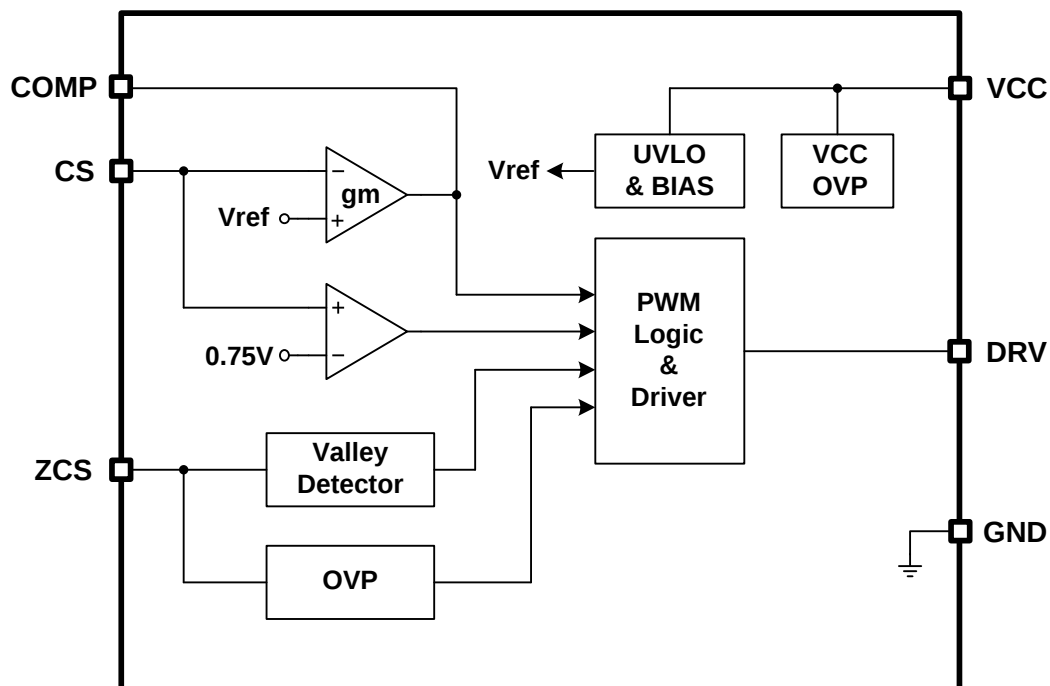
Pin Assignment



Pin Description

No.	Pin Name	Pin Function Description
1	CS	Current Sense Input
2	GND	Ground
3	COMP	Feedback Compensation Output
4	ZCS	Zero Current Sense Input
5	VCC	Power Supply Input
6	DRV	Gate Driver Output

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
Vcc	Supply Voltage	18	V
Vdrv	DRV Output Voltage	-0.3 ~ 18	V
Vzcs	ZCS Input Voltage	-0.3 ~ Vcc+0.3	V
Vin	Input Voltage (CS, COMP)	7	V
T _j	Operating Junction Temperature	150	°C
Ta	Operating Ambient Temperature Range	-20 ~ 85	°C
Tstg	Storage Temperature Range	- 55 ~ 150	°C
θ _{ja}	Package Thermal Resistance (SOT23-6)	170	°C/W
Pd	Power dissipation (SOT23-6)	0.6	W

Electrical Characteristics

* Vcc=15V, Ta=25°C, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY VOLTAGE SECTION						
Vcc	VCC Operating Range		8		15.5	V
Von	UVLO High Threshold Voltage	Vcc Increasing	15.5	16.5	17.5	V
Voff	UVLO Low Threshold Voltage	Vcc Decreasing	6	7	8	V
Vccovp	VCC OVP Voltage	Vcc Increasing	17.6	18.8	20	V
Ist	Start-up Current	Vcc Increasing	4	12	25	uA
Icc	Dynamic Operating Current	Co=100pF,fsw=15KHz	0.5	1	2	mA
Iovp	OVP Sink Current	Vcc > Vccovp		2		mA
ERRAMP SECTION						
Vref	Reference Voltage		294	300	306	mV
Vclamp	Erramp Output Clamp Voltage		294	300	306	mV
leo	Erramp Output Source Current			-4.2		uA
	Erramp Output Sink Current			7.4		uA
CURRENT SENSING SECTION						
Vlimit	Current Limit Threshold Voltage			0.75		V
ZERO CURRENT SENSE SECTION						
Vzcsovp	ZCS OVP Protection Voltage			1.45		V
GATE DRIVER SECTION						
Vhigh	DRV Output High Voltage	Isource=10mA		12		V
Vlow	DRV Output Low Voltage	Isink=10mA		0.5		V
Vouv	DRV Output Voltage at UV	Vcc=5V, Io=1mA		0.2	1	V

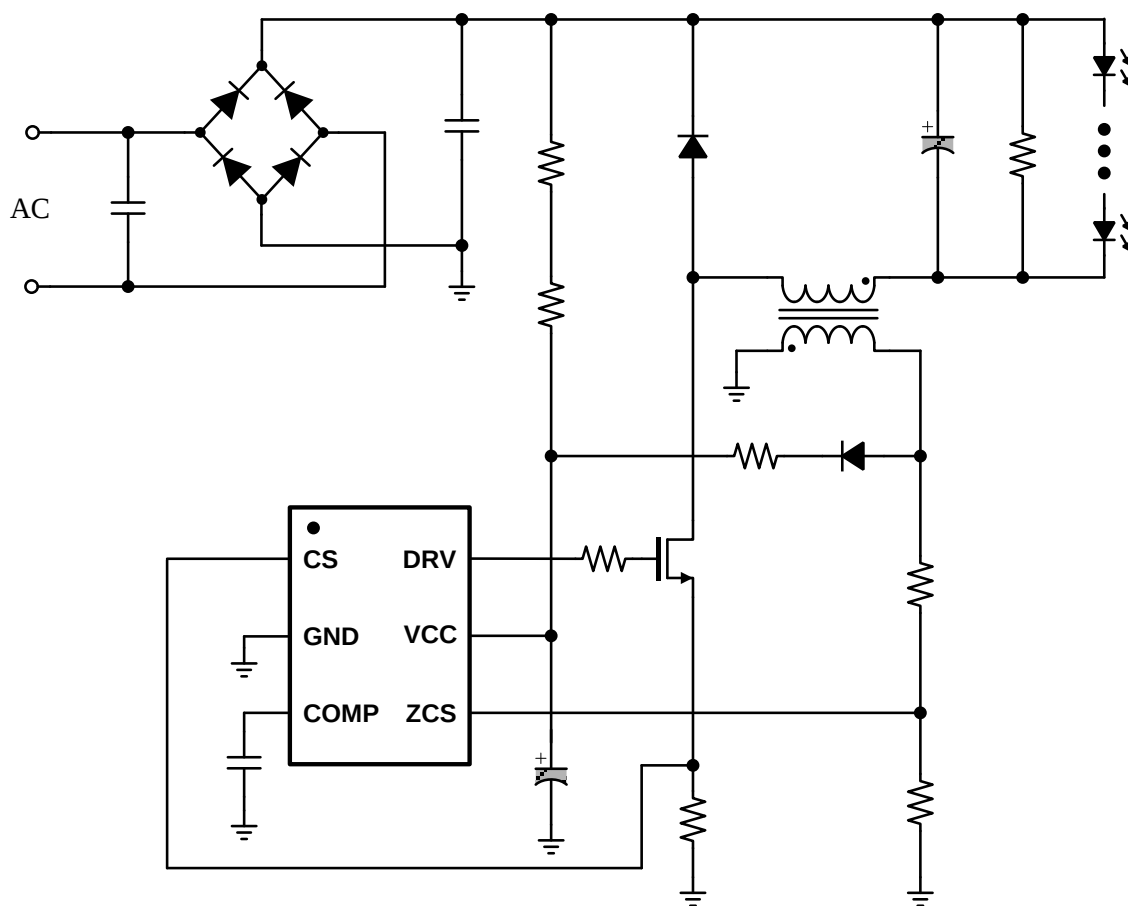
Electrical Characteristics

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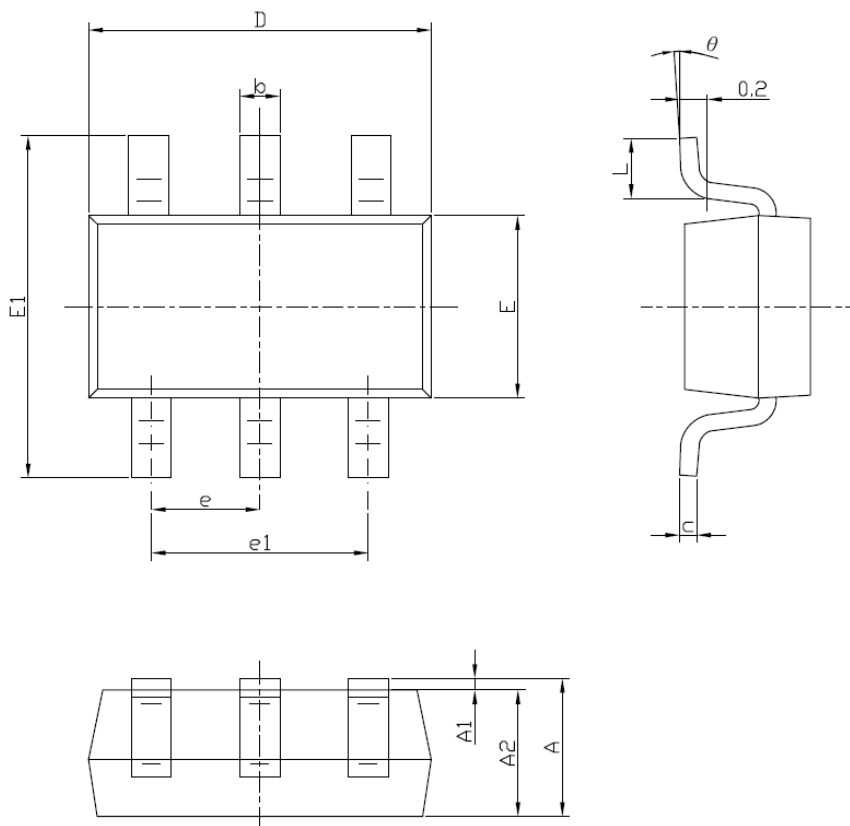
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SWITCHING TIMING SECTION						
Tonmax	Maximum On Time			16		us
Tonmin	Minimum On Time			400		ns
Toffmax	Maximum Off Time			69		us
Toffmin	Minimum Off Time			2		us
fmax	Maximum Switching Frequency			200		KHz
THERMAL SHUTDOWN PROTECTION SECTION						
Ttsd	Thermal Shutdown Temperature	(Note1)		150		°C
Thys	TSD Hysteresis	(Note2)		25		°C

* Note1,2 : Parameters are guaranteed by design, but not tested in production.

Typical Application Circuit



PACKAGE DIMENSION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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