Single Stage Buck PFC Controller for LED Lighting

Description

The GP8551 is a single stage Buck PFC controller targeting at LED lighting applications. It integrates a 600V MOSFET to decrease physical volume. It adopts the proprietary control architecture to achieve an accurate regulation of LED current, unity power factor, and quasi-resonant valley turn-on high efficiency operation.
It integrates open/short LED protection and eliminates the need for opto-coupler, thus minimizing the component count and board.
GP8551 is offered in 8-SOP package.

Features

•- Built-in 600V Power MOSFET
•- 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.
•- Low start up current: 12μA typical
•- Short LED and Open LED protection
•- P.F. >0.9 with single-stage conversion.
•- Maximum frequency limit: 200KHz
•- Compact SMD type package: 8-SOP

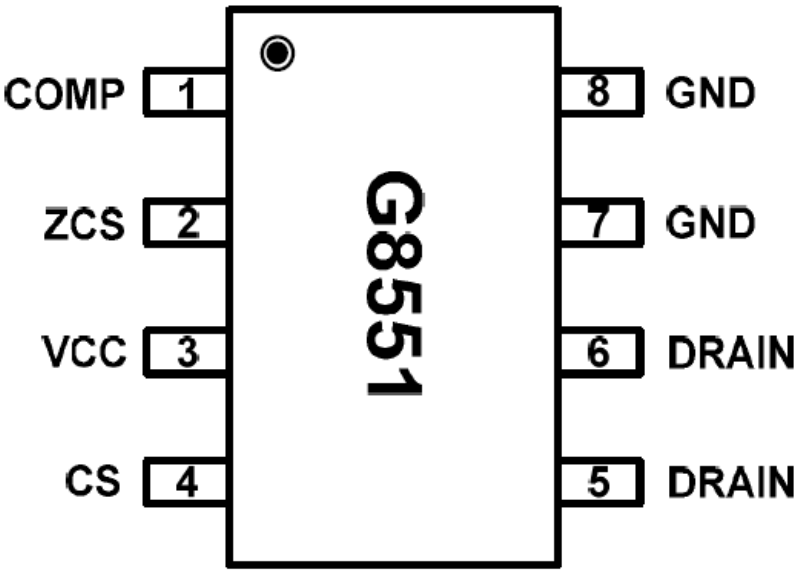
Application

• LED lighting

Ordering Information

Device	Marking	Package
GP8511	8511	8-SOP

Pin Assignment

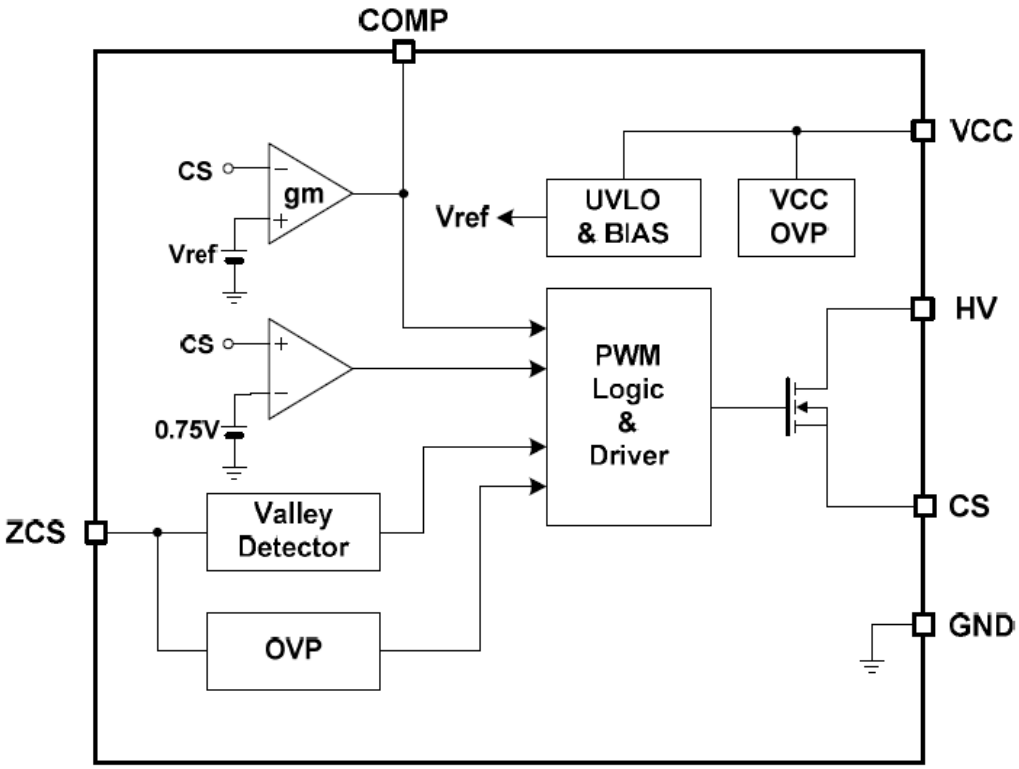


(PKG: 8-SOP)

Pin Description

No.	Pin Name	Pin Function Description
1	COMP	Feedback Compensation Output
2	ZCS	Zero Current Sense Input
3	VCC	Power Supply Input
4	CS	Current Sense Input
5,6	DRAIN	High Voltage Drain Input
7,8	GND	Ground

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
Vdrain	HV Drain Voltage	600	V
Id	HV Drain Continuous Current	1	A
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**
Tj	Operating Junction Temperature	150	℃
Ta	Operating Ambient Temperature Range	-20 ~ 85	℃
Tstg	Storage Temperature Range	- 55 ~ 150	℃
Pd	Power Dissipation (8-SOP)	0.8	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
Ieo	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
HV OUTPUT SECTION						
BVdss	HV Output Breakdown Voltage		600			V
Idss	HV Output Leakage Current				1	uA
Rdson	HV Drain-Source On Resistance	Id = 150mA		9.3		ohm

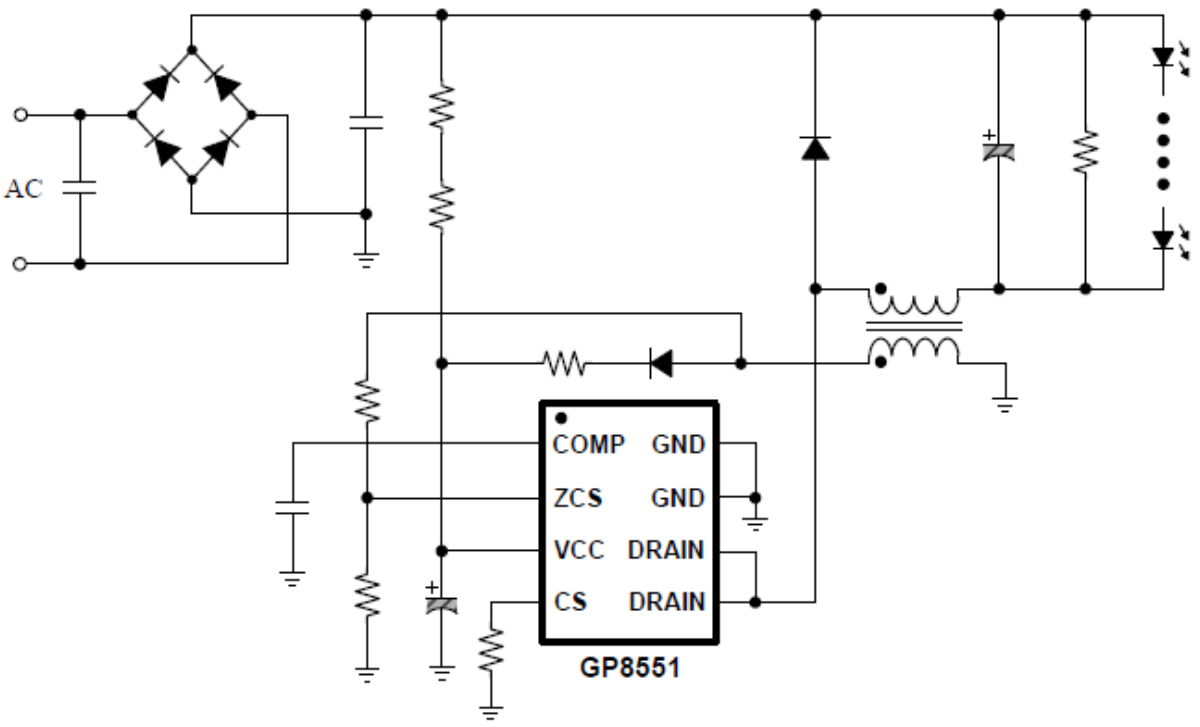
Electrical Characteristics

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

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		℃
Thys	TSD Hysteresis	(Note2)		25		℃

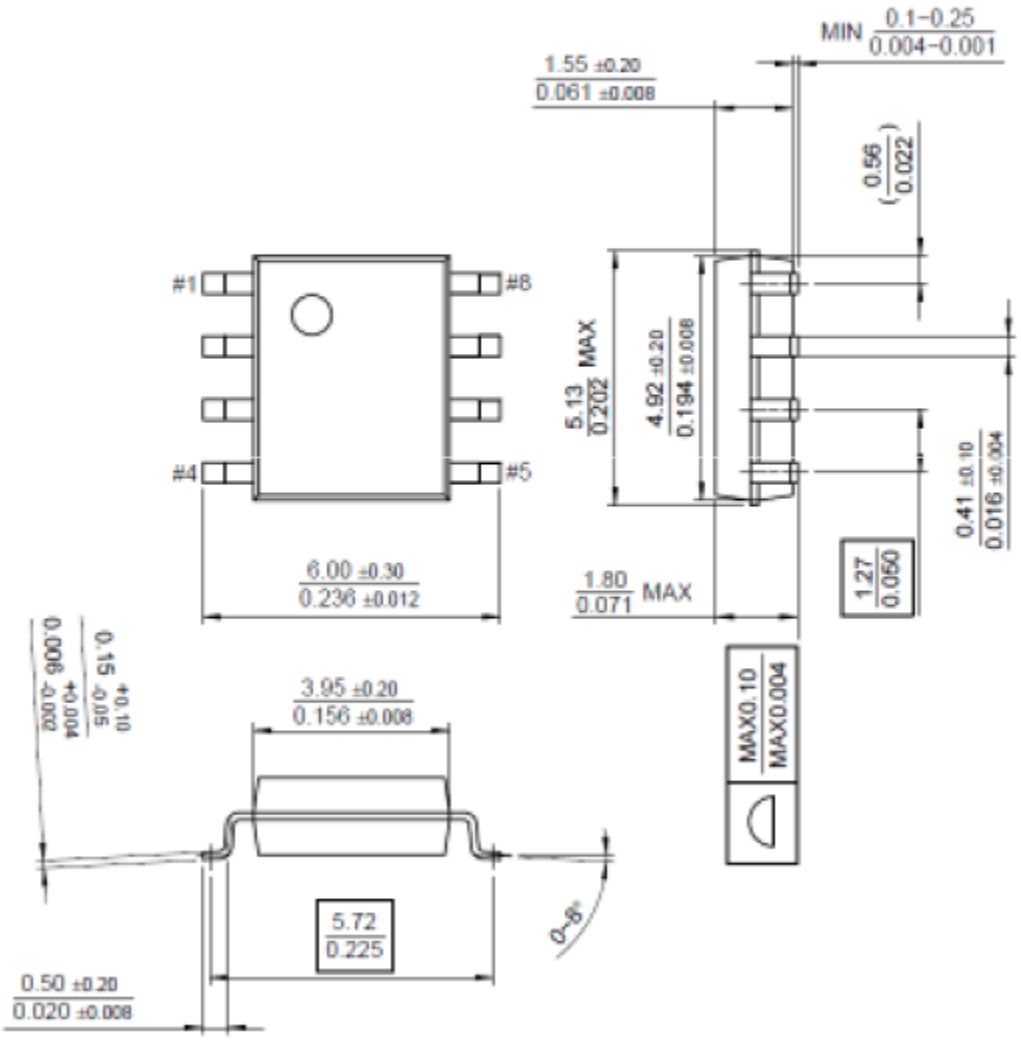
* Note1,2 : Parameters are guaranteed by design, but not tested in production.

Typical Application Circuit



PACKAGE DIMENSION

(PKG Type : 8-SOP)



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AP Semiconductor Co., Ltd
Contact. Tel 82.70.4693.2299 FAX 82.70.4000.4009
E-mail: sales@apsemi.com