



High Power Factor & Accuracy Constant Current LED Driver

Description

The G8211 is a highly-integrated, low startup current, average current mode, one cycle control PFC and fixed switching frequency PWM controller. These functions enable the LED driver to easily meet the accuracy average LED current and high power factor requirements. The integrated functions also include the LED short protection, open protection, and internal over temperature protection. The COMP pin controls the duty by connected an RC compensation network to ground and forming the closed loop feedback control. To protect the external power MOSFET from being damaged by supply over voltage, the G8211 OUT pin voltage is clamped to about 12V.

The G8211 improves the performance and reduces the cost of the LED driver.

Application

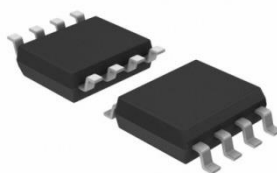
- LED Off-line Lamps
- High Voltage DC-DC LED Driver
- Signage and Decorative LED Lighting
- Back Lighting of Flat Panel Displays
- General Purpose Constant Current Source

Features

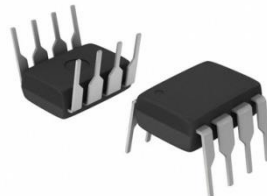
- High Power Factor by One Cycle Control
- Accuracy Constant Current
- Low BOM Cost
- Linear Dimming on DIM Pin
- Average Current / Fixed Frequency Control
- Gate Output Voltage Clamp
- LED Open Protection (OVP)
- LED Short Protection (SCP)
- Over Current Protection (OCP)
- Internal OTP Protection

Ordering Information

Device	Marking	Package
G8211	G8211	8-SOP
GP8211	GP8211	8-DIP



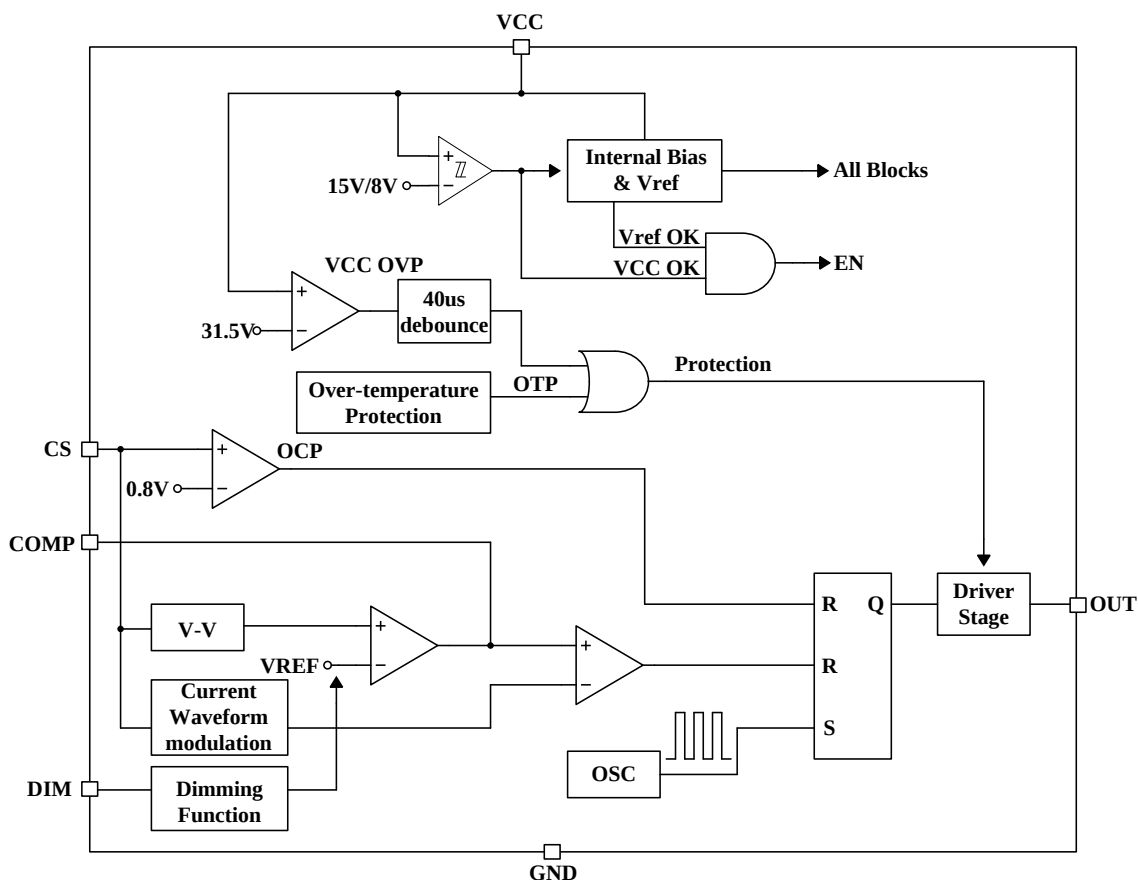
8-SOP



8-DIP



Block Diagram

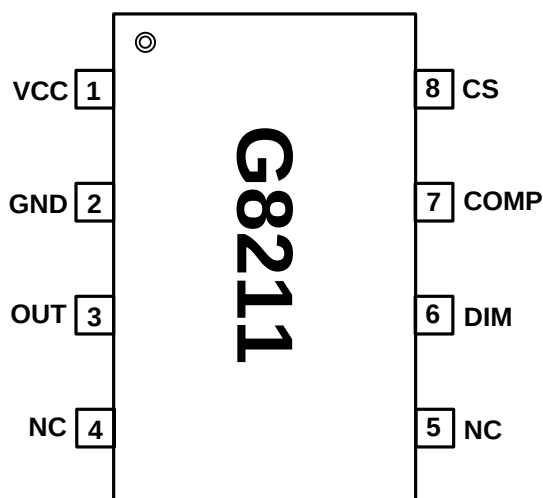


Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	30	V
V_{IN}	INPUT Voltage (DIM, CS, COMP)	-0.3 ~ 7	V
V_{OUT}	OUTPUT Voltage	15	V
T_J	Operating Junction Temperature	150	°C
T_A	Operating Ambient Temperature Range	-20 ~ 85	°C
T_{STG}	Storage Temperature Range	- 55 ~ 150	°C
θ_{JA}	Package Thermal Resistance (8SOP/8DIP)	165 / 125	°C/W
P_d	Power dissipation (8SOP/8DIP)	0.75 / 1	W



Pin Assignments



Pin Definitions

Pin Number	Pin Name	Pin Function Description
1	VCC	Power Supply Pin
2	GND	Ground Pin
3	OUT	The Output Driver for Driving The External MOSFET
4	NC	No Connection
5	NC	No Connection
6	DIM	Dimming Control Pin by Input a DC Voltage
7	COMP	Feedback Compensation Network
8	CS	Current Sense Pin, Connect to Sense The MOSFET Current (current sense resister : $R_{CS} = V_{REF}/I_{OUT}$)



Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY VOLTAGE SECTION						
I _{ST}	Startup Current	VCC=UVLO_on - 1V	-	8	15	uA
I _{OPR}	Operating Current	C _{OUT} =1nF, V _{COMP} =2.5V	-	2	3	mA
I _{SD}	Operating Current (Protection)	OCP, OVP, SCP, OTP	-	1.5	2.0	mA
V _{UV_OFF}	Under Voltage Lock Out (off)	-	7	8	9	V
V _{UV_ON}	Under Voltage Lock Out (on)	-	14	15	16	V
V _{OVP}	Over Voltage Protection	-	29.5	31.5	33.5	V
t _{OVP}	OVP De-Bounce Time (note1)	-	-	35	-	us
VOLTAGE FEEDBACK SECTION						
V _{REF}	Feedback Reference Voltage	VCC=15V	0.195	0.200	0.205	V
gm	Trans conductance (note2)	VCC=15V	-	110	-	uS
I _{SINK}	Output Sink Current	VCC=15V CS=-0.4V	-14	-11	-8	us
I _{SOURCE}	Output Source Current	VCC=15V CS=0V	8	11	14	us
CURRENT SENSING SECTION						
V _{OCP}	Over Current Protection	VCC=15V	0.7	0.8	0.9	V
t _{LEB}	Leading-Edge Blanking Time	VCC=15V	-	410	-	ns
t _{DELAY}	Delay to Output (note3)	VCC=15V	-	100	220	ns
SWITCHING FREQUENCY SECTION						
F _{SW}	Switching Frequency	VCC=15V	42	45	48	KHz
D _{MAX}	Maximum Duty	VCC=15V	90	95	-	%
F _{FM}	Frequency Jitter Range	VCC=15V	-	+/- 4	-	%
T _{STB}	Temp. Stability (note4)	-40 ~ 125 °C	-	-	6	%
V _{STB}	Voltage Stability	VCC = 11 ~ 25V	-	0.5	1	%



Electrical Characteristics

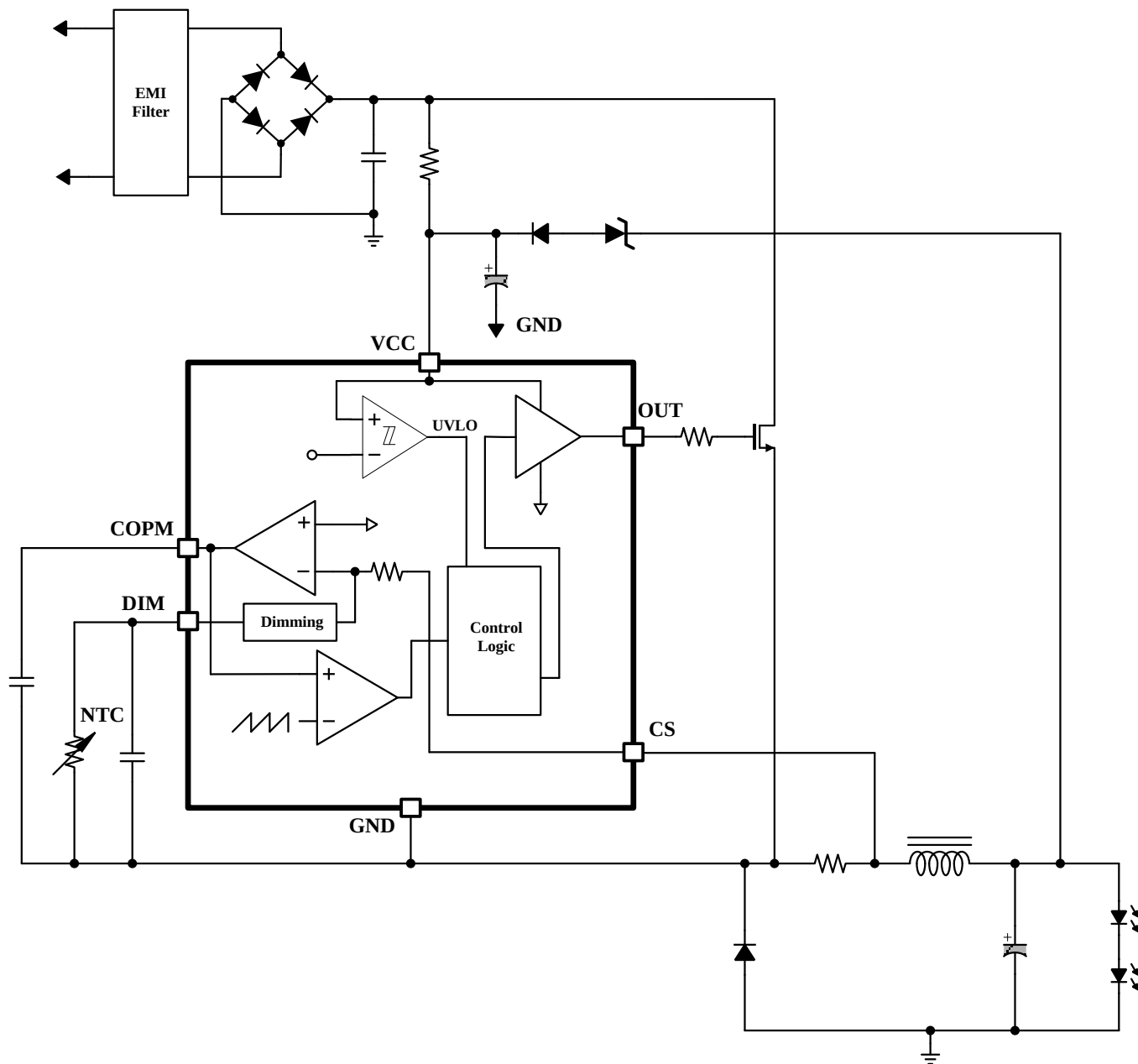
* Vcc=15V, Ta=25°C, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
GATE DRIVER OUTPUT SECTION						
t_{RISING}	Rising Time (note5-1)	Load = 1nF	-	280	420	ns
t_{FALLING}	Falling Time (note5-2)	Load =1nF	-	50	100	ns
V_{GATE}	Gate Clamp Voltage	VCC=25V	-	11	13.5	V
DIM INPUT SECTION						
SAT_{TH}	Saturation Threshold Voltage	VCC=15V	3.0	-	-	V
DIM	Linear Dimming Range	VCC=15V	0.3	-	3.0	V
DIM_{OFFTH}	LED Current off Threshold Voltage	VCC=15V	-	-	0.5	V
$I_{\text{DIM_CS}}$	Current Source	VCC=15V	270	300	330	uA
OTP SECTION (note6)						
OTP_{TP}	Over Temperature Protection	VCC=15V	-	150	-	°C
OTP_{TH}	OTP Hysteresis	VCC=15V	-	20	-	°C
t_{OTP}	OTP De-Bounce Time	VCC=15V	-	80	-	ns

* Note1,2,3,4,5,6 : Parameters are guaranteed by design, but not tested in production.



Application Circuit





Semi

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G8211/GP8211

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