

Step-Up LED Driver with 10-80V Input

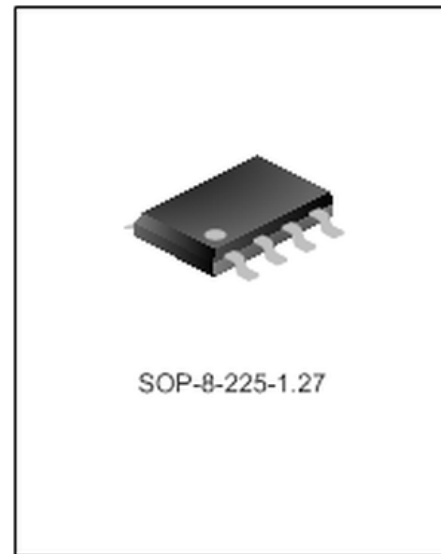
General Description

The GGD42566 is a step-up PWM control LED driver with external power MOSFET. It provides a thermal shutdown circuit, current limit circuit, and over voltage circuit.

The GGD42566 adopts current mode control which provides fast transient response, excellent constant current characteristics, and simple loop stabilization design. It has high efficiency up to 90%.

Features

- 10~80V input voltage range;
- External MOSFET;
- 300kHz fixed frequency;
- Over temperature protection;
- LED over voltage protection;
- Cycle-by-cycle over current protection



Applications

- LED building illumination
- LED street lamp

Ordering Information

Part No.	Package	Marking	Material	Packing
GGD42566	SOP-8-225-1.27	GGD42566	Pb free	Tube
GGD42566TR	SOP-8-225-1.27	GGD42566	Pb free	Tape&Reel

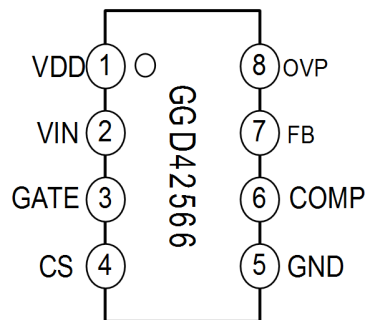
Absolute Maximum Ratings

Characteristics	Symbol	Ratings	Unit
Supply Voltage	V_{IN}	80	V
VDD Voltage	V_{DD}	10	V
GATE Voltage	V_{GATE}	-0.3~10	V
PWM Voltage	V_{PWM}	-0.3~6	V
ADJ Voltage	V_{ADJ}	-0.3~6	V
COMP Voltage	V_{COMP}	-0.3~6	V
CS Voltage	V_{CS}	-0.3~6	V
Junction Temperature	T_j	150	°C
Lead Temperature	T_L	260	°C
Input voltage range	V_{IN}	10~100	V
Operating Temperature Range	T_{OPR}	-40~125	°C
Storage Temperature Range	T_{STG}	-65~150	°C

Electrical Characteristics (Unless otherwise specified, $V_{IN}=24V$, $I_{OUT}=700mA$, $T_{amb}=25^{\circ}C$)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{IN}		10	--	80	V
Operating Current	I_{IN}	$V_{CC}=10/80V$, $V_{PWM}=5V$	--	1.5	2.0	mA
Current Limit	I_{LIM}	$R_{CS}=0.1$	4	4.5	5	A
Maximum Duty Cycle	D_{max}		--	93	95	%
Oscillator Frequency	f_{osc}		250	280	320	kHz
COMP Clamp Voltage	V_{COMP}		2.8	3	3.2	V
VDD Voltage	V_{DD}	No load	9	10	11	V
Sense voltage threshold value	V_{CS}	V_{CS} average value	--	200	--	mV
Over temperature protection threshold value	T_{SD}		--	160	--	$^{\circ}C$
Over temperature protection hysteresis	T_{SD-hys}		--	30	--	$^{\circ}C$

Pin Configuration



Pin Description

Pin No.	Pin Name	I/O	Description
1	V_{DD}	I/O	10V voltage output.
2	V_{IN}	I	Power input.
3	GATE	O	Gate drive.
4	CS	I	Current sense pin.
5	GND	O	Ground.
6	COMP	I/O	Compensation pin, connects to compensation component
7	FB	I	Output current sense feedback pin
8	OVP	I	Output voltage divider pin, used for over voltage protection

Function Description

The GGD42566 is a current mode LED driver. Output average current is available through detecting R_s current. The Gm amplifier compares the output average current with the threshold current (threshold current is set by internal) to dynamically adjust the current. When the output current is higher than threshold current, the COMP pin's voltage is lower down. Since the COMP pin's voltage is proportional to the peak inductor current, output current decreases. When the output current is lower than threshold current, the COMP pin's voltage is up and the output current increases. The output current is stable at the set value by adjusting the circuit loop.

1. Output current setting

The output current is determined by the sense resistor and setting voltage. The sense voltage (Drop voltage on R_{CS}) is 200mV, and adjust the output current by adjusting the sense resistor R_{CS} (refer to Typical Application Circuit).

$$I_{OUT} = \frac{0.2}{R_S}$$

2. Current limiting

GGD42566 is current mode IC with internal cycle-by-cycle current limiting function. The current limit value is determined by R_{CS} . And the current limiting occurs when voltage on CS is higher than 0.2V.

$$I_{LIMIT} = \frac{0.2}{R_{CS}}$$

3. Frequency jitter

GGD42566 has internal frequency jitter function to improve the EMI performance of the system. The internal frequency is hopping in a very small range to reduce the single frequency radiation which simplifies the EMI design.

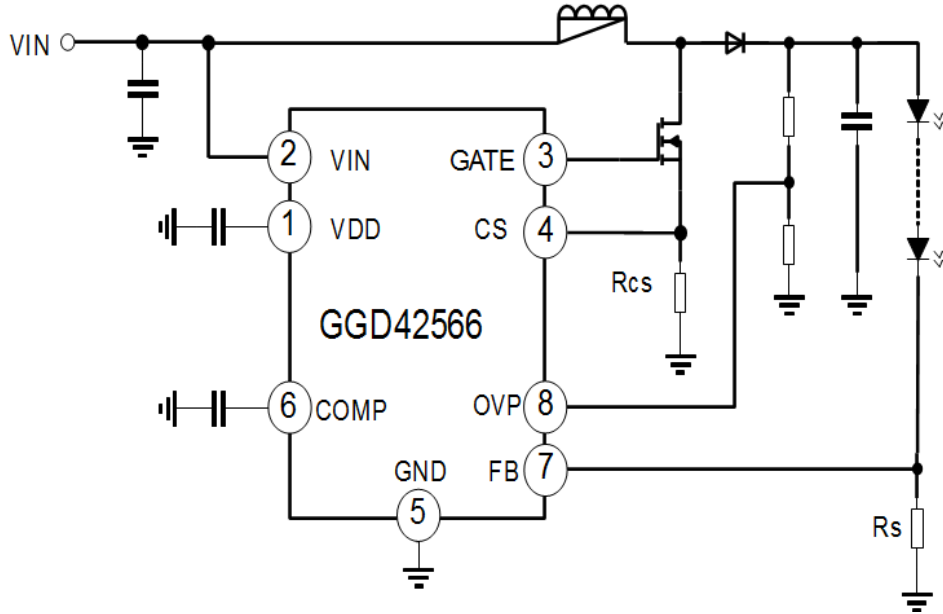
4. Over temperature protection

When the temperature is 160°C above, this protection works and comp voltage is pulled down, MOS is turned off. And all these are recovered when temperature falls to 130°C below.

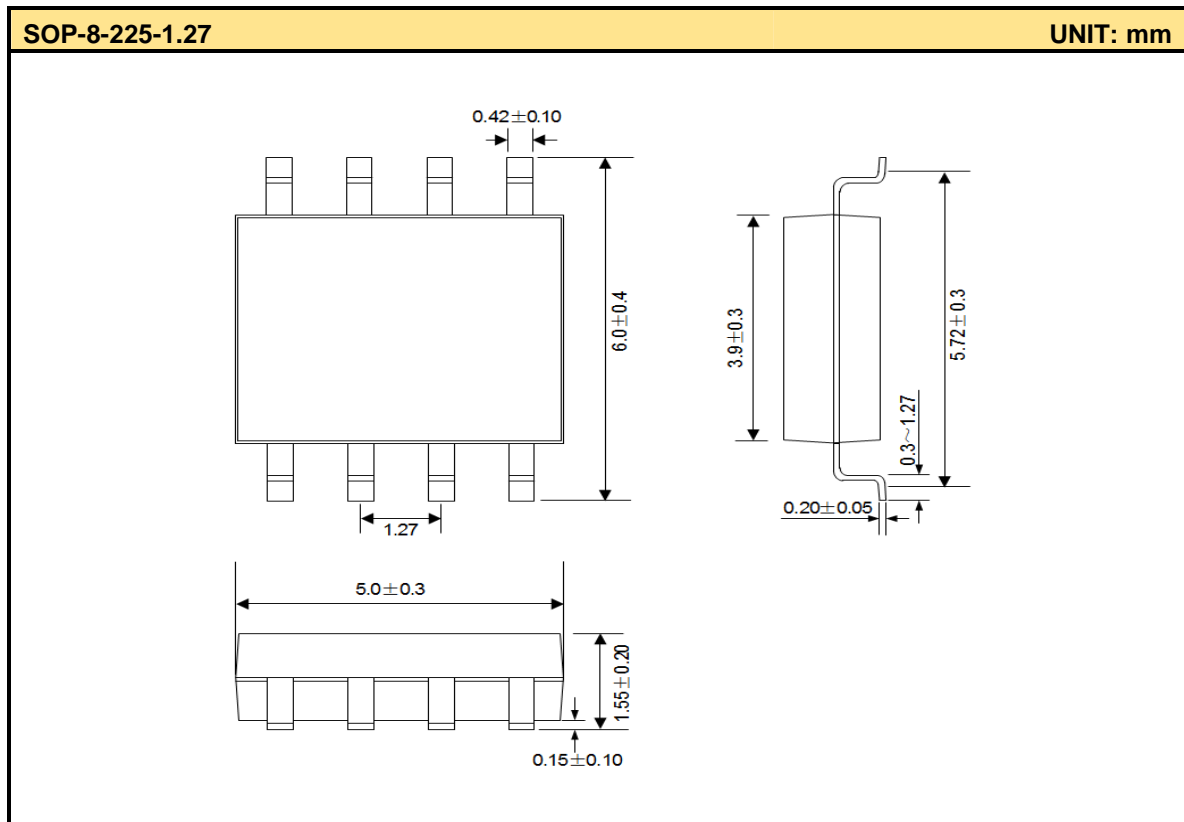
5. Open-circuit protection

Voltage drop on R_s is decreased to zero when LED is open, but IC is working. Output voltage will increase continuously if there is no protection and the MOSFET or other components will be damaged. The over voltage protection is active when OVP is higher than the internal threshold value, IC stops until the output voltage decreases to a fixed value and IC restarts. it enters to normal mode only after troubleshooting.

Typical Application Circuit



Package Outline





MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed. •
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.

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