EG2108 Datasheet

MOS/IGBT Driver IC

REV 1.0

Version Change record

Version №	Date	Description
V1.0	November 11, 2018	EG2108 First draft of the Data Sheet

Contents

EG2108 ChipDataSheet V1.0

1. Features

- High-end suspension bootstrap power supply design, withstand voltage up to 600V
- Adapts to 5V, 3.3 V input voltages
- Maximum frequency support 500KHZ
- VCC and VB-side power supply with undervoltage protection
- Low-side VCC voltage range10V-20V
- Output current capability IO+ / - 0.3 A/0.6 A
- Built-in dead zone control circuit
- HIN The input channel is active high to control the high-side HO output
- LIN The input channel is active high to control the low-side LO output
- Fewer peripheral devices
- Package form：SOP-8

2. Description

EG2108 is a cost-effective MOS/IGBT Gate Driver dedicated IC, integrated with logic signal input processing circuit, undervoltage protection circuit, level displacement circuit, pulse filter circuit and output drive circuit, dedicated to brushless motor controller, power supply DC-DC drive circuit.

EG2108 The high-end operating voltage can reach 600V,and the low-end Vcc has a wide supply voltage range of 10V~20V.The chip input channel Hin built-in a 200k pull-down resistor, LIN built-in a 200k pull-down resistor,when the input floating so that the upper and lower power MOS transistor is turned off,the output current capability IO+/- 0.3/0.6 A, using SOP8 package.

3. Areas of application

- Mobile power supply high voltage fast charge switching power supply
- Wireless charging drive variable frequency pump controller
- DC-DC Power supply
- Brushless motor driver

4. Pin

4.1 Pin definition

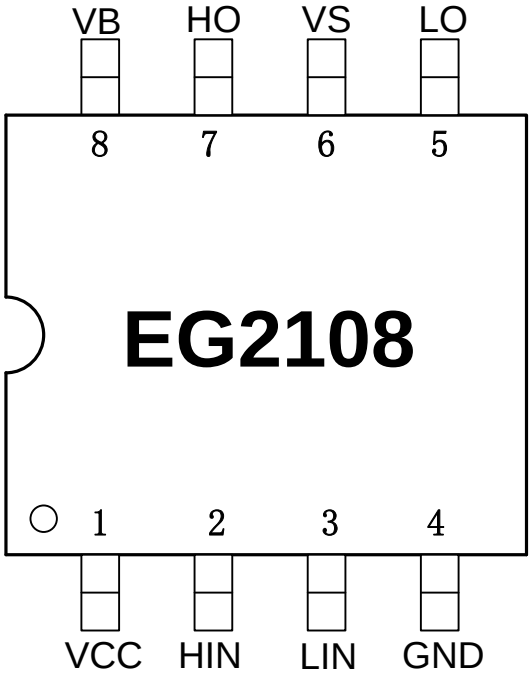

Figure 4-1. EG2108 pin definition

4.2 Pin description

Pin serial №	Pin name	I/O	Description
1	VCC	Power	Chip power input, voltage range 10V-20V,an external high-frequency 1uf bypass capacitor can reduce the high-frequency noise at the input of the chip
2	HIN	I	Logic input signal is active high, control the high-side power MOS transistor is turned on and off “0”is turned off power MOS transistor "1”is the open power MOS tube
3	LIN	I	Logic input signal is active high, the control of the low-end power MOS transistor is turned on and off “0”is turned off power MOS transistor ”1” is the open power MOS transistor
4	GND	GND	The ground end of the chip.
5	LO	O	The output controls the conduction and shutdown of the low-side MOS transistor
6	VS	O	High-end suspended Ground end
7	HO	O	The output controls the on and off of the high-side MOS transistor
8	VB	Power	High-end suspended power supply

5. Block diagram

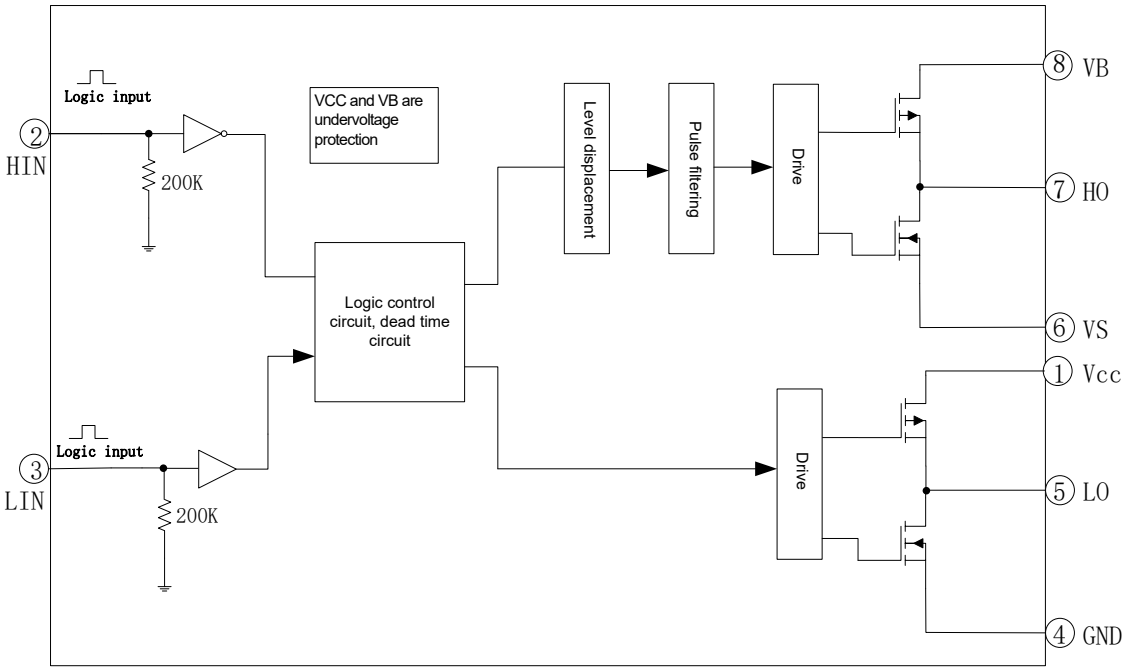

Figure 5-1. EG2108 internal circuit diagram

6. Typical application circuit

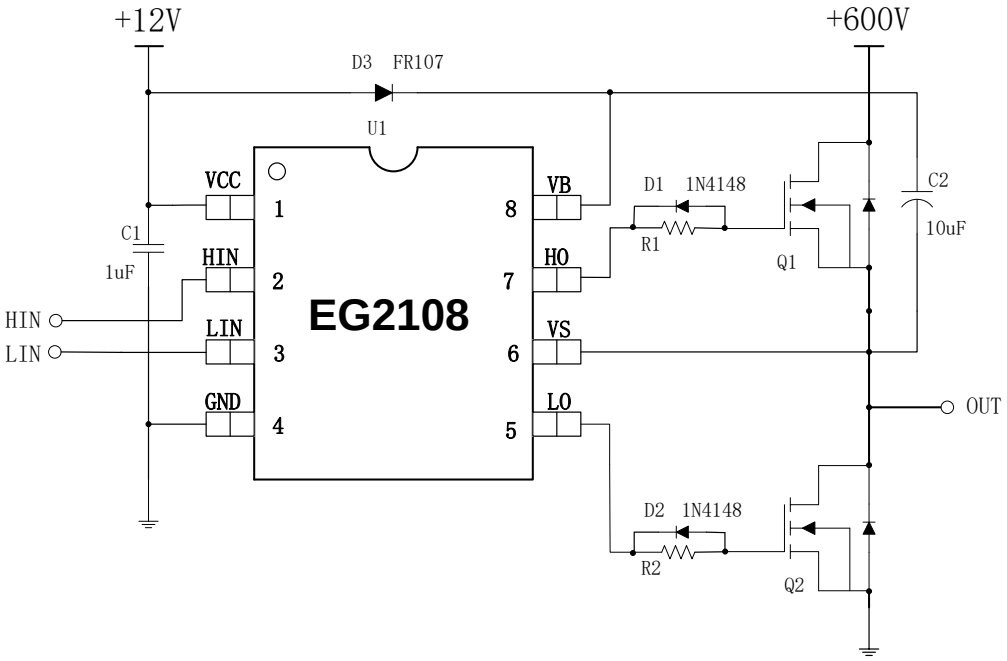

Figure 6-1. EG2108 typical application circuit diagram

7. Electrical characteristics

7.1 Limit parameters

Without further explanation, at T_A=25℃ conditions

Symbols	Parameter name	Test conditions	Min.	Max.	Units
High side floating absolute voltage	VB	-	-0.3	600	V
High side floating supply offset voltage	VS	-	VB-20	VB+0.3	V
High side floating supply offset voltage	HO	-	VS-0.3	VB+0.3	V
Low side output voltage	LO	-	-0.3	VCC+0.3	V
Low side and logic fixed supply voltage	VCC	-	-0.3	20	V
Logic input voltage (HIN)	HIN	-	-0.3	VCC+0.3	V
Logic input voltage (LIN)	LIN	-	-0.3	VCC+0.3	V
TA	Ambient temperature	-	-45	125	℃
Tstr	Storage temperature	-	-55	150	℃
TL	Lead temperature (soldering, 10 seconds)	T=10S	-	300	℃

Note: exceeding the listed limit parameters may cause permanent damage to the chip, operating in extreme conditions for a long time will affect the reliability of the chip.

7.2 Typical parameters

No additional instructions, in T_A=25℃, VCC=15V, load capacitance CL=1NF conditions

Parameter name	Symbols	Test conditions	Min.	Typical	Max.	Units
Power supply	Vcc	-	10	15	20	V
Quiescent current	Icc	Input dangling, VCC=15V	-	200	300	uA
Input logic signal high potential	Vin(H)	All input control signals	2.5	-	-	V
Input logic signal low potential	Vin(L)	All input control signals	-0.3	0	1.0	V
Current at the high level of the input logic signal	Iin(H)	Vin=5V	-	-	30	uA
Input logic signal low current	Iin(L)	Vin=0V	-10	-	-	uA
VCC supply undervoltage shutdown feature						
VCC turn-on voltage	Vcc(on)	-	7.7	8.7	9.7	V
Vcc shutdown voltage	Vcc（off）	-	7.0	8.0	9.0	V
VB supply undervoltage shutdown feature						
VB turn-on voltage	VB(on)	-	7.6	8.6	9.6	V
VB shutdown voltage	VB（off）	-	7.0	8.0	9.0	V
Low-side output LO switching time characteristics						
On delay	Ton	SeeFigure7-1	-	200	300	ns
Off delay	Toff	See Figure 7-1	-	200	300	ns
Rise Time	Tr	See Figure 7-1	-	70	150	ns
Fall time	Tf	See Figure 7-1	-	35	70	ns
High-side output HO switching time characteristics						
On delay	Ton	See Figure 7-2	-	200	300	ns
Off delay	Toff	See Figure 7-2	-	200	300	ns
Rise Time	Tr	See Figure 7-2	-	70	150	ns
Fall time	Tf	See Figure 7-2	-	35	70	ns
Dead time characteristics						
Dead time	DT	See Figure 7-3, No load capacitance CL=0	400	470	640	ns
IO output maximum drive capability						
IO output pull current	IO+	V_O=0V, V_{IN}=V_{IH} PW≤10uS	-	0.3	-	A

IO output sink current	IO-	Vo=12V,VIN=VIL PW≤10uS	-	0.6	-	A

7.3 Switching time characteristics

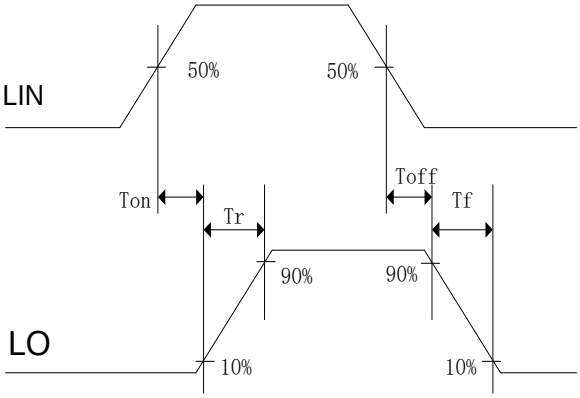

Figure 7-1. Low-side output LO switching time waveform diagram

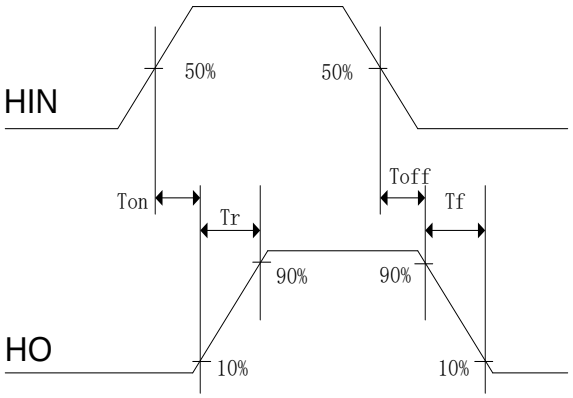

Figure 7-2. High-side output HO switching time waveform diagram

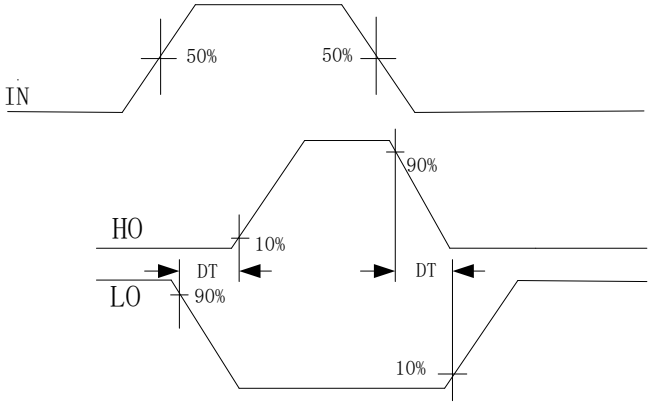

Figure 7-3. Dead time waveform diagram

8. Application design

8.1 VCC terminal supply voltage

For different MOS transistor, select a different drive voltage, chip supply voltage range of 10V-20V.

8.2 Input logic signal requirements and output driver characteristics

The main functions of the EG2108 are logic signal input processing,dead time control,level translation function,floating bootstrap power structure and up and down Bridge totem pole type output. Logic signal input terminal high threshold of 2.5 V or more, low threshold of 1.0 V or less, requires the input of the logic signal.

The MCU output logic signal can be connected directly to the input channel of the EG2108.

Up to 0.6 A and the maximum output current up to 0.3 A, the high-side channel can withstand 600V voltage, the input logic signal and the output control signal conduction delay between small, low-end output opening conduction delay of 200ns, turn-off conduction delay of 200ns,high-side output opening conduction delay of 200nS,turn-off conduction delay of 200nS.The rise time of the low-side output is 70ns, the fall time of the shutdown is 35ns, the rise time of the high-side output is 70ns, the fall time of the shutdown is 35ns.

Input signal and output signal logic function diagram shown in Figure 8-2：

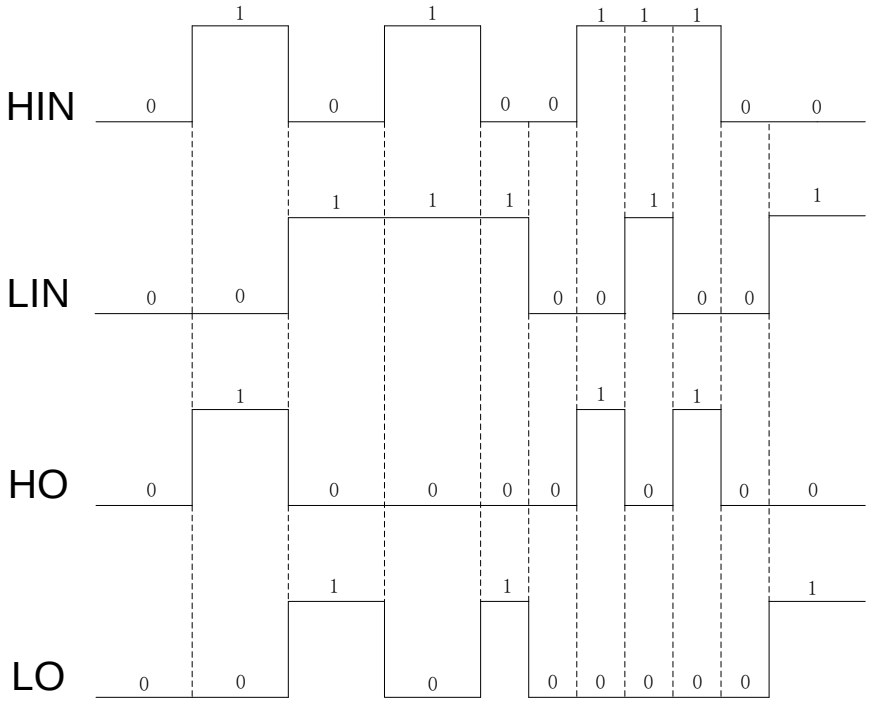

Figure 8-2. Input signal and output signal logic function diagram

Logic truth table for input and output signals：

Input		Output	
Input and output logic			
HIN	LIN	HO	LO
0	**0**	0	**0**
0	1	0	1
1	0	1	0
1	**1**	**0**	0

From the truth table, when the input logic signal HIN is “1” and LIN is “0”, The Drive control output HO is “1” on the tube is opened, LO is “0” under the tube is turned off; when the input logic signal HIN is “0” and LIN is “1”, the drive control output HO is “0” on the tube is turned off, LO is “1” under the tube is opened; Lo is “0” the upper and lower power tube is turned off at the same time; the internal logic processor to prevent the controller output, the lower power tube is turned on at the same time, with mutual locking function.

8.3 Bootstrap circuit

EG2108 bootstrap suspension drive power supply structure greatly simplifies the drive power supply design, only one way to complete the power supply voltage VCC high-end N-channel MOS transistor and a low-end N-channel MOS transistor driving two power switching devices,to the practical application of great convenience.EG2108 can use an external bootstrap diode as shown in figure 8-3 and a bootstrap capacitor to automatically complete the bootstrap boost function, assuming that the lower tube is turned on, the upper tube is turned off during the VC bootstrap capacitor has been charged to a sufficient voltage (VC=VCC), when the HO output is high on the tube is turned on, the lower tube is turned off, the voltage on the VC bootstrap Capacitor will be equivalent to a voltage source as an internal driver VB and VS, complete the high-end N-channel MOS transistor.

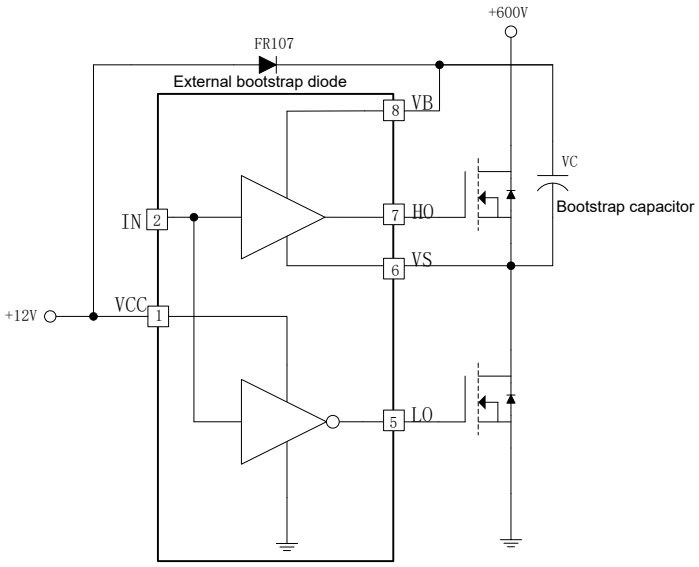

Figure 8-3. EG2108 bootstrap circuit structure

9. Package size

9.1 SOP8 package size