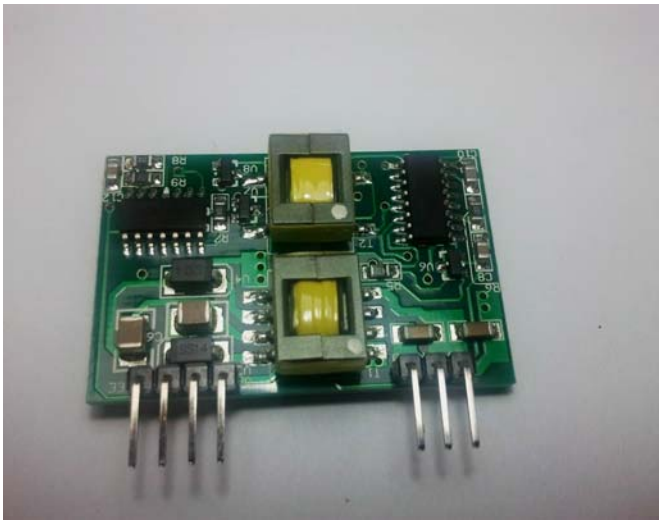
Description and Application Manual for PMD310 High Power MOS driver

The WEPOWER series high power IGBT/MOS intelligent module drivers are designed for high power IGBT/MOS module with high reliability and security. The products series have been patented in China.



The high power IGBT/MOS intelligent driving module released by WEPOWER is easy to use with intelligent design, high driving power and complete function.

The PMD310 high power MOS intelligent module driver is used for high power MOS with transformer modulation isolation technology and with advantages of built-isolated power supply, output power, higher operating frequency. It is suitable for driving MOS below 1700V.

The WEPOWER IGBT driver is a winning project of the competition organized by "China National Invention Association" in 2009.

The IGBT driver by distinguishing it as the "Bronze Medal" in the "National Exhibition of Inventions" in 2009.

Applications

※ Inverters
※ Converters
※ Railroad Traction
※ Switch Power Supplies
※ DC/DC Converters
※ Radiology and Laser Technology
※ Research
※ Motor Drive Technology

1. Main Features & Technical Specifications

1.1 Main Feature

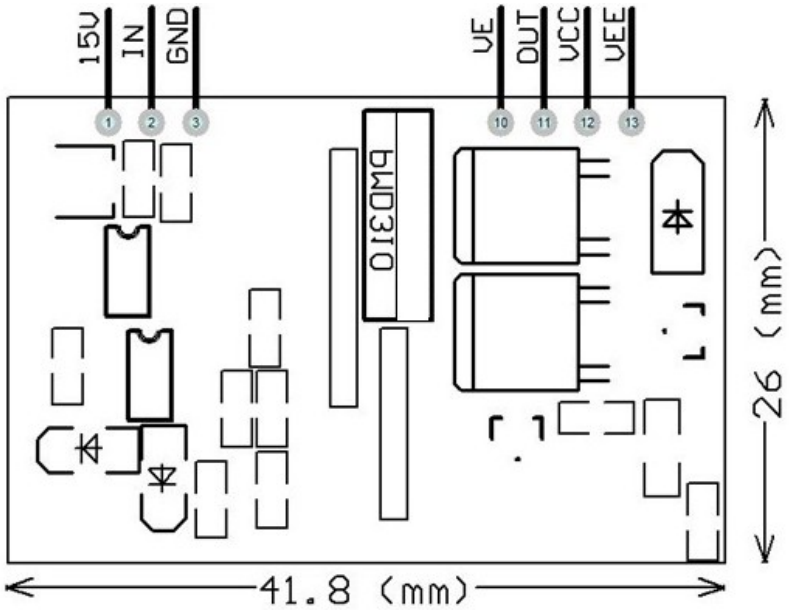
(1) Adopting transformer modulation isolation technique
(2) Interference pulse suppression technique
(3) Short circuit, over current and low-voltage protection.
(4) Reliable and durable
(5) High electrical isolation
(6) Switching frequency: 0-200kHz
(7) Duty ratio: 0-100%
(8) Disturbance rejection property: dv/dt >100,000V/us
(9) Integrated internal DC/DC power supply

1.2 Technical Specifications

Absolute maximum Ratings				
Symbol	Definition		Value	Unit
VCC	Power supply voltage		16	V
V_{iH}	Input signal voltage (high)		VS+0.3	V
V_{iL}	Input signal voltage (low)		GND-0.3	V
$Iout_{PEAK}$	Output peak current		10	A
f_{max}	Max switching frequency		200	kHz
V_{CE}	Collector emitter voltage sense across the IGBT		1700	V
dv/dt	Rate of rise and fall of voltage secondary to primary side		60	kV/us
V_{isolIO}	Isolation test voltage input-output (AC,RMS,2S)		4000	V
V_{isolPD}	Partial discharge extinction voltage，RMS, Q_{PD}≤10PC		2000	V
R_{Gmin}	Minimum rating for R_G		0.5	Ω
T_{op}	Operating temperature	PMD310I	-40℃～+85℃	℃
		PMD310J	-40℃～+105℃	
		PMD310M	-55℃～+125℃	
T_{stg}	Storage temperature	PMD310I	-55℃～+125℃	℃
		PMD310J	-55℃～+125℃	
		PMD310M	-55℃～+130℃	

Electrical characteristics					
Symbol	Definition	value			unit
		Min.	Typ.	Max.	
V_S	Supply voltage primary side	14.5	15	15.6	V
I_{SO}	Supply current primary side (no load)		25		mA
	Supply current primary side (max)			300	mA
	Internal DC/DC input power		3		W
V_i	Input signal voltage on/off		15/0		V
V_{iT+}	Input threshold voltage (High)	3.5	-	-	V
V_{iT-}	Input threshold voltage (Low)	-	-	2.5	V
$V_{G(on)}$	Turn on gate voltage output		+15		V
$V_{G(off)}$	Turn off gate voltage output		-5		V
$t_{d(on)}$	Turn-on propagation time		0.7		us
$t_{d(off)}$	Turn-off propagation time		0.6		us
C_{PS}	Coupling capacitance primary secondary		10		pF
W	weight		9		g
MTBF	Mean time between failure (Ta=40℃,max load)		1.8		10^6h

2、PMD310 Mechanical Dimensions



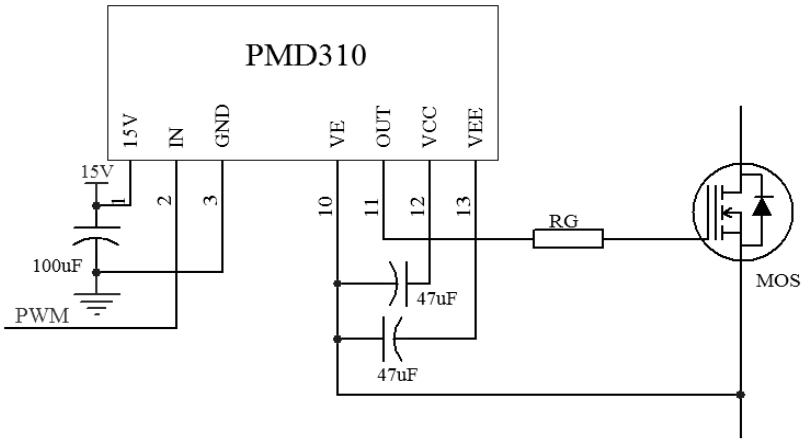
PMD310 outer dimensions and connector diagram (pin distance: 2.54mm)

PMD310 Pin Designation Table

Pin	Signal	Function
1	15V	+15V for electronic input side
2	GND	GND for electronic input side
3	IN	PWM Signal input (TTL or COMS)
10	VE	
11	OUT	
12	VCC	Blocking Capacitor+15V
13	VEE	Blocking Capacitor -10V

3. Application examples

Reference connection schematic of PMD310 is shown in the following figure. It shows that WEPOWER series IGBT/MOS drive module needs less peripheral device, driving circuits is simple and high integration. In order to improve its reliability, the parameters of the selection of electric level and the protection voltage are pre-set in the module.



PMD310 Connection Schematic

4. Overview of WEPOWER series High Power IGBT/MOS intelligent module driver

(1)Reliable operation (Gate bipolar power supply with +15V/-5V is suitable for MOSFETs of any manufacturer. The gate is driven by negative voltage which increases capacity of anti-interference and more Parallel MOSFETs can be driven.)

(2)Transformer Isolation technology (the driver using transformer isolation technology with better performance of insulation and fast respond speed)
(3)Pulse suppression technology (the driver using the special technology of pulse suppression interference, all interference pulse which width is less than 350ns will be ignored)
(4) Integrated DC/DC (the isolation DC/DC converter is integrated inside the module, it will working only provide 15V power supply from outside)

5. The Pin Designation

5.1 Low Power Side：

Pin 15V：primary internal DC/DC and Logic circuit +15V input power supply

Pin GND： primary internal DC/DC and Logic ground power supply

Pin IN：primary signal input, compatible with TTL&COMS electrical level

5.2 High Power Side

The grid drive voltage for WEPOWER series high power MOSFET driver module is +15V/-5V, and the negative voltage is caused inside the module. The max driving power for PMD310 is 10A.

Pin VEE
Pin VEE is the -5V output power supply of high power side. Filtering capacitor can be added between VEE and E when using.

Pin VE
Pin VE is the ground power supply of high power side. It will be connected to “S” of MOSFET.

Pin OUT
Pin OUT is the output for high power side drive. It will be connected to “G” of the MOSFET.

Pin VCC
Pin VCC is the +15V output power supply of high power side. Filtering capacitor can be added between VCC and VE when using.

5.3 Layout and wiring

Drivers should be placed as close as possible to the power semiconductors and the lead wire length of gate are less than 10 cm. It is better to use twisted wire to connect.

6. Calculation of driving power

Gate input capacitance (Cin) can be found thru data sheet. The total power need to drive MOSFET can be calculated by the following simple formula:

$P=f*Cin*\triangle V^2$ OR $P=f*Q*\triangle V$

Gate charge $Q=\int idt=C*\triangle V$

(Note: P represents the real driving power not including the losses in drive channel and drive power supply.)

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