DC/DC Converter

IGBT/SiC MOSFET Driver Power Supply Series

MORNSUN®

IGBT/SiC MOSFET driver power supply

Continuous Short Circuit Protection

3 years Warranty

CE Report EN62368-1

RoHS

FEATURES

- High efficiency up to 88%
- Isolation voltage up to 5000VAC (reinforced insulation)
- The maximum capacitive load is 200uF
- Isolation capacitor 3.5pF typ.
- Operating temperature range: -40℃ to +105℃
- Product material conforms to CTI Class I
- Designed for 1700V IGBT/SiC MOSFET driver

The IGBT/SiC MOSFET driver power supply series is a DC-DC module power supply specially designed for 1700 V IGBT/SiC MOSFET drivers. The product is dual isolated and dual positive output. It has output short-circuit protection and self-recovery. Both input and output meet the reinforced insulation design, complying with UL62368, EN62368, EN50178 standard certification. This product is suitable for:

1. Universal converter

2. AC servo drive system

3. Electric welding machine

4. Un-interruptible power supply (UPS)

Selection Guide

Certification	Part No.	Input		Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
		Voltage(VDC) (Range)	Current(mA, Typ.) Full Load/No Load	Voltage (VDC) +Vo1/+Vo2	Current (mA) +Io1/+Io2		
EN	QA123D-2GR3	12(10.80-13.20)	450/25	24/24	100/100	85/88	200
	QA153D-2GR3	15(13.50-16.50)	360/20				
	QA243D-2GR3	24(21.60-26.40)	230/15				

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage	QA123D-2GR3	DC	-0.7	--	18	VDC
	QA153D-2GR3	DC	-0.7	--	23	
	QA243D-2GR3	DC	-0.7	--	36	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			
Note: Input end of QA243D-2GR3 shall be connected with 27μF/63V electrolytic capacitor.						

Output Specifications

Item			Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage	QA123D-2GR3	+Vo1	Vin=12VDC, Pin14& Pin13 +Io= +100mA		22.80	24.00	25.20	VDC
		+Vo2	Vin=12VDC, Pin11& Pin12 +Io= +100mA		22.80	24.00	25.20	
	QA153D-2GR3	+Vo1	Vin=15VDC, Pin14& Pin13 +Io= +100mA		22.80	24.00	25.20	
		+Vo2	Vin=15VDC, Pin11& Pin12 +Io= +100mA		22.80	24.00	25.20	
	QA243D-2GR3	+Vo1	Vin=24VDC, Pin14& Pin13 +Io= +100mA		22.80	24.00	25.20	
		+Vo2	Vin=24VDC, Pin11& Pin12 +Io= +100mA		22.80	24.00	25.20	
Output Power			Vin=typ. 100% load		--	4.80	--	W
Voltage Accuracy			10% - 100% load		See output regulation curve (Fig. 1,Fig. 2)			
Linear Regulation			Full voltage input range	Vo1 Output	--	--	±1.5	--
				Vo2 Output	--	--	±1.5	
Load Regulation			QA123D-2GR3 10%-100% load	Vo1 Output	--	15	--	%
				Vo2 Output	--	15	--	

Load Regulation	QA153D-2GR3、QA243D-2GR3 10%-100% load	Vo1 Output	--	12	--	%
		Vo2 Output	--	12	--	
Temperature Coefficient	Full load		--	--	±0.1	%/℃
Ripple & Noise*	20MHz bandwidth		--	100	250	mVp-p
Short-circuit Protection			Continuous, self-recovery			
Note:* The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.						

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output, output 1- output 2, Test for 1 minute with a leakage current of 1mA max (reinforced insulation)	5000	--	--	VAC
Continuous insulation voltage （complying with EN61800-5-1）	Input- output 1， Input- output 2	1700	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation capacitor	Input- output 1, Input- output 2, output 1- output 2 capacitor at 100kHz/0.1V	--	3.5	5	pF
Electrical clearance	Input- output	24.30	24.90	--	mm
	Output 1- output 2	14.14	14.74	--	mm
Creepage distance	Input- output	24.30	24.90	--	mm
	Output 1- output 2	14.14	14.74	--	mm
Operating Temperature	Derating when operating temperature≥85℃, (see Fig. 3)	-40	--	105	℃
Storage Temperature		-55	--	125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Case Temperature Rise	Ta=25℃, nominal input voltage, full load	--	30	60	
Safety Standard		EN62368-1 (Report)			
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	Full load, nominal input voltage	--	200	--	kHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant
CTI level	roduct material conforms to CTI Class I
Dimensions	31.60 x 20.30 x 10.20mm
Weight	12g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS A (see Fig.6 for recommended circuit)
	RE	CISPR32/EN55032 CLASS A (see Fig.6 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV perf. Criteria A

Typical Characteristic Curves

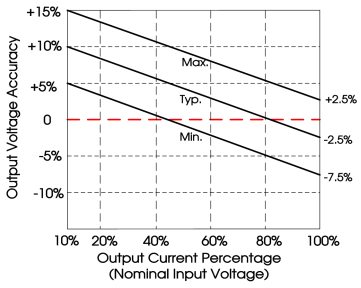


Fig. 1

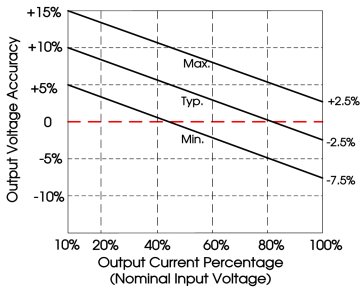


Fig. 2

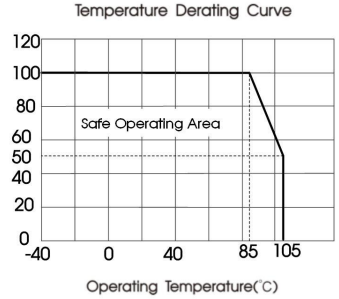


Fig. 3

Design Reference

1. Typical application

All driver power in this series are tested according to the recommended test circuit (Figure 4) before they leave the factory, with both outputs connected to the same load.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

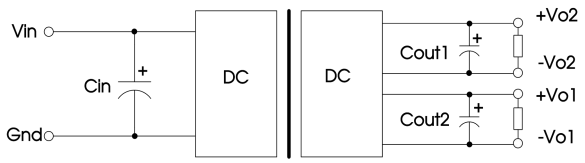
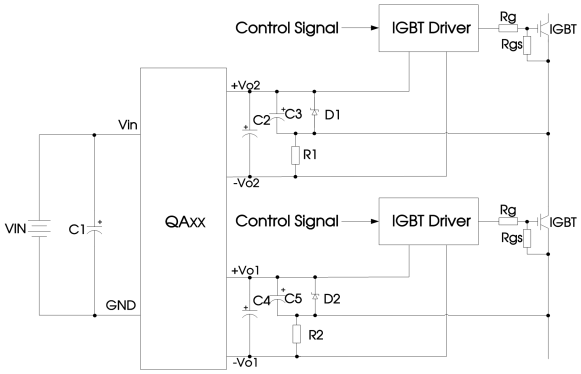


Fig.4

Vin	12/15/24V
Cin	100μF
Cout1	100μF
Cout2	100μF

2. Typical application



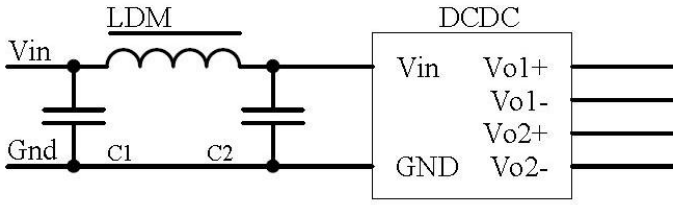
C1	100μF/63V
C2、C3、C4、C5	100μF/35V
R1、R2	15kΩ
D1、D2	15V/18V/20V

Fig. 5

Application Notes

1. The wire between the converter and IGBT driver must as short as possible.
2. External filter capacitors should be connected as close as possible to the IGBT driver.
3. To ensure the high peak gate current, the filter capacitors should be electrolytic capacitor and ceramic capacitor collocation.
4. The output average power of the IGBT driver should be less than the output power of DC-DC module.
5. SiC MOSFET driver application circuit can refer to the above design.

3. EMC compliance circuit



LDM	33μH
C1	10μF/50V
C2	10μF/50V

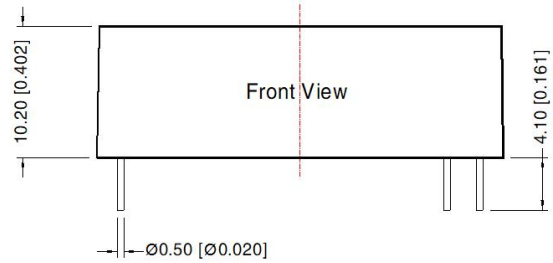
Fig. 6

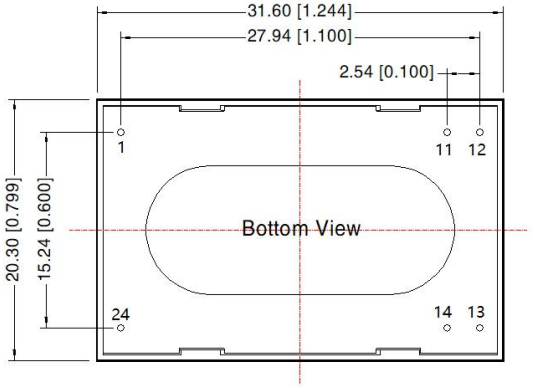
4. Electrolytic capacitors are recommended for external capacitors at the input or output of the product. Tantalum capacitors are not, otherwise there is a risk of failure.

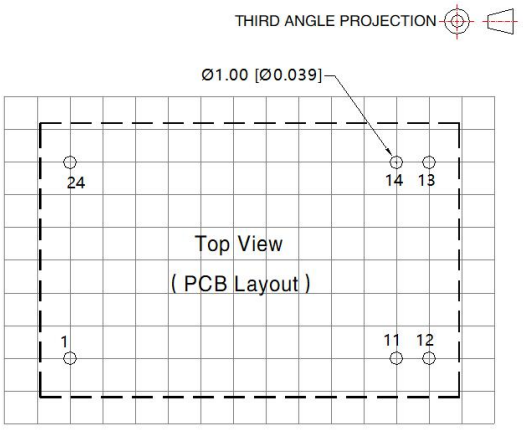
5. The products do not support parallel connection of their output or hot-plug use.

6. For additional information please refer to the application notes on www.mornsun-power.com

Dimensions and Recommended Layout







Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
11	Vo2+
12	Vo2−
13	Vo1−
14	Vo1+
24	Vin

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210008;
2. The lead wire connecting the power module and IGBT driver (or SiC MOSFET driver) should be as short as possible when in use;
3. The output filter capacitor is as close as possible to the power module and IGBT driver (or SiC MOSFET driver);
4. IGBT driver (or SiC MOSFET driver) gate drive current has a high peak value. It is recommended that the output filter capacitor of the power module use a low internal resistance electrolytic capacitor;
5. The average output power of the driver must be lower than that of the power supply module;
6. Consider fixing with glue near the module if being used in vibration occasion;
7. The maximum capacitive load offered were tested at nominal input voltage and full load;
8. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
9. All index testing methods in this datasheet are based on company corporate standards;
10. We can provide product customization service, please contact our technicians directly for specific information;
11. Products are related to laws and regulations: see "Features" and "EMC";
12. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

MORNSUN Guangzhou Science & Technology Co., Ltd.
Address: No. 8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com