MOSFET SiC Driver Dedicated Power Supply

Continuous Short Circuit Protection

Patent Protection **RoHS**

FEATURES

- High efficiency up to 81%
- SIP package
- I/O isolation test voltage 3.5k VAC
- Ultra low isolation capacitance
- Operating ambient temperature range: -40℃ ~ +105℃
- Continuous short-circuit protection
- Industry standard pin-out

QA121C2 is a dedicated power supply for SiC MOSFET drivers that require two sets of isolated power supplies. It features two independent outputs(postive / negative), which provide energy for SiC turn-on and turn-off. At the same time, it has output short circuit protection and self-recovery capability. This product is suitable for applications:

1. Universal inverter

2. AC servo drive system

3. Electric welding machine

4. Uninterruptible power supply (UPS)

Selection Guide

Part No.	Input Voltage (VDC) Nominal (Range)	Output Voltage (VDC) +Vo/-Vo	Output Current (mA) +Io/-Io	Full Load Efficiency (%) Min./Typ.	Capacitive Load*(μF) Max.
QA121C2	12 (10.8-13.2)	+15/-3.5	+111/-111	77/81	220

Note:* The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12V input	--	210/15	--	mA
Surge Voltage (1sec. max.)		-0.7	--	18	VDC
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage	Vin=12VDC, Pin6 & Pin7	+Vo	14.4	15	15.9	VDC
	Vin=12VDC, Pin5 & Pin6	-Vo	-3.3	-3.5	-4.0	
Output Voltage Accuracy	Vin=12VDC, Pin6 & Pin7	+Vo	-4% to +6%			
	Vin=12VDC, Pin5 & Pin6	-Vo	-5% to +15%			
	10%-100% load		See output regulation curve (Fig. 1)			
Linear Regulation	Input voltage change: ±1%		--	±1.1	±1.2	%/%
Load Regulation	10%-100% load	+Vo	--	7	--	%
		-Vo	--	10	--	
Ripple & Noise*	20MHz bandwidth	+Vo	--	120	--	mVp-p

		-Vo	--	80	--	
Temperature Drift Coefficient	100% load		--	±0.02	--	%/℃
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 Electric strength test for 1 minute with a leakage current of 1mA max.	3500	--	--	VAC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	3.5	--	pF
Operating Temperature	Derating when operating temperature≥85℃, (see Fig. 2)	-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℃	--	30	--	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	100% load, nominal input voltage	--	67	--	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours

Mechanical Specifications

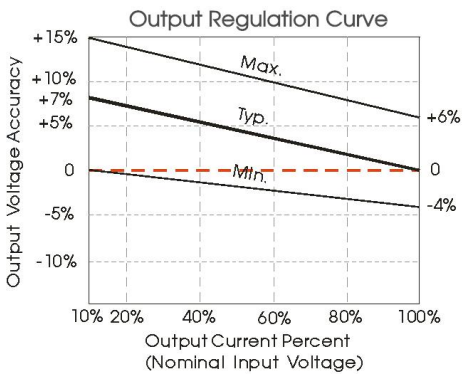
Case Material	Black plastic; flame-retardant and heat-resistant
Dimensions	19.50 x 9.80 x 12.50mm
Weight	4.2g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B

Typical Characteristic Curves

+Vo output



-Vo output

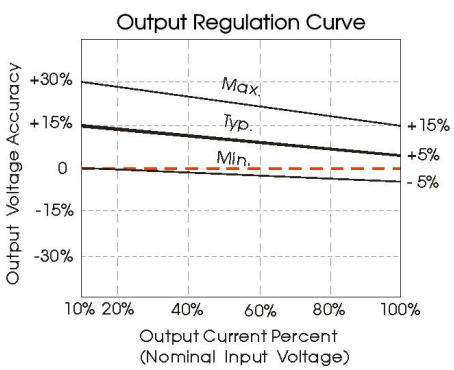


Fig. 1

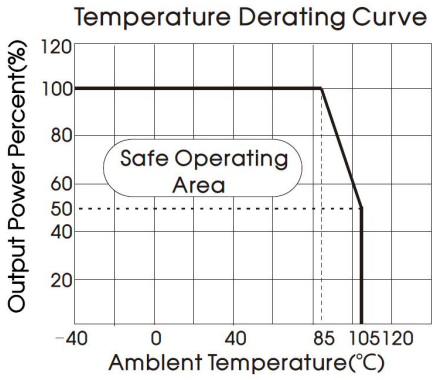


Fig. 2

Design Reference

1. Overload Protection

In normal operating conditions, the circuit of these products have no overload protection. Protect with a breaker is a simple way to make overload protection.

2. Test configurations

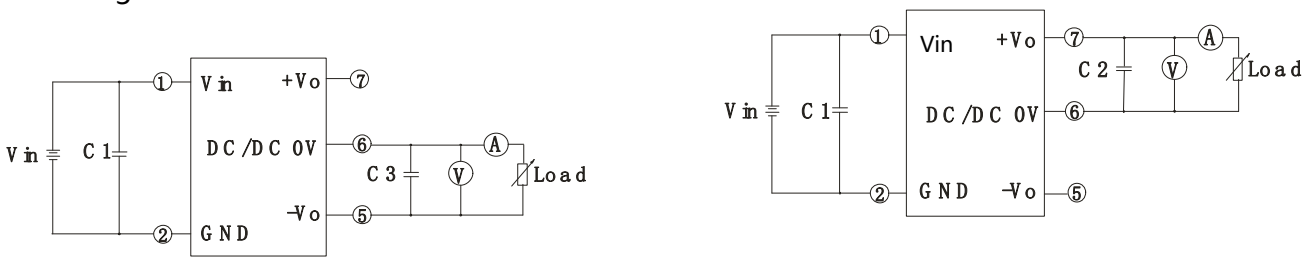


Fig. 3

Note: C1,C2,C3: 100uF/35V (Low internal resistance capacitance)

3. Typical application

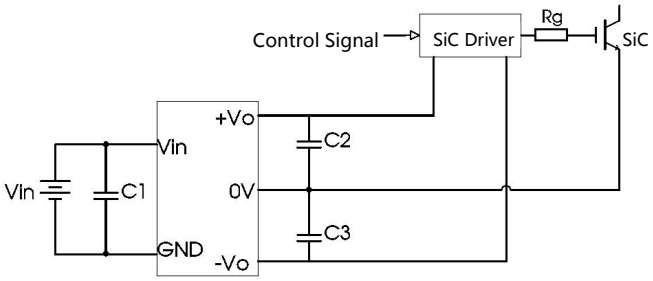


Fig. 4

C1/C2/C3
100uF/35V (Low internal resistance capacitance) (Recommended brand:KEMET)

4. EMC (CLASS B) compliance circuit

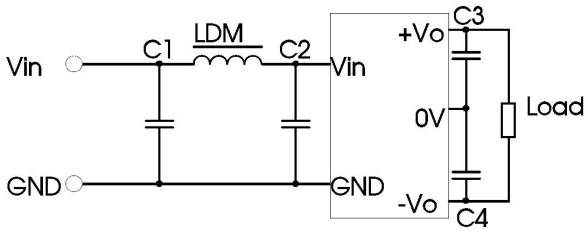


Fig. 5

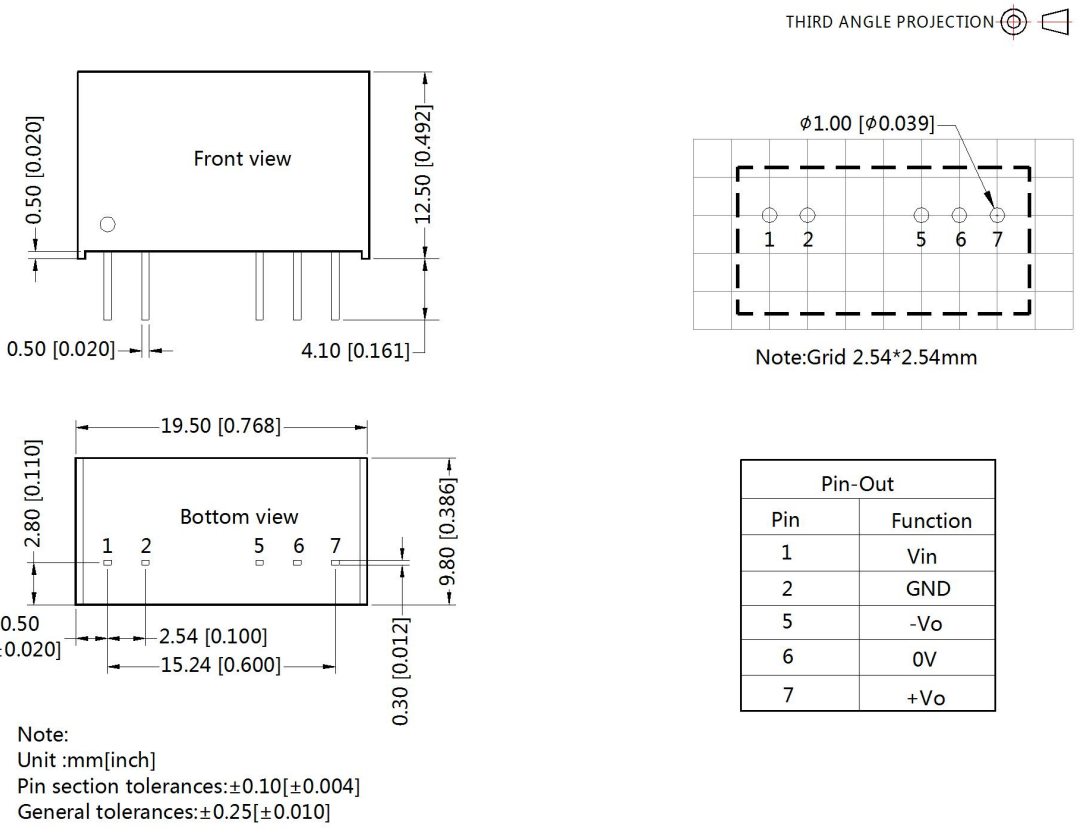
Input voltage (VDC)		15
Emission	C1/C2	4.7μF /50V (Recommended brand:TDK)
	C3/C4	100μF /35V (Low internal resistance capacitance) (Recommended brand:KEMET)
	LDM	22μH (Recommended brand:TDK)

5. 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.

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

7. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com.

Dimensions and Recommended Layout



Pin-Out	
Pin	Function
1	Vin
2	GND
5	-Vo
6	0V
7	+Vo

Note:
Unit :mm[inch]
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.25[±0.010]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200013;
2. The lead connecting the power supply module and SiC driver should be as short as possible during use;
3. The output filtering capacitor should be as close as possible to the power supply module and SiC driver;
4. The peak of the MOSFET SiC driver dedicated power supply gate drive current is high, so low internal resistance electrolytic capacitor is recommended to be used for the power supply module output filter 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 max. capacitive load should be tested within the input voltage range and under full load conditions;
8. Unless otherwise specified, data in this datasheet should be tested 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 our company corporate standards;

10. The performance indexes of the product models listed in this manual are as above, please directly contact our technicians for specific information;
11. We can provide product customization service, please contact our technicians directly for specific information;
12. Products are related to laws and regulations: see "Features" and "EMC";
13. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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