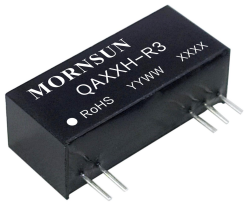
DC-DC module power supply specialized for IGBT driver



RoHS

3 years Warranty

c UL us UL62368-1

CE Report EN62368-1

FEATURES

- High efficiency up to 87%
- SIP package
- I/O isolation test voltage:5000VAC(reinforced insulation)
- Max. Capacitive Load: 2200μF
- Ultra-low isolation capacitance
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short-circuit protection
- Industry standard pin-out

QAxx3H-R3 is DC-DC module power supplie designed for SiC driver requiring two sets of isolation power supply. The mode of common ground outputs is adopted internally for better energy provision of SiC turn-on and turn-off. Output short-circuit protection and self-recovery capabilities are also provided. General application includes:

1. Universal converter

2. AC servo drive system

3. Electric welding machine

4. Uninterruptible power supply (UPS)

Selection Guide

Certification	Part No.	Input		Output		Full Load Efficiency (%) Typ.	Max. Capacitive Load(μF)
		Voltage(VDC) (Range)	Current(mA, Typ.) Full Load/No Load	Voltage (VDC) +Vo1/+Vo2	Current (mA) +Io1/+Io2		
UL/EN	QA123H-1509R3	12 (10.8-13.2)	242/8	+15.0/-9.0	+100/-100	82/87	2200
	QA153H-1509R3	15 (13.5-16.5)	195/8				
	QA243H-1509R3	24 (21.6-26.4)	135/9			77/82	

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage (1sec. max.)	Vin=12VDC	DC	-0.7	--	18	VDC
	Vin=15VDC	DC	-0.7	--	21	
	Vin=24VDC	DC	-0.7	--	30	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item			Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage	QA123H-1509R3	+Vo	Vin=12VDC, Pin10 & Pin9 +Io= +100mA	14.25	15.00	15.75	VDC
		-Vo	Vin=12VDC, Pin9 & Pin8 -Io= -100mA	-8.64	-9.09	-9.54	
	QA153H-1509R3	+Vo	Vin=15VDC, Pin10 & Pin9 +Io= +100mA	14.10	14.85	15.60	
		-Vo	Vin=15VDC, Pin9 & Pin8 -Io= -100mA	-8.10	-8.55	-9.00	
	QA243H-1509R3	+Vo	Vin=24VDC, Pin10 & Pin9 +Io= +100mA	14.55	15.30	16.05	
		-Vo	Vin=24VDC, Pin9 & Pin8 -Io= -100mA	-8.37	-8.82	-9.27	
Voltage Accuracy			10% - 100% load	See output regulation curve (Fig. 2)			%

Linear Regulation		Full voltage input range	+Vo Output	--	±1.1	±1.5	--
			-Vo Output	--	±1.1	±1.5	
Load Regulation	QA123H-1509R3	10% - 100% load	+Vo Output	--	8	18	%
			-Vo Output	--	8	18	
Load Regulation	QA153H-1509R3 QA243H-1509R3	10% - 100% load	+Vo Output	--	8	15	
			-Vo Output	--	8	15	
Temperature Coefficient		Full load		--	±0.04	±0.1	%/℃
Ripple & Noise*		20MHz bandwidth		--	50	100	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, Test for 1 minute with a leakage current of 1mA max(reinforced insulation)	5000	--	--	VAC
Continuous insulation voltage (IEC61800-5-1)	Input- output	1700	--	--	V
Insulation Resistance	Input- output resistance at 500VDC	1000	--	--	MΩ
Isolation capacitor	Input- output capacitor at 100kHz/0.1V	--	3.5	5	pF
Electrical clearance	Input- output	14.14	14.74	--	mm
Creepage distance	Input- output	14.14	14.74	--	mm
CMTI	Input- output	±200	--	--	kV/us
Operating Temperature	Derating when operating temperature≥85℃, (see Fig. 1)	-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	--	--	40	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	Full load, nominal input voltage	--	200	--	kHz
Safety Standard		UL62368-1 & EN62368-1 (Report)			
Safety Class		CLASS III			
MTBF	MIL-HDBK-217F@25℃	3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant
Dimensions	27.40 x 9.50 x 12.00mm
Weight	5.3 g (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 ±8kV perf. Criteria B

Typical Characteristic Curves

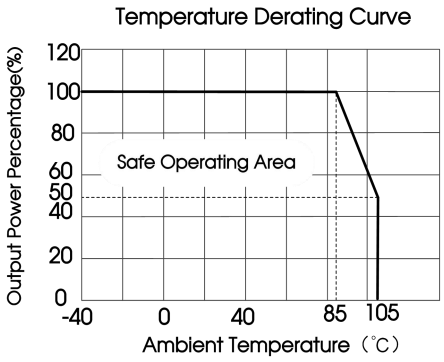
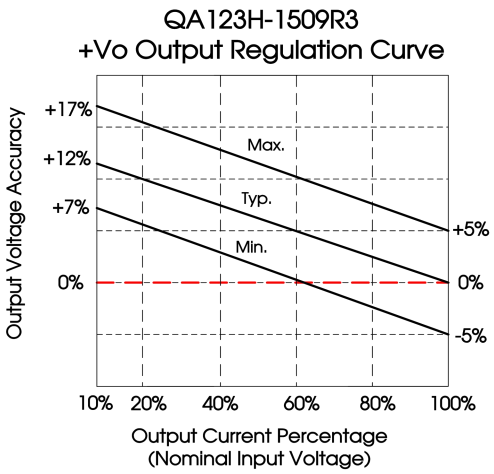
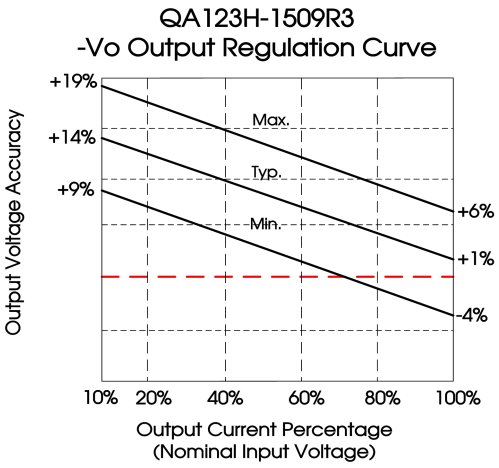
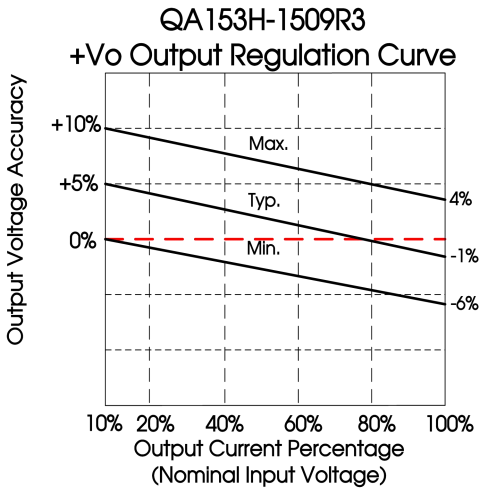
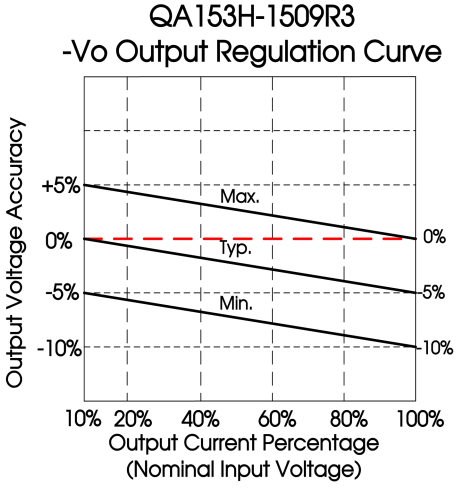


Fig. 1









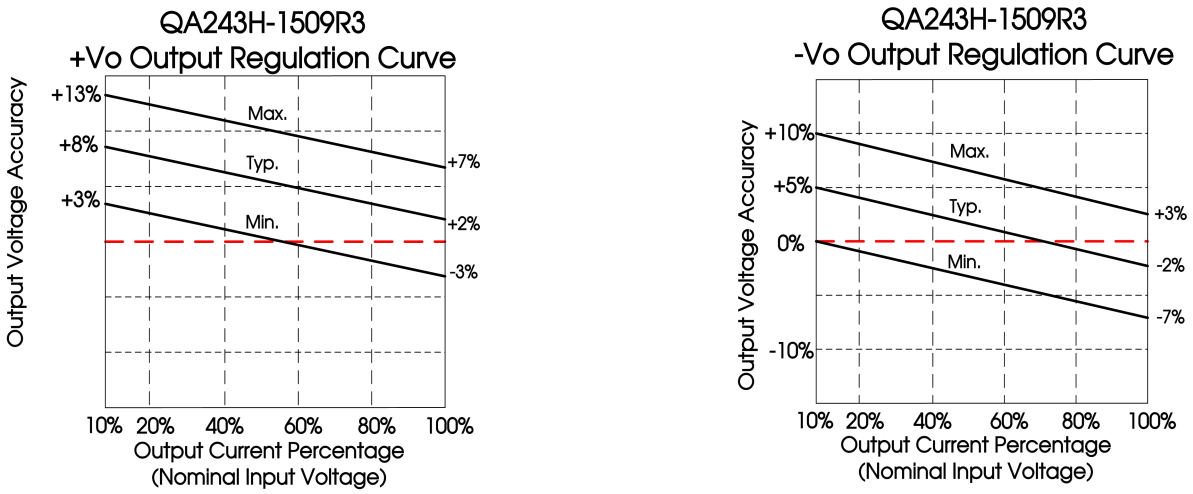


Fig. 2

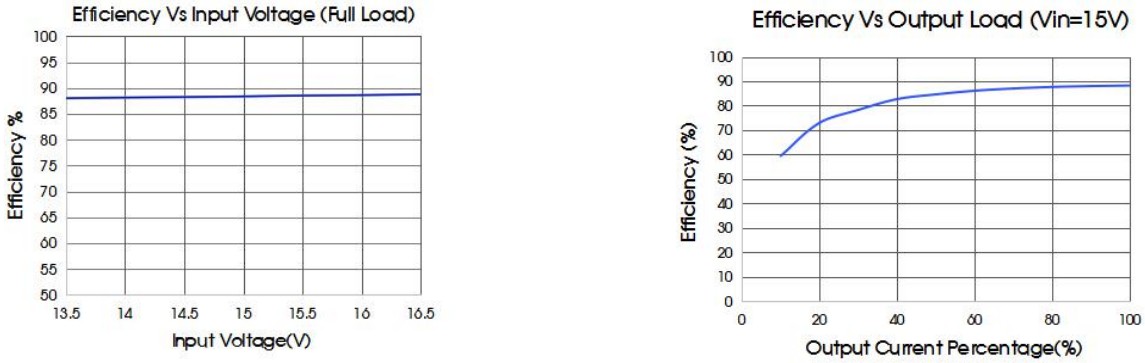


Fig. 3

Note: Take QA153H-1509R3 as an example, other models can be corresponding reference

Design Reference

1. Over-load Protection

There is no over-load protection under normal operating conditions, we suggest to add an circuit breaker outside in the circuit.

2. Test configurations

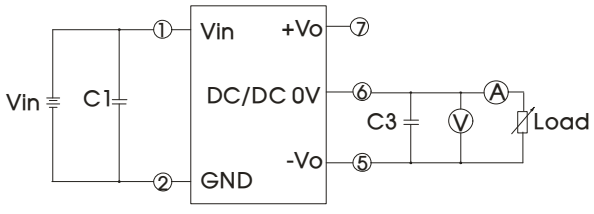


Fig. 4

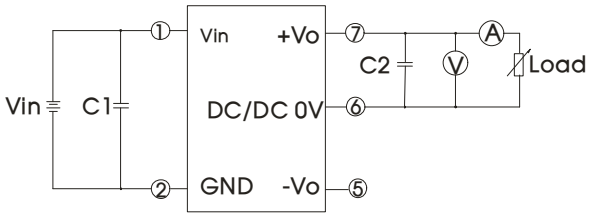


Fig. 5

Note: C1, C2, C3: 100uF/35V

3. Typical application

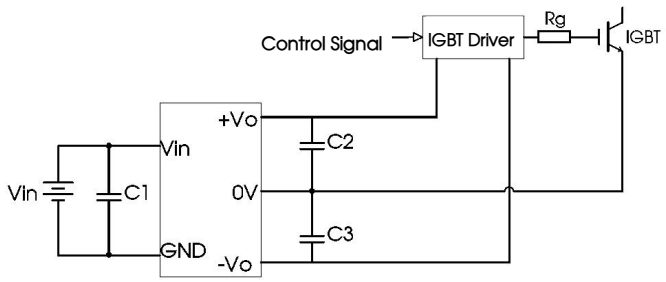


Fig. 6

C1/C2/C3
100μF/35V

4. EMC typical recommended circuit

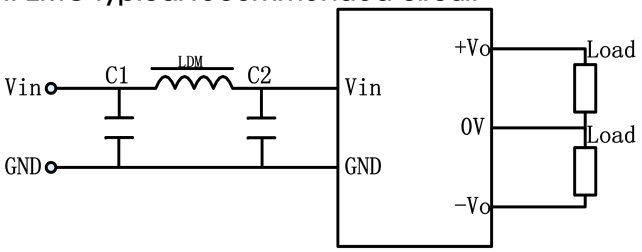
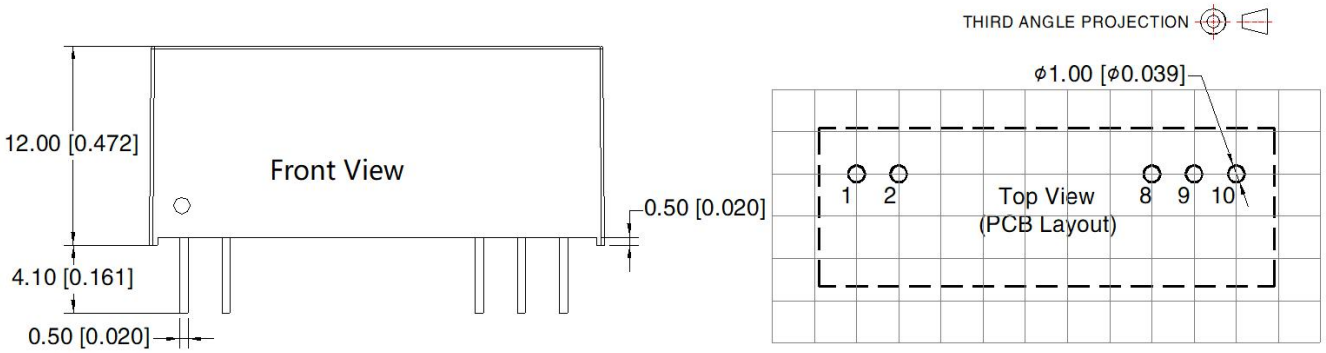


Fig. 7

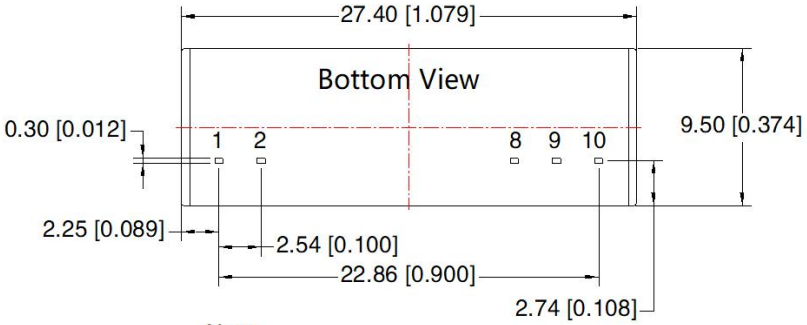
LDM	33uH
C1/ C2	1.0μF/35V(Low internal resistance capacitance)

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 for power expansion purpose or hot-plug.
7. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.5[± 0.020]

Pin–Out	
Pin	Mark
1	Vin
2	GND
8	Vo–
9	0V
10	Vo+

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200015;
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.
5. It is recommended that the output filter capacitor of the power module use a low internal resistance electrolytic capacitor;
6. The average output power of the driver must be lower than that of the power supply module;
7. Consider fixing with glue near the module if being used in vibration occasion;
8. The maximum capacitive load offered were tested at nominal input voltage and full load;
9. 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;
10. All index testing methods in this datasheet are based on company corporate standards;
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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