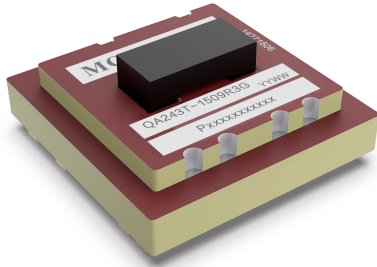


DC/DC Converter for IGBT Driver

QAxx3T-R3G Series

MORNSU

IGBT MOSFET driver power supply



FEATURES

- Reinforced insulation
- Ultra-low isolation capacitance: 2.5pF(typ.)
- I/O isolation test voltage: 5.0kVAC
- Partial Discharge 2.5kV
- CMTI>200 kV/μs
- Max. Capacitive Load: 2200μF
- High efficiency up to 86%
- Operating ambient temperature range: -40°C to +105°C
- Continuous short-circuit protection
- SMD package
- Power 2.4W
- MSL 1
- AEC-Q100 experiment

patent protection

RoHS



The QAxx3T-R3G series is a DC-DC module power supply designed for IGBT drives, which uses asymmetric voltage output to minimize the drive loss of IGBT. At the same time with output short circuit protection and self-recovery ability. The product is suitable for:

- 1.General frequency converter
- 2.AC servo drive system
- 3.Arc welder
- 4.Uninterruptible power supply (UPS)

Selection Guide

Certification	Part No.	Input		Output		Full load efficiency(%) Min./Typ.	Max.Capacitive Load(μF)
		input voltage(VDC) (Range)	input currenton (mA,Typ.) Full / No load	Voltage(VDC) +Vo/-Vo	Current (mA) +Io/-Io		
UL/CE-ing	QA123T-1509R3G	12 (10.8-13.2)	240/9	+15.0/-9.0	+100/-100	80/86	1000
	QA153T-1509R3G	15 (13.5-16.5)	180/8	+15.0/-9.0	+100/-100	80/86	2200
	QA243T-1509R3G	24 (21.6-26.4)	120/7	+15.0/-9.0	+100/-100	77/81	2200

Note: * The output capacitive load per channel is the same.

Limiting Character

Project	Operating Conditions	Min.	Typ.	Max.	Unit
Reflux welding temperature	--	The peak temperature Tc 245°C, the time above 217°C is maximum 60s, Refer to the IPC / JEDEC J-STD-020D.1 standard for practical application.			

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 the filter type		Capacitor filtering				
Hot plug		Unavailable				

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Output Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Output voltage	QA123T-1509R3G	+Vo	Vin=12VDC, Pin9 & Pin10 +Io= +100mA	14.10	14.85	15.60	VDC
		-Vo	Vin=12VDC, Pin8 & Pin9 -Io= -100mA	-8.10	-8.55	-9.00	
	QA153T-1509R3G	+Vo	Vin=15VDC, Pin9 & Pin10 +Io= +100mA	14.25	15.00	15.75	
		-Vo	Vin=15VDC, Pin8 & Pin9 -Io= -100mA	-8.10	-8.55	-9.00	
	QA243T-1509R3G	+Vo	Vin=24VDC, Pin9 & Pin10 +Io= +100mA	13.65	14.40	15.15	
		-Vo	Vin=24VDC, Pin8 & Pin9 -Io= -100mA	-8.28	-8.73	-9.18	
Voltage Accuracy		10% -100% of load		See output regulation curve (Figure 2-Figure 7)			%
Linear Regulation		+Vo	Full voltage input range	--	±1.1	±1.3	--
		-Vo		--	±1.1	±1.3	
Load Regulation	QA123T-1509R3G	+Vo	10% - 100% load	--	9	12	%
		-Vo		--	9	12	
	QA153T-1509R3G	+Vo		--	7	12	
		-Vo		--	8	12	
	QA243T-1509R3G	+Vo		--	5	10	
		-Vo		--	5	10	
Temperature Coefficient		Full load		--	±0.04	±0.1	%/°C
Ripple & Noise*		20MHz bandwidth		--	50	--	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	5000	--	--	VAC
Continuous barrier withstand voltage	Input- output	--	2500	--	V
CMTI	Input- output	±200	--	--	kV/μs
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation capacitor	Input- output, capacitor at 100kHz/0.1V	--	2.5	4	pF
Operating Temperature	Derating when operating temperature ≥85°C, (see Fig. 1)	-40	--	105	°C
Storage Temperature		-55	--	125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10s seconds	--	--	300	
Case Temperature Rise	Ta=25°C, nominal input voltage, full load	--	30	60	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	Full load, nominal input voltage	--	200	--	kHz
Safety Standard		--			
Safety Class		CLASS III			
MTBF	MIL-HDBK-217F@25°C	3500	15604	--	k hours

Mechanical Specifications

Dimensions	23.11*22.61*9.85mm
Weight	6.6g (Typ.)
Cooling Method	Natural air cold

Electromagnetic Compatibility (EMC)

Emissions	CE (12V/15V Series)	CISPR32/EN55032	CLASS B (see Table 2. for recommended circuit)
	CE (24V Series)	CISPR32/EN55032	CLASS A (see Table 2. for recommended circuit)
	RE	CISPR32/EN55032	CLASS A (see Table 2. for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Contact ±8kV perf. Criteria B

Typical Characteristic Curves

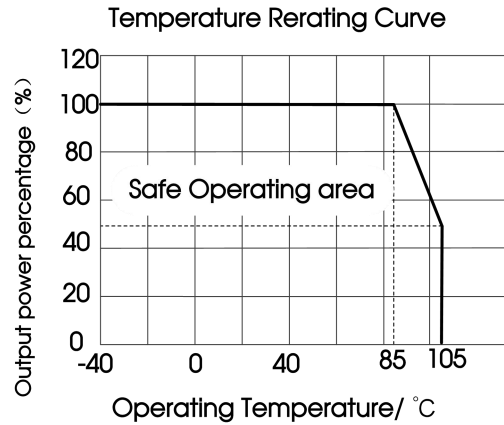


Fig.1

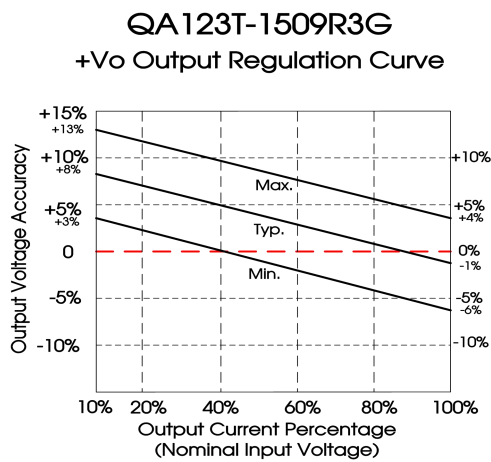


Fig.2

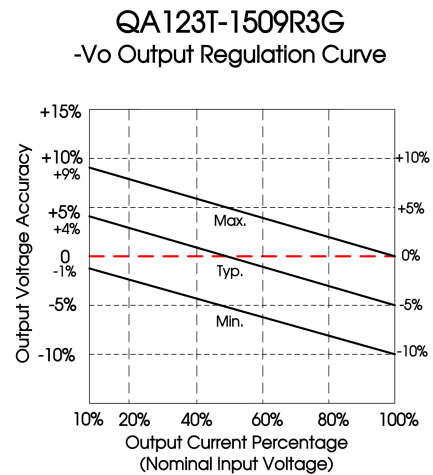


Fig.3

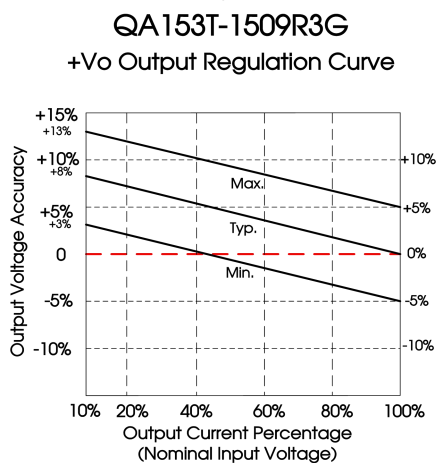


Fig.4

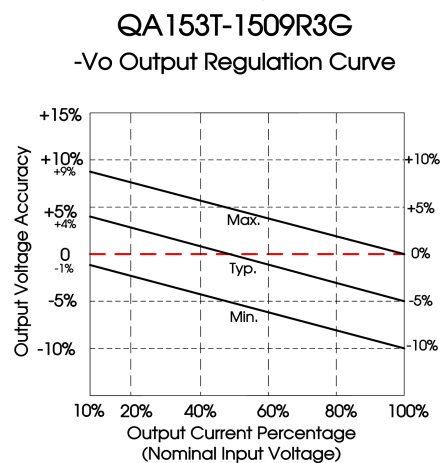


Fig.5

QA243T-1509R3G
+Vo Output Regulation Curve

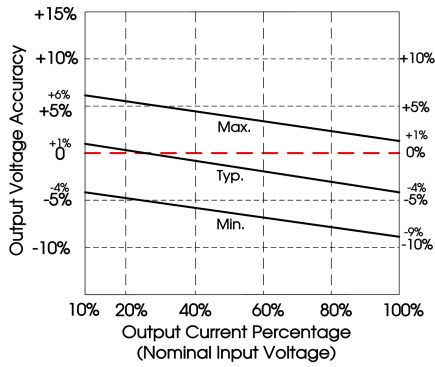


Fig.6

QA243T-1509R3G
-Vo Output Regulation Curve

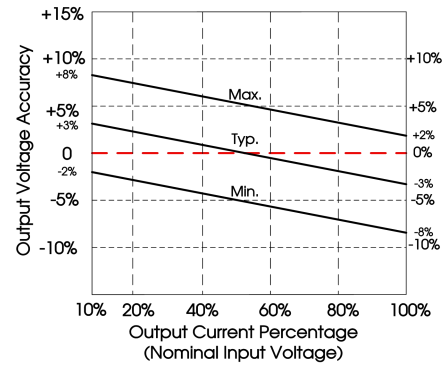


Fig.7

Efficiency Vs Input Voltage(Full Load)

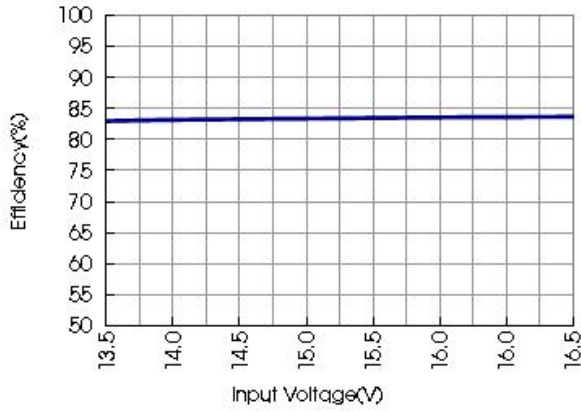


Fig.8

Efficiency Vs Output Load(Vin=15V)

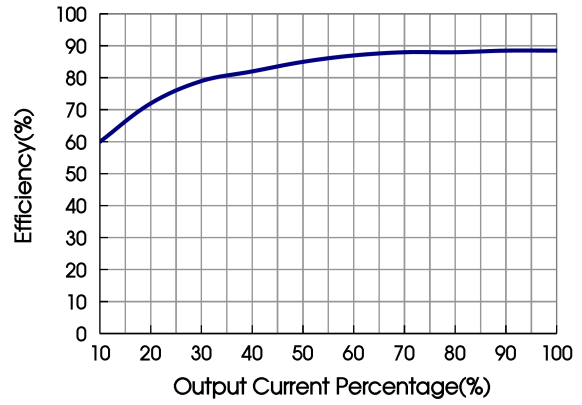


Fig.9

Note: Take QA153T-1509R3G as an example, other models can be corresponding reference

Design Reference

1. Test configurations

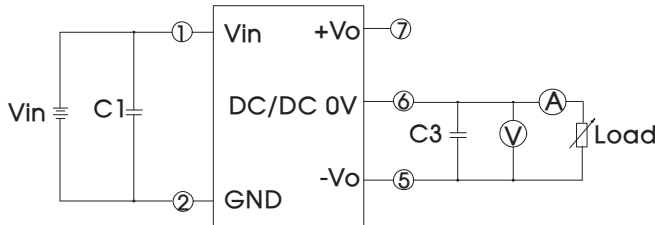


Fig.10

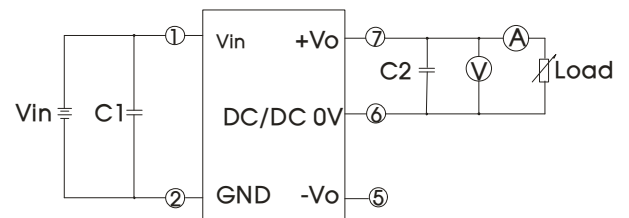


Fig.11

Note: C1, C2, and C3, respectively, are 100 μ F / 35V (low internal resistance capacitance)

2. Typical applications

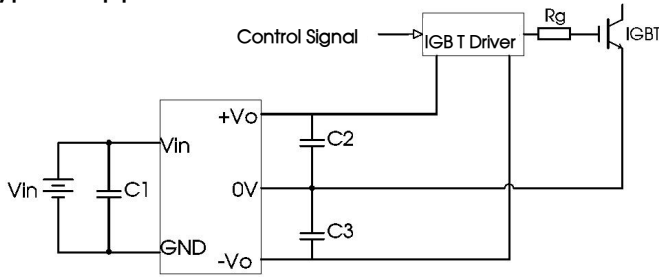


Fig.12

Table 1.

C1/C2/C3
100 μ F / 35V
(low internal resistance capacitor)

3. EMC typical recommended circuit

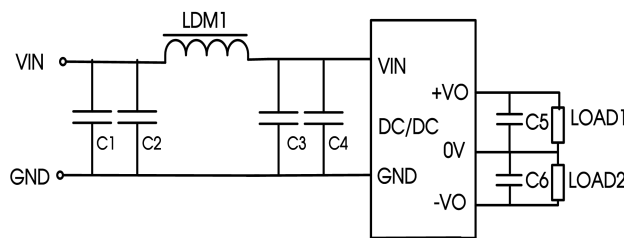


Fig.13

Table 2.

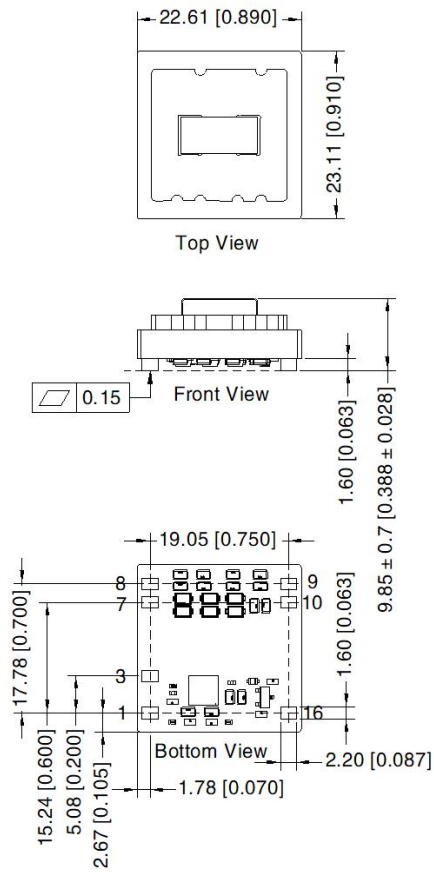
Part No.	Recommended circuit	C1	C2	C3	C4	LDM1
QA123T-1509R3G	Fig.13	1 μ F/50V	0.1 μ F/50V	1 μ F/50V	0.1 μ F/50V	27 μ H
QA153T-1509R3G						
QA243T-1509R3G						

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.

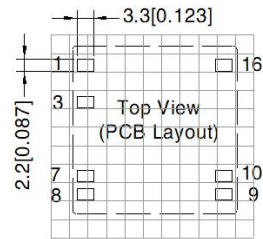
5. The products do not support parallel connection of their output for power expansion purpose or hot-plug.

6. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin-Out	QAXX3T-1509R3G
Pin	Mark
1	GND
3	NC
7	NC
8	-V0
9	0V
10	+V0
16	VCC

Note:

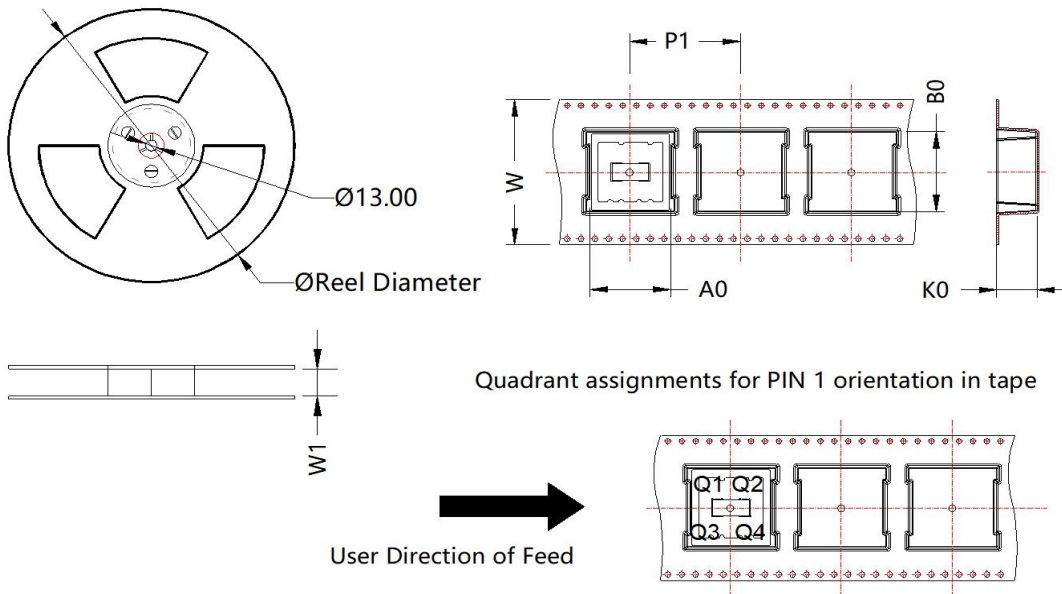
Unit: mm[inch]

Pin size tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

The layout of the device is for reference only, please refer to the actual product

Package diagram:



Device	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
QAxx3T-xxxxR3G	170	180.0	44.5	23.78	24.28	11.6	32.0	44.0	Q1

- Notes:
- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58070018;
 - The leads for the module and SIC drives are as short as possible;
 - The output filtering capacitor should be as close as possible to the power supply module and IGBT driver;
 - The peak of the IGBT driver gate drive current is high, so low internal resistance electrolytic capacitor is recommended to be used for the power supply module output filter capacitor;
 - The average output power of the driver must be lower than that of the power supply module;
 - Consider fixing with glue near the module if being used in vibration occasion;
 - The maximum capacitive load offered were tested at nominal input voltage and full load;
 - Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
 - All index testing methods in this datasheet are based on company corporate standards;
 - The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff;
 - Products are related to laws and regulations: see "Features" and "EMC".
 - Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
 - We can provide product customization service, please contact our technicians directly for specific information;

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