DC/DC Converter for IGBT Driver

QAxx1 Series

MORNSUN®

DC/DC Converter for IGBT driver

Patent Protection CE Report EN62368-1 RoHS

FEATURES

- High efficiency up to 81%
- Ultra compact SIP package
- I/O isolation test voltage 3000VAC
- Max. Capacitive Load:1000uF
- Ultra low isolation capacitance
- Operating ambient temperature range: -40℃ to +105℃
- No-load operation allowed

QAxx1 series are DC-DC converters for IGBT drivers. The ultra low isolation capacitance can improve the capability of anti-interference. The built-in common-ground mode of the unique asymmetric voltage output mode reduces the driver loss of IGBT driver. It features short-circuit protection, auto-recovery and can be widely used in:

1. General inverter
2. AC servo drive system
3. Electric welding machine
4. Uninterruptible power supply (UPS)

Selection Guide

Certification	Part No.	Input		Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF) Max.
		Input Voltage(VDC) Nominal (Range)	Input Current(mA, Typ.) full load/no-load	Voltage(VDC) +Vo/-Vo	Current(mA) +Io/-Io		
EN	QA121	12 (11.4-12.6)	280/40	+15/-8.0	+120/-120	78/81	1000
--	QA151	15 (14.25-15.75)	230/35				
EN	QA241	24 (22.8-25.2)	144/30				

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Surge Voltage (1sec. max.)	QA121	DC	-0.7	--	14	VDC
	QA151	DC	-0.7	--	16	
	QA241	DC	-0.7	--	26	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item			Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage	QA121	+Vo	Vin=12VDC, Pin6 & Pin7 +Io= +120mA		14.10	14.81	15.60	VDC
		-Vo	Vin=12VDC, Pin5 & Pin6 -Io= -120mA		-6.24	-7.84	-9.44	
	QA151	+Vo	Vin=15VDC, Pin6 & Pin7 +Io= +120mA		14.10	14.81	15.60	
		-Vo	Vin=15VDC, Pin5 & Pin6 -Io= -120mA		-6.24	-7.84	-9.44	
	QA241	+Vo	Vin=24VDC, Pin6 & Pin7 +Io= +120mA		14.10	14.81	15.60	
		-Vo	Vin=24VDC, Pin5 & Pin6 -Io= -120mA		-6.24	-7.84	-9.44	
Voltage Accuracy			10% -100% load		See output regulation curve (Fig. 2, Fig. 3)			%
Linear Regulation			Input voltage range	Positive output	--	±1.1	±1.2	--
				Negative output	--	±1.1	±1.2	

Load Regulation	10%-100% load	Positive output	--	8	15	%
		Negative output	--	10	15	
Temperature Coefficient	Full load		--	±0.04	--	%/℃
Ripple & Noise*	20MHz bandwidth		--	100	200	mVp-p
Short-circuit Protection			--	--	1	s
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.	3000	--	--	VAC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	6	10	pF
Operating Temperature	Derating when operating temperature up to 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, full load output	--	--	40	
Safety Standard		EN62368-1 (Report)			
Storage Humidity	Non-condensing	5	--	95	%RH
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 12.50 mm
Weight	4.3g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Immunity	ESD	IEC/EN61000-4-2	Contact ±8kV	perf. Criteria B
	EFT	IEC/EN61000-4-4	±2kV	perf. Criteria B
	Surge	IEC/EN61000-4-5	±2kV (Input to Output)	perf. Criteria B

Typical Characteristic Curves

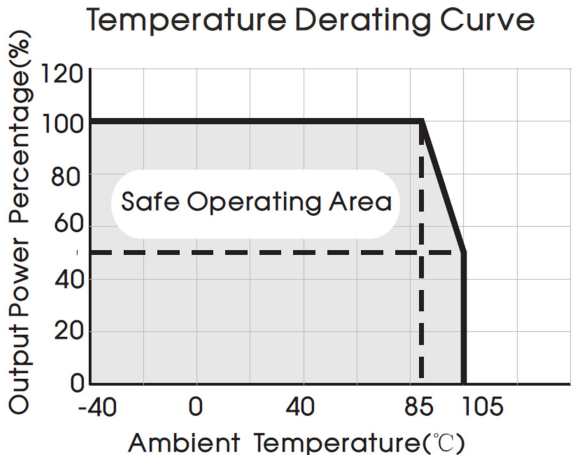


Fig. 1

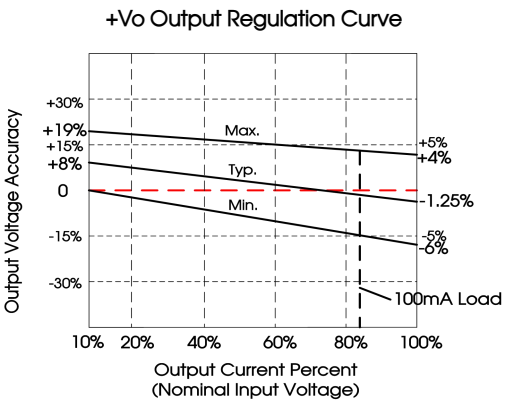


Fig. 2

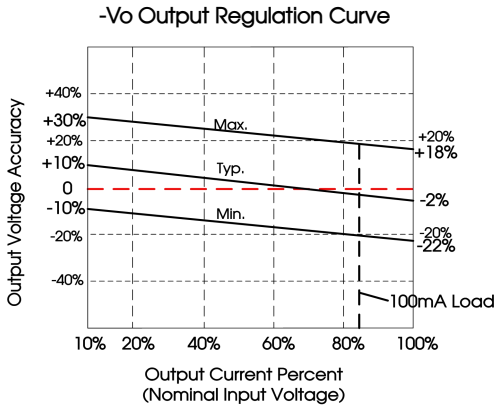
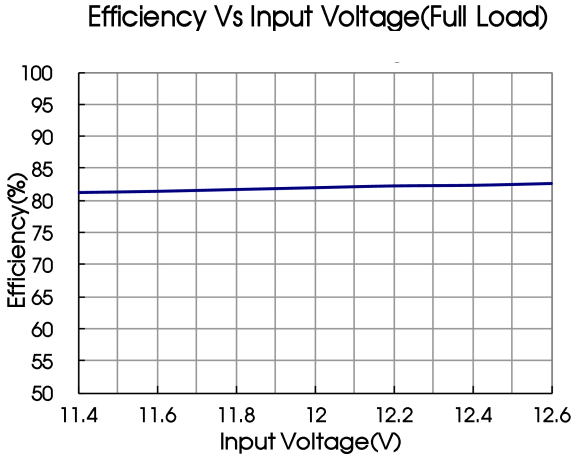
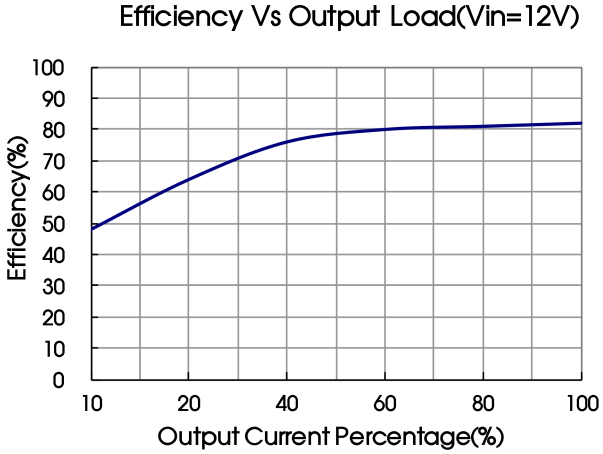


Fig. 3





Note: Take QA121 as an example, other models can be corresponding reference

Design Reference

1. Typical application

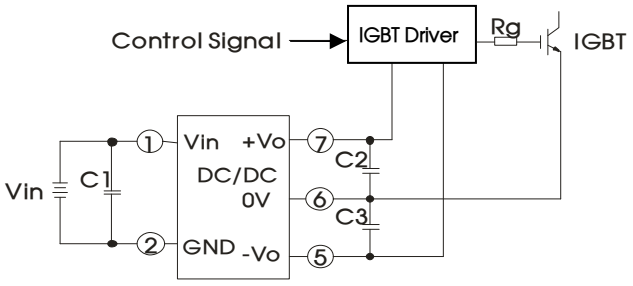


Fig. 4

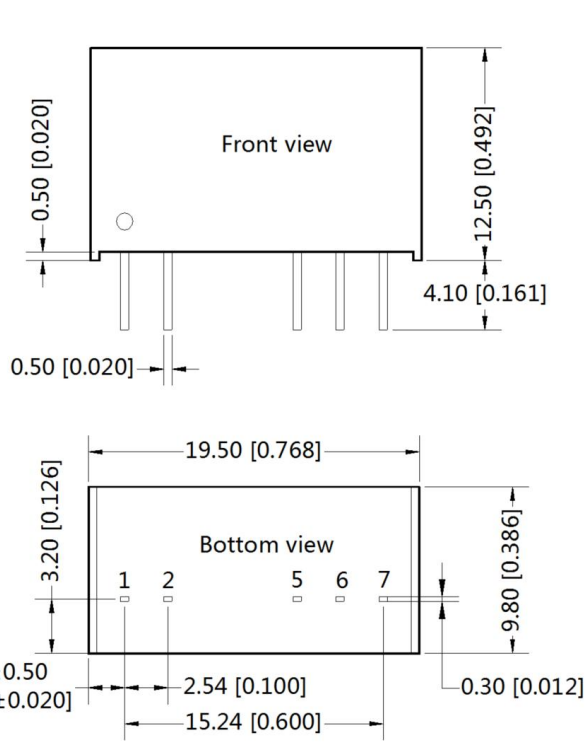
C1/ C2 /C3
100uF/35V (Low internal resistance capacitance)

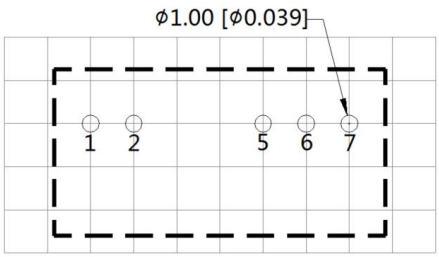
Note: A ceramic capacitor (1uF-10uF) can be connected in parallel to both ends of the C2 and C3 to reduce ripple and noise

2. The products do not support parallel connection of their output

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

Dimensions and Recommended Layout





Note: Grid 2.54*2.54mm

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

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: 58200013;
2. The lead wire connecting the power supply module and IGBT 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 IGBT driver;
4. 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;
5. The average output power of the driver must be lower than that of the power supply module;
6. Consider fixing in place with glue near the module if being used in vibration occasions;
7. The maximum capacitive load is measured under the full input voltage range and full load condition;
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 our company corporate standards;
10. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. 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.
13. We can provide product customization service, please contact our technicians directly for specific information.

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