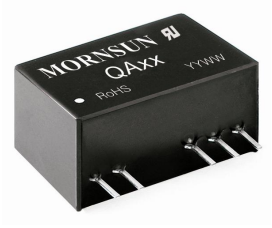
MORNSUN®

QA Series

Application Design For IGBT Driver DC-DC Converter



Continuous Short Circuit Protection

Patent Protected RoHS

FEATURES

- Efficiency up to 80%
- Miniature SIP package
- Good performance at high and low temperature
- 3000VAC isolation
- Ultra-miniature isolation capacitor
- Operating temperature: -40℃ ~ +105℃
- Using without load

APPLICATIONS

QA series is an application-designed power supply for the IGBT driver which needs two outputs isolate from the input. With two outputs, it can drive IGBT more effective. The module also provides functions of short-circuit protection and auto-recovery capability. The general application is:

- General-purpose inverter
- AC servo systems
- Welding machines
- Uninterrupted power supplies(UPS)

SELECTION GUIDE

Approval	Model	Input Voltage(VDC)	Output Voltage (VDC)		Output Current (mA)		Input Current (mA,Typ.)		Max. Capacitive Load(μF)	Efficiency(%) @Max. Load	
		Nominal (Range)	+Vo	-Vo	+Io	-Io	@Max. Load	@No Load		Min.	Typ.
UL	QA01	15 (14.5~15.5)	+15	-8.7	+80	-40	130	20	220	78	80
	QA01-09		+9.0	--	+111	--	84			78	80
	QA01-A09		+9.0	-9.0	+55	-55	84			78	80
	QA01-17		+17	-8.7	+80	-40	143			78	80
	QA02	12 （11.6~12.4）	+15	-8.7	+80	-40	162			78	80
	QA03	24 （23.3~24.7）	+15	-8.7	+80	-40	81			78	80
	QA04	12 （9~15）	+15	-8.0	+100	-80	223			78	80

INPUT SPECIFICATIONS

Item		Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	QA01*	DC	-0.7	--	16	V
	QA02	DC	-0.7	--	13	
	QA03	DC	-0.7	--	26	
	QA04	DC	-0.7	--	15	
Input Filter			Capacitor			

Note: QA01* is for models with the beginning of QA01.

OUTPUT SPECIFICATIONS

Item			Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	QA01	+Vo	Vin=15VDC, Pin6 & Pin7 +Io=+80mA	14	15	16	VDC
		-Vo	Vin=15VDC, Pin5 & Pin6 -Io=-40mA	-7	-8.7	-10	
	QA01-09	+Vo	Vin=15VDC, Pin6 & Pin7 +Io=+111mA	8	9	10	
		-Vo	--	--	--	--	
	QA01-A09	+Vo	Vin=15VDC, Pin6 & Pin7 +Io=+55mA	8	9	10	
		-Vo	Vin=15VDC, Pin5 & Pin6 -Io=-55mA	-8	-9	-10	
	QA01-17	+Vo	Vin=15VDC, Pin6 & Pin7 +Io=+80mA	16.5	17	18	
		-Vo	Vin=15VDC, Pin5 & Pin6 -Io=-40mA	-7	-8.7	-10	

Output Voltage	QA02	+Vo	Vin=12VDC, Pin6 & Pin7 +Io=+80mA	14	15	16	VDC
		-Vo	Vin=12VDC, Pin5& Pin6 -Io=-40mA	-7	-8.7	-10	
	QA03	+Vo	Vin=24VDC, Pin6 & Pin7 +Io=+80mA	14	15	16	
		-Vo	Vin=24VDC, Pin5 & Pin6 -Io=-40mA	-7	-8.7	-10	
	QA04	+Vo	Vin=12VDC, Pin6 & Pin7 +Io=+100mA	14	15	16	
		-Vo	Vin=12VDC, Pin5 & Pin6-Io=-80mA	-7	-8	-9	
Line Regulation			Vin Range	--	±1.2	±1.5	%
Temperature coefficient			100% load	--	--	±0.03	%/°C
Ripple & Noise*			20MHz Bandwidth		100	200	mVp-p
Short Circuit Protection				Continuous, automatic recovery			
Note:* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at *DC-DC Application Notes.*							

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	3000	--	--	VAC
Isolation Resistance	Input-Output, test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	6.6	--	pF
Switching Frequency	Full load ,nominal input	--	100	300	KHz
MTBF	MIL-HDFK-217F@25℃	3500	--	--	K hours
Case Material		Plastic(UL94-V0)			
Weight		--	4.3	--	g

ENVIRONMENTAL SPECIFICATIONS

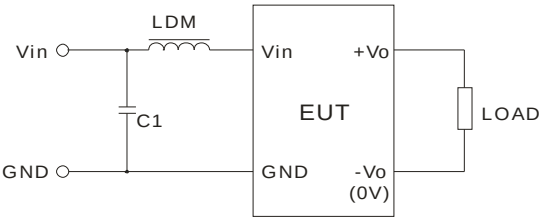
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (≥85℃, see Figure 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Temperature rise	Ta=25°C	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (Recommended Circuit Refer to Figure1)
	RE	CISPR22/EN55022 CLASS B (Recommended Circuit Refer to Figure1)
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

EMC RECOMMENDED CIRCUIT

EMI Typical Recommended Circuit（CLASS B）:

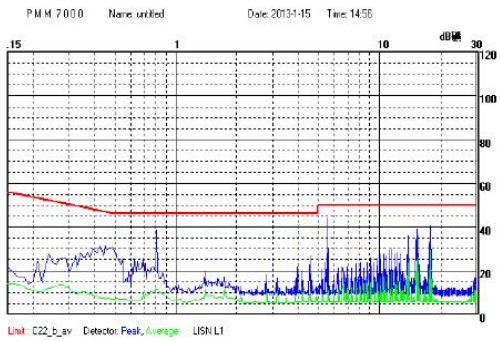


(Figure1)

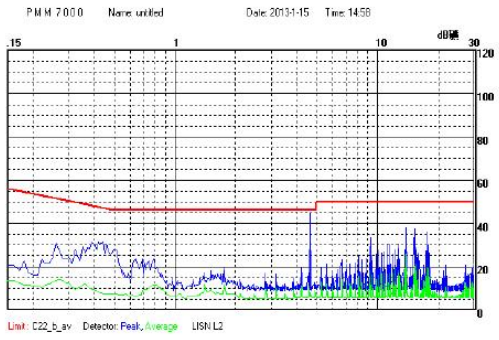
Recommended typical circuit parameters:

Vin(V)		12/15/24
EMI	C1	4.7μF /50V
	LDM	12μH

EMC TEST WAVEFORM (RECOMMENDED CIRCUIT FINGURE 1)

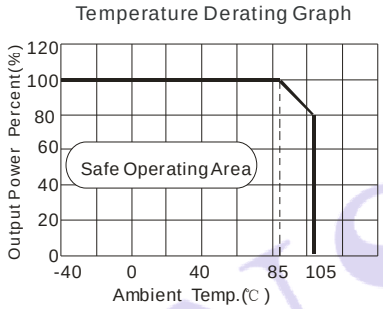


QA01 CE(Class B, Positive line)

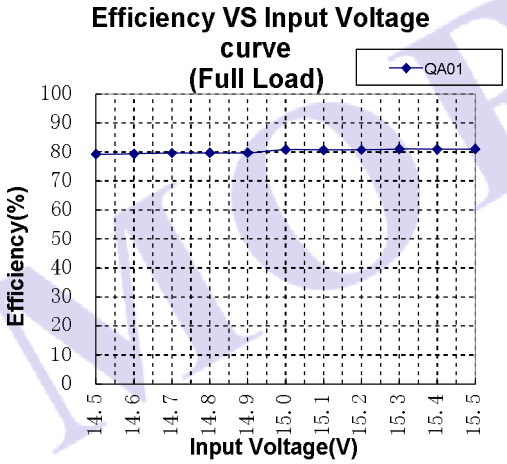


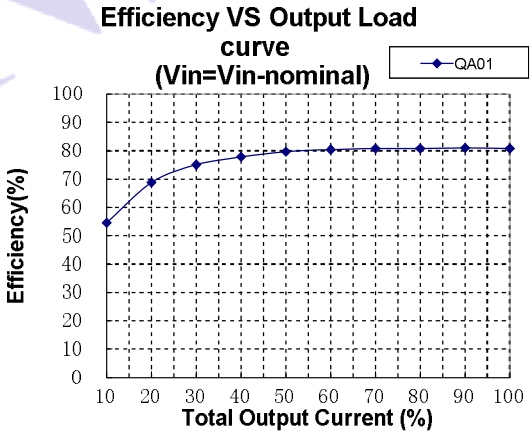
QA01 CE(Class B , Negative line)

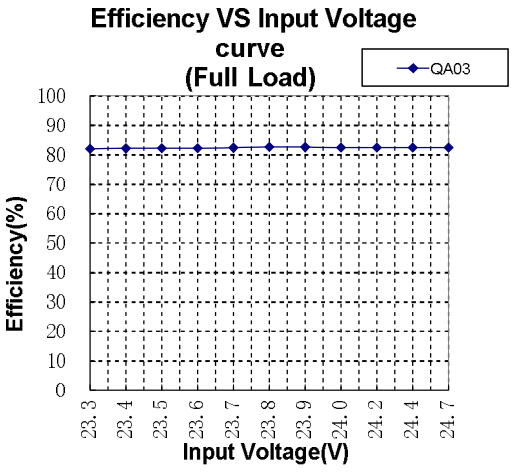
PRODUCT TYPICAL CURVE

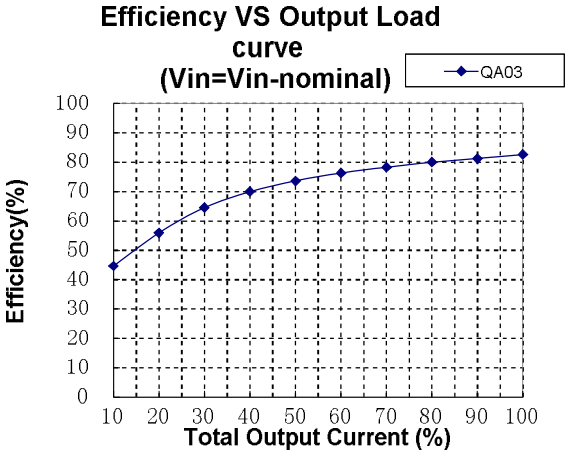


(Figure2)



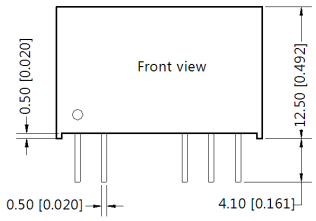


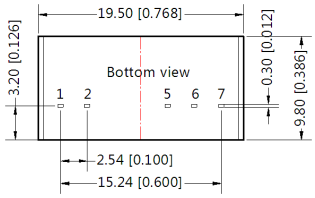




DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS





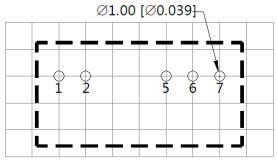
PIN CONNECTION	
Pin	Function
1	Vin
2	GND
5*	-Vo
6	0V
7	+Vo

Note:*QA01-09 has no connection

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

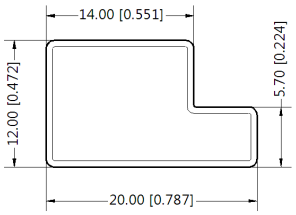
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



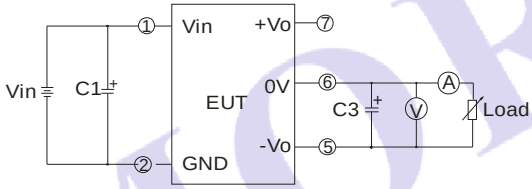
Note:Grid 2.54*2.54mm

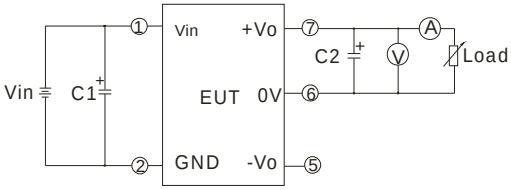
TUBE PACKAGING DIMENSIONS



Note:
General tolerances :±0.5mm[±0.020inch]
L=530mm[20.866 inch] Tube Quantity:25 pcs
L=220mm[8.661 inch] Tube Quantity:10 pcs
Inner carton(S): L*W*H=255*170*80 mm
Outer carton(S): L*W*H=375*280*270mm, 6 inner cartons(S)
Inner carton(L): L*W*H=580*200*100mm
Outer carton(L): L*W*H=600*215*220mm, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325mm, 3 inner cartons(L)

TEST CONFIGURATIONS





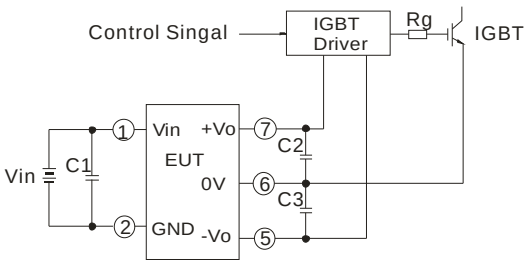
C1,C2,C3: 100uF/35V (Low impedance)

DESIGN CONSIDERATIONS

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) Recommended circuit



C1: 100uF/35V(Low impedance)
C2: 100uF/35V(Low impedance)
C3: 100uF/35V(Low impedance)

3) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable

Note:

1. The wire between the converter and IGBT driver should be as short as possible.
2. External filter capacitors should be placed as close as possible to the converter and the IGBT driver.
3. The average power of the IGBT driver should be less than the output power of DC-DC module.
4. For the application of shocking, recommend to glue the module by glue.
5. Max. Capacitive Load is tested at nominal input voltage and full load.
6. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load.
7. In this datasheet, all test methods are based on our corporate standards.
8. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
9. Please contact our technical support for any specific requirement.
10. Specifications of this product are subject to changes without prior notice.

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