

Typical Characteristics

DC/DC Power Module for IGBT Drivers

- Fixed-voltage input, isolated unregulated output, 2W power
- Isolation voltage: 3000VAC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 80% (Typ.)
- Operating ambient temperature: -40℃~+105℃
- MTBF≥3.5 million hours (3500000Hrs)
- Output short-circuit protection: Continuous short-circuit protection, automatic recovery
- Compact SIP package, plastic housing
- Industry standard pin-out
- Ripple/noise (20MHz bandwidth):30mVp-p(Typ.)



The QA series is a DC-DC module power supply designed by Huizhi Electronics specifically for IGBT drivers. It uses an asymmetric voltage output internally to minimize the driving loss of the IGBT as much as possible. It also features output short-circuit protection and self-recovery capability. This product is suitable for:

- General-purpose variable-frequency drives
- AC servo drive systems
- Welding machines
- Uninterruptible power supplies (UPS)

Product selection table

Cer tif ica tio n	Model number	Input voltage range (Vdc)	Output Voltage/Current		Ripple and Noise	Efficien cy@ Full load	Max. capacit ive load
		Rated value ^② (Range)	Output V (Vdc)	Output I (mA) (Max. Min.)	Full Load (mVp-p) Typ./Max.	%, (Min./Typ.)	μF
	QA01	15 (14.5- 15.5)	+ 15/-8.7	+80/-40	30/80	77/80	220
	QA01-09		+9.0/—	+111/—	30/80		
	QA01-A09		+9.0/-9.0	+55/-55	30/80		
	QA01- 17		+17/-8.7	+80/-40	30/80		
	QA02	12 (11.6- 12.4)	+15/-8.7	+80/-40	30/80		
	QA03	24 (23.3-24.7)	+15/-8.7	+80/-40	30/80		
	QA04	12 (9- 15)	+15/-8.0	+100/-80	30/80		

Note: 1. Due to space limitations, the above is only a list of representative products. For products not included in this list, please contact our Sales Department.

2. The maximum capacitive load indicates the maximum capacitive load that can be connected to +Vo or -Vo. If this value is exceeded, the product will not start properly.

Test Conditions: Unless otherwise specified, all parameter measurements were taken at the nominal input voltage, with a purely resistive rated load, and at an ambient temperature of 25° C.

Input characteristics						
Items		Working conditions	Min.	Typ.	Max.	Unit
Input voltage	QA01*	DC	-0.7	--	16	VDC
	QA02	DC	-0.7	--	13	
	QA03	DC	-0.7	--	26	
	QA04	DC	-0.7	--	15	
Input filter type			Capacitor filtering			
Hot swap			Not supported			

Output characteristics									
		Working conditions		Min.	Typ.	Max.	Unit		
QA01	+Vo	Vin= 15VDC, Pin6 & Pin7 +Io=+80mA		14.25	15	15.75	VDC		
	-Vo	Vin= 15VDC, Pin5 & Pin6 -Io=-40mA		-8.00	-8.7	-9.40			
QA01-09	+Vo	Vin= 15VDC, Pin6 & Pin7 +Io=+ 111mA		8.46	9	9.54			
	-Vo	---		---	---	---			
QA01-A09	+Vo	Vin= 15VDC, Pin6 & Pin7 +Io=+55mA		8.55	9	9.45			
	-Vo	Vin= 15VDC, Pin5 & Pin6 -Io=-55mA		-8.28	-9	-9.72			
QA01-17	+Vo	Vin= 15VDC, Pin6 & Pin7 +Io=+80mA		16.15	17	17.85			
	-Vo	Vin= 15VDC, Pin5 & Pin6 -Io=-40mA		-8.00	-8.7	-9.40			
QA02	+Vo	Vin= 12VDC, Pin6 & Pin7 +Io=+80mA		14.25	15	15.75			
	-Vo	Vin= 12VDC, Pin5 & Pin6 -Io=-40mA		-8.00	-8.7	-9.40			
A03	+Vo	Vin=24VDC, Pin6 & Pin7 +Io=+80mA		14.25	15	15.75			
	-Vo	Vin=24VDC, Pin5 & Pin6 -Io=-40mA		-8.00	-8.7	-9.40			
QA04	+Vo	Vin= 12VDC, Pin6 & Pin7 +Io=+100mA		14.25	15	15.75			
	-Vo	Vin= 12VDC, Pin5 & Pin6 -Io=-80mA		-7.36	-8	-8.64			
Output voltage accuracy		QA01-09		---	±4	±6	%		
		Other models		See the error envelope curve (Figure 1)					
Line Regulation		Within the input voltage range		---	± 1.2	± 1.5	---		
Load Regulation		10% to 100% load	QA01-09		---	12	26	%	
			Other models	Positive output		---	8		15
				Negative output		---	10		15
Temperature drift coefficient		Full load		---	---	±0.03	%/C		
Ripple & Noise		20MHz bandwidth		---	100	200	mVp-p		
Short-circuit protection				Sustainable, self-recovering					

Note: *The test method for ripple and noise uses the twisted-pair test method; see the Test Reference.

General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	1500	--	--	VDC
Insulation resistance	Input-output, insulation voltage 500 VDC.	1000	--	--	MΩ
Isolation capacitor	Input-Output, 100 kHz/0.1 V	--	40	--	pF
Operating temperature	Use the reference temperature derating curve	-40	--	+85	℃
Storage temperature		-40	--	+125	
Maximum operating case temperature		--	25	--	
Storage temperature	No condensation	5	--	95	%RH
Pin soldering temperature	The solder joint is 1.5 mm from the housing; 10 seconds	--	--	+300	℃
Switching frequency	Full load, rated voltage input	--	100	--	KHz
Vibration		10-55Hz, 10G, 30 Min. along X, Y and			
Housing material		Black flame-retardant, heat-resistant plastic (UL94 V-0)			
Minimum mean time between failures	MIL-HDBK-217F@25℃	3.5X10 ⁶	--	--	Hrs

Product Performance Curve

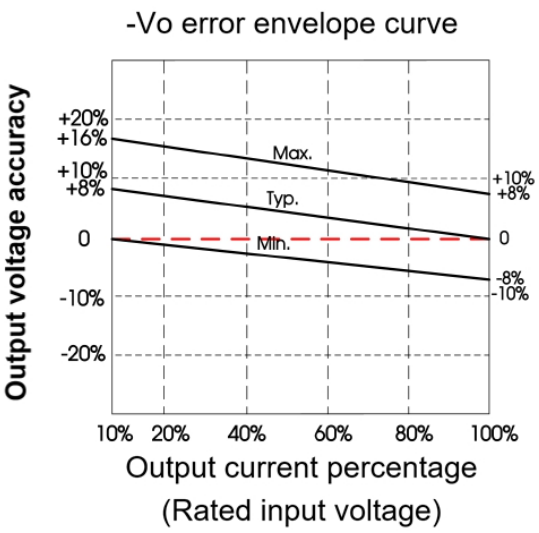
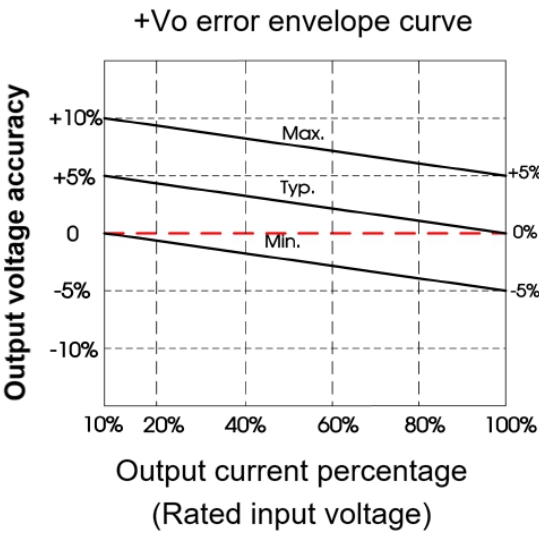


Figure 1
(Excludes model QA01-09)

1. General applications:

If further reduction of input and output ripple is required, a capacitor filter network can be connected across the input and output terminals; the circuit is shown in Figure 1.

However, care must be taken to select an appropriate filter capacitor. If the capacitor is too large, it is likely to cause startup issues. For each output channel, the recommended capacitive load values—which ensure safe and reliable operation—are listed in Table 1.

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

The schematic diagram illustrates a DMCM filter. It features a differential input with terminals labeled $+Vin$ and $-Vin$. The input signal passes through a series inductor labeled $LDM2$, followed by a shunt capacitor labeled $C2$. This is followed by another series inductor labeled $LDM2$, and then a shunt capacitor labeled $C1$. The output of the filter is a differential signal with terminals labeled $+Vin$ and $-Vin$, which are connected to a load consisting of two series resistors labeled $LDAD1$ and $LDAD2$.

Input voltage		12/ 15/24VDC
EMI	C1 、C2	4.7μF /50V
	LDM1	12μ H
	LDM2	47μ H

1	2	3	4	5	6	7
+Vin	-Vin	No Pin	No Pin	-Vout	COM	+Vout
输入正	输入负	空脚	空脚	输出负	公共地	输出正

Package code	L x W x H	
QA	19.5 x 9.8x 12.5 mm	0.768 × 0.386 ×0.492inch

Test Application Reference

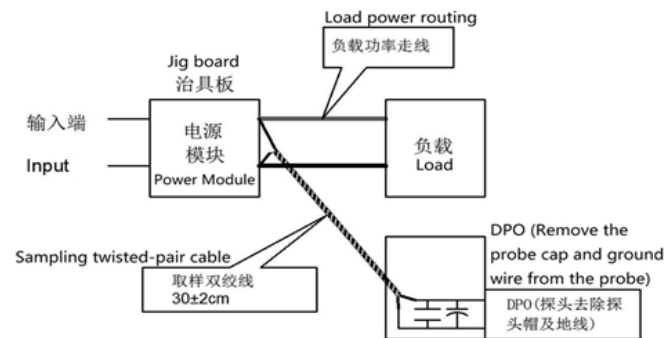
Ripple & Noise Testing: (Twisted-pair method, 20 MHz bandwidth)

Test Method:

1. For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1 μF polypropylene capacitor and a 4.7 μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope to “Sample” mode.

2. Schematic Diagram for Output Ripple and Noise Testing:

Connect the power supply input to the input power source. Connect the power supply output to the electronic load via the fixture board. For testing, use a 30 cm ± 2 cm sampling lead to take a direct sample from the power supply output port. Select insulated wires with appropriate gauge based on the magnitude of the output current.



Application Precautions

1. Input Requirements: Ensure that the output voltage fluctuation range of the power supply does not exceed the input requirements of the DC/DC module itself; the output power of the input power supply must be greater than the output power of the DC/DC module.
2. Recommended Circuit 1: For applications with general ripple and noise requirements, a filter capacitor can be connected in parallel at both the input and output terminals. The external circuit is shown in Figure (1) below; refer to Table (1). Output Load Requirements: Avoid operating under no-load conditions whenever possible. When the actual power consumption of the load is less than 10% of the module's rated output power or no-load conditions occur, it is recommended to connect a dummy load to the output. The dummy load (resistor) can be calculated based on 5 - 10% of the module's rated power, where the resistance value = $U_{out} / (1W \times R3 \times 10\%)$;
3. Overload Protection: Under normal operating conditions, the product's output circuit does not provide overload protection. Prolonged overload will trigger over-temperature protection, causing the output to shut down;
4. The output features continuous short-circuit protection with automatic recovery.
5. The capacitance of the external capacitor connected to the output should not be too large, as this may cause overcurrent or poor startup during module startup;
6. If the product operates below the minimum required load, performance compliance with all specifications in this manual cannot be guaranteed;
7. Maximum capacitive loads are tested within the input voltage range and under full-load conditions;
8. Unless otherwise specified, all specifications in this manual are measured at $T_a=25^\circ\text{C}$, humidity <75% RH, nominal input voltage, and rated output load;
9. All test methods for the specifications in this manual are based on our company's standards;
10. We offer product customization; please contact our technical staff directly for details;
11. Product specifications are subject to change without notice.

Contact

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