

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 81% (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.)



QAxx1 series is a DC-DC module power supply designed by Huizhi Electronics specifically for IGBT drivers. It features an asymmetric voltage output configuration to minimize IGBT drive losses as much as possible. It also includes output short-circuit protection and self-recovery capabilities. This product is suitable for:

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

Product selection table

Ce rt if ic at io n	Model number	Input voltage range (Vdc)	Output Voltage/Current	Ripple and Noise		Efficiency@ Full load	Max. capaci tive load
		Rated value ^② (Range)	Output V (Vdc)	Output I (mA) (Max. Min.)	Full Load (mVp-p) Typ. /Max	%, (Min. /Typ.)	μ F
	QA121	12 (11.4-12.6)	+15/-8.0	+120/-120	100/200	78/81	1000
	QA151	15 (14.25-15.75)					
	QA241	24 (22.8-25.2)					

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	QA121	DC	-0.7	--	14	VDC
	QA151	DC	-0.7	--	16	
	QA241	DC	-0.7	--	26	
Input filter type			Capacitor filtering			
Hot swap			Not supported			

Output characteristics

Items		Working conditions		Min.	Typ.	Max.	Unit
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	
Output voltage accuracy		10% -100% load					
Line Regulation		Within the input voltage range		--	±1.1	±1.2	--
Load Regulation		10% -100% load	+ output	--	8	15	%
			- output	--	10	15	
Temperature drift coefficient		Full load		--	±0.04	--	%/°C
Ripple & noise		20MHz bandwidth		--	100	200	mVp-p
Output short-circuit protection				--	--	1	s

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

General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	3000	--	--	VDC
Insulation resistance	Input-output, insulation voltage 500 VDC.	1000	--	--	MΩ
Isolation capacitor	Input-Output, 100 kHz/0.1 V	--	6	10	pF
Operating temperature	Use the reference temperature derating curve	-40	--	105	℃
Storage temperature		-55	--	+125	
Maximum operating case temperature		--	25	--	
Storage temperature	No condensation	-55	--	125	%RH
Pin soldering temperature resistance	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 Z			
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

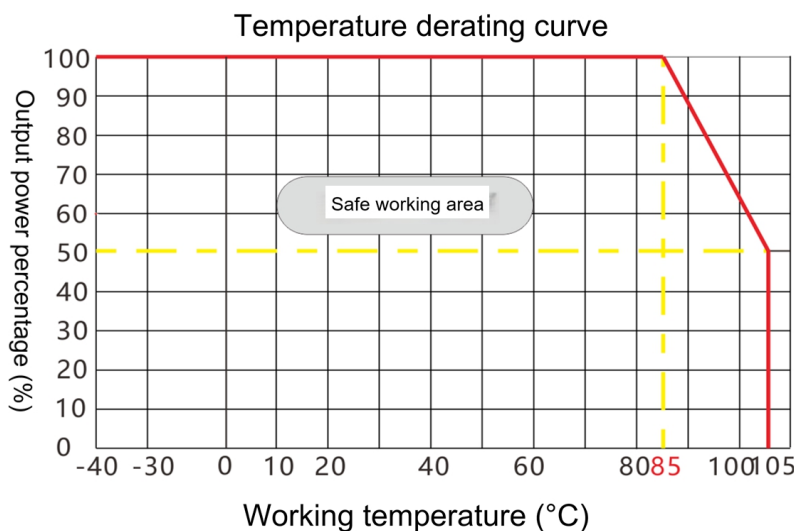


Figure 1

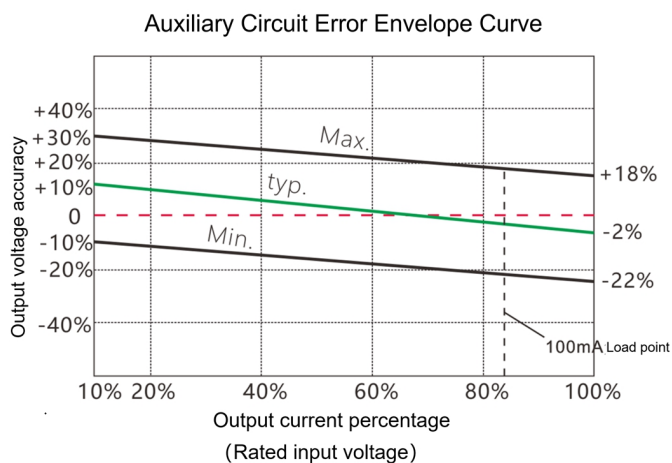


Figure 2 (Main Circuit Error Envelope Curve)

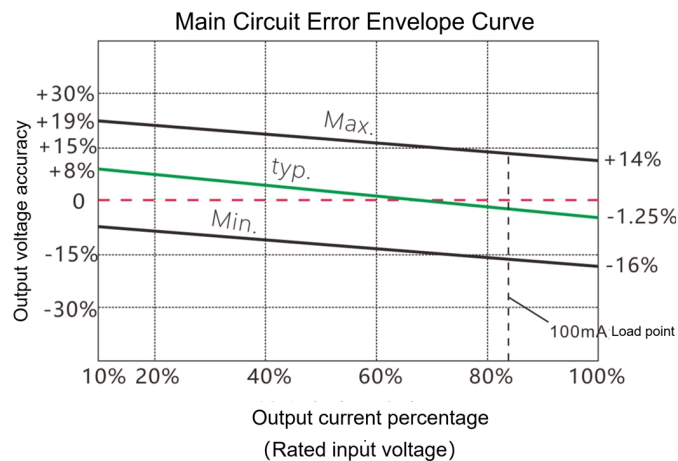


Figure 2 (Main Circuit Error Envelope Curve)

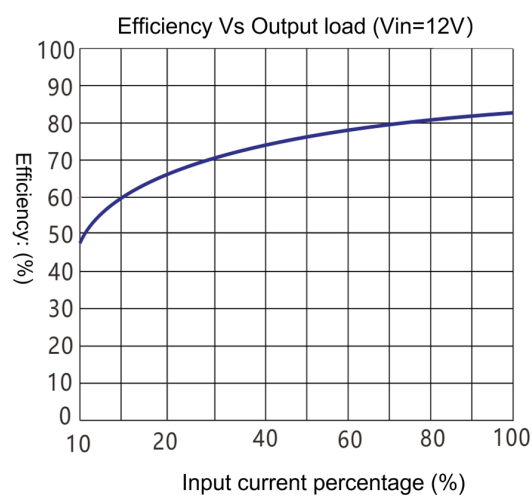
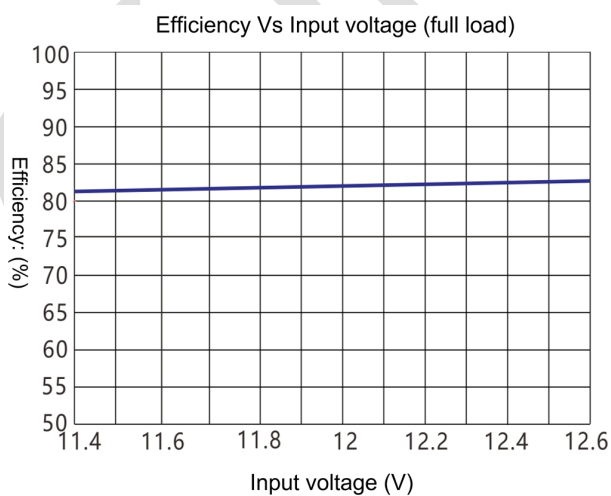


Figure 3

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.

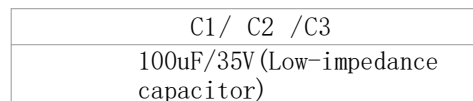


图4

输入电压		12/ 15/24VDC
EMI	C1 、C2	4.7μF /50V
	LDM1	12μ H
	LDM2	47μ H

Test Application Reference

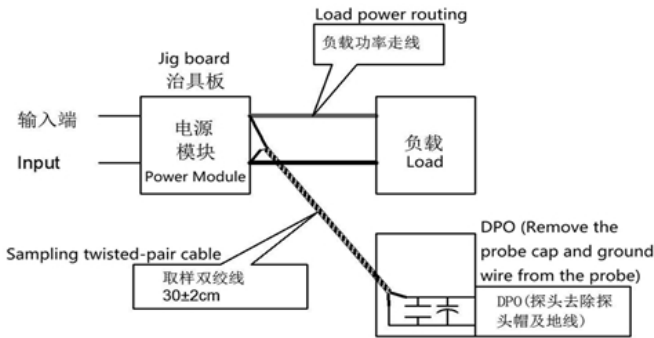
Ripple & Noise Testing: (Twisted-pair method, 20 MHz bandwidth)

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 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 Ta=25° 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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