Typical Characteristics

- Meets enhanced insulation requirements
- Isolation voltage: 5000V AC
- Partial discharge 1700
- CMTI>200 kV/μs
- Maximum capacitive load: 2200μF
- Ultra-compact isolation capacitor 4.2pF(typ.)
- Efficiency up to: 85%
- DIP package
- Working temperature: -40℃ to +105℃
- Sustainable short-circuit protection

DC/DC Power Module for SIC Drivers

The QAxx3HCD2-R3 series is a DC-DC module power supply designed by Huizhi Electronics specifically for SiC MOSFET drivers. It features an asymmetric voltage output configuration to minimize drive losses in SiC MOSFETs 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

Certification	Product model no.①	Input voltage range (Vdc)	Output voltage/current		Ripple & noise	Efficiency @ Full Load	Maximum capacitive load
		Rated value② (Range)	Output voltage (Vdc)	Output current (mA) (Max. Min)	Full load (mVp-p)	%, (Min./ Typ.)	uF
	QA152D	15 (13.5-16.5)	+15/-9.0	+200/-200	80/120	83/87	1000
	QA123HCD2-1504R3	12 (10.8-13.2)	+15/-4	+120/-120	80/120	80/85	2200
	QA123HCD2-1803R3	12 (10.8-13.2)	+18/-3	+110/-110	80/120	80/85	2200
	QA123HCD2-2005R3	12 (10.8-13.2)	+20/-5	+90/-90	80/120	80/85	2200
	QA153HCD2-1504R3	15 (13.5-16.5)	+15/-4	+120/-120	80/120	80/85	2200
	QA153HCD2-1803R3	15 (13.5-16.5)	+18/-3	+110/-110	80/120	80/85	2200

	QA153HCD2-2005R3	15 (13.5-16.5)	+20/-5	+90/-90	80/120	80/85	2200
	QA243HCD2-1504R3	24 (21.6-26.4)	+15/-4	+120/-120	80/120	74/80	2200
	QA243HCD2-1803R3	24 (21.6-26.4)	+18/-3	+110/-110	80/120	74/80	2200

Note: 1. Due to space limitations, the above is only a list of representative products. If you require products not included in this list, please do not hesitate to contact us.

2. Maximum capacitive load refers to the maximum capacitive load that can be connected to +Vo or -Vo; if this value is exceeded, the product will not start up properly.

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

Input Characteristics

Items		Working conditions	Mi	Typ.	Max	Unit
Input surge voltage	Vin=12VDC	DC	-0.7	--	18	VDC
	Vin=15VDC	DC	-0.7	--	21	
	Vin=24VDC	DC	-0.7	--	30	
Input filter type			Capacitor filtering			
Hot-swappable			Not supported			

Output Characteristics

Items			Working conditions	Min.	Typ.	Max.	Unit
Output voltage	QA123HCD2-1504R3	+Vo1/2	Vin=12VDC,Pin11/14&Pin12/13 +Io= +120mA	14.34	15.09	15.84	VDC
		-Vo1/2	Vin=12VDC,Pin10/15&Pin11/14 +Io= -120mA	-4.00	-4.20	-4.40	
	QA123HCD2-1803R3	+Vo1/2	Vin=12VDC, Pin11/14&Pin12/13 +Io=+110mA	16.81	17.71	18.61	
		-Vo1/2	Vin=12VDC, Pin10/15&Pin11/14 +Io=-110mA	-2.85	-3.00	-3.15	
	QA123HCD2-2005R3	+Vo1/2	Vin=12VDC, Pin11/14&Pin12/13 +Io=+90mA	19.00	20.00	21.00	
		-Vo1/2	Vin=12VDC, Pin10/115&Pin11/14 +Io=-90mA	-4.65	-4.90	-5.15	
	QA153HCD2-1504R3	+Vo1/2	Vin=15VDC, Pin11/14&Pin12/13 +Io=+120mA	14.55	15.30	16.05	
		-Vo1/2	Vin=15VDC, Pin10/115&Pin11/14 +Io=-120A	-3.70	-3.90	-4.10	
	QA153HCD2-1803R3	+Vo1/2	Vin=15VDC, Pin11/14&Pin12/13 +Io=+110mA	17.30	18.20	19.10	
		-Vo1/2	Vin=15VD, Pin10/115&Pin11/14 +Io=-110mA	-2.90	-3.05	-3.20	
	QA153HCD2-2005R3	+Vo1/2	Vin=15VDC, Pin11/14&Pin12/13 +Io=+90mA	18.80	19.80	20.80	
		-Vo1/2	Vin=15VDC, Pin10/115&Pin11/14 +Io=-90mA	-4.85	-5.10	-5.35	
	QA243HCD2-1504R3	+Vo1/2	Vin=24VDC, Pin11/14&Pin12/13 +Io=+120mA	13.76	14.51	15.26	
		-Vo1/2	Vin=24V, Pin10/115&Pin11/14 +Io=-120mA	-3.90	-4.10	-4.30	
	QA243HCD2-1803R3	+Vo1/2	Vin=24VDC, Pin11/14&Pin12/13 +Io=+110mA	17.69	18.59	19.49	
		-Vo1/2	Vin=24V, Pin10/115&Pin11/14 +Io=-110mA	-2.88	-3.03	-3.18	
	QA243HCD2-2005R3	+Vo1/2	Vin=24VDC, Pin11/14&Pin12/13 +Io=+90mA	19.20	20.20	21.20	
		-Vo1/2	Vin=24VD, Pin10/115&Pin11/14 +Io=-90mA	-4.65	-4.90	-5.15	
Output voltage accuracy			0% -100% Load	See Figure 2: Error Envelope Curve			
Line Regulation		Within the full input voltage range	+Vo1/2	--	±1.1	±1.5	--
			-Vo1/2	--	±1.1	±1.5	

Load Regulation	10% -100% Load	+Vo1/2	--	10	20	%
		-Vo1/2	--	10	20	
Temperature drift coefficient	Full load		--	±0.04	±0.1	%/℃
Ripple & noise *	20MHz bandwidth		--	50	100	mVp-p
Output short-circuit protection	Sustainable, self-regenerating		--	--	1	s

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

General Characteristics

Items	Working Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	Input-Output 1, Input-Output 2, test duration 1 minute, leakage current less than 1 mA		5000	--	--	VDC
	Input-Output, insulation voltage 500 VDC		3750	--	--	VDC
Partial discharge	Input-Output 1, Input-Output 2		1700	--	--	pF
CMTI	Input-Output 1, Input-Output 2		±200	--	--	kV/μs
Insulation resistance	Input-Output 1, Input-Output 2, Insulation voltage 500 VDC。		1000	--	--	MΩ
Isolation capacitor	Ta=25℃, Rated input, full-load output	Vin=12VDC series	--	4.2	5.0	pF
		Vin=15VDC series	--	5.0	6.0	
		Vin=24VDC series	--	5.5	6.5	
Operating temperature	At temperatures of 85° C or higher, derate the device (see Figure 1)		-40	--	105	℃
Storage temperature			-55	--	125	
Pin soldering temperature resistance	The solder joint is 1.5 mm from the housing; 10 seconds		--	--	+300	
The housing heats up during operation	Ta = 25° C, nominal input, full-load output		--	30	60	
Switching frequency	Full load, rated voltage input		--	200	--	KHz
Storage humidity	No condensation		5	--	95	%RH
Mean Time between failures	MIL-HDBK-217F@25℃		3500	--	--	K Hrs

Product Characteristic Curve

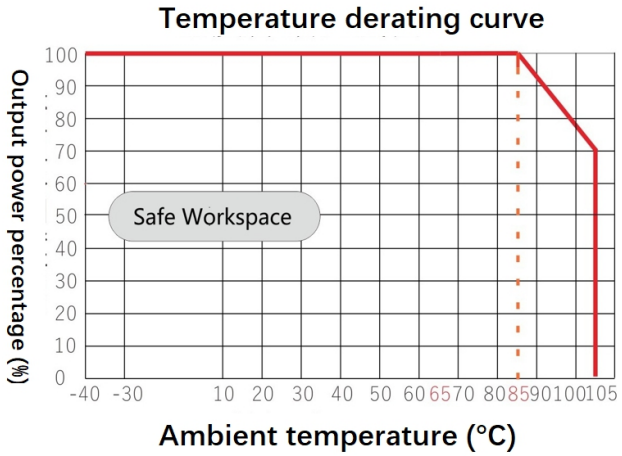


Figure 1 (Temperature derating curve)

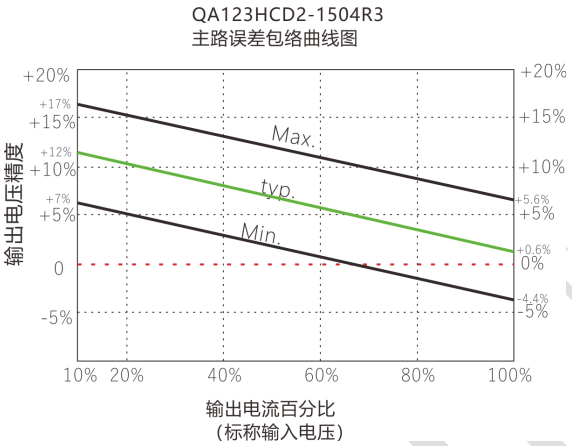


Figure 2 (Main Path Error Envelope Curve)

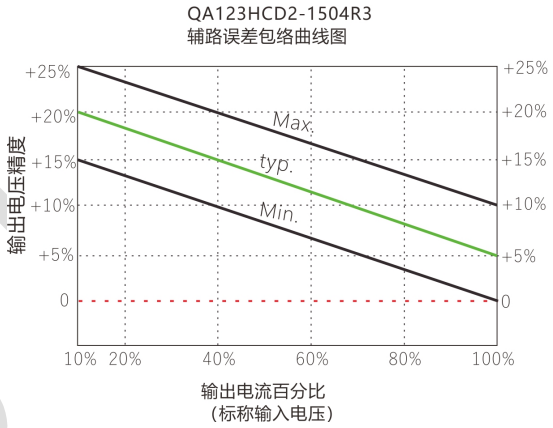


Figure 3 (Error Envelope Curve for the Auxiliary Path)

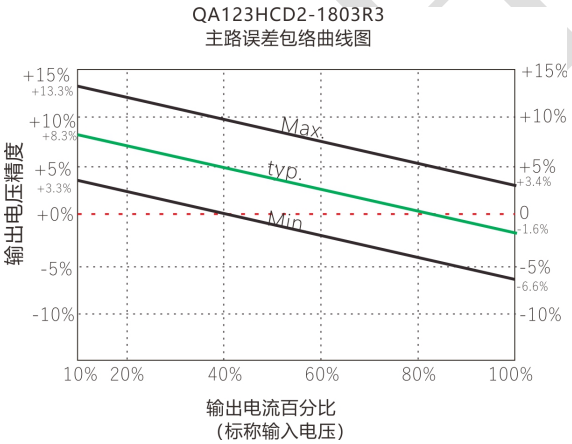


Figure 4 (Main Channel Error Envelope Curve)

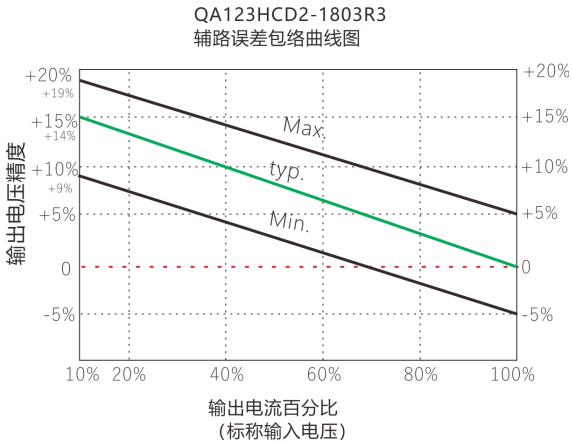


Figure 5 (Auxiliary Channel Error Envelope Curve)

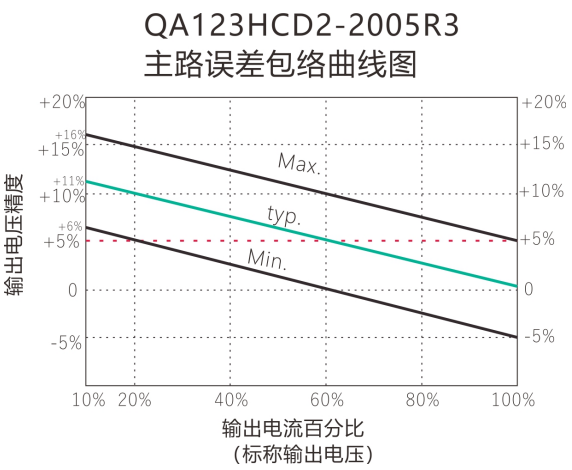


Figure 6 (Main channel error envelope curve)

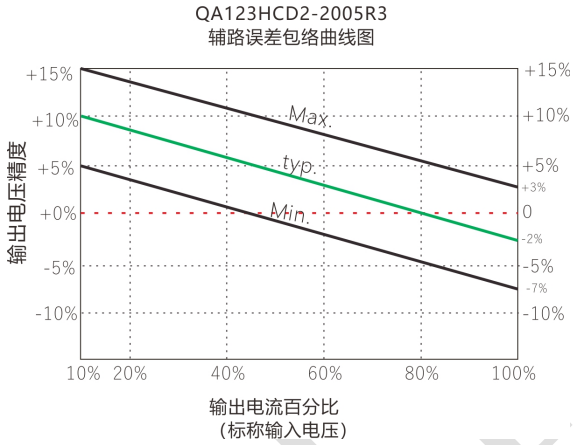


Figure 7 (Auxiliary channel error envelope curve)

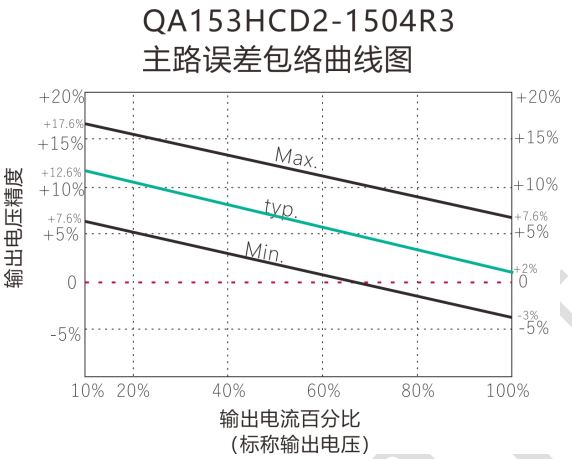


Figure 8 (Main channel error envelope curve)

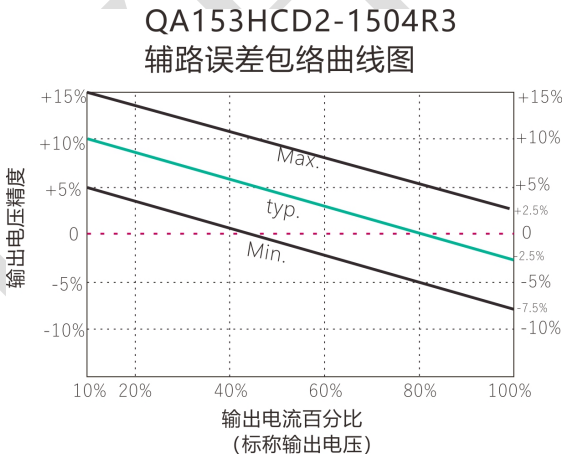


Figure 9 (Auxiliary channel error envelope curve)

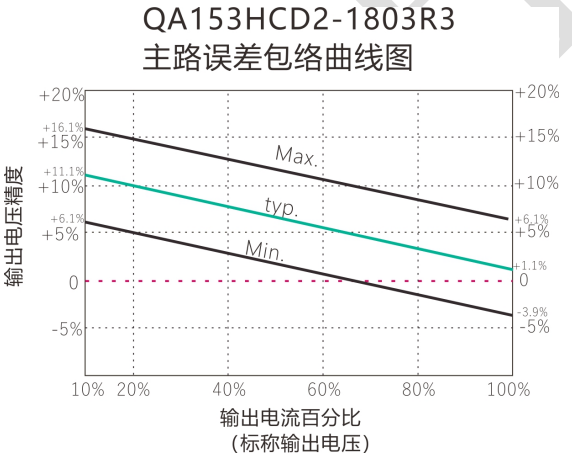


Figure 10 (Main channel error envelope curve)

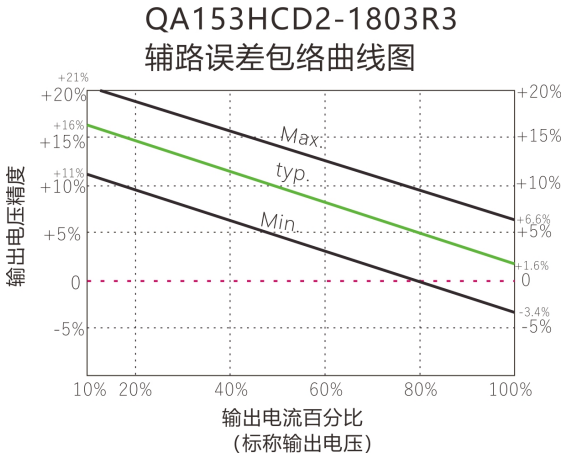


Figure 11 (Auxiliary channel error envelope curve)

QA153HCD2-2005R3
主路误差包络曲线图

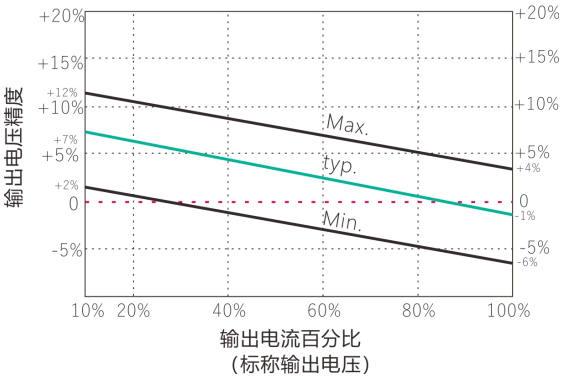


Figure 12 (Main channel error envelope curve)

QA153HCD2-2005R3
辅路误差包络曲线图

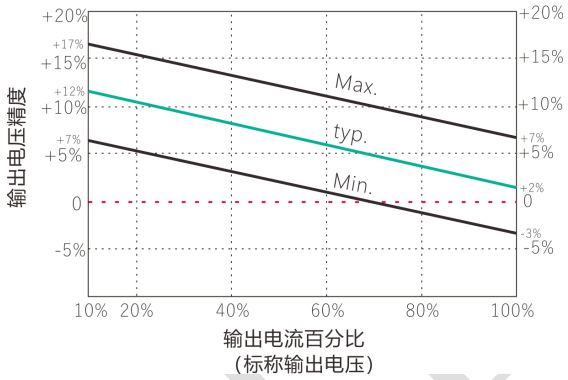


Figure 13 (Auxiliary channel error envelope curve)

QA243HCD2-1504R3
主路误差包络曲线图

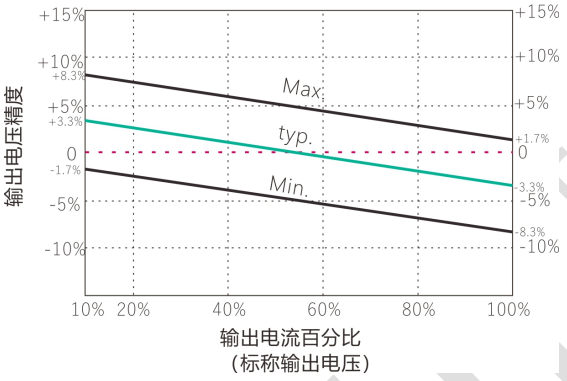


Figure 14 (Main channel error envelope curve)

QA243HCD2-1504R3
辅路误差包络曲线图

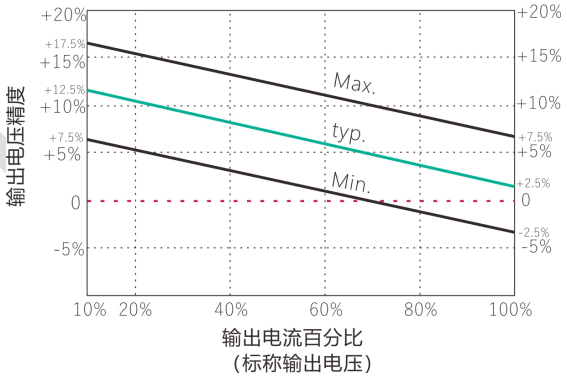


Figure 15 (Auxiliary channel error envelope curve)

QA243HCD2-1803R3
主路误差包络曲线图

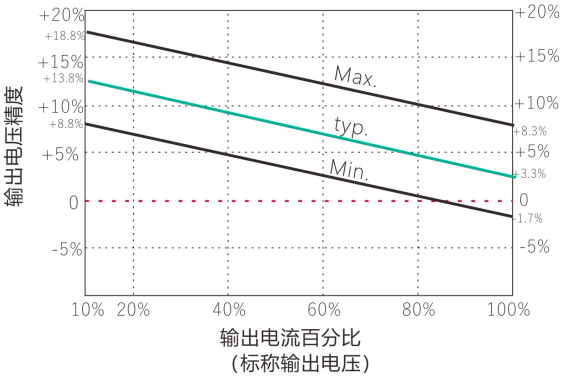


Figure 16 (Main channel error envelope curve)

QA243HCD2-1803R3
辅路误差包络曲线图

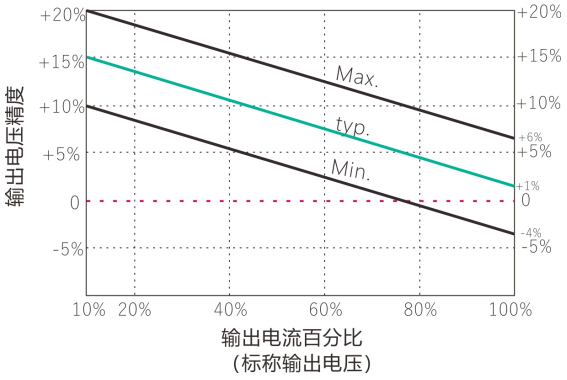


Figure 17 (Auxiliary channel error envelope curve)

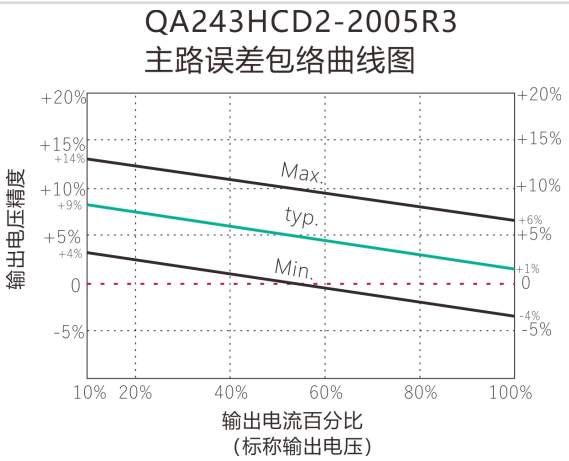


Figure 18 (Main channel error envelope curve)

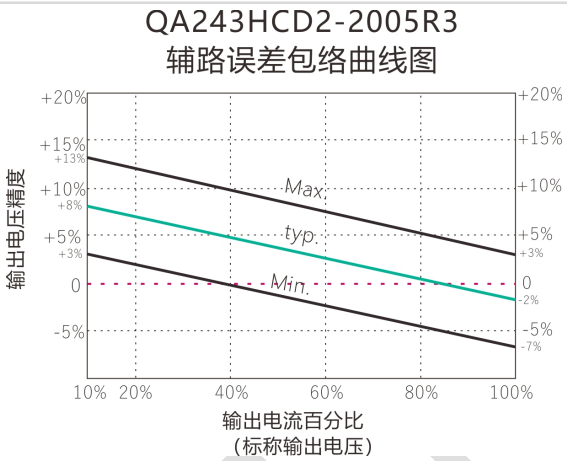
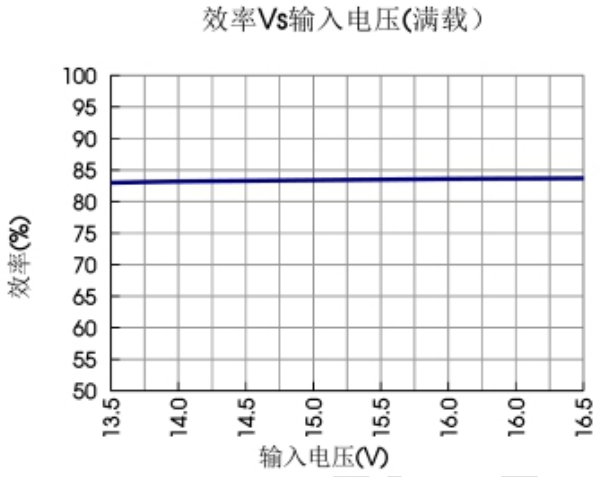


Figure 19 (Auxiliary channel error envelope curve)

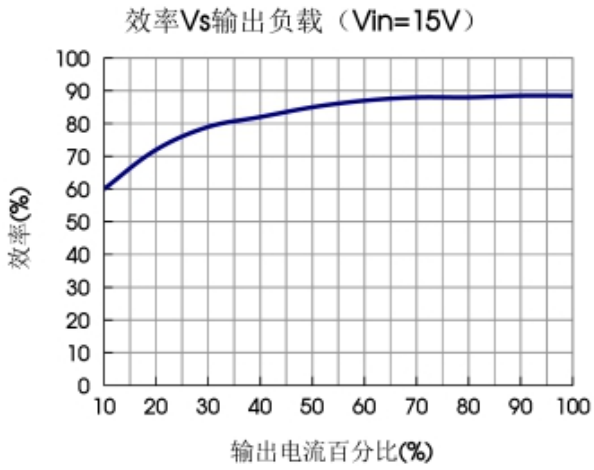
Efficiency Vs. Input Voltage (Full Load)



Input Voltage (V)

Figure 20

Efficiency vs. Output Load(Vin=15V)



Output current (%)

Figure 21

Typical Application Reference Circuit (Recommended Parameters)

1. Common applications:

If further reduction of input and output ripple is required, a capacitor filter network can be connected to the input and output terminals; the application circuit is shown in Figure 2. 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—ensuring safe and reliable operation—are detailed in Table 1.

For C3 and C5, ceramic capacitors with a capacitance ranging from 1μF to 10μF may be selected. Alternatively, the capacitance values of C2 and C4 may be appropriately increased, provided they remain below the product's maximum capacitive load, in order to reduce ripple noise.

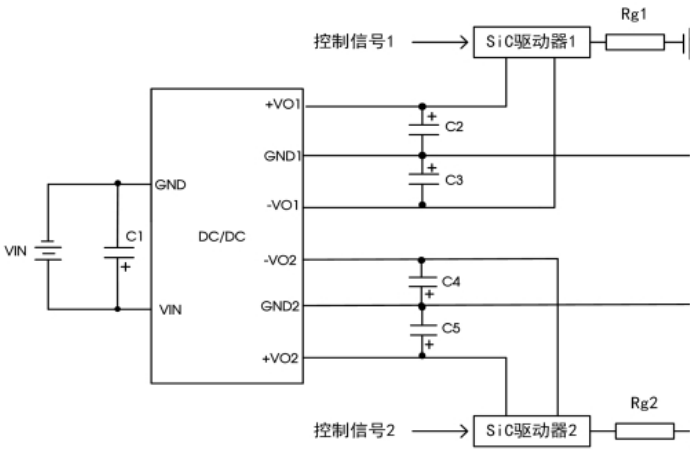
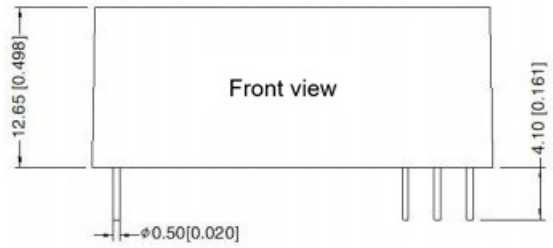
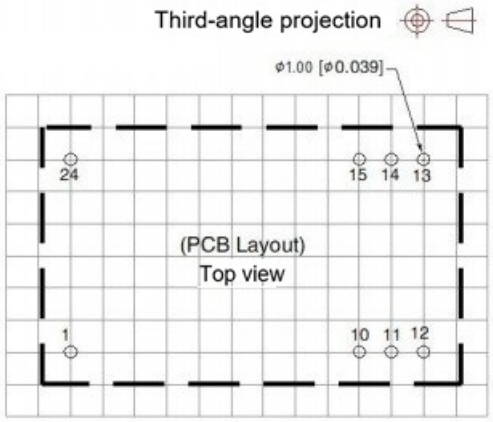


Figure 24

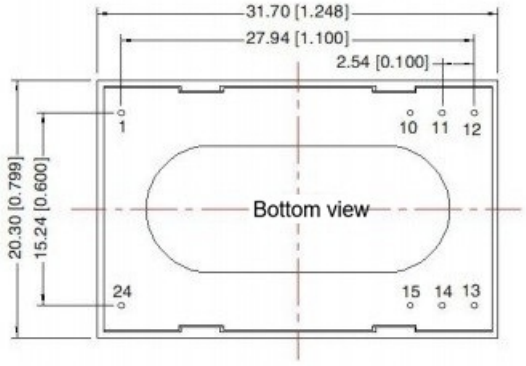
C1/C2/C3/C4/C5
100uF/35V (Low-impedance capacitor)

Product Dimensions and Pin Assignment, Recommended PCB Layout





Remarks: grid distance: 2.54 x 2.54mm



Pin Assignment	
Pin	Function
1	GND
10	-Vo1
11	GND1
12	+Vo1
13	+Vo2
14	GND2
15	-Vo2
24	Vin

Notes:
Dimension unit: mm (inch)
Terminal diameter tolerance: ±0.10 (±0.004)
Unspecified tolerance: ±0.50 (±0.020)

Package Description

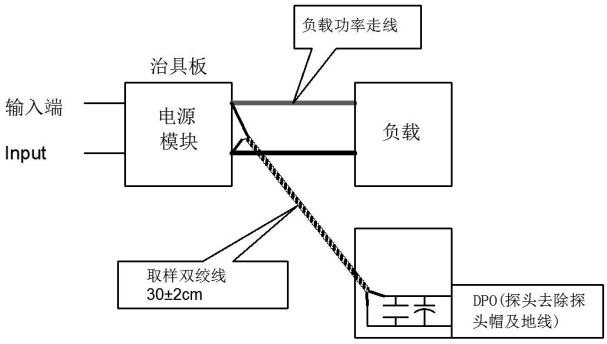
Package code	L x W x H	
QA	31.7 x 20.3x 12.65 mm	1.248 × 0.799 ×0.40inch

Test Application Reference

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

Test Method:

1. Ripple noise was measured using a Category 12 twisted-pair cable. The oscilloscope was set to a bandwidth of 20 MHz with a 100 MHz bandwidth probe, and a 0.1μF polypropylene capacitor and a 4.7μF high-frequency, low-impedance electrolytic capacitor were connected in parallel at the probe tip. The oscilloscope used the "Sample" sampling mode.



2、Schematic Diagram of Output Ripple Noise Testing:

Connect the power input to the power source, and connect the power output to the electronic load via the fixture board. For testing, use a 30 cm ± 2 cm test lead to take a direct measurement from the power output port. Select insulated wires with an appropriate gauge based on 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, connect one filter capacitor in parallel at both the input and output terminals. The external circuit is shown in Figure (1) below; refer to Table (1) for the recommended values of the filter capacitors. 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 when 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 is calculated=Uout/(1WR3*10%);
3. Overload Protection: Under normal operating conditions, the product's output circuit does not provide protection against overloads; however, prolonged overloads will trigger over-temperature protection, causing the output to shut down.;
4. Output short-circuit protection with automatic reset.
5. The capacitance of the external capacitor connected to the output terminal should not be too high, as this may cause overcurrent or prevent the module from starting properly.
6. 6. If the product is operated below the minimum required load, we cannot guarantee that all performance specifications listed in this manual will be met.
7. All maximum capacitive loads were 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, and under nominal input voltage and rated output load conditions.
9. All test methods for the specifications in this manual are based on our company's standards.
10. We offer custom product solutions. Please contact our technical staff directly for more details.
11. Product specifications are subject to change without notice.

Contact

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