

Typical Characteristics

- Fixed-voltage input, isolated unregulated output, Power: 1W
- Isolation voltage: 1500VDC
- Working ambient temperature: -40℃~+105℃
- Efficiency: up to 85%
- Output short-circuit protection: continuous short-circuit protection, automatic recovery
- Industry standard pin-out
- Compact SMD package
- Ripple/noise (20MHz bandwidth): 50mVp-p(typ.)
- MTBF≥3.5 million hours (3500000Hrs)

1W, fixed-voltage input, isolated unregulated dual-output DC-DC power module



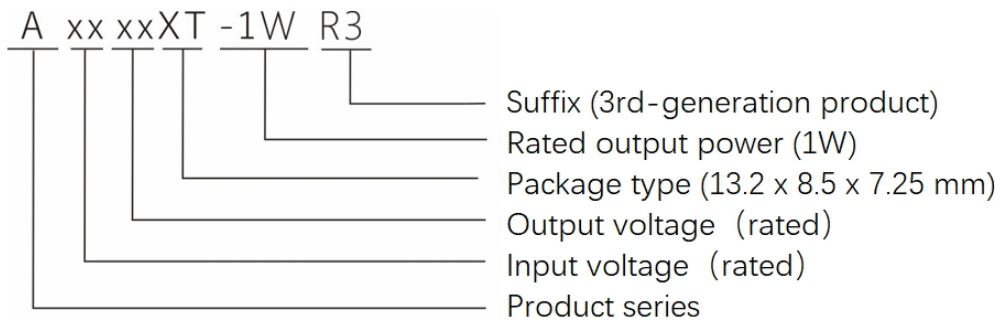
RoHS

Over-temperature protection and continuous output short-circuit protection

A_XT-1WR3 Series—is a compact, high-efficiency, low-power, fixed-input-voltage, isolated, unregulated single-output DC/DC module power supply designed by Huizhi Electronics for its customers;
This product series is specifically designed for applications in on-board power supply systems that require the generation of a voltage isolated from the input power source.
This product is suitable for:

- The input voltage is relatively stable (voltage variation range: $\pm 10\%$ Vin) ;
- Isolation is required between input and output (isolation voltage ≤ 1500 VDC);
- The output voltage stability requirements are not high;
- Typical applications: purely digital circuits, general-purpose low-frequency analog circuits, relay driver circuits, data switching circuits, etc.

Model Number Description



Model Number Description

Certi- fication	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
	A0303XT-1WR3	3.3 (2.97-3.63)	±3.3	±151/15	50/100	73/77	1200
	A0305XT-1WR3		±5	±100/10	50/100	78/82	1200
	A0309XT-1WR3		±9	±56/5	50/100	78/82	470

	A0312XT-1WR3	5 (4.5-5.5)	±12	±42/5	50/100	78/82	220
	A0315XT-1WR3		±15	±34/4	50/100	78/82	220
	A0324XT-1WR3		+24	+21/2	50/100	80/84	100
	A0503XT-1WR3		±3.3	±151/15	50/100	70/74	1200
	A0505XT-1WR3		±5	±100/10	50/100	78/82	1200
	A0509XT-1WR3	12 (10.8-13.2)	±9	±56/5	50/100	79/83	470
	A0512XT-1WR3		±12	±42/5	50/100	79/83	220
	A0515XT-1WR3		±15	±34/4	50/100	79/83	220
	A0524XT-1WR3		±24	±21/2	50/100	81/85	100
	A1203XT-1WR3		±3.3	±151/15	50/100	70/74	1200
	A1205XT-1WR3	15 (13.5-16.5)	±5	±100/10	50/100	79/83	1200
	A1209XT-1WR3		±9	±56/5	50/100	79/83	470
	A1212XT-1WR3		±12	±42/5	50/100	79/83	220
	A1215XT-1WR3		±15	±34/4	50/100	81/85	220
	A1224XT-1WR3		±24	±21/2	50/100	79/83	100
	A1503XT-1WR3	24 (21.6-26.4)	±3.3	±151/15	50/100	72/76	1200
	A1505XT-1WR3		±5	±100/10	50/100	76/82	1200
	A1509XT-1WR3		±9	±56/5	50/100	77/83	470
	A1512XT-1WR3		±12	±42/5	50/100	77/83	220
	A1515XT-1WR3		±15	±34/4	50/100	77/83	220
	A1524XT-1WR3		±24	±21/2	50/100	79/85	100
	A2403XT-1WR3		±3.3	±151/15	50/100	72/76	1200
	A2405XT-1WR3		±5	±100/10	50/100	76/82	1200
	A2409XT-1WR3		±9	±56/5	50/100	77/83	470
	A2412XT-1WR3		±12	±42/5	50/100	77/83	220
	A2415XT-1WR3		±15	±34/4	50/100	77/83	220
	A2424XT-1WR3		±24	±21/2	50/100	79/85	100

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 rated 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 Current (Full Load/No Load)	3.3VDC input	3.3VDC output		--	394/12	416/--	mA
		5VDC/9VDC/12VDC/15VDC output		--	370/12	389/--	
		24VDC output		--	361/12	379/--	
	5VDC input	3.3VDC output		--	270/8	286/--	
		5VDC output		--	244/8	257/--	
		9VDC/12VDC output		--	241/18	254/--	

	12VDC input	3.3V/5VDC output	--	102/8	107/--	
		9VDC/12VDC/15VDC output	--	101/8	106/--	
		24VDC output	--	99/8	103/--	
	15VDC input	5VDC/9VDC output	--	82/8	86/--	
		15VDC output	--	81/8	85/--	
	24VDC input	3.3V/5VDC output	--	53/8	57/--	
		9VDC/12VDC/15VDC output	--	51/8	55/--	
		24VDC output	--	53/8	57/--	
Reflected Ripple Current	3.3VDC input		--	30	--	
	Other input		--	15	--	
Impulse voltage (I sec. max)	3.3VDC input series		-0.7	--	5	VDC
	5VDC input series		-0.7	--	9	
	12VDC input series		-0.7	--	18	
	15VDC input series		-0.7	--	21	
	24VDC input series		-0.7	--	30	
Input filter type	Capacitor filtering					
Hot swap	Not supported					

Output characteristics

Items	Working and test conditions		Min.	Typ.	Max.	Unit	
Output load	Load percentage		10	--	100	%	
Output voltage accuracy			See the error envelope curve				
Line Regulation	Input voltage variation: $\pm 1\%$	3.3V output	--	--	± 1.5	%	
		Others	--	--	± 1.2	%	
Load Regulation	10%~100% load	3.3VDC input	3.3VDC output	--	10	20	%
			5/9/12/15/24VDC output	--	10	15	%
	10%~100% load	5VDC input	3.3VDC output	--	15	20	%
			5VDC output	--	10	15	%
			9VDC output	--	8	10	%
			12VDC output	--	7	10	%
			15VDC output		6	10	
			24VDC output		5	10	
	10%~100% load	12/15/24V DC input	3.3VDC output		15	20	
			5VDC output		5	15	
			9VDC output		3	10	
			12VDC output		3	10	
			15VDC output		3	10	
			24VDC output		2	10	

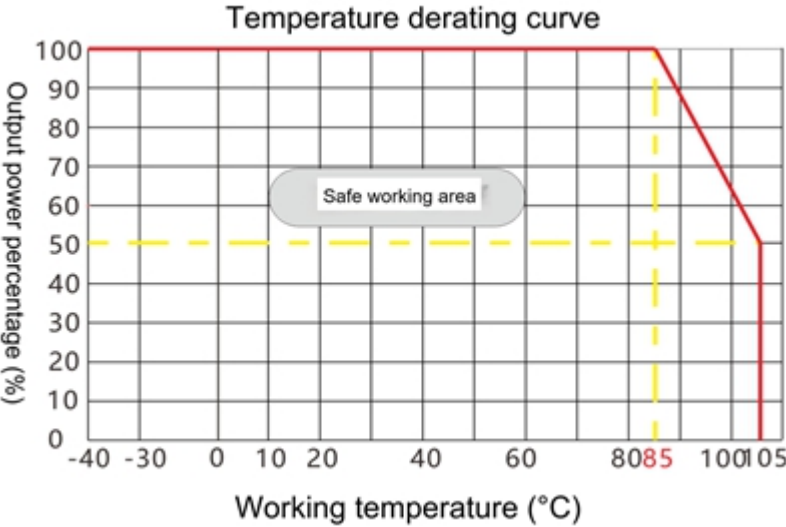
Ripple & Noise	Pure resistive load, 20 MHz bandwidth, peak-to-peak value	--	50	100	mVp-p
Temperature drift coefficient	Full load	--	--	±0.02	%/° C
Output short-circuit protection	Sustainable short-circuit protection, automatic recovery				

Note: ① Test method for ripple and noise: twisted-pair test method.

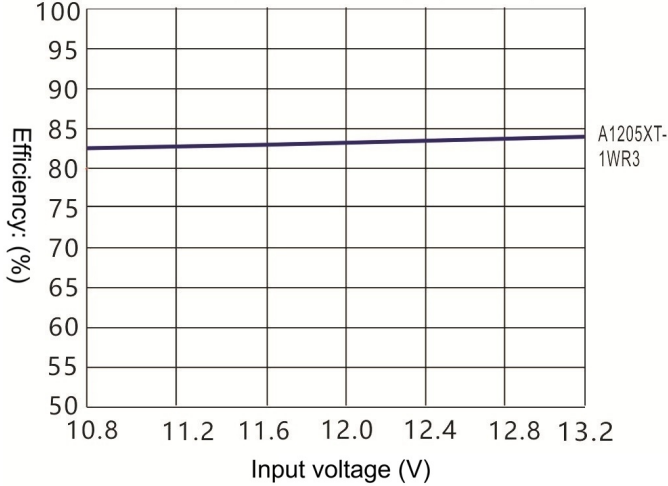
General characteristics

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	--	20	--	pF
Operating temperature	Use the reference temperature derating curve	-40	--	+105	°C
Storage temperature		-55	--	+125	
Maximum operating case temperature		--	25	--	
Storage humidity	No condensation	5	--	95	%RH
Pin soldering temperature resistance	The solder joint is 1.5 mm from the housing; 10 seconds	--	--	+300	°C
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°C	3.5X10 ⁶	--	--	Hrs

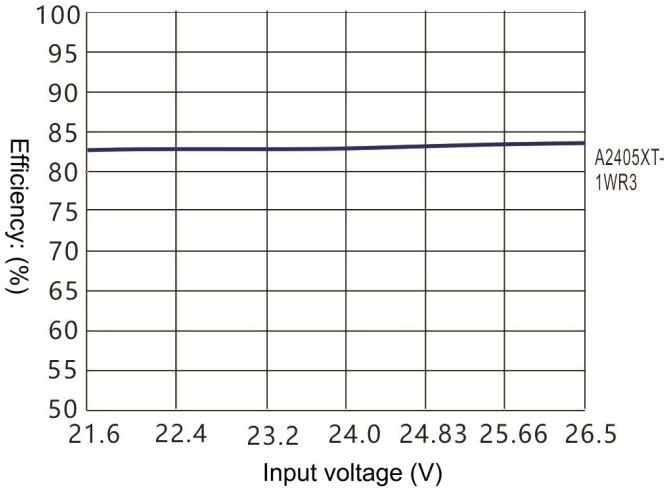
Product Performance Curve



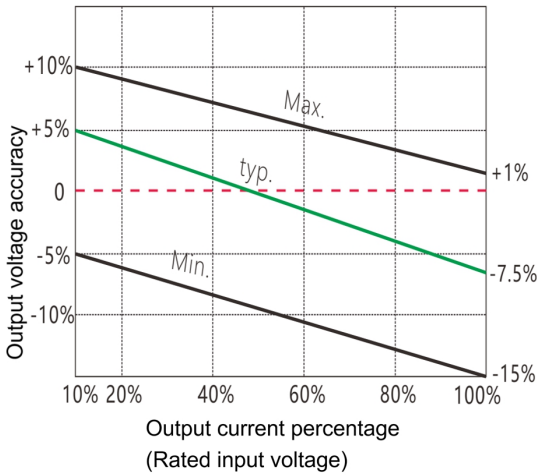
Efficiency Vs Input voltage (full load)



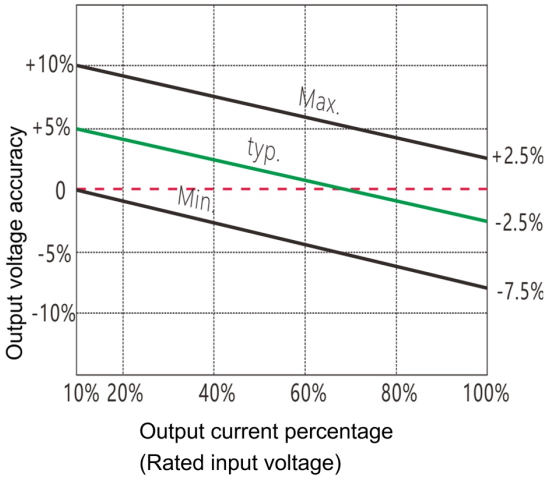
Efficiency Vs Input voltage (full load)



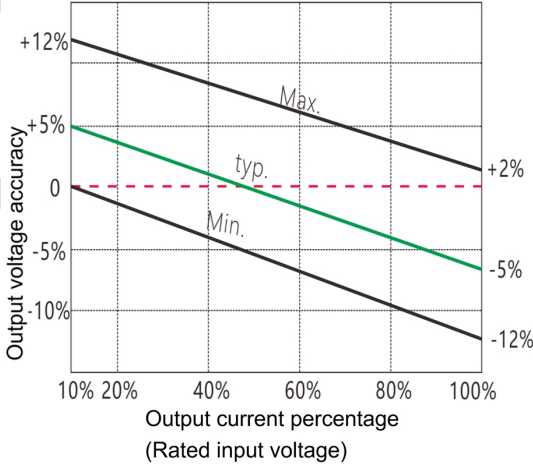
3.3VDC input/3.3VDC output
Error Envelope Curve



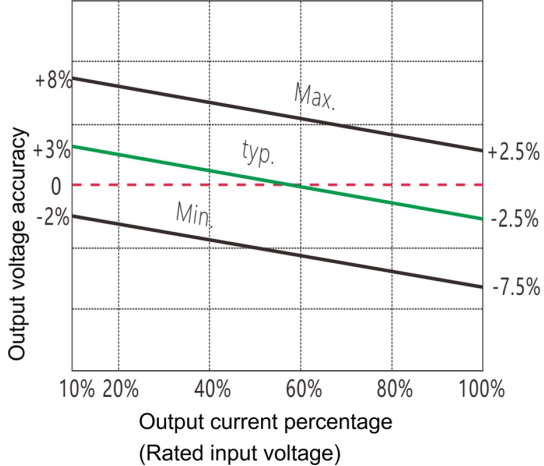
3.3VDC/5VDC input/Other output
Error Envelope Curve



5VDC/12VDC/24VDC input / 3.3VDC output
Error Envelope Curve



12VDC/15VDC/24VDC input / Other output
Error Envelope Curve



1. General applications:



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.

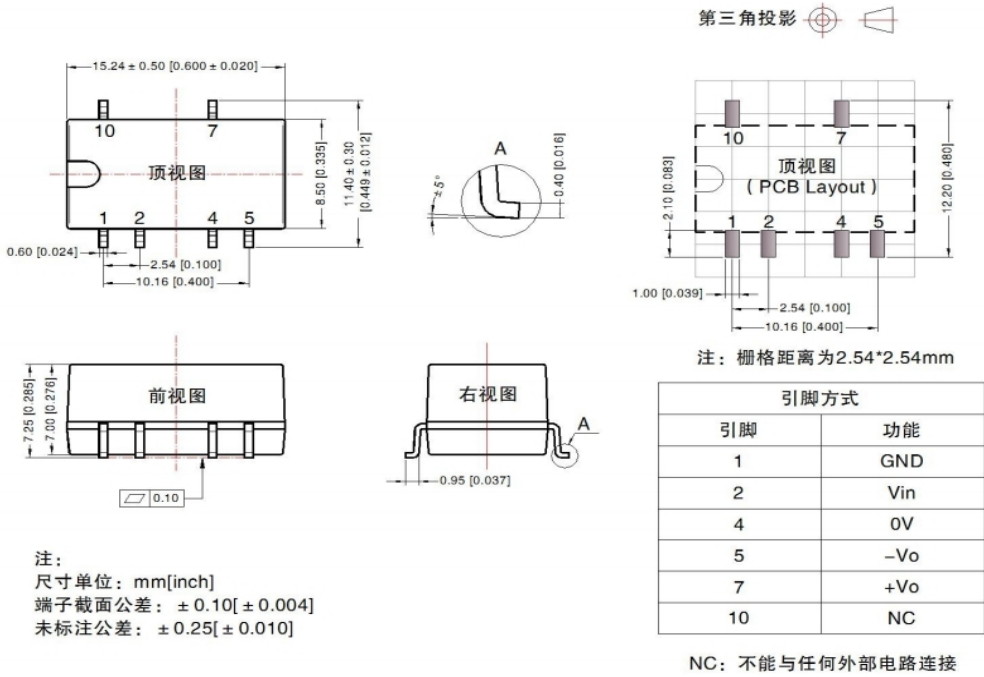
Vin (Vdc)	Cin(u F)	Vo(Vdc)	Cout (u F)
3.3	10μF/16V	3.3VDC	10μF/16V
5	4.7μF/16V	5VDC	4.7μF/16V
12	2.2μF/25V	7.5VDC	1μF/16V
15	2.2μF/25V	9VDC	1μF/16V
24	1μF/50V	12VDC	1μF/25V
--	--	15VDC	0.47μF/25V
--	--	24VDC	0.47μF/50V

The diagram shows a DC/DC converter block with input terminals V_{in} and GND , and output terminals $+V_o$ and $0V$. An input filter consists of a capacitor $C1$ in parallel with the input, followed by an inductor LDM in series, and then a capacitor $C2$ in parallel to GND . An output filter consists of a capacitor $C3$ in parallel with the output, which is connected to a $LOAD$. A capacitor CY is connected between the GND terminals of the converter.

Vin (Vdc)	3.3VDC	5VDC		12/15/24V DC
Output Voltage	--	3.3/5/ 9VDC	12/15/24 VDC	--
C1, C2	4.7μF/1 6V	4.7μF/25V		4.7μF/50V
CY	270pF/ 2kV	47pF/2 kV	1nF/2k V	270pF/2kV
C3	See Cout Parameters in table 1			
LDM	6.8μH			

To ensure that this module operates efficiently and reliably, the minimum output load must not be less than 10% of the rated load during use. If your power requirement is indeed very low, please connect a resistor in parallel between the positive and negative terminals of the output (the total power rating of the resistor must be greater than or equal to 10% of the rated power, and the selected resistor's power rating must be at least 5 times greater than the actual power consumption; otherwise, the resistor will become excessively hot)

Appearance Dimensions and Pin Assignment, Recommended PCB Layout



*Note: If the pin definitions of the power module differ from those in the selection guide, refer to the labels on the actual product.

Package Description

Package code	L x W x H	
XT	15.30 x 8.5 x 4.5mm	0.531 × 0.334 × 0.177inch

Test Application Reference

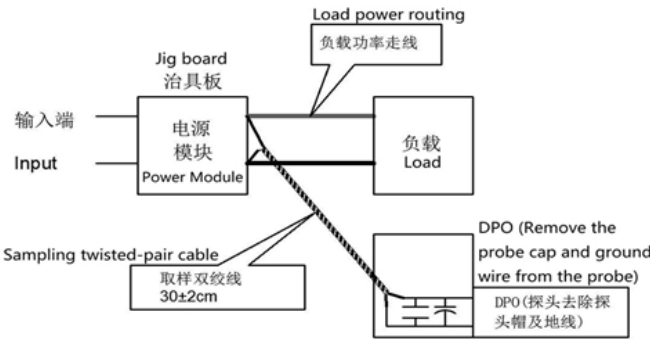
Ripple & Noise Testing: (Twisted-pair method, 20 MHz bandwidth)

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 μ F polypropylene capacitor and a 4.7 μ F 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 $\pm$ 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 $T_a=25^{\circ}C$, 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

GDHUIZHI®

广东汇智电子技术有限公司

Guangdong Huizhi Electronic Technology Co., Ltd.

地址: 广东省肇庆市端州区 11 区肇庆大道北侧厂房、办公楼(二期)3 楼

Add.: 3rd floor, factory and office building (phase II) on the north side of Zhaoqing Avenue,

District 11, Duanzhou District, Zhaoqing City, Guangdong Province, China

Homepage: www.huizhi-elec.com/www.chinaebizal.com

Tel: +86 - 758 - 2566 585

E-mail: sales@huizhi-elec.com

GDHUIZHI