CFD12-110SXXA3N4 Series

DC/DC Converter

Typical Features

- ◆ Wide input voltage range (4:1), Output Power 12W
- ◆ Transfer Efficiency up to 89%
- ◆ Stand-by Power Consumption as low as 0.05W
- ◆ Output super-fast start up
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Input under voltage, output over voltage, short circuit, over current protection
- ◆ Switching Frequency 300KHz
- ◆ Isolation Voltage: 2100VAC
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Good EMI performance
- ◆ International standard pin-out

Application Field

CFD12-110SXXA3N4 *is a newly designed DIP 1X1 packed,12W output power, ultra wide input range 4:1, low stand-by power consumption, isolated regulated output DC-DC converter, could be widely used for railway, industrial control, instrument, communication, power electricity, internet of things field. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.*

Typical Product List

Part No	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise 20MHz (Typ.)		Full load efficiency (%)	
	Nominal	Range	Voltage (VDC)	Current(mA)MAX./Min	Full load typ.	No Load typ.	uF	mVp-p Typ.	mVp-p Max.	Min	Typ
*CFD12-110S3V3A3N4	110	40-160	3.3	2400/0	90	1	10000	50	100	77	80
CFD12-110S05A3N4	110	40-160	5	2400/0	133	1	8000	50	100	79	82
*CFD12-110S09A3N4	110	40-160	9	1333/0	128	1	4000	50	100	82	85
CFD12-110S12A3N4	110	40-160	12	1000/0	125	1	2000	50	100	84	87
*CFD12-110S15A3N4	110	40-160	15	800/0	123	1	1000	50	100	86	89
*CFD12-110S24A3N4	110	40-160	24	500/0	123	1	500	50	100	86	89

1. “*” are models being developing;
2. Suffix ”N” is without Ctrl function. ”C” is with Ctrl function; ”-T” suffix for chassis mounting, ”-TS” suffix for DIN-Rail mounting, DIN-Rail width is: 35mm;
3. Max capacitive load is, when the power supply is fully loaded, the max capacity could be connected to output, if exceed, the power supply cannot start-up;

4. To reduce no load power consumption and improve efficiency of light-load, IC will be flitter frequency under no-load and light-load operating, output cannot be no load, at least with 15% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise;

Input Specification

Stand-by Consumption	0.05 W(TYP)	
Input Filter	π filter	
Input Under-Voltage Protection	34VDC Input	
CTRL*	Module turn-on	CTRL suspended or connect to TTL high level (3.5-12VDC)
	Module turn-off	CTRL connect to GND or low level (0-1.2VDC)
	Input current when switched off	5mA (TYP)

Note: *The voltage of CTRL pin is relative to -Vin pin.

Output Specification

Output Voltage Accuracy	Full voltage full load	Vo	±2.0%
Voltage Regulation	Nominal load, full voltage range	Vo	≤±0.5%
Load Regulation	10% ~ 100% nominal load	Vo	≤±1.0%
Ripple & Noise	Nominal load, nominal voltage, Twisted Pair Method,20M Hz bandwidth;	≤15% load,	5%Vo mVp-p typ
		≥15% load,	50mVp-p typ, 100mVp-p max
Output Over-voltage Protection	120%~200%Vo		
Output Over-load Protection	110%~220% Io		
Output Short circuit Protection	Continuous, Self-recovery		
Dynamic Response	25% nominal load step change △Vo/△t	3.3V,5V	±3% typ , ±8% max /500us
		Others Output	±3% typ , ±5% max /500us
Output Voltage Ajustment	No adjustment		
Turn-on delay time	Typical	60ms	
Output Voltage Set-up Time	Rated Input satisfy output	10mS	
Output Turn-on Overshoot Voltage		≤10%Vo	

Note: For several models, the ripple maybe ≥100mV when high input and load ≤25%,

General Specification

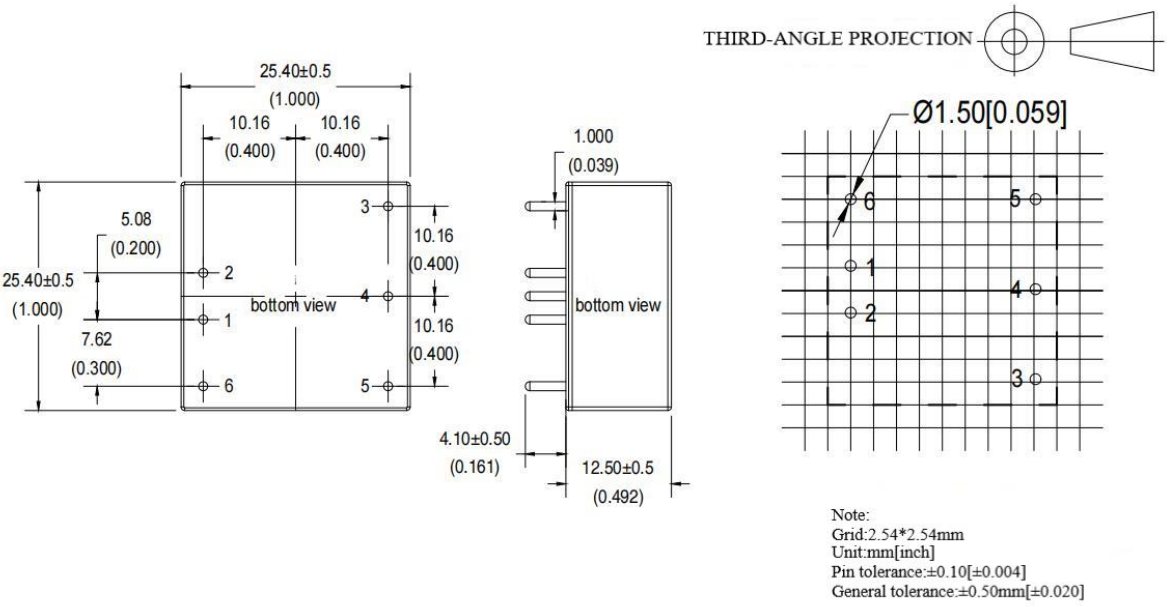
Switching Frequency	Typical	300KHz
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +85℃
Storage Temperature		-55℃ ~ +125℃
Max Case Temperature	Within Operating Curve	+105℃
Relative Humidity	No condensing	5%~95%
Case Material		Aluminum Metal Case

Cooling Method		Free air convection
Isolation Voltage	Input to Output	2100Vac ≤ 5mA / 1min
Meantime Between Failure	MIL-HDBK-217F@25℃	2X10^{5}Hrs
Product Weight	Average	15g

EMC Characteristics

Total Items		Sub Items	Test Standard	Class
EMC	EMI	CE	CISPR22/EN55032	CLASS B (see recommended circuit photo ②)
		RE	CISPR22/EN55032	CLASS B (see recommended circuit photo ②)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (see recommended circuit photo 2)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (see recommended circuit photo 2)
		ESD	IEC/EN61000-4-2	Contact ±4KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B (see recommended circuit photo 1)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B (see recommended circuit photo 1)
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

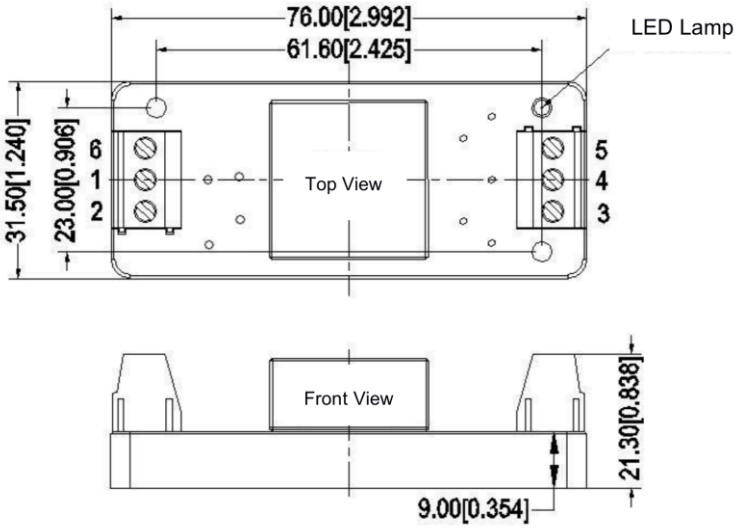
A3 Packing Dimension

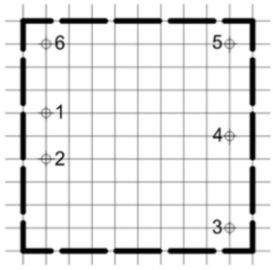


Pin out Specifications

Single (S)	1	2	3	4	5	6
	-Vin	+Vin	+Vout	NC	GND	CTRL

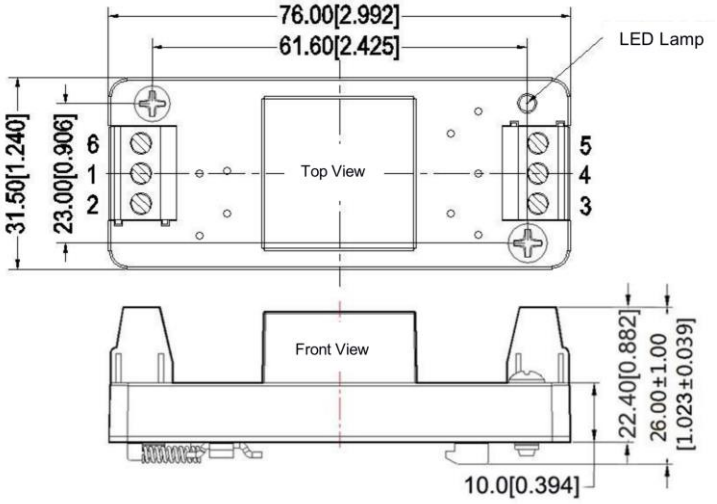
A3-T Packing Dimension

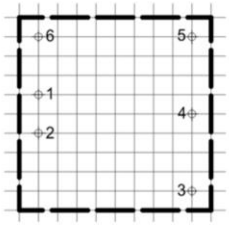




Unit: mm
Print board vertical view
Grid: 2.54mm(0.1inch)
General tolerance: ±0.25mm
Pin section tolerances: ±0.10mm

A3-TS Packing Dimension





Unit: mm
Print board vertical view
Grid: 2.54mm(0.1inch)
General tolerance: ±0.25mm
Pin section tolerances: ±0.10mm

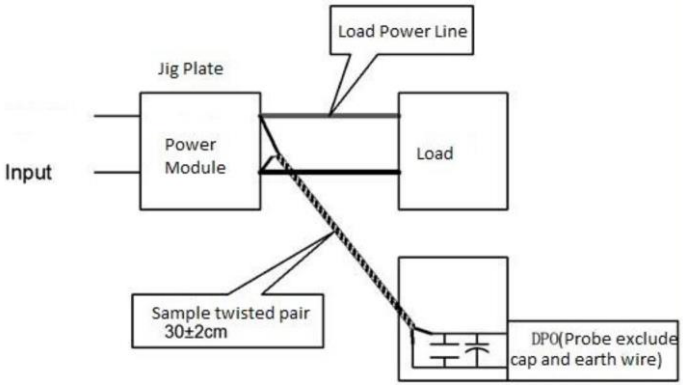
Packing Code	L x W x H
A3	25.4X 25.4X12.5 mm
A3-T	76X31.5X21.3mm
A3-T	76X31.5X26mm

Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)

Test Method:

a. 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Application Reference:

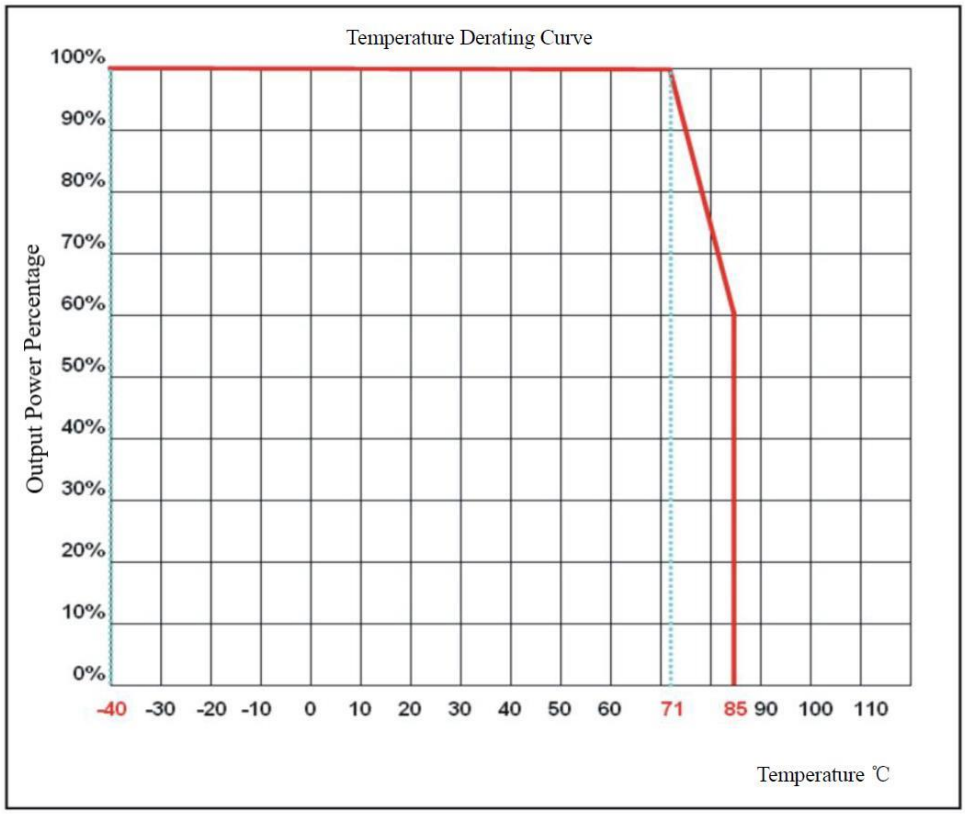
1.The recommended minimum load is 15% or above 100uF high frequency low resistance electrolytic capacitor, or output ripple will rise;

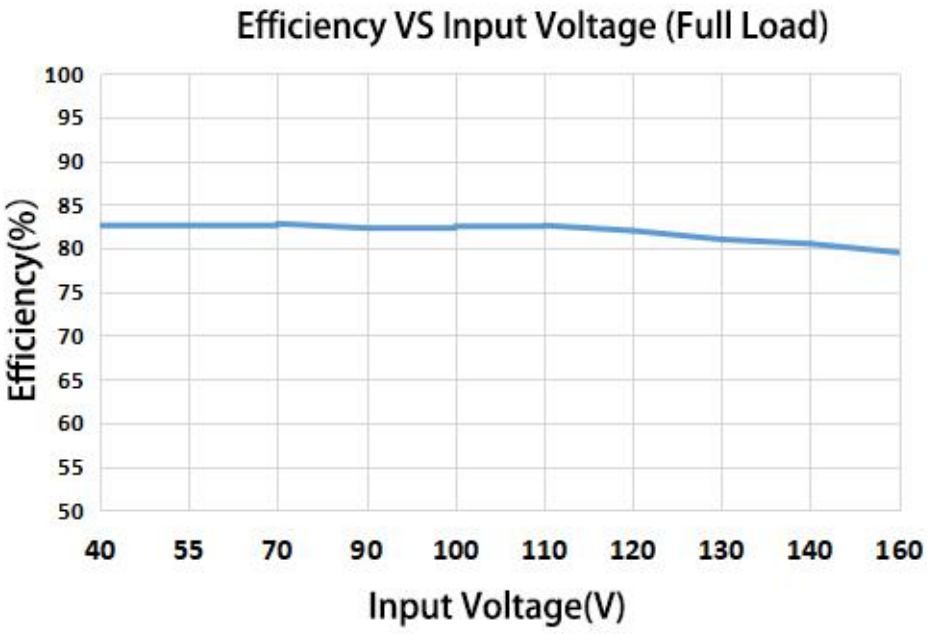
2.Recommend the unbalance loads of dual output to be ≤±5%;

3.The maximum capacitive load is tested under pure resistance and full load condition;

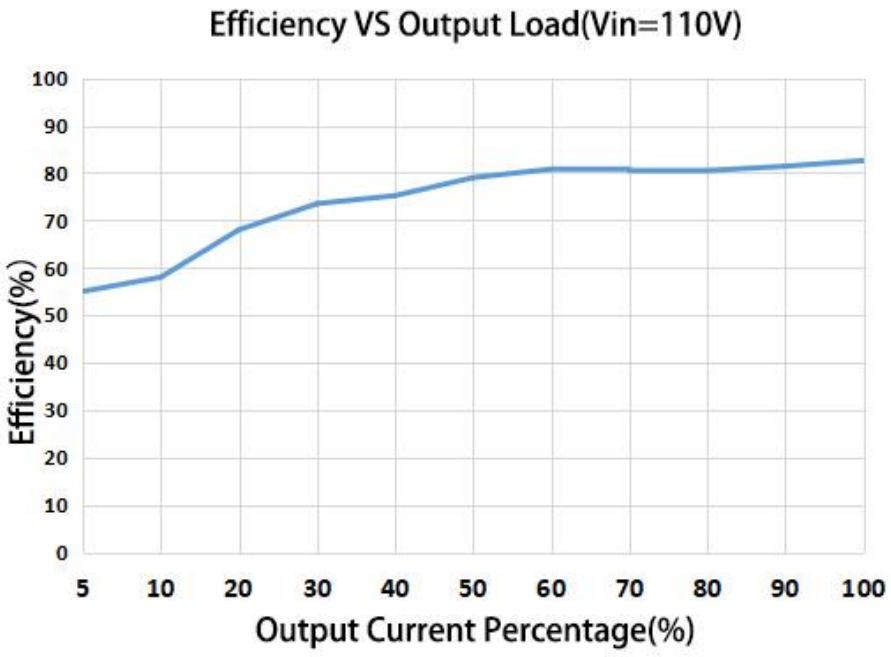
4.Our company could provide whole power supply solution, or customized made items; Due to space limitation, please contact our team for more information.

Product Characteristic Curve





CFD12-110S05A3N4



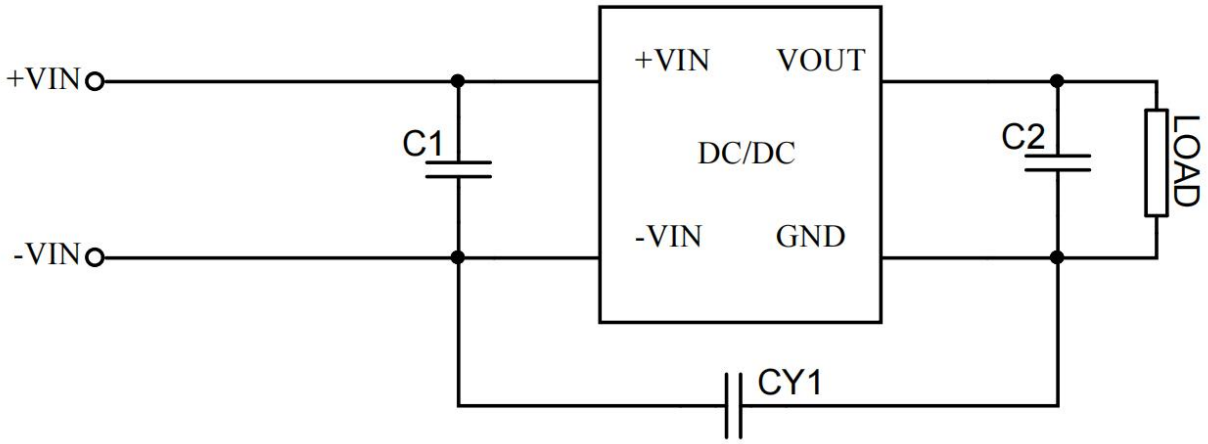
CFD12-110S05A3N4

Design Application

Recommended circuit

1. DC/DC test circuit:

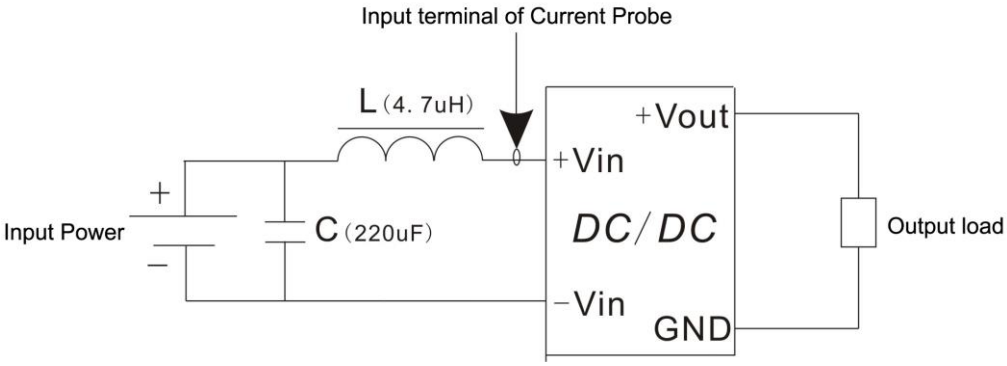
Normal recommended capacitors: C1: 47-100uF; C2:100uF; CY1: 2.2nF/400VAC.



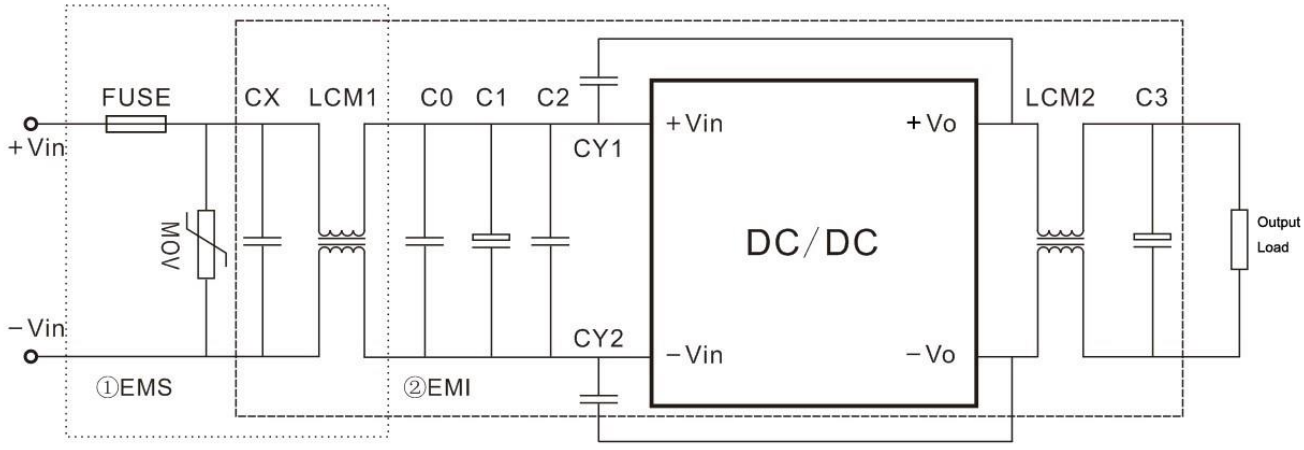
Note: In any case, CY1 capacitor is requested.

2. Input reflecting ripple current test circuit:

Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage;



3.EMC external recommended circuit:



Recommended Spec:

Component	110V Input
FUSE	According to customer's request
MOV	14D201K
CX	0.47 uF
LCM1	10mH
C0	1uF/250V
C1	100uF/200V
C2	1uF/250V
LCM2	30uH
C3	47uF/50V
CY1,CY2	2.2nF/2000V

Note:

1. The product should be used under the specification range, otherwise it will cause permanent damage to it.
2. If the product worked beyond the load range or below the minimum load, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
3. Unless otherwise specified, data in this datasheet should be tested under conditions of Ta=25℃, humidity<75% when inputting nominal voltage and outputting rated load(pure resistance load);
4. All index testing methods in this datasheet are based on our Company's corporate standards
5.The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
6. We can provide customized product service;
7. The product specification may be changed at any time without prior notice.