CFD50-36SXXB3(R)2(-T)(-TS)
DC/DC Converter

Typical Features

- ◆Wide input voltage range 4:1, Output Power 50W
- ◆Ultra thin Package:9.5mm
- ◆Transfer Efficiency up to 90%
- ◆Stand-by Power Consumption as low as 0.2W
- ◆Output super-fast start up as low as 20ms
- ◆Continuous Short Circuit protection, Self-recovery
- ◆Protection: Input under voltage, output over voltage, short circuit, over current
- ◆Switching Frequency 350KHz
- ◆Isolation Voltage 1500VDC
- ◆Operating Temperature: -40°C~+85°C
- ◆Good EMI performance
- ◆International standard pin-out

CFD50-XXSXXB3(R)2 is a new designed 50W output DC/DC Converter with wide input voltage range(4:1), super-fast start up, isolated& regulated output, DIP/chassis mounting/DIN-Rail mounting, single output, isolation 1500VDC. It features the protection function of input under-voltage, output over current, short circuit, over voltage. It is widely used in the industrial control, electrical power, communication, railway engine, industrial robot, etc. 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 (MAX)	Efficiency (%)	
	Nominal	Range	Voltage (V)	Current (A)	Full load(mA)	No Load (mA)	u F	mVp-p (mV)	Min	Typ.
CFD50-36S05B3(R)2	48	18-75	5.0	10	1157	50	8000	100	88	90
CFD50-36S12B3(R)2			12	4.16	1155	2	2000	100	88	90
CFD50-36S15B3(R)2			15	3.33	1156	2	1000	100	88	90
CFD50-36S24B3(R)2			24	2.08	1155	2	500	100	88	90

1. R is with control and adjustment pin, C is with control pin, N is without control and adjustment pin;
2. Suffix "-H" is with heatsink, "-T" for chassis mounting, "-TS" suffix for DIN-Rail mounting, rail width 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.
5. Output cannot be no load, at least with 10% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise.

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Input Specification			
Input Surge Voltage (1Sec)	48Vdc input		100Vdc (Max)
Under-Voltage Turn-off	TYP 14VDC		
Start-up Time	20ms (Typ.)		
Input Filter	Pi filter		
CTRL	Module turn-on		Suspended or connect to High level(3.5V-12VDC)
	Module turn-off		Connect to -Vin or connect to low level (0-0.7VDC)
	Input current when switched off		1mA(Typ.)
Reflected Ripple Current	Input full range, connect to test tools		150mA
Note: *The voltage of CTRL pin is relative to -Vin pin.			

Output Specification			
Output Voltage Accuracy	Full voltage full load	Vo	≤±2.0% (Max)
Line Regulation	Nominal load, full voltage range	Vo	≤±1.0%
Load Regulation	10%~100% nominal load	Vo	≤±2.0%
Ripple & Noise	10%~100% nominal load	≤100mVp-p (20MHz bandwidth)	
Output Over-voltage Protection	110%~200%Vo		
Output Voltage Adjustment	Trim-pin function		±10%(Typ.)
Output Short circuit Protection	Hiccup, continuous, self-recovery		
Output Over-current protection	110%~200%Io (150%Io (Typ.))		
Dynamic Response	25% nominal load step change	△Vo/△t	⩽±5.0%/500μs; (Output 3V3,5.0V⩽±8.0%/500μs)

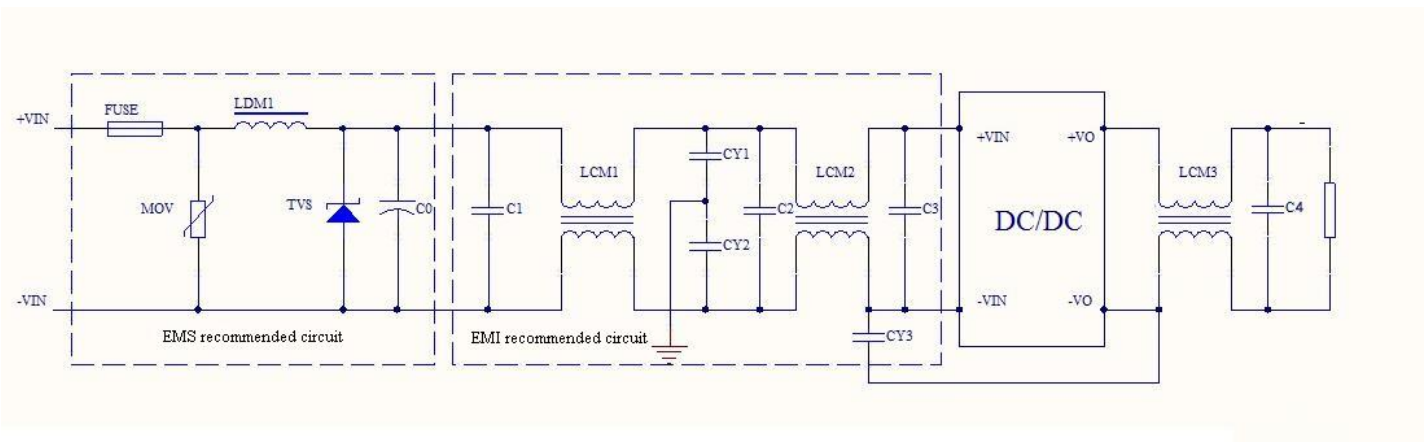
General Specification		
Switching Frequency	Typical	350KHz
Isolation Capacitor	Typical	1000pF
Operating Temperature	-	-40℃ ~ +85℃
Storage Temperature	-	-55℃ ~ +125℃
Max Case Temperature	-	+105℃
Pin withstand soldering temp	Distance to case 1.5mm, 10S	300℃ MAX
Relative Humidity	No condensing	5%~95%
Case Material	-	Aluminum Metal Case
Isolation Voltage	Input to Output	1500Vdc ≤ 0.5mA / 1min
	Input Output to Case	1000Vdc ≤ 0.5mA / 1min

Insulation resistance	Input to Output, voltage 500Vdc	≥1000MΩ
MTBF	MIL-HDBK-217F@25℃	$2X10^5$Hrs
Product Weight	Average	28g

EMC Characteristics

EMI	CE	CISPR22/EN55032 CLASSB (external circuit is needed)	
	RE	CISPR22/EN55032 CLASSB (external circuit is needed)	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV	perf.Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4 ±2KV	perf.Criteria B (external circuit is needed)
	Surge	IEC/EN61000-4-5 ±2KV	perf.Criteria B (external circuit is needed)
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-6 3V/r.m.s	perf.Criteria A

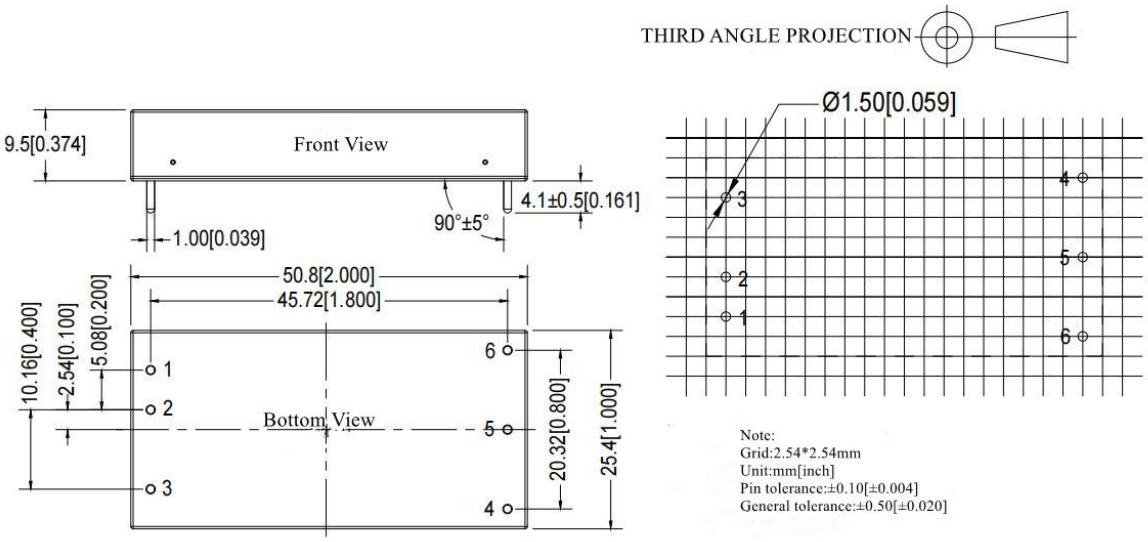
EMC External Recommended Circuit



Recommended Parameter:

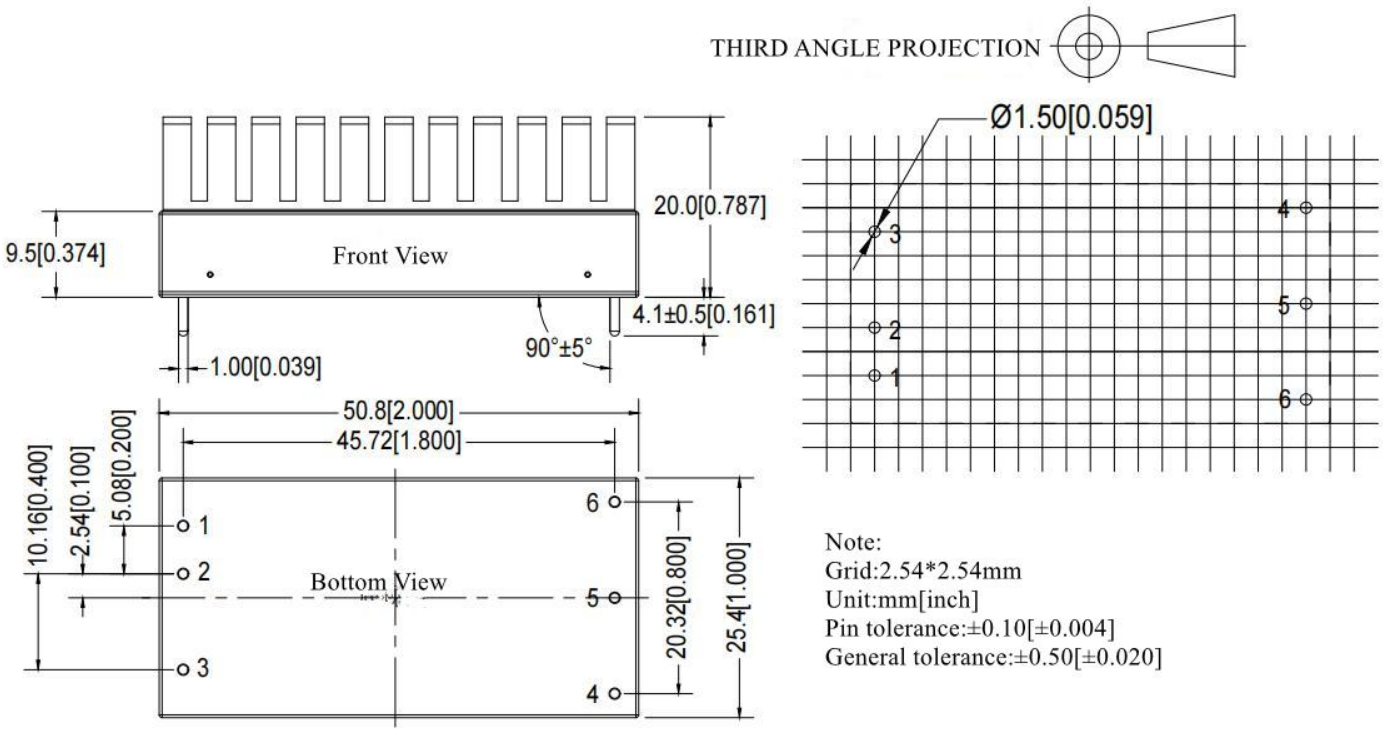
Component	48V Input
FUSE	According to customer's request
MOV	14D101K
LDM1	56uH
TVS	SMCJ80A
C0	560uF/100V
C1,C2,C3	4.7uF/100V
LCM1	15mH
LCM2	56uH
LCM3	20uH~30uH
C4	47uF/50V
CY1,CY2,CY3	1nF/2KV

B3 Package Dimension and Pin Function

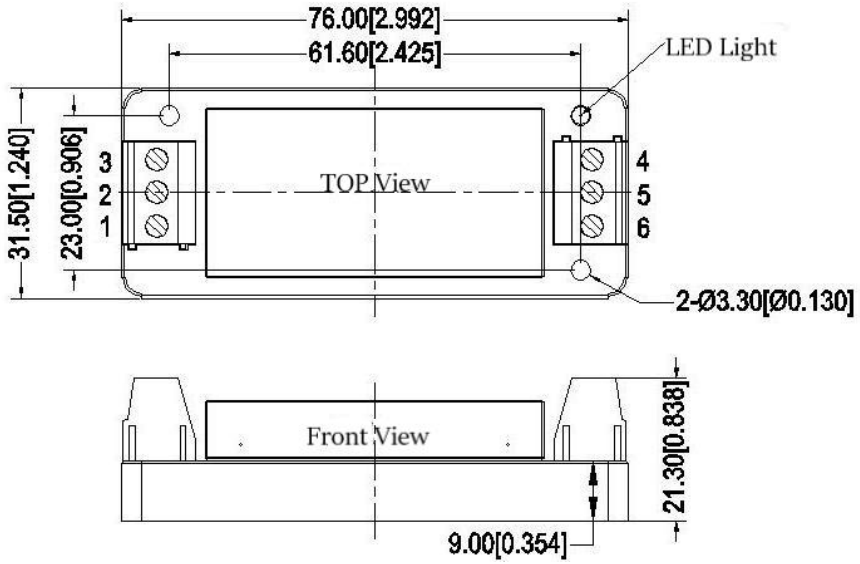


Single (S)	1	2	3	4	5	6
	+Vin	-Vin	CTRL	Trim	-Vo	+Vo

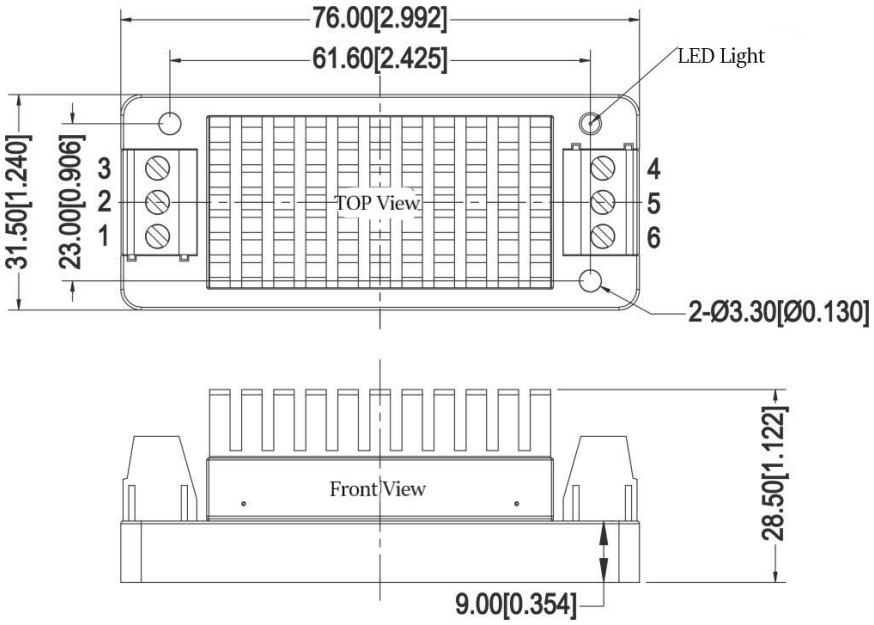
B3-H Package(with Heat Sink) Dimension and Pin Function



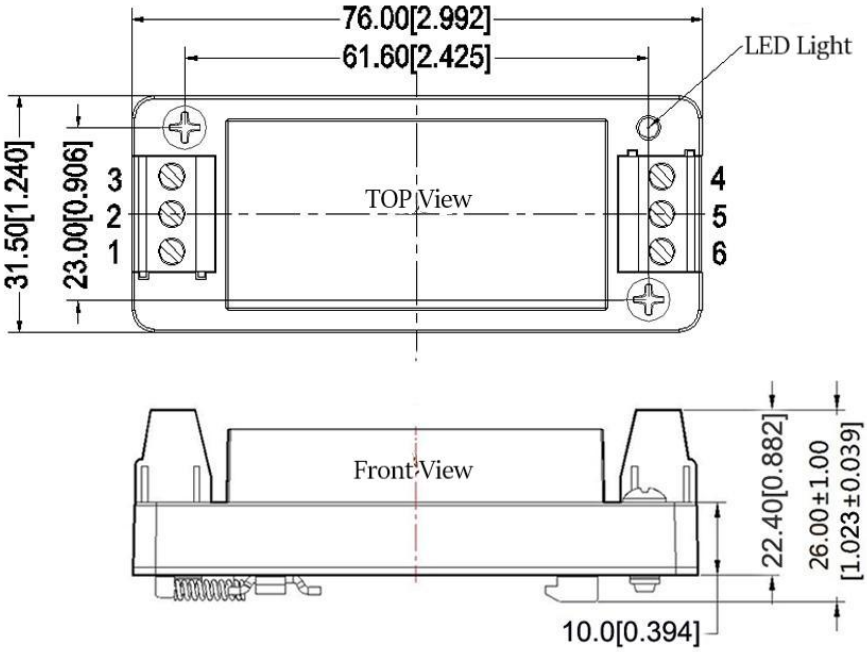
B3-T Package(without Heat Sink) Dimension



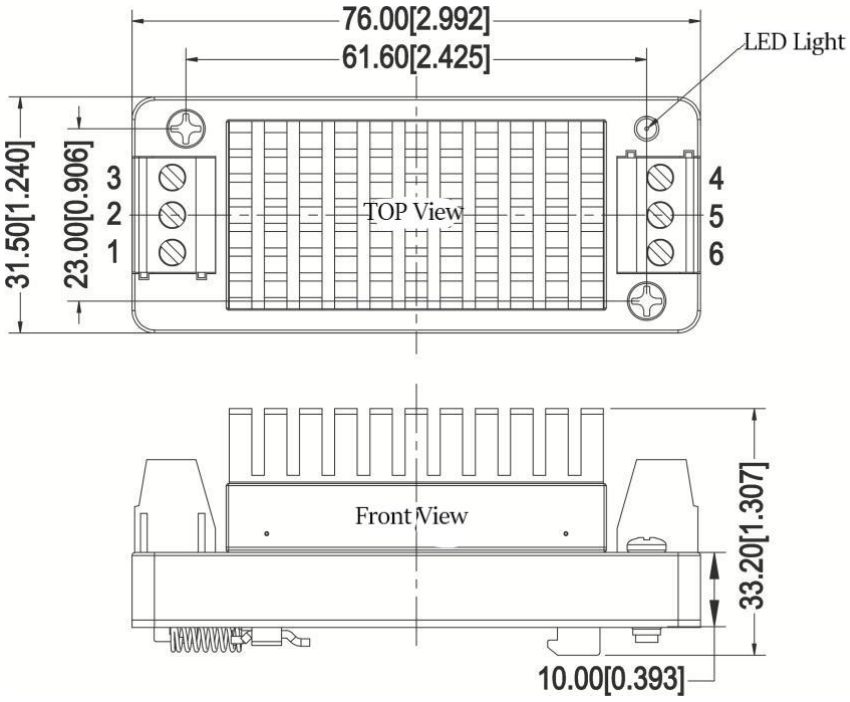
B3-TH Package(with Heat Sink) Dimension



B3-TS Package(without Heat Sink) Dimension



B3-TSH Package(with Heat Sink) Dimension



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Package Description

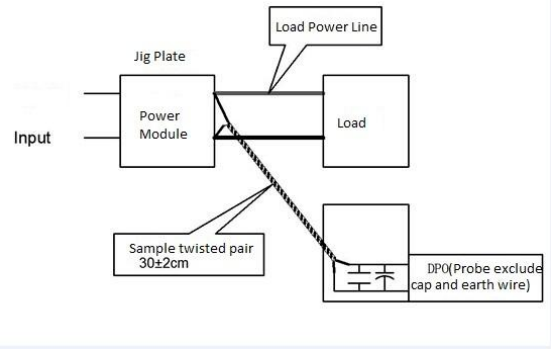
Packing Code	L x W x H	
B3(without Heat Sink)	50.80X25.40X9.5mm	2.000X1.000X0.374inch
B3-H(with Heat Sink)	50.80X25.40X19.5mm	2.000X1.000X0.767inch
B3-T(without Heat Sink)	76X31.5X21.3mm	2.99X1.24X0.838inch
B3-TH(with Heat Sink)	76X31.5X28.5mm	2.99X1.24X1.122inch
B3-TS(without Heat Sink)	76X31.5X26mm	2.99X1.24X1.023inch
B3-TSH(with Heat Sink)	76X31.5X33.2mm	2.99X1.24X1.307inch

Ripple & Noise Test (Twisted Pair Method 20MHz Bandwidth)

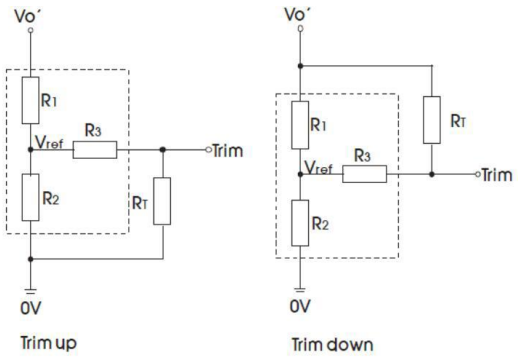
1.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

2. Output Ripple& Noise Test Method:

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.



The usage of Trim and Calculating Trim resistor values



Calculating Trim resistor values:

$$up:\ R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$down:\ R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

RT= Trim Resistor value;
a= self-defined parameter, no actual meaning;
Vo' is the actula voltage to increas or desearse;

The usage circuit of the Trim circuit (dashed line shows inside of product)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	24	24	68	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
24	25.5	2.955	18	2.5

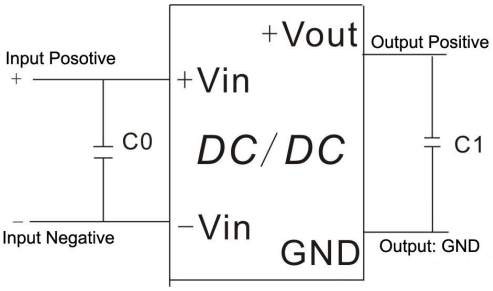
Design and Application Reference

Recommended circuit

1. DC/DC test circuit:

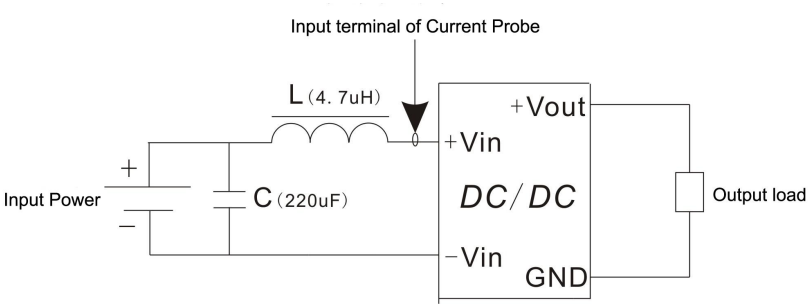
Normal recommended capacitors:

C0:47-100uF;C1:100uF.



2. Input reflecting ripple current test circuit:

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



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.