

Product Typical Features

- ◆ Wide input voltage range (4:1) Output Power 30W
- ◆ Ultrathin Package: 13mm
- ◆ Efficiency up to 90%
- ◆ Stand-by Power Consumption as low as 2W
- ◆ Output super-fast start up as low as 10ms
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Input under voltage, output over voltage, short circuit, over current protection
- ◆ Switching Frequency 300KHz
- ◆ Isolation Voltage 3000VDC/1500VAC
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Good EMI performance
- ◆ International standard pin-out



FD30-110SXXB3C3 Series ----- is a new designed 30W 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 and isolation voltage 3000VDC/1500VAC. It features the protection function of under-voltage, output over current, output short circuit, and output over voltage. It is widely used in the 72V, 96V, 110V of industrial control, electrical power, communication, engine, industrial robot, etc.

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)
FD30-110S3V3B3C3	110	40-160	3.3	8	276	25	8000	100	85	88
FD30-110S05B3C3			5	6	313	25	6800	100	86	89
FD30-110S12B3C3			12	2.5	313	2	2200	200	85	87
FD30-110S15B3C3			15	2	313	2	1000	200	87	89
FD30-110S24B3C3			24	1.25	313	2	680	200	87	89
FD30-110S48B3C3			48	0.625	313	2	470	200	87	89

Note 1: The suffix -H indicates the part with Heat sink, -T (H) indicates a kind of chassis packaging with terminals(with heat sink), -TS (H) indicates a kind of packaging of DIN Rail (with heat sink).

Note 2: The maximum capacitive load is the capacitance allowed to be used when the power supply operate at full load. The converter may not start up if the capacitor exceeds this value.

Note 3: The chip could operate at jitter frequency situation at no load or light load to decrease no-load power consumption and improve the efficiency.

Note 4: The output cannot be no-load, $\geq 5\%$ load or a high-frequency resistance E-cap($\geq 470\mu\text{F}$) load is recommended, to avoid the output ripple increasing.

Input Specification		
Input Surge Voltage (1Sec)	110Vdc Input	160Vdc (Max)
Under-Voltage Turn-off	36VDC	
Turn-on delay Time	10ms (Typ)	
Input Filter	Pi filter	
*CTRL	Module turn-on	No connection or connect to High level (3.5V-12VDC)
	Module turn-off	Connect to -Vin or low level (0-1.2VDC)
	Current value for shut off	1mA(Typ)
Reflected Ripple Current	Input full range, connect to test tools	100mA

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

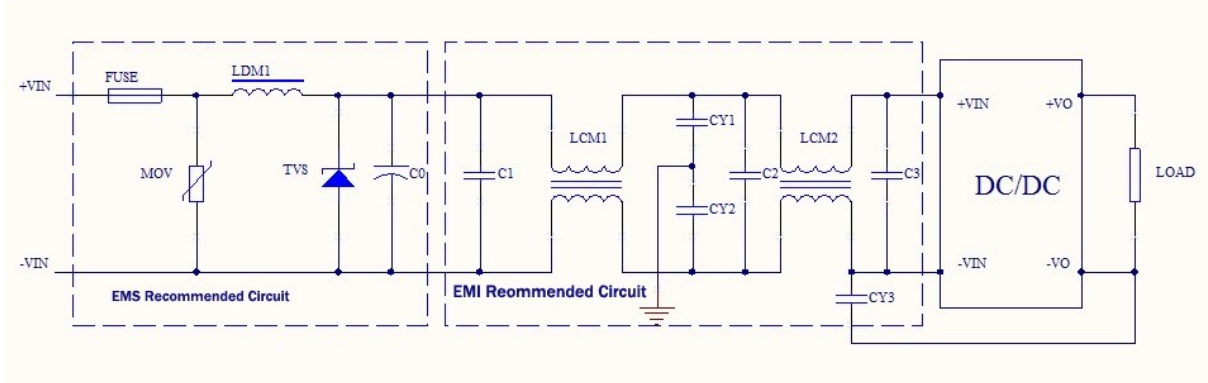
Output Specification			
Output Voltage Accuracy	Full voltage full load	Vo	≤±2.0% (Max)
Line Voltage Regulation	Nominal load, full voltage range	Vo	≤±1.0%
Load Regulation	10% ~ 100% rated load	Vo	≤±1.0%
Ripple & Noise	Nominal load, nominal voltage	≤200mVp-p (20MHz bandwidth)	
Output Over-voltage Protection	110%~190%Vo		
Output Voltage Adjustment	Trim-pin function	±10% (Typ)	
Output Short circuit Protection	Hiccup, continuous, self-recovery		
Output Over-current protection	≥120%		
Dynamic Response	25% nominal load step change	ΔVo/Δt	≤±5.0%/500μs; (3V3, 5.0V Series ≤±8.0%/500μs)

General Specification		
Switching Frequency	Typical	300KHz
Isolation Capacitor	Typical	2000pF
Operating Temperature	Refer to Temperature Derating Curve	-40°C ~ +85°C
Storage Temperature	-	-55°C ~ +125°C
Max Case Temperature	Within Operating Curve	+105°C
Relative Humidity	No condensing	5%~95%
Case Material	-	Aluminum Metal Case
Isolation Voltage	Input to Output	3000Vdc ≤ 0.5mA / 1min 1500VAc ≤ 5mA / 1min
Meantime Between Failure	MIL-HDBK-217F@25°C	2X10 ⁵ Hrs
Product Weight	Average	30g

EMC Performances

EMI	CE	CISPR22/EN55032 CLASSA (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	(external circuit is needed) perf.Criteria B
	CS	IEC/EN61000-4-6	3Vr.m.s perf.Criteria A
	Voltage dips, short interruptions and voltage variations immunity		IEC/EN61000-4-29

Recommended External Circuit for EMC

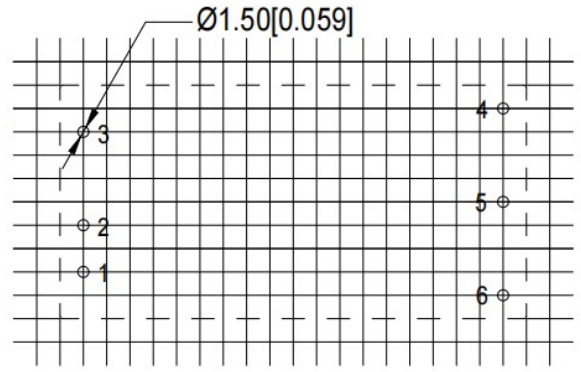
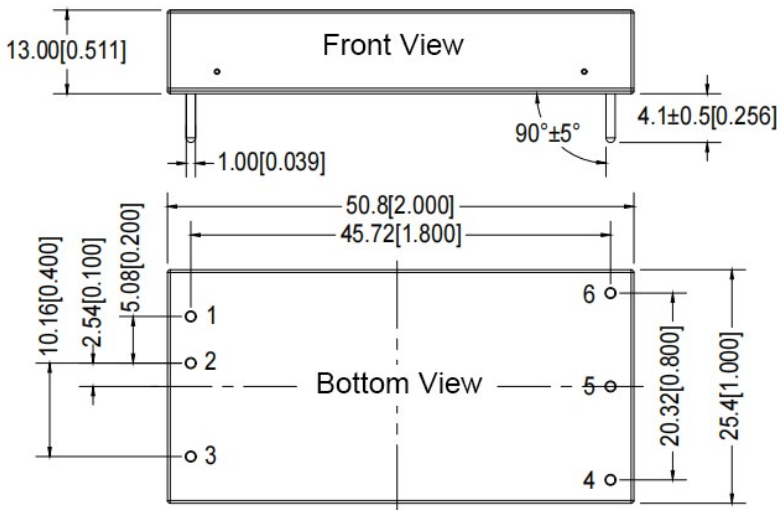
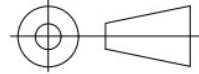


Recommended Parameter:

Component	110V Input
FUSE	According to customer's request
MOV	14D201K
LDM1	56uH
TVS	SMCJ170A
C0	560uF/200V
C1,C2,C3	4.7uF/200V
LCM1	15mH
LCM2	56uH
CY1,CY2,CY3	1nF/3KV

B3 Package(without Heat Sink) Dimension and Pin Function

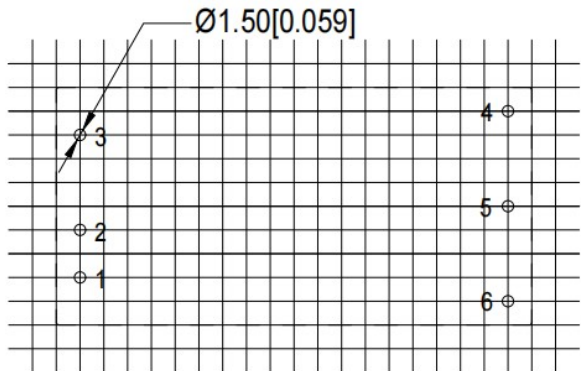
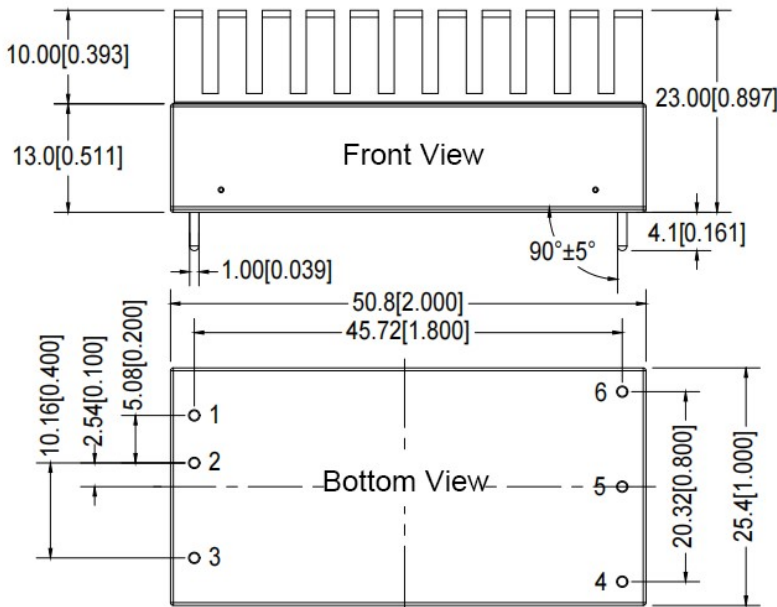
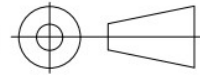
THIRD ANGLE PROJECTION



Note:
 Grid distance: 2.54*2.54mm
 Unit: mm[inch]
 Pin diameter tolerance: ±0.10[±0.004]
 General tolerance: ±0.50[±0.0020]

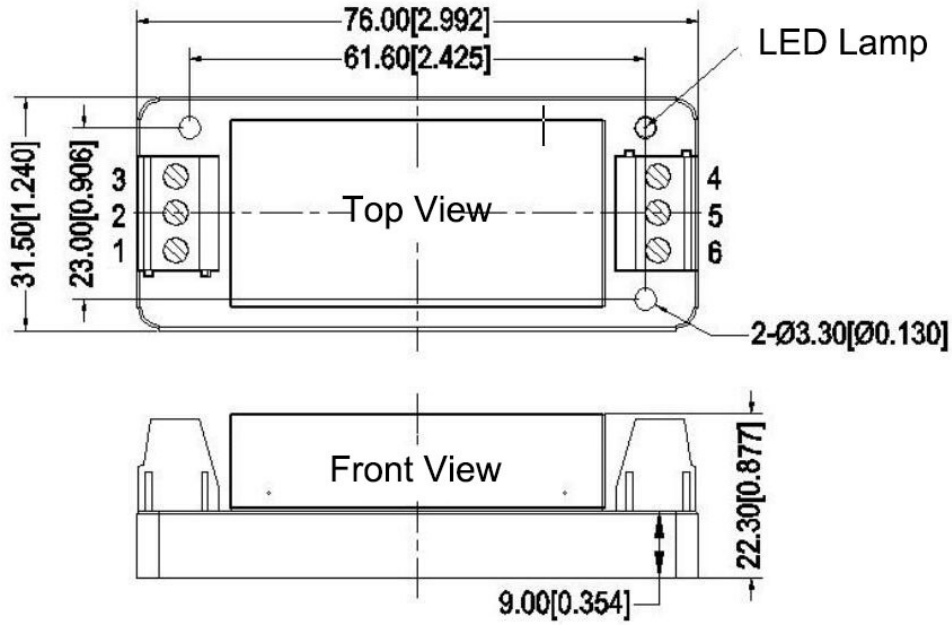
B3-H Package (with Heat Sink) Dimension and Pin Function

THIRD ANGLE PROJECTION

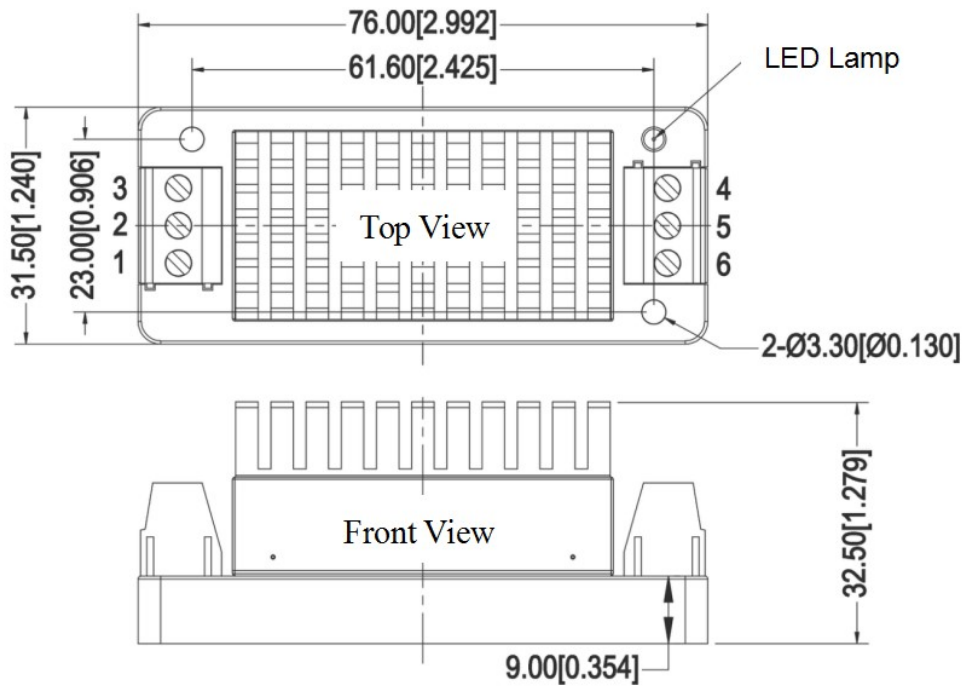


Note:
 Grid distance: 2.54*2.54mm
 Unit: mm[inch]
 Pin diameter tolerance: ±0.10[±0.004]
 General tolerance: ±0.50[±0.0020]

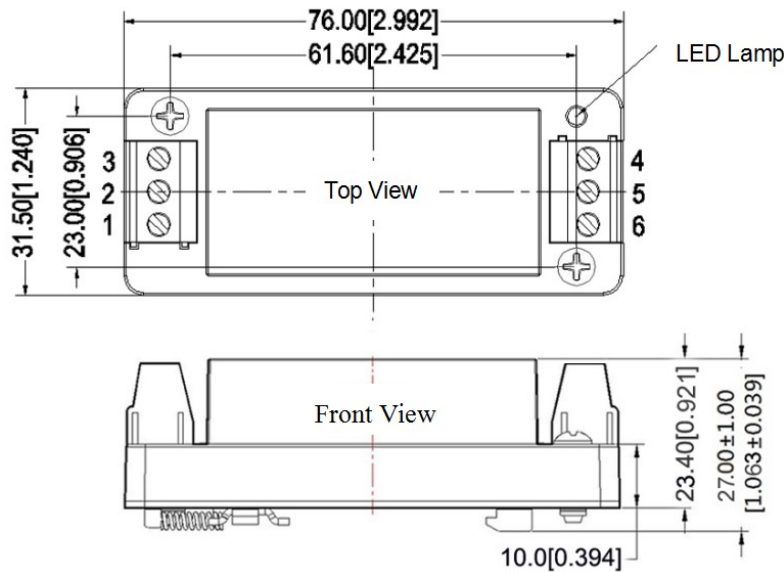
B3-T Package(without Heat Sink) Dimension



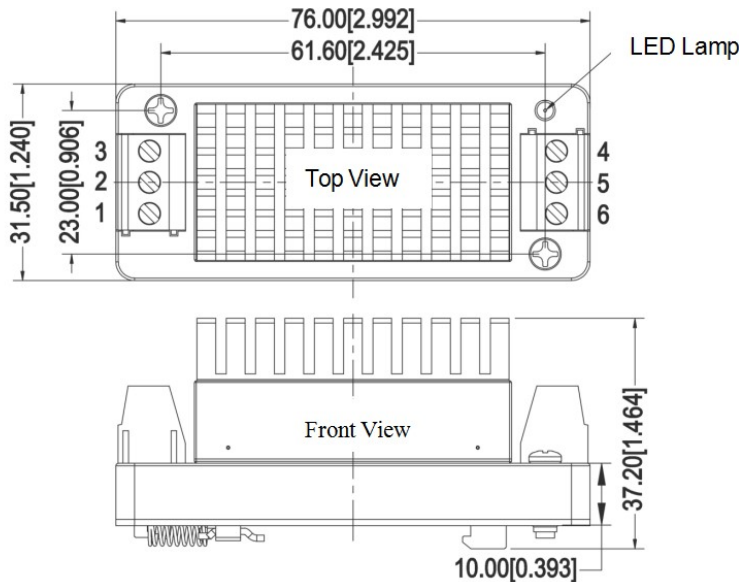
B3-T Package(with Heat Sink) Dimension



B3-TS Package(without Heat Sink) Dimension



B3-TS Package(with Heat Sink) Dimension



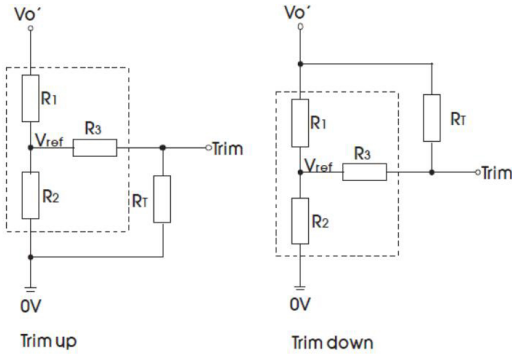
All Packages Dimensions

Packing Code	L x W x H	
B3 (without Heat Sink)	50.80X25.40X13mm	2.000X1.000X0.511inch
B3-H (with Heat Sink)	50.80X25.40X23mm	2.000X1.000X0.905inch
B3-T (without Heat Sink)	76X31.5X22.3mm	2.99X1.24X0.877inch
B3-TH (with Heat Sink)	76X31.5X32.5mm	2.99X1.24X1.279inch
B3-TS (without Heat Sink)	76X31.5X27mm	2.99X1.24X1.063inch
B3-TSH (with Heat Sink)	76X31.5X37.2mm	2.99X1.24X1.464inch

Pin Definition

Pin	1	2	3	4	5	6
Single	+Vin	-Vin	CTRL	Trim	-Vo	+Vo

Trim and Calculation of Trim resistor values



Calculating Trim resistor values:

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

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

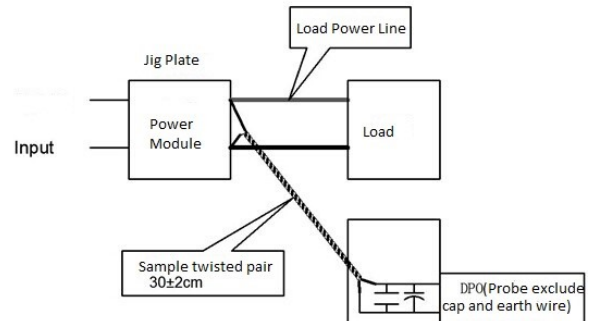
\$R_T\$ = Trim Resistor value;
 \$a\$ = self-defined parameter, no actual meaning;
 \$V_o'\$ is the actual voltage to increase or decrease;

Note: Trim up & down circuits, the components in the dotted area are inside of the converter.

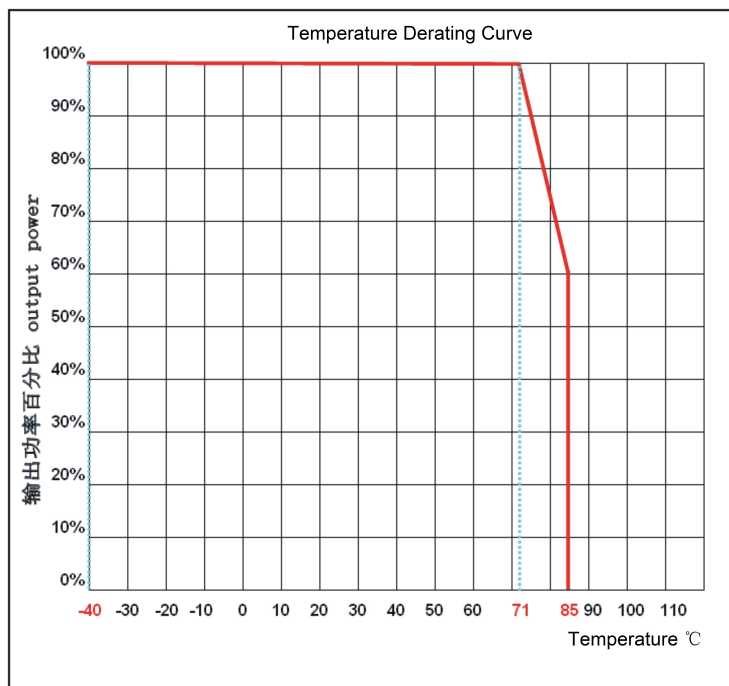
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHz Bandwidth)

Test method:

- 1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 47uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set on the Sample Mode.
- 2) The output ripple noise test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Temperature Derating Curve

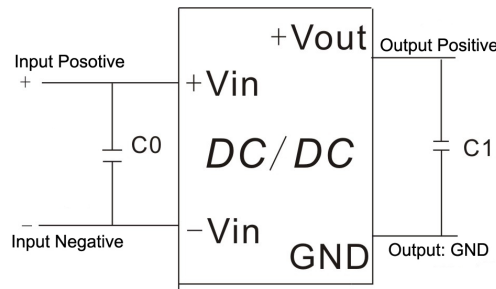


Recommended Circuit for Application

Recommended circuit

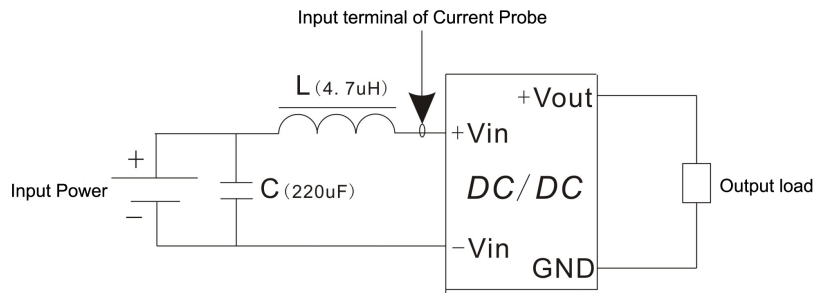
1. DC/DC test circuit:

Normal recommended capacitors: C0: 47-100uF; C1: 470uF.



2. Input reflected ripple current test circuit:

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



Note:

1. The output should not be no-load, $\geq 10\%$ load or a high-frequency resistance E-cap ($\geq 470\mu\text{F}$) load is recommended, to avoid the output ripple increasing.
2. It is recommended that the load imbalance of dual-channel output products should be less than $\pm 5\%$.
3. The maximum capacitive load is obtained by testing at pure resistance full load.
4. Unless otherwise specified, all values or indicators in this manual are tested at $T_a=25^\circ\text{C}$, humidity $< 75\% \text{RH}$, rated input voltage and rated load (pure resistance load).
5. All values or indicators in this manual had been tested based on Aipupower test specifications.
6. The specifications are specially for the parts listed in this manual, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirement.
7. Aipupower can provide customization service.
8. The product specifications may be modified without a prior notice. Please refer to the published data sheet in Aipupower website.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: <https://www.aipupower.com>