

Typical Features

- ◆ Input voltage range 36-60VDC
- ◆ Output overload and short circuit protection
- ◆ Input no-load current as low as 90mA
- ◆ Input and output isolation 1500VDC
- ◆ High Efficiency, High Reliability, Low Ripple Noise
- ◆ Over temperature protection, over current protection, short circuit protection
- ◆ Protection: Input under voltage, output over voltage, short circuit, over current
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Good EMI performance
- ◆ Industrial product technology design, international standard volume



BA600-48SXX-H is a small-sized, high-efficiency EMC-compatible DC-DC portable module power supply provided by Aipu to customers. This series of power supplies has the advantages of EMC compatibility, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, and high safety isolation. The product is safe and reliable with good EMC performance. This series of products have important applications in many fields such as industry, office and civil use.

Typical Product List

Part No	Output Power	Input voltage Range	Output Voltage/Current (Vo/Io)		Input Current (mA) (Nominal Voltage)		Max. Capacitive Load u F	Efficiency (%)	
			Voltage (V)	Current (A)	Full load(mA)	No Load (mA)		Min	Typ.
BA600-48S12-H	600	30-60	12	50000	14700	95	2000	82	85

Note 1: The typical value of output efficiency is based on the product aging for half an hour under full load.

Note 2: The fluctuation range of full load efficiency (% , TYP) in the table is $\pm 2\%$, and the full load output efficiency is equal to the total output power divided by the input power of the power module.

Note 3: When the output power is used above 300W, it is necessary to take heat dissipation measures (add heat sink), the larger the output power, the larger the heat dissipation area.

Note 4: The suffix with H means with heat sink, and without H means without heat sink.



Input Specification

	Working conditions	Min	Nominal	Max	Unit
Input voltage range	--	36	48	60	VDC
		When 36VDC input, output 60% load			
	Working conditions	Min	Nominal	Max	Unit
Input Current	36DC@100% load	-	19800	-	mA
	48DC@100% load	-	14700	-	
	60DC@100% load	-	11600	-	
Standby power consumption	Output no load, nominal input	-	4.5	-	W

Output Specification

Output Voltage Accuracy	Full voltage full load	Vo	≤±2.0% (Max)	
Line Regulation	Nominal load, full voltage range	Vo	≤±0.5% (Max)	
Load Regulation	10%~100% nominal load	Vo	≤±1.0% (Max)	
Ripple & Noise	Nominal load, nominal voltage	≤150mVp-p (20MHz bandwidth)		
Output Over-voltage Protection	110%~160%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 $\Delta Vo/\Delta t$	3.3V&5V	7.5%(Max)	
		Others	≤±5.0%/500μs;(24V Input 16-36VDC) (48V Input 36-75VDC) ≤±7.0%/500μs;(24V Input 9-16VDC) (48V Input 18-36VDC)	

General Specification

Switching Frequency	Typical	350KHz
Isolation Capacitor	Typical	2000pF
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

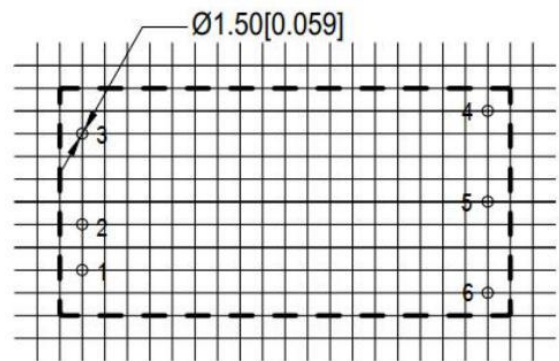
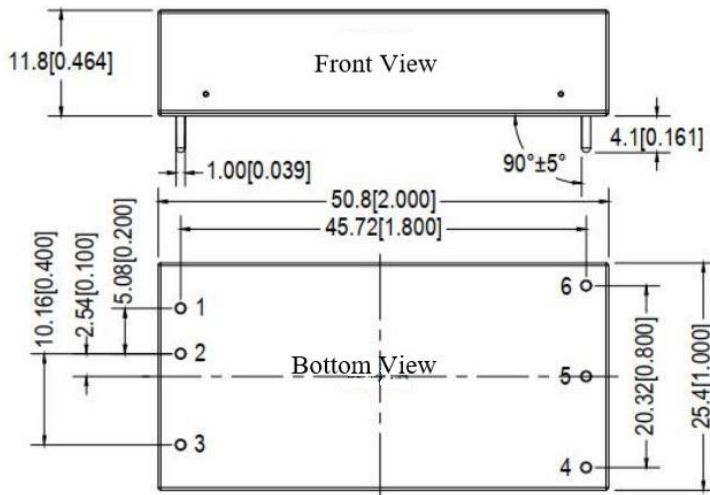
Isolation Voltage	Input to Output	1500Vdc ≤ 0.5mA / 1min
MTBF	MIL-HDBK-217F@25°C	2X10 ⁵ Hrs
Product Weight	Average	45g

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

B3R2 Package(without Heat Sink) Dimension and Pin Function

THIRD ANGLE PROJECTION

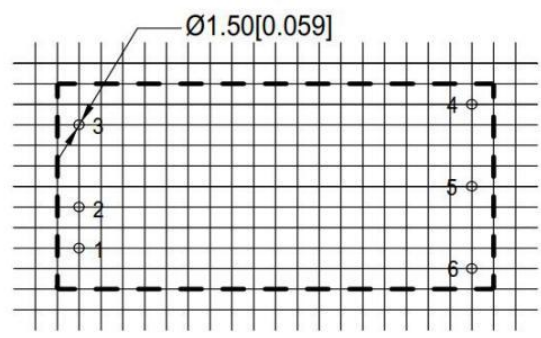
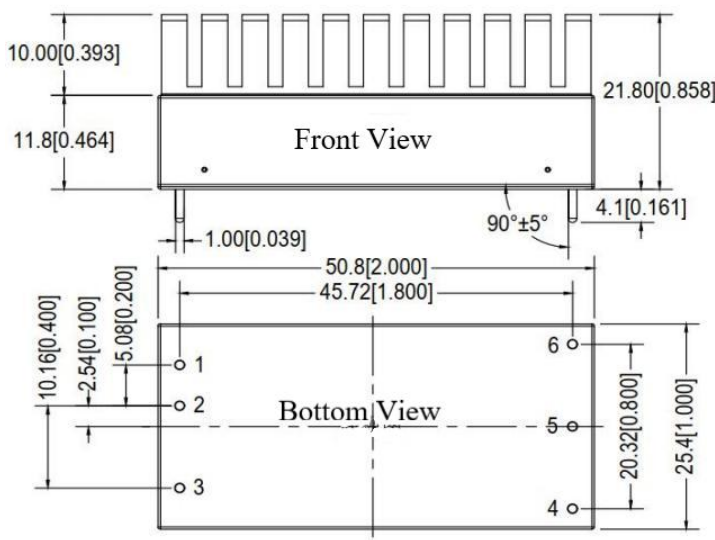


Note:
Grid 2.54*2.54mm
Unit:mm[inch]
Pin tolerance:±1.0[±0.004]
General tolerance:±0.50[±0.020]

B3R2 Package(with Heat Sink) Dimension and Pin Function

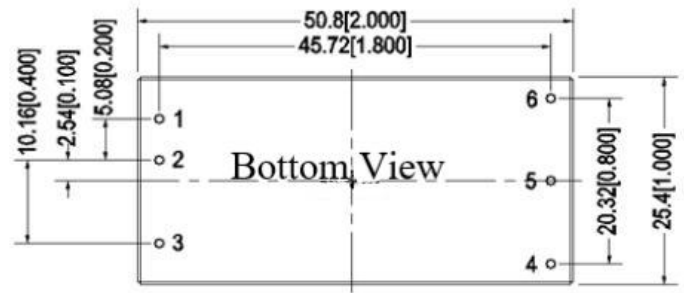
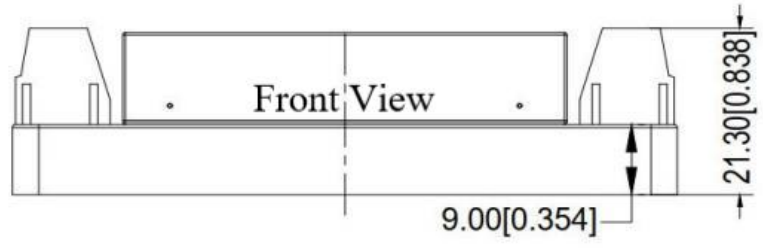
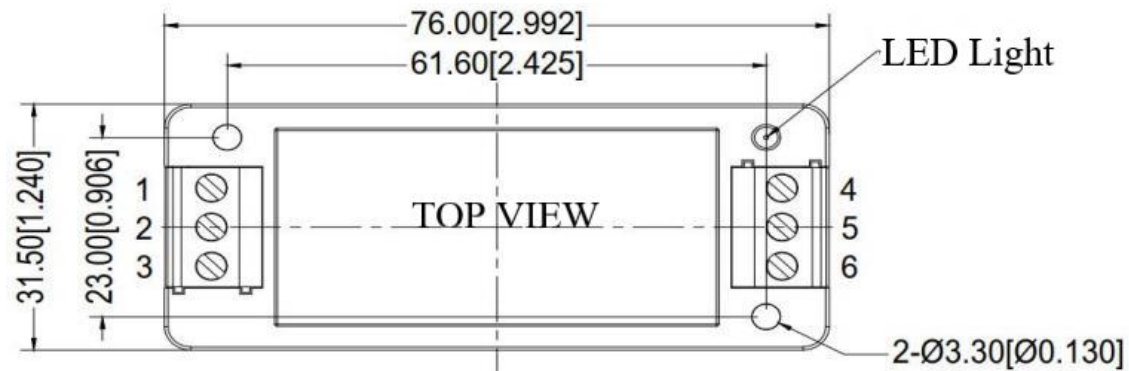


THIRD ANGLE PROJECTION



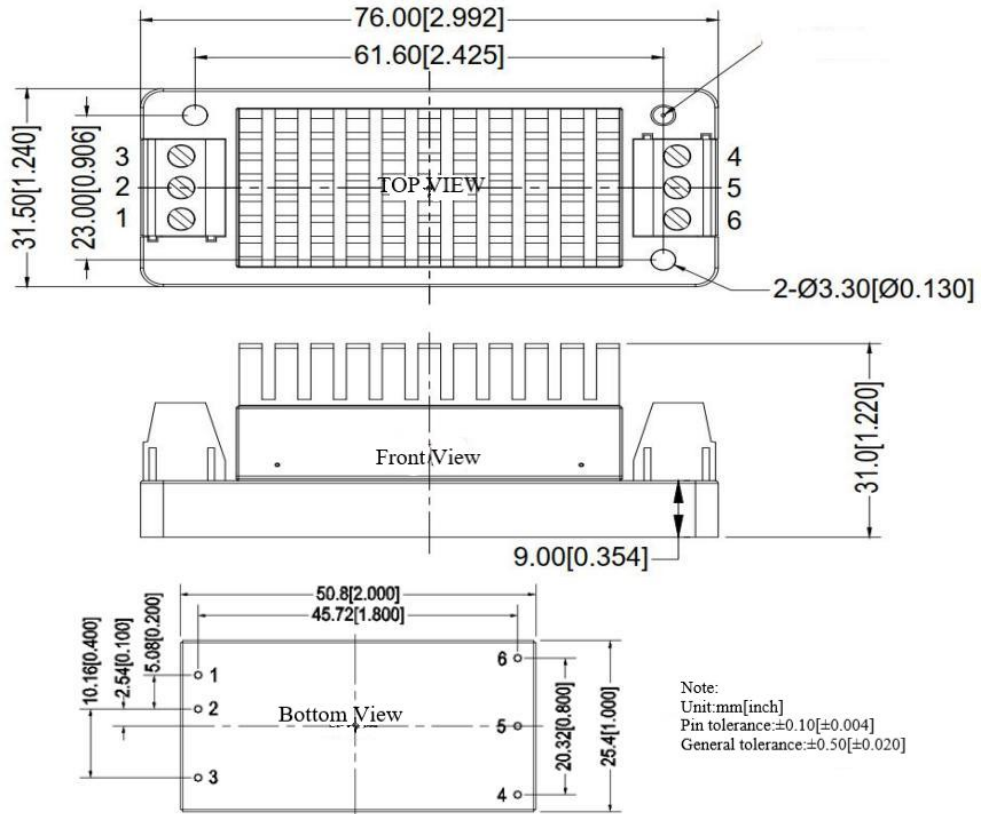
Note:
Grid 2.54*2.54mm
Unit:mm[inch]
Pin tolerance:±0.10[±0.004]
General tolerance:±0.50[±0.020]

B3R2-T Package(without Heat Sink) Dimension

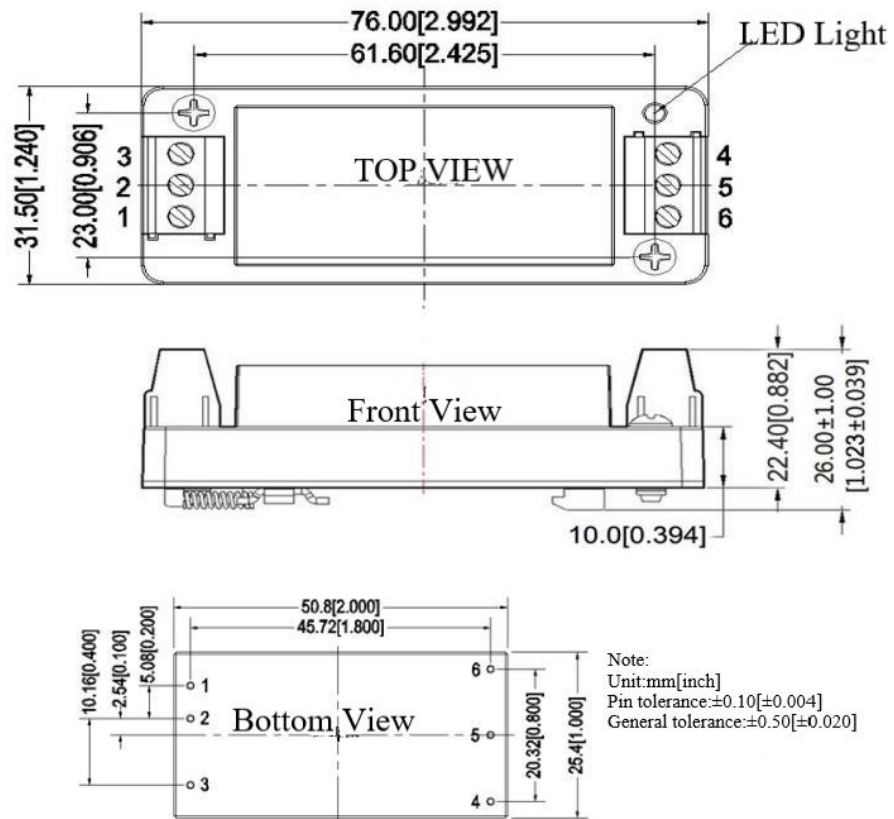


Note:
Unit:mm[inch]
Pin tolerance:±0.10[±0.004]
General tolerance:±0.50[±0.020]

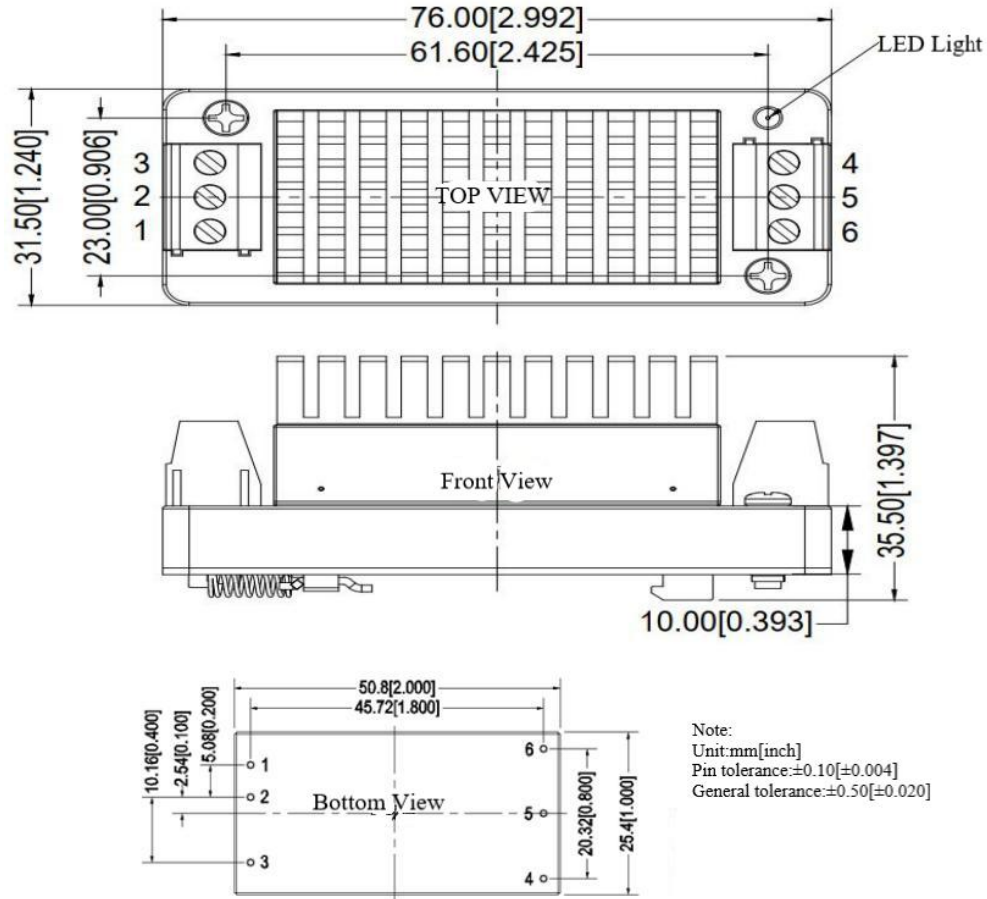
B3R2-TH Package(with Heat Sink) Dimension



B3R2-TS Package(without Heat Sink) Dimension



B3R2-TSH Package(with Heat Sink) Dimension



Package Description

Packing Code	L x W x H	
B3R2(without Heat Sink)	50.80X25.40X11.8mm	2.000X1.000X0.464inch
B3R2-H(with Heat Sink)	50.80X25.40X21.8mm	2.000X1.000X0.858inch
B3R2-T(without Heat Sink)	76X31.5X21.3mm	2.99X1.24X0.838inch
B3R2-TH(with Heat Sink)	76X31.5X31.0mm	2.99X1.24X1.1220inch
B3R2-TS(without Heat Sink)	76X31.5X26.0mm	2.99X1.24X1.023inch
B3R2-TSH(with Heat Sink)	76X31.5X35.5mm	2.99X1.24X1.397inch

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

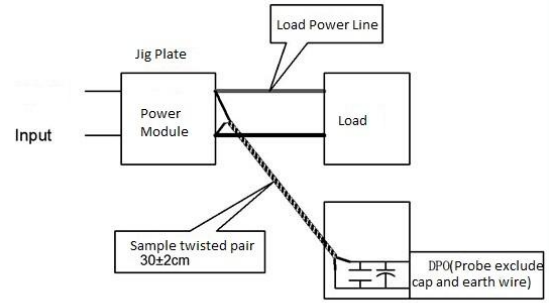
Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

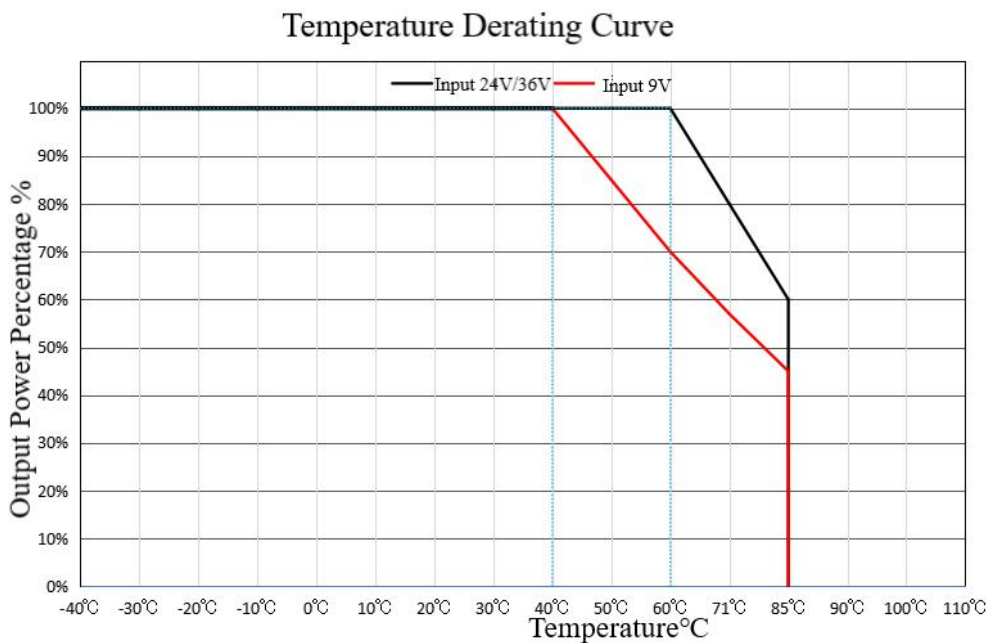
1.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

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.

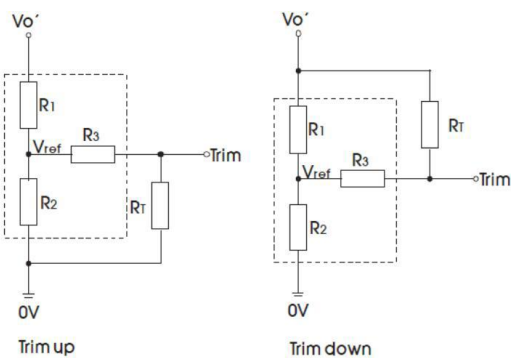


Temperature Derating Curve



Note: The temperature derating curve is based on the product with heatsink and no wind environment.

The usage of Trim and Calculating Trim resistor values



Calculating Trim resistor values:

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

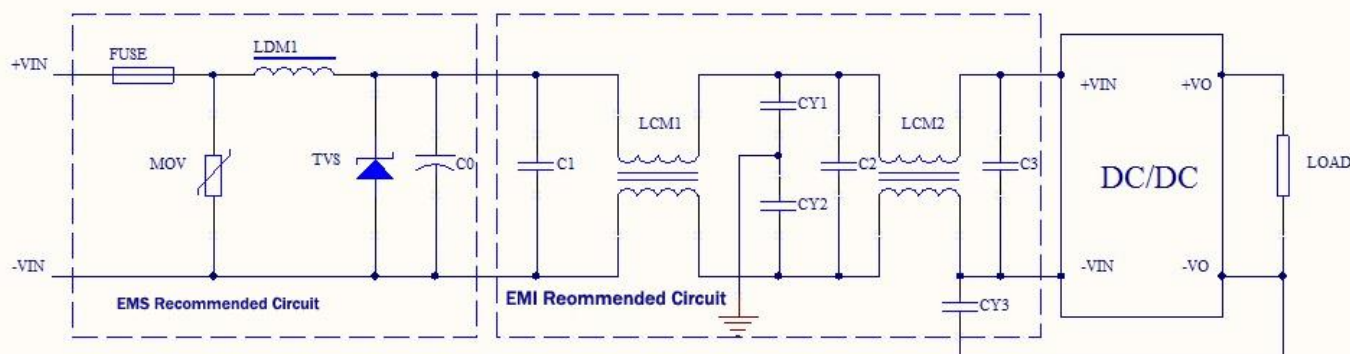
$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_{o'} - V_{ref}}{V_{ref}} \cdot R_2$$

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

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

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	24	14.53	68	1.25
5	24	24	68	2.5
9	12.1	4.62	30	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
24	25.5	2.955	18	2.5

EMC External Recommended Circuit



Recommended Parameter: :

Component	18V Input	36V Input
FUSE	According to customer's request	
MOV	14D101K	14D470K
LDM1	56uH	
TVS	SMCJ80A	SMCJ40A
C0	560uF/100V	680uF/100V
C1,C2,C3	4.7uF/100V	4.7uF/100V
LCM1	15mH	
LCM2	56uH	
CY1,CY2,CY3	1nF/2KV	

Design and Application Reference

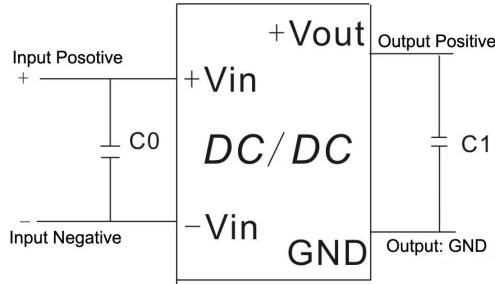
Recommended circuit

1. DC/DC test circuit:

Normal recommended capacitors:

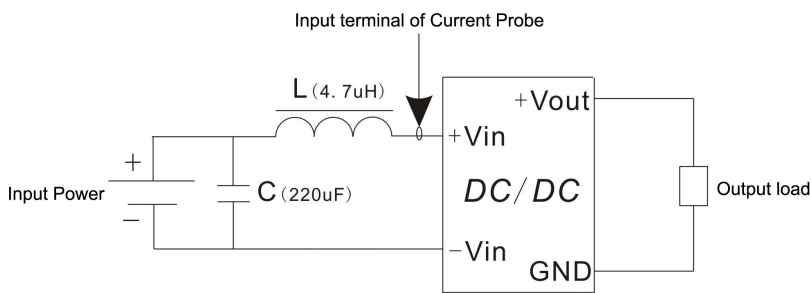
C0:47-100uF; (Input 24VDC use 50V, Input 48VDC use 100V)

C1:100uF/50V.



2. Input reflecting ripple current test circuit:

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



Application Reference:

1. The recommended minimum load is 10% or high frequency low resistance electrolytic capacitor above 470uF, or output ripple will rise;
2. Recommend the unbalance loads of dual output to be $\leq \pm 5\%$;
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;
5. Due to space limitation, please contact our team for more information;
6. If no special specified, all parameters tested under nominal input voltage, pure resistance rated load and $T_a=25^\circ\text{C}$ conditions.