Typical Features

- ◆ Fixed input voltage, isolated & unregulated, output 2W
- ◆ Efficiency up to 85% (Typ.)
- ◆ Mini size SIP package
- ◆ Reinforced insulation
- ◆ Isolation voltage 5000VAC/6000VDC
- ◆ Continuous short circuit protection, self-recovery
- ◆ Operating temperature from -40℃ to +105℃
- ◆ Plastic case, flame class UL94-V0

Application Field

This series of products can be widely used in the fields of instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @nominal volt.		Max Capacitive Load	Efficiency (%) @full load/ nominal volt.	
		Nominal (VDC)	Range (VDC)	Vo (VDC)	Io(mA) Max/Min	Full Load	No Load	（uF)	Min	Typ.
-	FN2-12S12H6R3	12	10.8 - 13.2	12	167/17	193	15	470	80	84
-	FN2-12S15H6R3			15	133/13	193	15	470	80	84
-	FN2-12S24H6R3			24	83/8	100	20	220	80	84
-	FN2-12D12H6R3			±12	±83/±8	192	20	220	80	84
-	FN2-12D15H6R3			±15	±67/±7	192	15	220	80	84
-	FN2-15S05H6R3	15	13.5 - 16.5	5	400/40	155	12	470	80	84
-	FN2-15S15H6R3			15	67/7	155	12	470	80	84
-	FN2-15D12H6R3			±12	±83/±8	155	15	220	80	84
-	FN2-15D15H6R3			±15	±67/±7	155	15	220	80	84
-	FN2-24S12H6R3	24	21.6 - 26.4	12	167/17	98	8	470	81	85
-	FN2-24S15H6R3			15	133/13	98	8	470	81	85
-	FN2-24S24H6R3			24	83/8	100	8	220	81	85
-	FN2-24D09H6R3			±9	±111/±11	96	8	220	81	85
-	FN2-24D12H6R3			±12	±83/±8	96	8	220	81	85
-	FN2-24D15H6R3			±15	±67/±7	96	8	220	81	85

Note 1: The maximum capacitive load is the capacitance allowed to be used when the power supply starts up at full load. The converter may not start if the capacitor exceeds this value.

Note 2: The efficiency is tested at the nominal input voltage and the rated load.

Note 3: Please contact Aipu sales for other output voltages requirements of this series but not listed in this table.

Input Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Input inrush voltage (1Sec max.)	12Vdc Input	-0.7	--	18	VDC
	15Vdc Input	-0.7	--	21	
	24Vdc Input	-0.7	--	30	
Input filter	Capacitor Filter				
Hot plug	Unavailable				

Output Specifications

Item	Operating Condition		Min.	Typ.	Max.	Unit
Output power			0.2	--	2	W
Output voltage accuracy	Please refer to the Output Voltage Deviation Graph (Figure 1)					
Load regulation	10% - 100% load	5V output	--	15	20	%
		Others	--	10	15	
Line voltage regulation	Input voltage change ±1%	5V output	--	--	1.5	%
		Others	--	--	1.2	
Temperature drift coefficient			--	--	±0.03	%/°C
Ripple & Noise	0%-100% load, 20MHz bandwidth		--	100	150	mVp-p
Short circuit protection	Continuous, self-recovery					
Note: The Ripple & Noise is tested by the Twisted Pair Method, please refer to the following test instruction.						

General Specifications

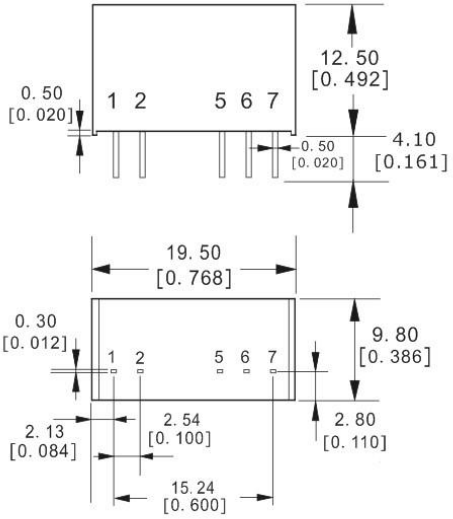
Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load	--	240	--	KHz
Operating temperature	Refer to the Temperature Derating Graph (Figure 2)	-40	--	+105	℃
Storage temperature		-55	--	+125	℃
Case temperature rise	Within the operating derating range	--	30°	--	℃
Pin soldering temperature	1.5mm from the case, soldering time 10S	--	--	300	℃
Relative humidity	No condensing	5	--	95	%RH
Isolation voltage	I/P-O/P, test 1 minute, leakage current <1mA	5000	--	--	VAC
		6000	--	--	VDC
Insulation resistance	I/P-O/P, @ 500VDC	1000	--	--	MΩ
Isolation capacitance	I/P-O/P, 100KHz/0.1V	--	6	--	pF
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Transformer CL distance		5	--	--	mm
Transformer CR distance		5	--	--	
PCB CL&CR distances		5.5	--	--	
Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z				
Case material	Plastic in Black, flame class UL94-V0				
Unit weight	3.7g (Typ.)				

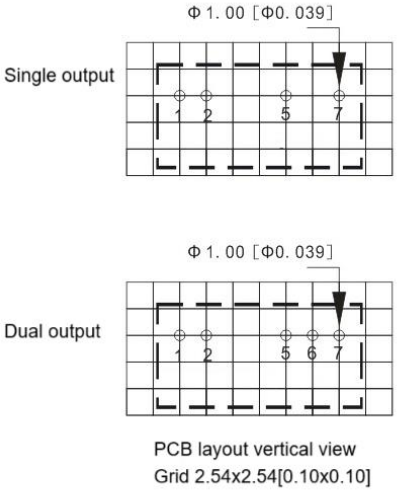
Cooling method	Natural air		
Packing	Tube size (525x18x10mm)	25PCS/Tube	
	Carton size (542x110x155mm)	1400PCS/Carton (Total 56 Tubes)	
Unit dimensions	L x W x H	19.50× 9.80 × 12.50 mm	0.768 × 0.386 × 0.492 inch

EMC Performance

Item		Standards	Performance/Class
EMI	CE	CISPR32/EN55032	Class B (with the Recommended EMC circuit)
	RE	CISPR32/EN55032	Class B (with the Recommended EMC circuit)
EMS	ESD	IEC/EN61000-4-2	Contact ±8kV, air ±15kV perf. Criteria B

Mechanical Dimensions





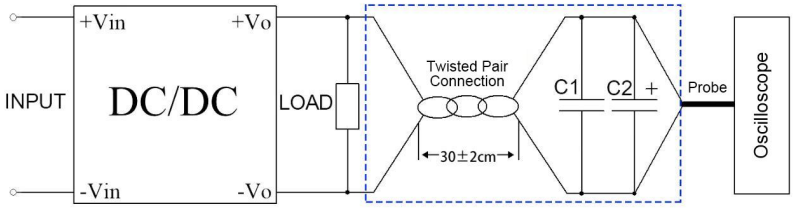
Unit: mm[inch]
Pin section tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

Pin-out Function Description

Pin No.	1	2	3	4	5	6	7
Single (S)	+Vin	GND	No Pin	No Pin	-Vo	No Pin	+Vo
Dual (D)	+Vin	GND	No Pin	No Pin	-Vo	COM	+Vo

Note: Please take the pin definition on the product label as the right one if it is different than the data sheet description.

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



1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. Refer to the test diagram, 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 other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load. The test can start after the input power on.
3. It is recommended to connect a ≥10% load or a high-frequency low resistance electrolytic capacitor (≥100uF) load to the output to avoid the output ripple increasing.

Product Characteristics Graphs

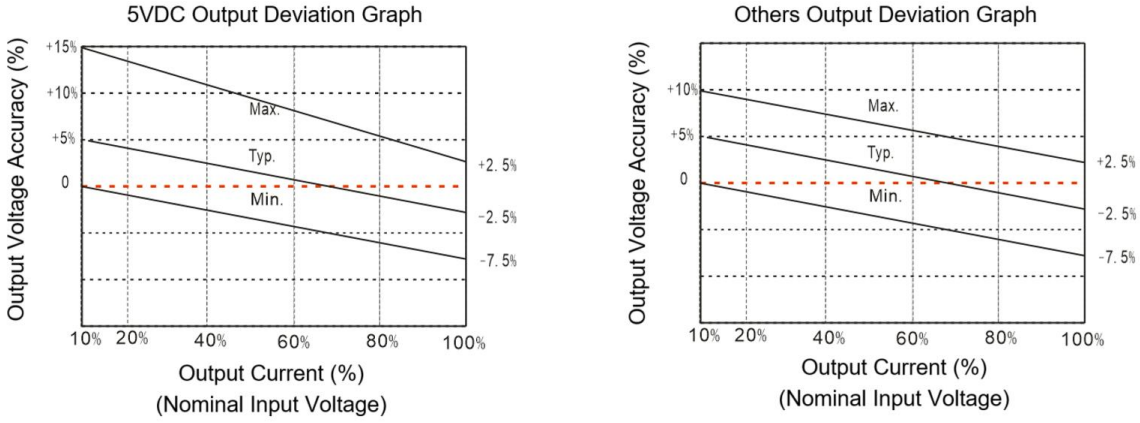


Figure 1

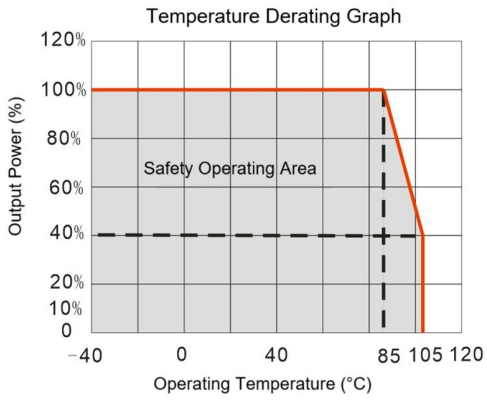


Figure 2

Recommended Circuits for Application

1. Requirement for the output load

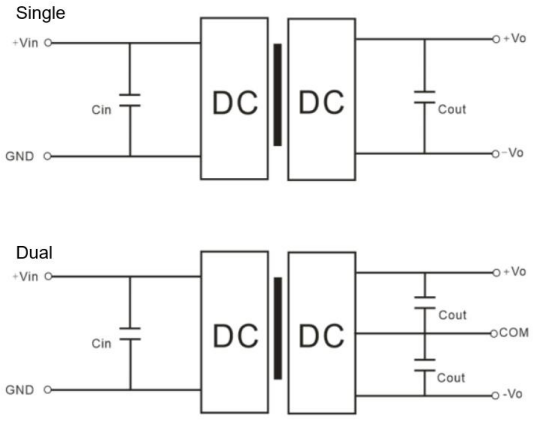
a. To ensure the converter operating efficiently and reliably, its minimum load should not be less than 10% of the rated load. It is recommended to connect a resistor in parallel to the output when the real load is less than 10% (the sum of the power consumed

should be bigger than or equal to 10% of the rated power).

b. The maximum capacitive load is tested at the full load. The converter may not start or be damaged at the capacitive over-load.

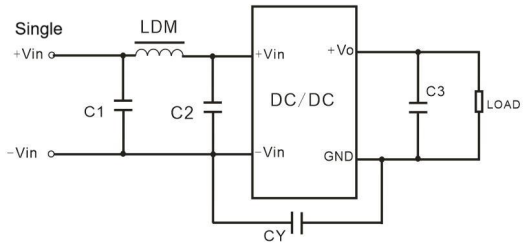
2. Typical application circuits

To ensure effectively decrease the input and output ripple and noise, a capacitor filter can be connected at the input and output, the application circuit is shown in the figure below. The suitable filter capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not start if the capacitance is too big.

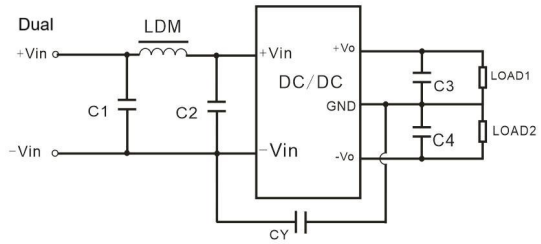


Recommended Capacitive Load Values (Table 1)					
Vin (Vdc)	Cin	Single Vout (Vdc)	Cout	Dual Vout (Vdc)	Cout
12	2.2uF/25V	5	10uF/16V	±5	4.7uF/16V
15	2.2uF/25V	9	10uF/16V	±9	4.7uF/16V
24	1uF/50V	12	2.2uF/25V	±12	1uF/50V
		15	1uF/50V	±15	1uF/50V
		24	1uF/50V	±24	470nF/50V

3. Recommended EMC circuit diagram



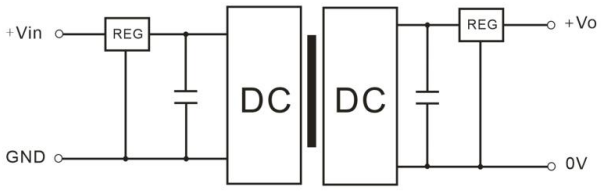
Input Volt. (single)		12/15/24Vdc
EMI	C1/C2	4.7uF/50V
	CY	270pF
	C3	Refer to Cout value in Table 1
	LDM	6.8uH



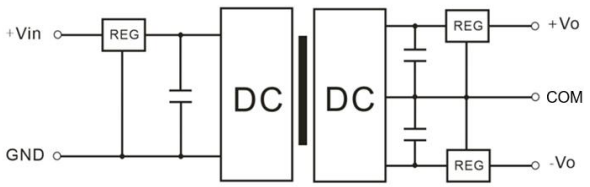
Input Volt. (dual)		12/15/24Vdc
EMI	C1/C2	4.7uF/50V
	CY	270pF
	C3/C4	Refer to Cout value in Table 1
	LDM	6.8uH

4. Output voltage regulation and overvoltage protection

The simple solution to achieve the output regulated voltage, over voltage and over current protections is to connect a linear regulator with overheat protection at input or output, and a capacitor filter connected in parallel as below circuits diagrams. Filter capacitive value recommended see table 1, Linear regulator should be chosen according to the actual voltage & current for operating. Or Aipu NW series products are recommended instead.



Single output



Dual output

Application Notice

1.This series of products cannot be connected in parallel to increase the output power, and do not support hot-plug.

2.The product should be used according to the specifications, otherwise it could be permanently damaged.

3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance cannot be guaranteed if it works under the over-load condition.

5. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

8. Aipupower can provide customization service.

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