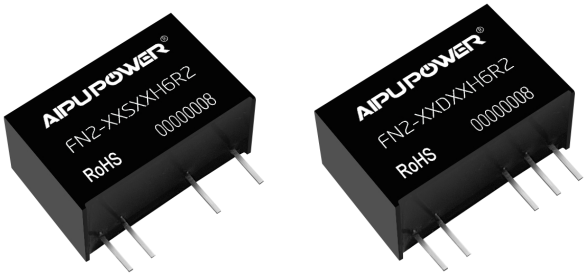
Typical Features

- ◆ Fixed input voltage, isolated & unregulated, output 2W
- ◆ Efficiency up to 81% (Typ.)
- ◆ Mini size SIP package
- ◆ Reinforced insulation
- ◆ Isolation voltage 4200VAC/6000VDC
- ◆ Continuous short circuit protection, self-recovery
- ◆ Operating temperature from -40℃ to +85℃
- ◆ 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.
-	FN2-05S05H6R2	5	4.5 - 5.5	5	400/40	480	22	1000	73	77
-	FN2-05S09H6R2			9	222/22	480	25	470	75	79
-	FN2-05S12H6R2			12	167/17	490	40	470	75	79
-	FN2-05S15H6R2			15	133/13	490	40	470	75	79
-	FN2-05D05H6R2			±5	±200/±20	481	28	470	74	78
-	FN2-05D09H6R2			±9	±110/±11	480	35	470	74	78
-	FN2-05D12H6R2			±12	±83/±8	480	31	220	74	78
-	FN2-05D15H6R2			±15	±67/±7	480	40	220	76	79
-	FN2-12S05H6R2	12	10.8 - 13.2	5	400/40	217	11	1000	72	76
-	FN2-12S12H6R2			12	167/17	200	13	470	75	79
-	FN2-12S15H6R2			15	133/13	200	17	470	77	81
-	FN2-12D05H6R2			±5	±200/±20	217	12	680	70	74
-	FN2-12D09H6R2			±9	±110/±11	200	35	470	76	80
-	FN2-12D12H6R2			±12	±83/±8	208	35	220	76	80
-	FN2-12D15H6R2			±15	±67/±7	208	14	220	73	77
-	FN2-15S05H6R2	15	13.5 - 16.5	5	400/40	168	12	1000	73	77
-	FN2-15S15H6R2			15	133/13	186	12	470	76	80
-	FN2-24S05H6R2			5	400/40	102	8	1000	75	79
-	FN2-24S12H6R2			12	167/17	104	5	680	76	80

-	FN2-24S15H6R2	24	21.6 - 26.4	15	133/13	105	15	470	77	81
-	FN2-24S24H6R2			24	83/8	104	11	680	76	80
-	FN2-24D05H6R2			±5	±200/±20	111	15	470	75	79
-	FN2-24D12H6R2			±12	±83/±8	104	15	220	76	80
-	FN2-24D15H6R2			±15	±67/±7	100	10	220	77	81

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	Test Condition	Min.	Typ.	Max.	Unit
Input inrush voltage (1Sec max.)	5Vdc Input	-0.7	-	9	VDC
	9Vdc Input	-0.7	-	12	
	12Vdc Input	-0.7	-	18	
	15Vdc Input	-0.7	-	21	
	24Vdc Input	-0.7	-	30	
Input filter	Capacitor Filter				
Hot plug	Unavailable				

Output Specifications

Item	Test Condition		Min.	Typ.	Max.	Unit
Output voltage accuracy	Please refer to the Output Voltage Deviation Graph (Figure 1)					
Load regulation	10% - 100% load	3.3V&5V output	-	15	20	%
		Others	-	10	15	
Line voltage regulation	Input voltage change ±1%	3.3V&5V output	-	-	1.5	%
		Others	-	-	1.2	
Temperature drift coefficient	-		-	-	±0.03	%/°C
Output power			0.2	-	2	W
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

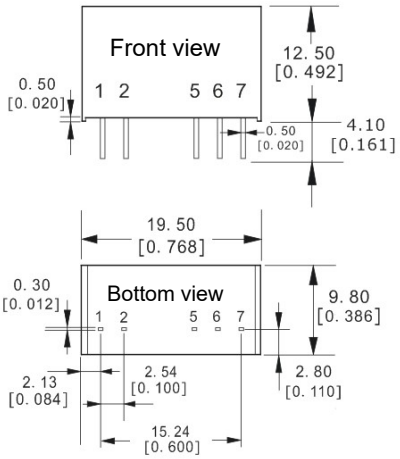
Item	Test Condition	Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load	-	100	-	KHz
Operating temperature	Refer to the Temperature Derating Graph (Figure 2)	-40	-	+85	℃
Storage temperature		-55	-	+125	℃
Case temperature rise	Within the temperature derating range	-	30	-	℃
Pin soldering temperature	1.5mm from the case, soldering time 10S	-	-	300	℃
Relative humidity	No condensing	5	-	95	%RH

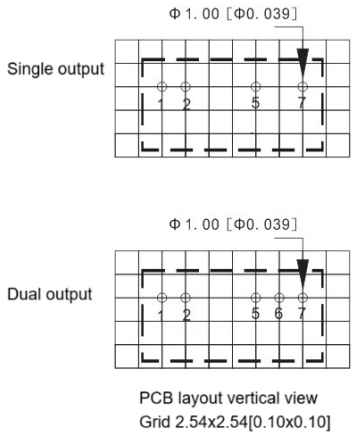
Isolation voltage	I/P-O/P, test 1 minute, leakage current <1mA	4200	-	-	VAC
		6000	-	-	VDC
Insulation resistance	I/P-O/P, @ 500VDC	1000	-	-	MΩ
Isolation capacitance	I/P-O/P, 100KHz/0.1V	-	7	-	pF
Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z				
MTBF	MIL-HDBK-217F@25℃	3500	-	-	K hours
Transformer CL distance		5	-	-	mm
Transformer CR distance		5	-	-	
PCB CL&CR distances		5.5	-	-	
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 × 12.50mm		0.768 × 0.386 × 0.492inch	

EMC Performance

Items		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 perf. Criteria B

Mechanical Dimensions





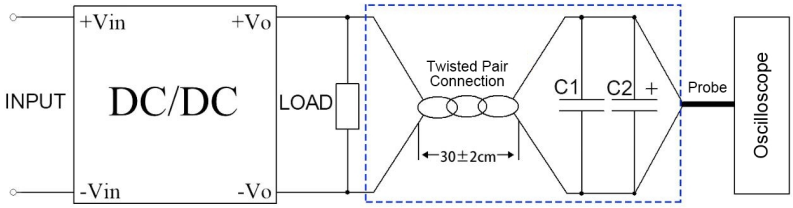
Unit: mm[inch]
Pin section tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

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 impedance 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 use a ≥5% load or a high-frequency low impedance electrolytic capacitor (≥100uF) load at the output to avoid the output ripple increasing.

Product Characteristics Graphs

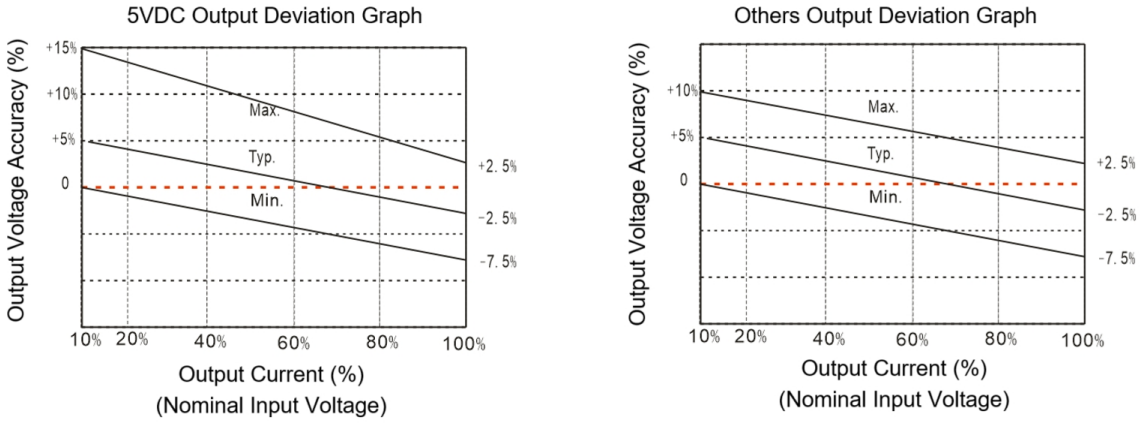


Figure 1

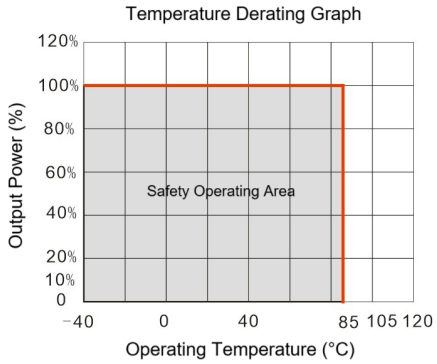


Figure 2

Recommended Circuits for Application

1. Requirement for the output load

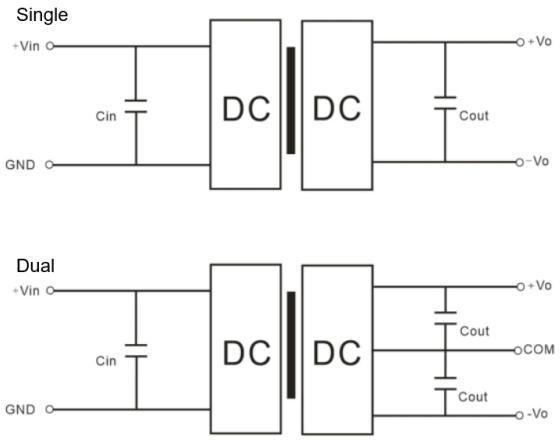
a.To ensure the converter operating efficiently and reliably, its minimum load should not be less than 10% of the rated load. It is recommended to connect a resistor in parallel to the output when the real load is less than 10% (the sum of the power consumed

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.

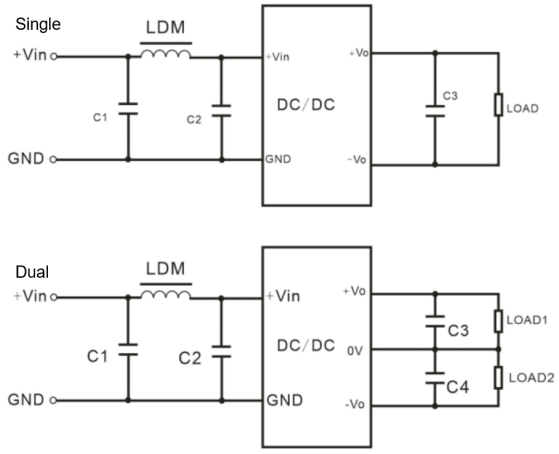
2. Typical application circuits

To ensure effectively decrease the input and output ripple and noise, a capacitor filtering net can be used at the input and output, the application circuits are shown below. Suitable filtering 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
3.3	10uF/16V	3.3	10uF/16V	±3.3	4.7uF/16V
5	10uF/16V	5	10uF/16V	±5	4.7uF/16V
9	4.7uF/16V	9	2.2uF/25V	±9	2.2uF/25V
12	2.2uF/25V	12	2.2uF/25V	±12	1uF/50V
15	2.2uF/25V	15	2.2uF/25V	±15	1uF/50V
24	1uF/50V	24	1uF/50V	±24	470nF/50V

3. Recommended EMC circuit diagram

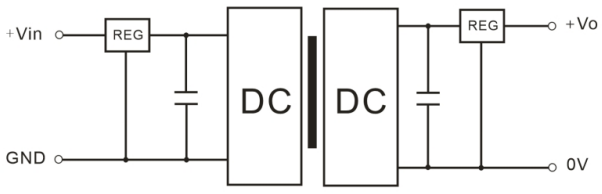


Input Volt. (single)		3.3/5Vdc	12/15/24Vdc
EMI	C1/C2	4.7uF/16V	4.7uF/50V
	C3	Refer to Cout value in Table 1	
	LDM	6.8uH	6.8uH

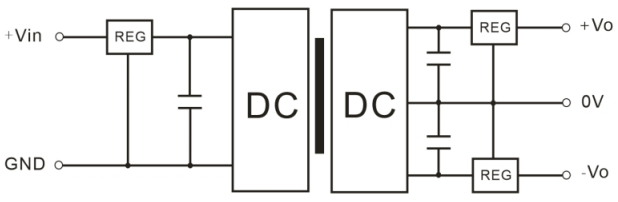
Input Volt. (dual)		3.3/5Vdc	12/15/24Vdc
EMI	C1/C2	4.7uF/16V	4.7uF/50V
	C3/C4	Refer to Cout value in Table 1	
	LDM	6.8uH	6.8uH

4. Output voltage regulation and overvoltage protection

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



Single output



Dual output

Application Notice

1.This series of products cannot be used in parallel, 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 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.

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