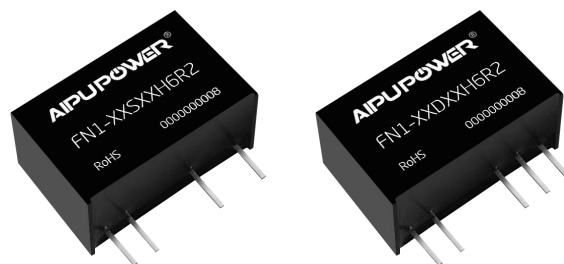


Typical Features

- ◆ Fixed input voltage, isolated & unregulated, output 1W
- ◆ Efficiency up to 78% (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. (%)
-	FN1-05S3V3H6R2	5	4.5	3.3	303/31	270	40	1000	69	73
-	FN1-05S05H6R2			5	200/20	265	40	1000	73	76
-	FN1-05S12H6R2			12	83/9	265	40	680	74	77
-	FN1-05S15H6R2			15	67/7	265	40	470	74	77
-	FN1-05D05H6R2		5.5	±5	±100/±10	265	40	470	73	74
-	FN1-05D12H6R2			±12	±42/±4	265	40	220	70	76
-	FN1-05D15H6R2			±15	±34/±4	265	40	220	72	77
-	FN1-12S05H6R2	12	10.8	5	200/20	120	15	1000	73	77
-	FN1-12S12H6R2			12	83/9	120	15	680	74	77
-	FN1-12S15H6R2			15	67/7	120	15	470	74	77
-	FN1-12D05H6R2		13.2	±5	±100/±10	120	40	470	73	77
-	FN1-12D12H6R2			±12	±42/±4	120	40	220	69	73
-	FN1-12D15H6R2			±15	±34/±4	120	40	220	70	74
-	FN1-24S05H6R2	24	21.6	5	200/20	60	15	1000	71	75
-	FN1-24S12H6R2			12	83/9	58	15	680	74	78
-	FN1-24S15H6R2			15	67/7	58	15	470	74	78
-	FN1-24S24H6R2			24	42/4	58	15	220	74	78
-	FN1-24D05H6R2		26.4	±5	±100/±10	58	15	470	71	75
-	FN1-24D12H6R2			±12	±42/±4	58	15	220	70	74
-	FN1-24D15H6R2			±15	±34/±4	58	15	220	70	74

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
	12Vdc Input	-0.7	--	18	
	24Vdc Input	-0.7	--	30	
Input filter	Capacitor Filter				
Hot plug	Unavailable				

Output Specifications

Item	Test Condition		Min.	Typ.	Max.	Unit
Output power			0.1	--	1	W
Output voltage accuracy	Please refer to the Output Voltage Deviation Graph (Figure 1)					
Load regulation	10% - 100% load	3.3 & 5V output	--	15	20	%
		Others	--	10	15	%
Line voltage regulation	Input voltage change $\pm 1\%$	3.3 & 5V output	--	--	1.5	%
		Others	--	--	1.2	%
Temperature drift coefficient			--	--	± 0.03	%/ $^{\circ}\text{C}$
Ripple & Noise	0%-100% load, 20MHz bandwidth		--	80	120	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

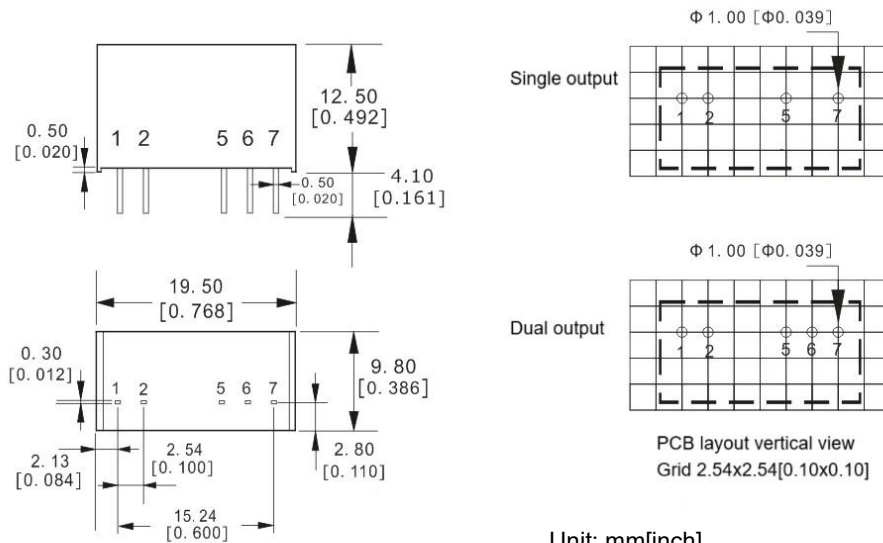
Item	Test Condition	Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load	--	100	--	KHz
Operating temperature	Refer to the Temperature Derating Graph (Figure 2)	-40	--	+85	$^{\circ}\text{C}$
Storage temperature		-55	--	+125	$^{\circ}\text{C}$
Case temperature rise	Within the operating derating range	--	30 $^{\circ}$	--	$^{\circ}\text{C}$
Pin soldering temperature	1.5mm from the case, soldering time 10S	--	--	300	$^{\circ}\text{C}$
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	--	--	M Ω
Isolation capacitance	I/P-O/P, 100KHz/0.1V	--	7	--	pF
Transformer CL distance		5	--	--	mm
Transformer CR distance		5	--	--	
PCB CL&CR distances		5.5	--	--	

MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
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		Test Standard	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]

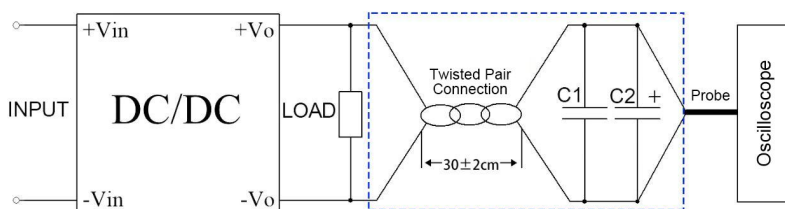
General tolerance: ±0.50[±0.020]

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(0V)	+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

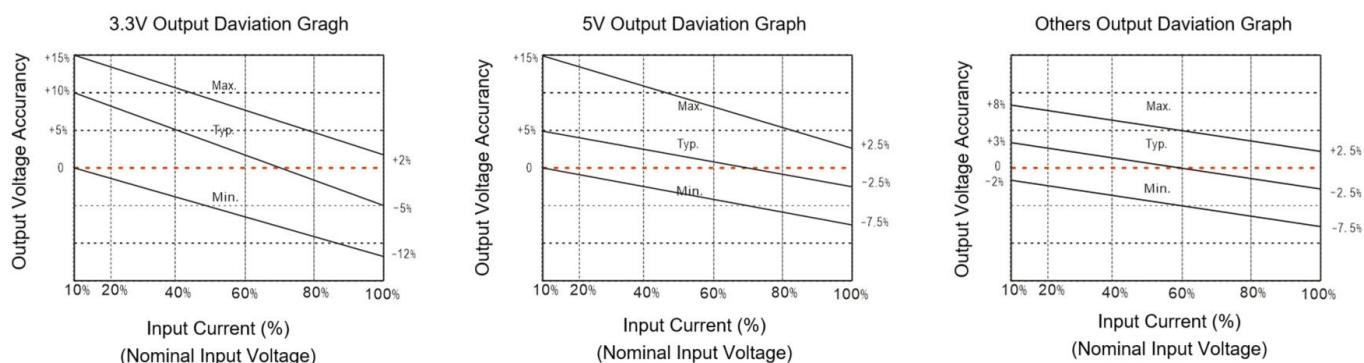


Figure 1

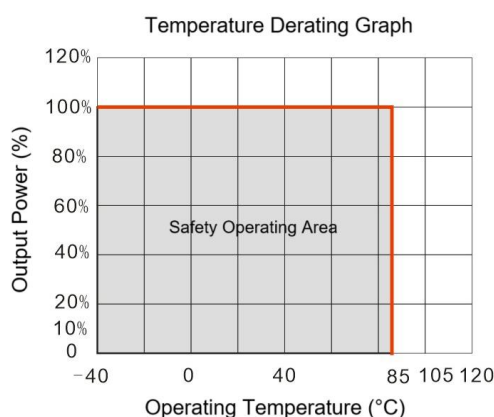


Figure 2

Recommended Circuits for Application

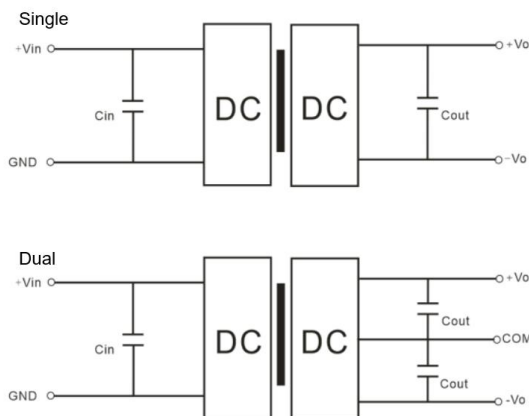
1. Requirement for Output load

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

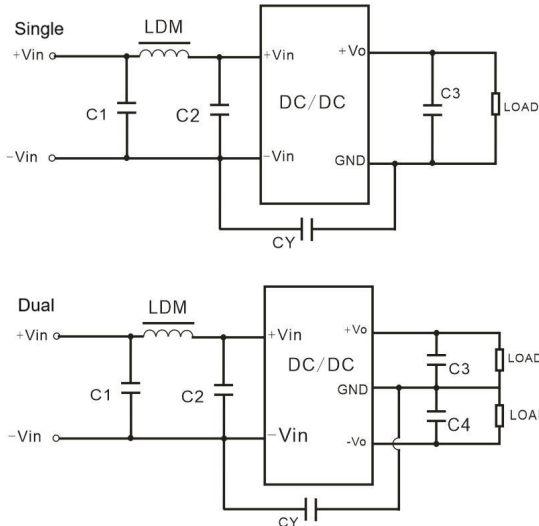
To ensure effectively decrease the input and output ripple and noise, a capacitor filter can be connected at the input and output, the application circuit is shown in the figure below. The suitable filtering capacitors should be chosen as the recommended capacitive load values in Table 1. The converter 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
5	10uF/16V	3.3	10uF/16V	±3.3	4.7uF/16V
12	2.2uF/25V	5	10uF/16V	±5	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

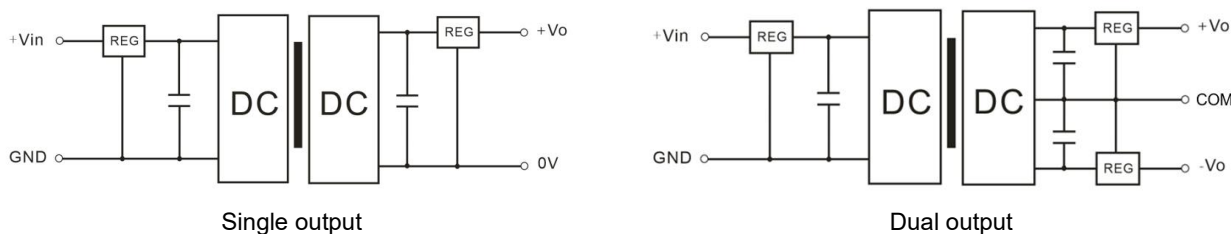


Input Voltage (Single)		5Vdc	12/24Vdc
EMI	C1/C2	4.7uF/16V	4.7uF/50V
	CY	270pF	270pF
	C3	Refer to Cout value in Table 1	
	LDM	6.8uH	6.8uH

Input Voltage (Dual)		5Vdc	12/24Vdc
EMI	C1/C2	4.7uF/16V	4.7uF/50V
	CY	270pF	270pF
	C3, C4	Refer to Cout values 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 connect a linear regulator with overheat protection at input or output, and a capacitor filter connected in parallel as below circuit. 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.



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 $T_a=25^{\circ}\text{C}$, 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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