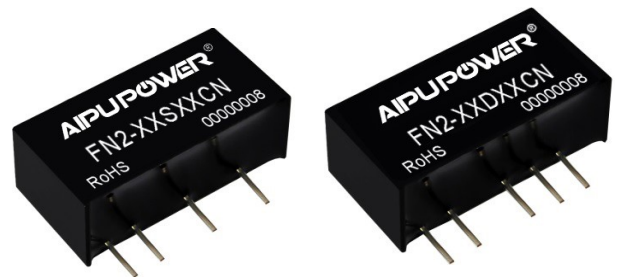


Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 2W
- ◆ Efficiency up to 86%(Typ.)
- ◆ Small compact SIP packing
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Plastic Case, meet UL94 V-0 standard



Test Condition: Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25°C

Application Field

It could be widely used for instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Model	Input Voltage Range (VDC)		Output Voltage/ Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load uF	Ripple & Noise (Max.) mVp-p	Efficiency (%)full load, input nominal voltage	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.			Min.	Typ.
FN2-05S3V3CN	5	4.5 - 5.5	3.3	400	330	50	470	150	75	79
FN2-05S05CN			5	400	519	50	470	150	76	80
FN2-05S09CN			9	220	513	50	470	150	75	79
FN2-05S12CN			12	167	513	50	470	150	80	84
FN2-05S15CN			15	133	506	50	470	150	80	84
FN2-05S24CN			24	83	506	50	470	150	80	84
FN2-12S3V3CN	12	10.8 - 13.2	3.3	400	186	20	470	150	75	79
FN2-12S05CN			5	400	208	20	470	150	76	80
FN2-12S09CN			9	220	183	20	470	150	78	82
FN2-12S12CN			12	167	183	20	470	150	80	84
FN2-12S15CN			15	133	187	20	470	150	80	84
FN2-12S24CN			24	83	186	20	470	150	80	84
FN2-24S3V3CN	24	21.6 - 26.4	3.3	400	70	10	470	150	75	79
FN2-24S05CN			5	400	108	10	470	150	76	80
FN2-24S09CN			9	220	107	10	470	150	82	86
FN2-24S12CN			12	167	105	10	470	150	80	84
FN2-24S15CN			15	133	105	10	470	150	82	86
FN2-24S24CN			24	83	105	10	470	150	82	86

FN2-05D05CN	5	4.5	±5	±200	519	50	220	150	76	80
FN2-05D09CN			±9	±110	513	50	220	150	80	84
FN2-05D12CN		5.5	±12	±83	458	28	220	150	80	84
FN2-05D15CN			±15	±67	506	50	220	150	78	82
FN2-12D05CN	12	10.8	±5	±200	214	18	220	150	76	80
FN2-12D09CN			±9	±110	211	18	220	150	78	82
FN2-12D12CN		13.2	±12	±83	211	18	220	150	80	84
FN2-12D15CN			±15	±67	216	18	220	150	80	84
FN2-15D15CN	15	13.5-16.5	±15	±67	160	18	220	150	80	84
FN2-24D05CN	24	21.6	±5	±200	108	10	220	150	76	80
FN2-24D09CN			±9	±110	107	10	220	150	82	86
FN2-24D12CN		26.4	±12	±83	105	10	220	150	80	84
FN2-24D15CN			±15	±67	105	10	220	150	80	84

Note: 1.In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance recommended equal to 10% nominal power.

2.the capacitive load of positive and negative output are the same.

Input Specifications

Item	Working Conditions	Min.	Typ.	Max.	Unit
Input Overshoot Voltage (1 Second.max.)	5Vdc Input	-0.7	--	9	VDC
	9Vdc Input	-0.7	--	15	
	24Vdc Input	-0.7	--	30	
Input Filter	Capacitor Filter				

Output Specifications

Item	Working Conditions	Min.	Typ.	Max.	Unit	
Output Power		0.2	--	2	W	
Output Voltage Accuracy	Nominal input, Full load		--	±2	±5	%
Load Regulation	10% ~ 100% nominal load	3.3Vdc output	--	--	20	
		Other output	--	--	15	
Line Voltage Regulation	Input Voltage Change±1%	3.3Vdc output	--	--	±1.5	
		Other output	--	--	±1.2	
Ripple & Noise①	Nominal input,full load, 20MHZ bandwidth		--	100	150	mVp-p
Temperature Drift Coefficient	100% Full Load		--	--	±0.03	%/°C
Output Short Circuit Protection	Continuous short-circuit protection, self-recovery					

NOTE:①Ripple & Noise tested by twisted-pair method;

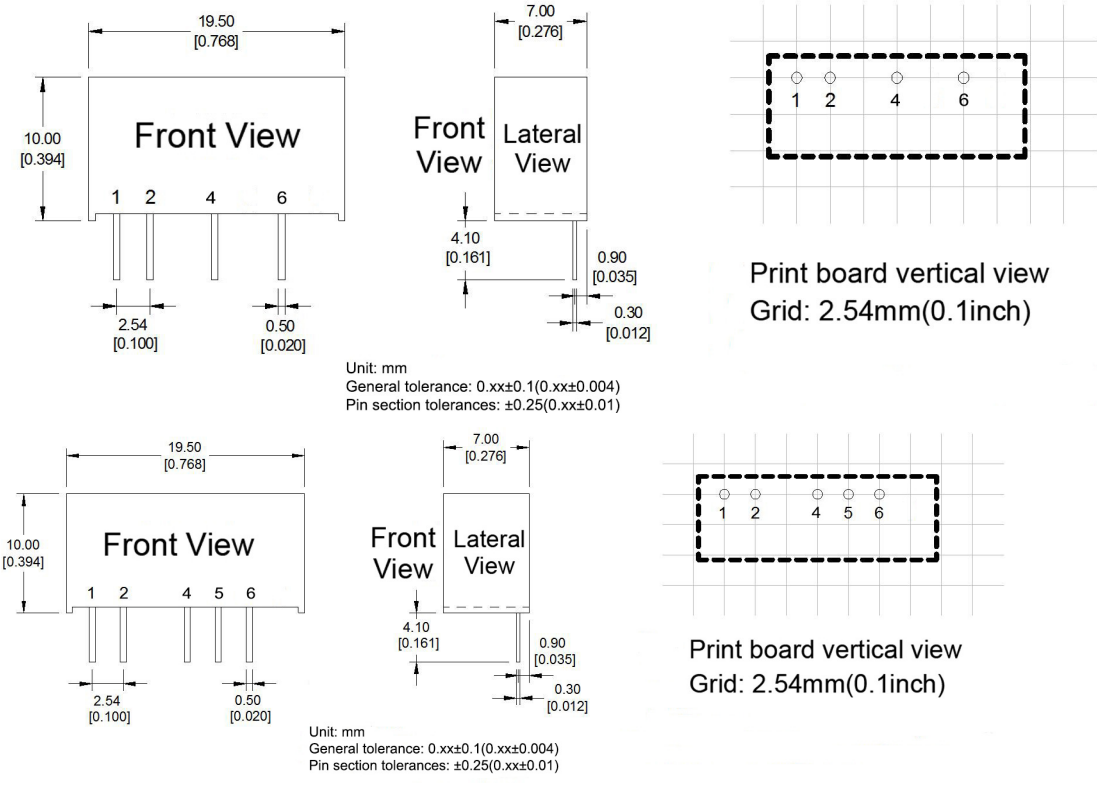
General Specifications

Switching Frequency	Full load	3.3Vdc/5Vdc input	260KHz (Typ.)
		12Vdc/24Vdc input	450KHz (Typ.)
Operating Temperature	Refer to Temperature Derating Curve		-40°C ~ +85°C
Storage Temperature			-55°C ~ +125°C
Shell temperature rise during work	Within Temperature Derating Curve		25°C(Typ.)
Relative Humidity	No condensing		5%~95%
Case Material			Plastic in Black with flame class UL94 V-0
Pin Withstand Soldering Temp	Distance to Case 1.5mm, 10S	300°C MAX	
Isolation Voltage	Test 1 minute, leakage current < 0.5mA	1500Vdc	
Isolation Capacitor	Input/Output, 100KHz/0.1V	20 pF (Typ.)	
MTBF	MIL-HDBK-217F@25°C	35X10 ⁵ Hrs	
Product Weight			2.5g (Typ.)
Packing	Tube(525*18*10mm)	25PCS	
	Box(542*110*155mm)	2000PCS(Total 80 tubes)	

EMC Performance

EMI	CE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Air±8kV, Contact±6kV perf.Criteria B

Packing Dimension



Packing Code	L x W x H	
C	19.50×7.00 × 10.00mm	0.768 × 0.276 × 0.394inch

Pin Function

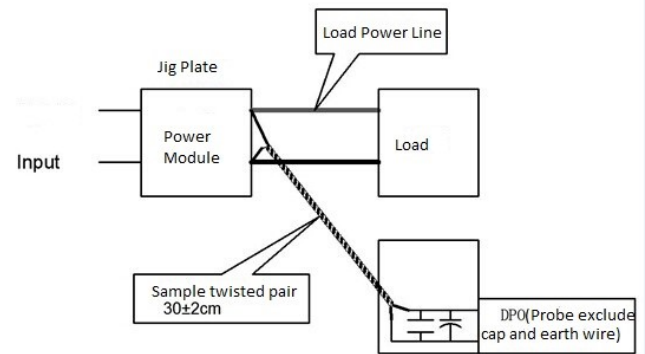
Pin No.	1	2	3	4	5	6
Single (S)	+Vin	GND	--	-Vo	--	+Vo
Dual (D)	+Vin	GND	--	-Vo	COM	+Vo

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 Instruction (Twisted Pair Method, 20MHZ bandwidth)

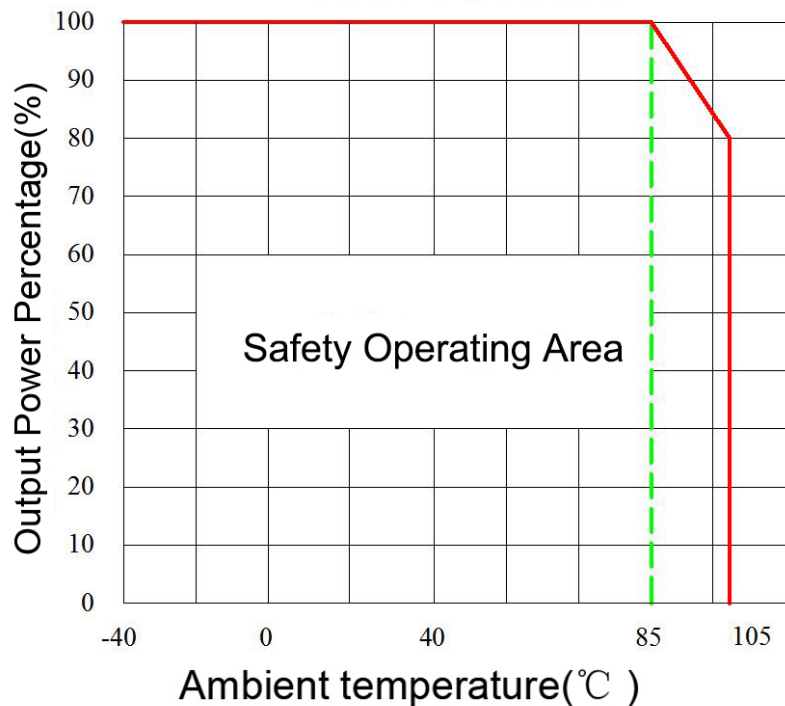
Test Method:

- 1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF 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 Curve

Temperature Derating Curve



Recommended Circuits for Application

1. Output load requirements

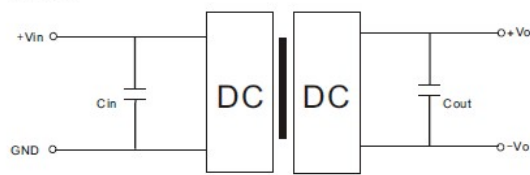
a. In order to ensure the converter working reliably with high efficiency, the minimum load should not less than 10% of the rated load. Please connect a resistor to the output in parallel, the resistance should be $\geq 10\%$ load if the needed power is indeed small.

b. The maximum capacitive load is tested at rated input and full load. The convertor may not start up or be damaged if the capacitor load exceeds this value.

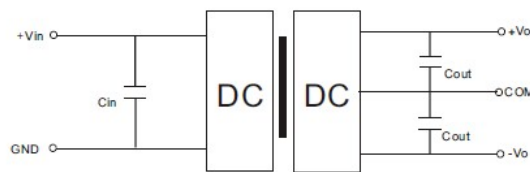
2. Typical application circuit

In order to decrease the input/output ripple and noise, capacitor filters should be connected at input and output as below application circuit. The filter capacitor is very critical, too large capacitance may cause start-up failure. The capacitive load values are recommended as shown in Table 1 below to ensure the module operating safely and reliably.

Single



Dual

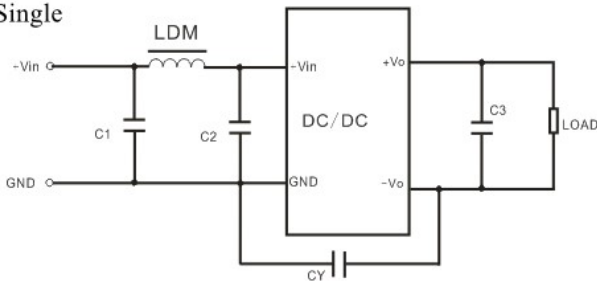


Recommend Capacitive Load Table(Table 1)

Vin (Vdc)	Cin	Svout Vdc	Cout (μF)	D.Vout (Vdc)	Cout (μF)
5	10 μF/16V	3.3	10 μF/16V	±3.3	4.7 μF/16V
12	2.2 μF/25V	5	10 μF/16V	±5	4.7 μF/16V
15	2.2 μF/25V	9	2.2 μF/25V	±9	2.2 μF/25V
24	1 μF/50V	12	2.2 μF/25V	±12	1 μF/25V
--	--	15	1 μF/25V	±15	1 μF/16V
--	--	24	1 μF/50V	±24	0.47 μF/50V

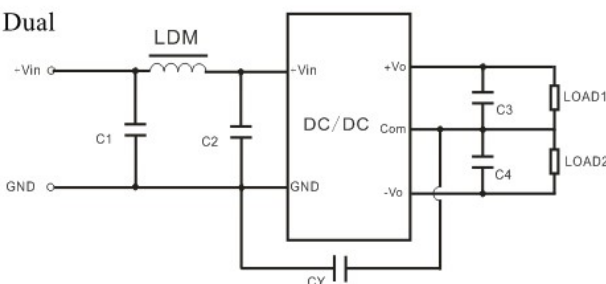
3. Recommended EMC circuit

Single



Input Voltage		5VDC	12/15/24VDC
EMI	C1/C2	4.7 μF/16V	4.7 μF/50V
	CY	270pF/2kV	270pF/2kV
	C3	Refer to Cout at Table 1	Refer to Cout at Table 1
	LDM	6.8 μH	6.8 μH

Dual



Input Voltage		5VDC	12/15/24VDC
EMI	C1/C2	4.7 μF/16V	4.7 μF/50V
	CY	270pF/2kV	270pF/2kV
	C3/C4	Refer to Cout at Table 1	Refer to Cout at Table 1
	LDM	6.8 μH	6.8 μH

4. Output regulated voltage and over voltage protection circuit

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.

Single Output



Note:

1. This product should not be used in parallel, and it does not support hot-plugging.
2. The product performance in this manual cannot be guaranteed if it works at a lower load than the minimum load defined.
3. All values or indicators in this manual had been tested based on Aipupower test specifications.
4. The product specifications may be modified without a prior notice. Please refer to the published data sheet in Aipupower website.

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