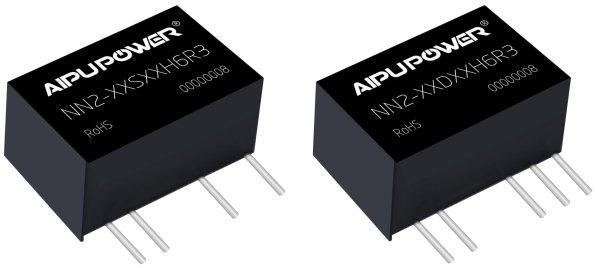
Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 2W
- ◆ High Efficiency up to 84%
- ◆ Small SIP package
- ◆ Isolation Voltage 5000VAC/ 6000VDC
- ◆ Operating Temperature: -40℃～+105℃
- ◆ 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℃

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

Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise (Max.)	Efficiency (%)@output full load, nominal input voltage	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.	uF	mVp-p	Min.	Typ.
NN2-12S12H6R3	12	10.8 - 13.2	12	167/17	189	12	470	120/100	80	84
NN2-12S15H6R3			15	133/14	180	12	470	120/100	80	84
NN2-12D12H6R3			±12	±83/±9	189	12	220	120/100	79	83
NN2-12D15H6R3			±15	±67/±7	180	12	220	120/100	79	83
NN2-15S15H6R3	15	13.5 - 16.5	15	133/14	155	12	470	120/100	80	84

Note: ① The ripple & noise test method adopts the twisted pair method.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input Overshoot Voltage (1 Second.max.)	12Vdc Input	-0.7	-	18	VDC
	15Vdc Input	-0.7	-	21	
Input Filter	Capacitor Filter				
Hot Plug	Unavailable				

Output Specifications

ITEM	Working Conditions	Min.	Typ.	Max.	Unit
Output Power		0.2	--	2	W
Output Voltage Accuracy		See the Error Envelope Curve (Figure 1)			
Load Regulation	10% ~ 100% nominal load	--	10	15	%
Line Voltage Regulation	Input Voltage Change±1%	--	--	1.2	
Temperature Drift Coefficient	100% Full Load	--	--	±0.03	%/°C
Output Short Circuit Protection	Continuous, self-recovery				

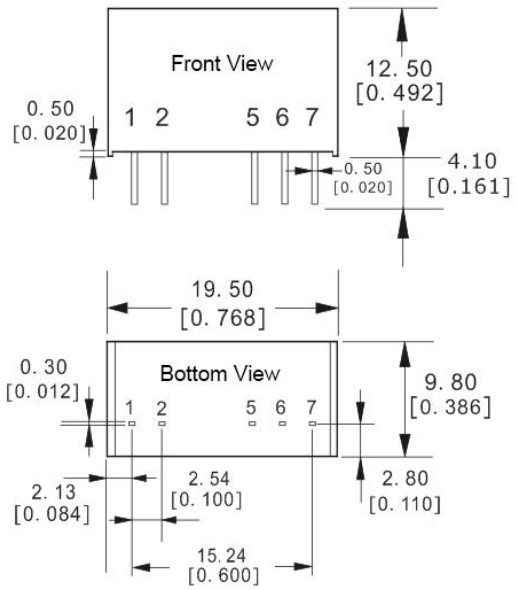
General Specifications

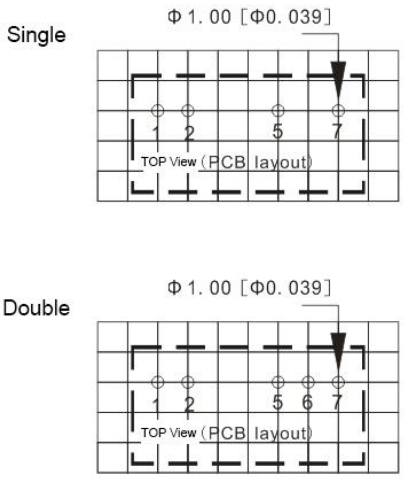
ITEM	Working Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Nominal input voltage, full load		240		KHz
Operating Temperature	Within Temperature Derating Curve (Figure 2)	-40	--	85	℃
Storage Temperature		-55	--	+125	
Shell temperature rise during work	Ta=25℃	--	25	--	
Pin resistance soldering temperature	The distance between the soldering point and the shell is 1.5mm, 10 seconds	--	--	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, Insulation resistance 500VDC	1000	--	--	MΩ
Isolation Capacitor	Input/Output, 100KHz/0.1V	--	6	--	pF
Vibration		10-150Hz, 5G, 30 Min. along X, Y and Z			
MTBF	MIL-HDBK-217F@25℃	19360			K hours
Case Material	Black flame retardant and heat resistant plastic (UL94-V0)				
Product Weight	3.7g (Typ.)				
Cooling Method	Natural air cooling				
Package	Tube（525*20*13mm）			25PCS	
	Inner Box（542*110*155mm）			1400PCS（Total 56 tubes）	
Dimension	L x W x H	19.50× 9.80 × 12.50mm		0.768 × 0.386 × 0.492inch	

EMC Characteristic

EMI	CE	CISPR32/EN55032 CLASS B （EMC Recommended Circuit）
		EN60601-1-2/CISPR 11 GROUP1 CLASS B （EMC Recommended Circuit）
	RE	CISPR32/EN55032 CLASS B （EMC Recommended Circuit）
		EN60601-1-2/CISPR 11 GROUP1 CLASS B （EMC Recommended Circuit）
EMS	ESD	EN60601-1-2（IEC/EN61000-4-2 Contact ±6KV perf.Criteria B

Packing Dimension





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

Packing Code	L x W x H	
H	19.50× 9.80 × 12.50 mm	0.768 × 0.386 × 0.492 inch

Pin Function

Pin	1	2	3，4	5	6	7
Single (S)	+Vin	GND	NP	-Vo	NP	+Vo
Dual (D)	+Vin	GND	NP	-Vo	COM	+Vo

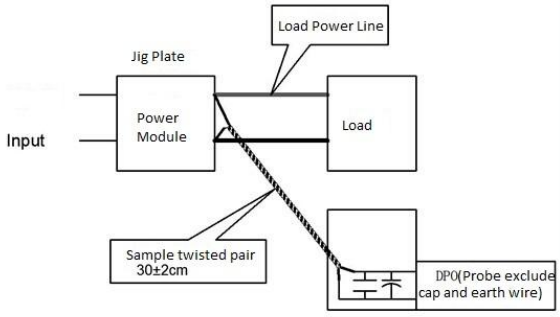
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

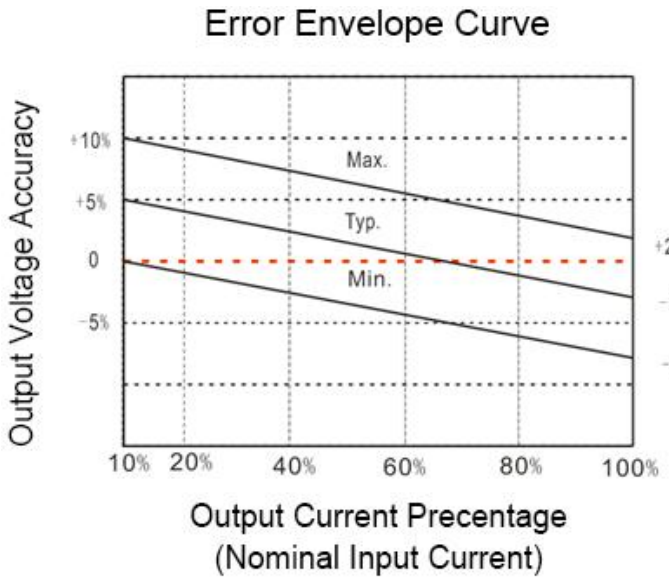
Test Method:

a.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

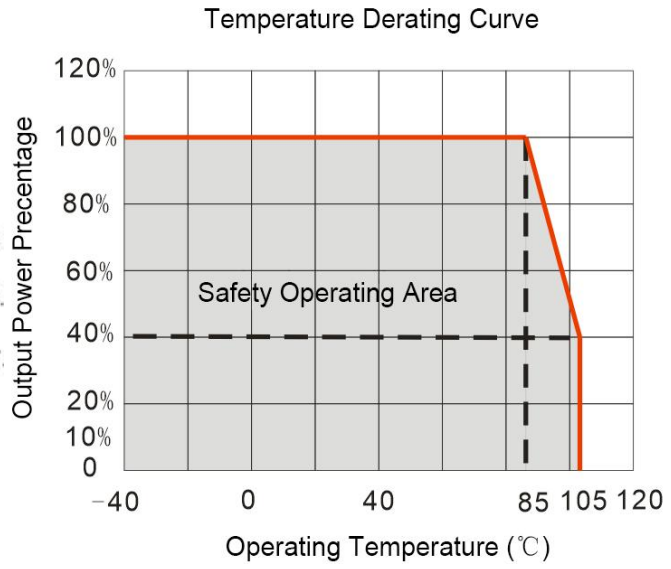
b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Product Characteristic Curve



(Figure 1)



(Figure 2)

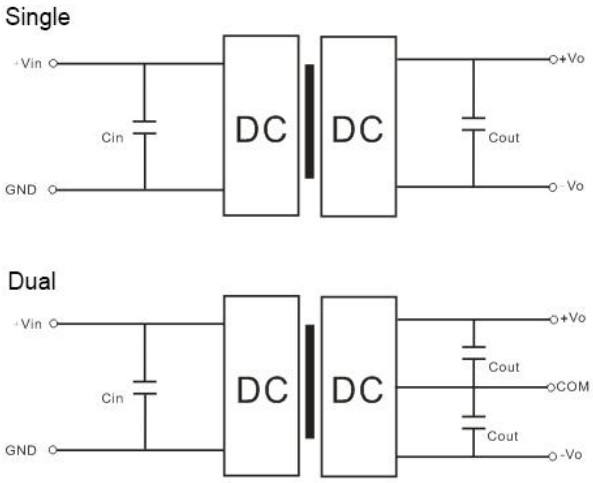
Design and Application Circuit Recommended

① Output load requirements

The maximum capacitive load of the product is obtained from the nominal full load test. When in use, it cannot exceed the maximum capacitive load of the output end, otherwise it is likely to cause startup difficulties and damage the product.

② Recommended circuit

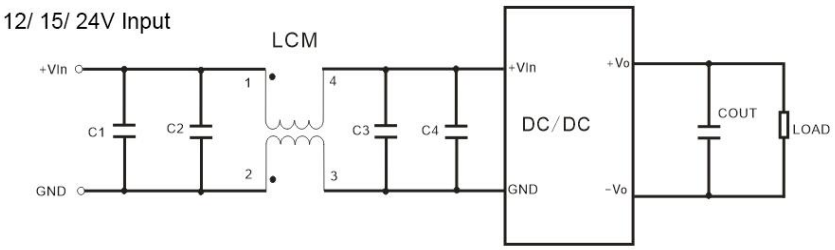
To ensure effective reduction of input and output ripple and noise, a capacitor filter network can be connected to the input and output ends. The application circuit is shown in the figure below; but a suitable filter capacitor should be selected. If the capacitance is too large, it may affect the startup of the product. To ensure that each output works under safe and reliable conditions, the recommended capacitive load value is detailed in Table 1 below.



Recommended Capacitive Load Value Table (Table 1)

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

③EMC typical recommended circuit

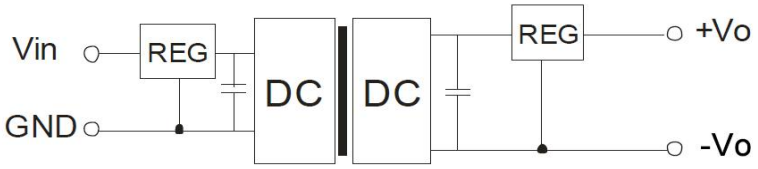


Input Voltage		12/15/24VDC
EMI	C1/C2	4.7μF/50V
	C3/C4	Refer to Table 1 for Cout parameters
	LCM	6.8μH

④ Output voltage regulation and overvoltage protection circuit

The simplest device for output voltage regulation, overvoltage and overcurrent protection is to connect a linear voltage regulator with overheat protection in series at its input or output end and connect a capacitor filter network (see the figure below). The recommended value of the filter capacitor is detailed in (Table 1). The linear voltage regulator should be reasonably selected according to the voltage and current required for actual work; or choose our NW series products.

Single



Note:

1. This product cannot be used in parallel and does not support hot swapping;
2. If the product operates below the minimum required load, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
3. All indicator test methods in this article are based on the company's corporate standards;
4. Product specifications are subject to change without prior notice.

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