

Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 1W
- ◆ High Efficiency up to 86%
- ◆ Small compact SIP packing
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40°C ~ +105°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

Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load uF	Ripple & Noise (Max.) mVp-p	Efficiency (%)@output full load, nominal input voltage	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.			Min.	Typ.
NN1-3V3S3V3ANR3	3.3	2.97-3.63	3.5	303/30	370	8	2400	100	74	76
NN1-3V3S05ANR3			5	200/20	358	8	2400	100	81	83
NN1-3V3S12ANR3			12	84/9	340	10	560	100	83	85
NN1-05S3V3ANR3	5	4.5-5.5	3.3	300/30	250	8	2400	100	78	80
NN1-05S05ANR3			5	200/20	225	8	2400	100	83	85
NN1-05S09ANR3			9	111/12	227	10	1000	100	83	85
NN1-05S12ANR3			12	84/9	220	10	560	100	83	85
NN1-05S15ANR3			15	67/7	220	18	560	100	83	85
NN1-05S24ANR3			24	42/4	266	25	220	100	82	84
NN1-09S09ANR3	9	8.1-9.9	9	111/12	128	10	560	100	82	84
NN1-12S3V3ANR3	12	10.8-13.2	3.3	303/30	98	10	2400	100	80	82
NN1-12S05ANR3			5	200/20	96	10	2400	100	84	86
NN1-12S09ANR3			9	111/12	92	10	1000	100	84	86
NN1-12S12ANR3			12	84/9	90	10	560	100	84	86
NN1-12S15ANR3			15	67/7	90	10	560	100	84	86
NN1-12S24ANR3			24	42/4	92	10	220	100	83	85

NN1-15S05ANR3	15	13.5	5	200/20	78	10	2400	100	83	85
NN1-15S12ANR3		-	12	84/9	76	10	1000	100	84	86
NN1-15S15ANR3		16.5	15	67/7	76	10	560	100	83	85
NN1-24S3V3ANR3	24	21.6 - 26.4	3.3	303/30	48	8	2400	100	80	82
NN1-24S05ANR3			5	200/20	47	8	2400	100	82	84
NN1-24S09ANR3			9	111/12	48	8	1000	100	83	85
NN1-24S12ANR3			12	84/9	48	8	560	100	84	86
NN1-24S15ANR3			15	67/7	48	8	560	100	83	85
NN1-24S24ANR3			24	42/4	49	8	220	100	83	85

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.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input Overshoot Voltage (1Second.max.)	3.3Vdc Input	-0.7	-	7	VDC
	5Vdc Input	-0.7	-	9	
	9Vdc Input	-0.7	-	12	
	12Vdc Input	-0.7	-	18	
	15Vdc Input	-0.7	-	21	
	24Vdc Input	-0.7	-	30	
Input Filter	Capacitor Filter				

Output Specifications

ITEM	Working Conditions	Min.	Typ.	Max.	Unit
Output Power		0.1	--	1	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	--	75	100	mVp-p
Temperature Drift Coefficient	100% Full Load	--	--	±0.03	%/°C
Output Short Circuit Protection	Continuous, self-recovery				

NOTE:① Ripple & Noise Tested by twisted-pair method.



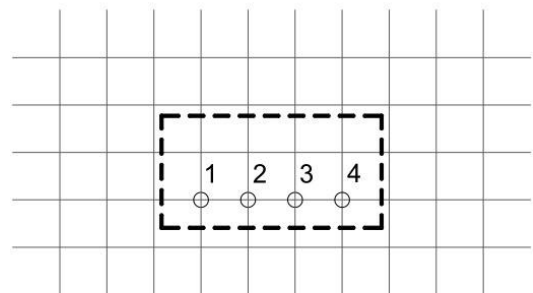
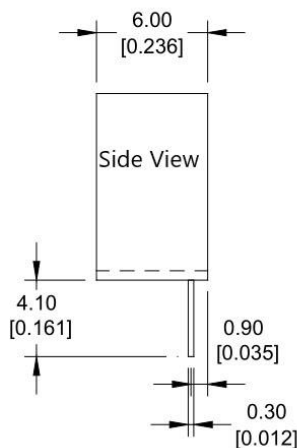
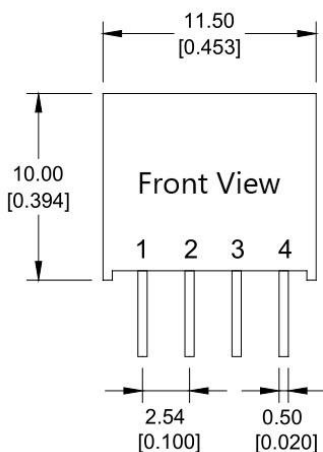
General Specifications

Switching Frequency	Full load	3.3Vdc/5Vdc input	330KHz (Typ.)
		12Vdc/24Vdc input	470KHz (Typ.)
Operating Temperature	Refer to Temperature Derating Curve		-40°C ~ +105°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			Black flame-retardant heat-resistant Plastic (UL94 V-0)
Pin withstand welding 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			1.4g(Typ.)
Package	Tube(525*18*10mm)		43PCS
	Inner Box(542*110*155mm)		3440PCS(Total 80Tubes)

EMC Characteristic

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

Packing Dimension



Printed board vertical view

Lattice spacing: 2.54mm(0.1 inch)

General tolerance: ±0.5mm

Packing Code	L x W x H	
A	11.50 × 6.00 × 10.00mm	0.453 × 0.236 × 0.394inch

Pin Function

Single(S)	1	2	3	4
	GND	+Vin	-Vo	+Vo

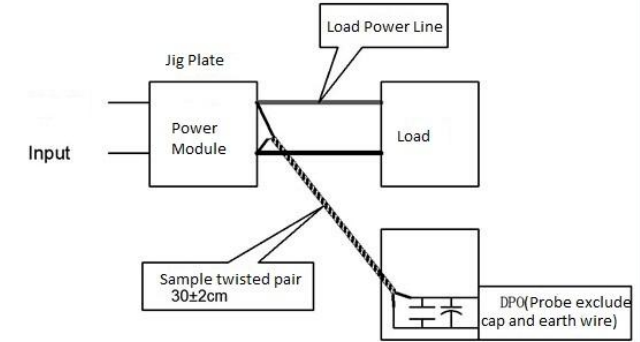
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

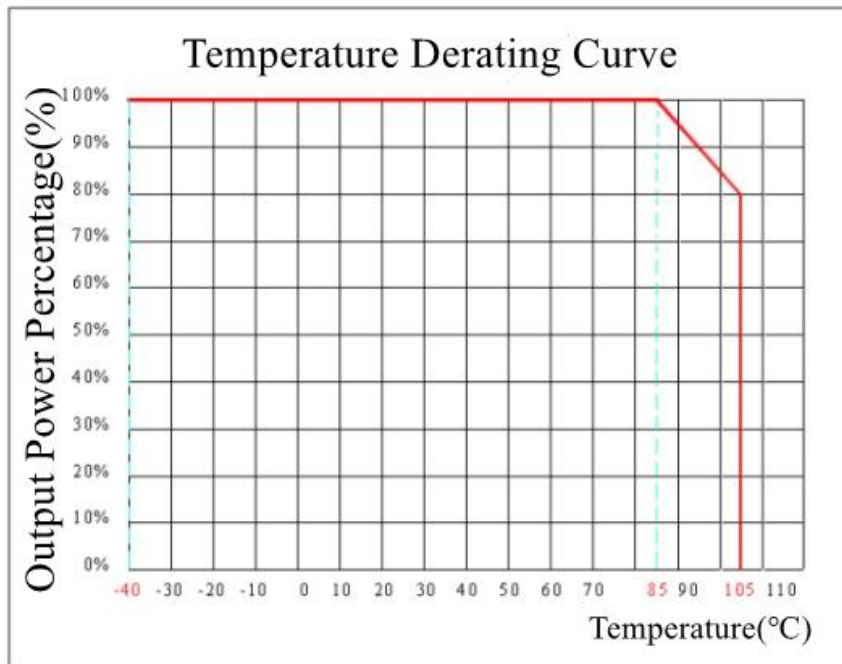
Test Method:

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



Design and Application Circuit Recommended

① **Output load requirements**

a. In order to ensure that the power module can work efficiently and reliably, it is recommended that its minimum load should not be less than 10% of the rated resistive load; if the power you require is really small, please connect a resistor equivalent to 10% of the rated load in parallel at the output end. resistance.

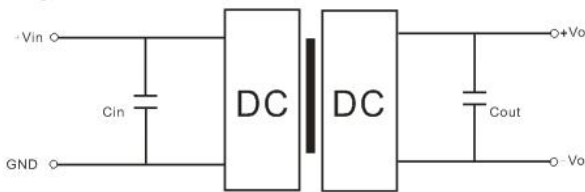
b. The maximum capacitive load of the product is the result of the nominal full load test. The maximum capacitive load of the output terminal cannot be exceeded during use, otherwise it may cause difficulty in starting and damage the product.

② **Recommended circuit**

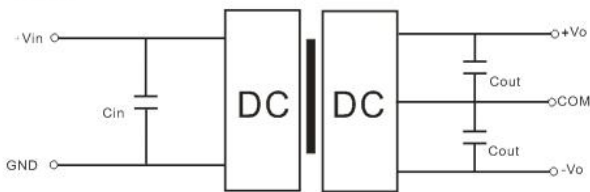
a. To ensure that the input and output ripple and noise are effectively reduced, a capacitor filter network can be connected to the input and output ends. The application circuit is shown in Figure 1 below; however, a suitable filter capacitor should be selected. If the

capacitor 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 values are detailed in Table 1 below. (But for application circuits with actual output power less than 0.5W, it is recommended not to connect external capacitors)

Single

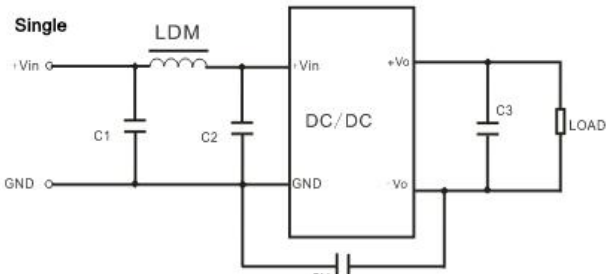


Double

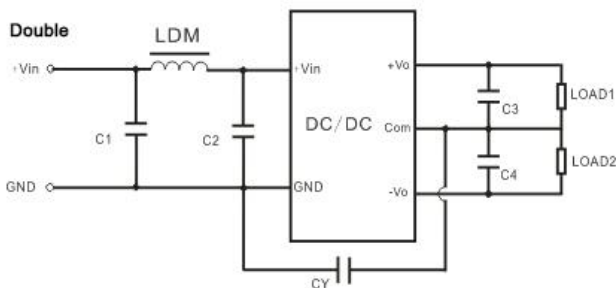


Vin (Vdc)	Cin	Single Vout Vdc	Cout (μF)	Double Vout (Vdc)	Cout (μF)
5	10 μF/16V	3.3	10 μF/16V	±3.3	4.7 μF/16V
12	2.2 μF/25V	5	10 μF/16V	±5	4.7 μF/16V
15	2.2 μF/25V	9	2.2 μF/25V	±9	2.2 μF/25V
24	1 μF/50V	12	2.2 μF/25V	±12	1 μF/25V
--	--	15	1 μF/25V	±15	1 μF/16V
--	--	24	1 μF/50V	±24	0.47 μF/50V

③ EMC typical recommended circuit



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 specification in Table 1	
	LDM	6.8 μH	6.8 μH

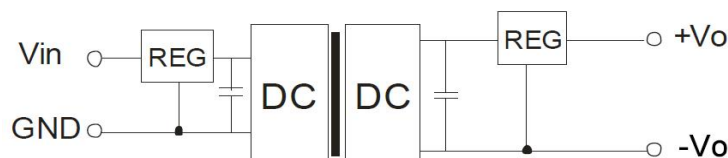


Output Voltage		5VDC	12/15/24VDC
EMI	C1/C2	4.7 μF/16V	4.7 μF/50V
	CY	270pF/3kVdc	270pF/3kVdc
	C3/C4	Refer to Cout specification in Table 1	
	LDM	6.8 μH	6.8 μH

④ Output voltage stabilization and overvoltage protection circuit

The simplest device for output voltage regulation, overvoltage and overcurrent protection is to connect a linear regulator with overheating protection in series to its input or output end and connect a capacitor filter network (see the figure below). The recommended value of the filter capacitor See (Table 1) for details. The linear voltage regulator should be selected reasonably according to the voltage and current required for actual work; or choose our company's 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, there is no guarantee that the product performance will meet all the performance indicators in this manual;
- 3. All index testing methods in this article are based on our company's corporate standards;
- 4. Product specifications are subject to change without prior notice.

