

**Typical Features**

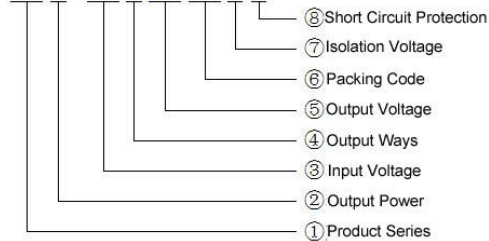
- ◆ Fixed input voltage, isolated & unregulated output, output power 1W
- ◆ High efficiency up to 78%
- ◆ Small compact SIP packing
- ◆ No external component required
- ◆ Isolation Voltage 3000VDC
- ◆ Operating Temperature: -40°C ~ +85°C
- ◆ Plastic Case, meet UL94 V-0 standard



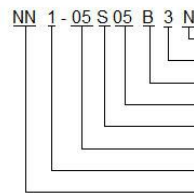
**Test Condition:** Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25°C.

**Product Named Method**

XX X - XX X XX XX X X



For example:



- ① NN means with short circuit protection
- ② 1 means isolation voltage 3KVdc
- ③ 05 means 19.5\*6.0\*10.0mm plastic packing
- ④ S means output voltage 5V
- ⑤ 05: single output; D: dual output
- ⑥ Nominal input voltage 5V
- ⑦ Output Power 1W
- ⑧ ±10% fixed voltage input unregulated output series

**Input Specifications**

Item	Operating Condition	Min.	Typ.	Max.	Unit
Input Overshoot Voltage (1sec. max.)	5Vdc Input	-0.7	--	9	Vdc
	12Vdc Input	-0.7	--	18	
	15Vdc Input	-0.7	--	21	
	24Vdc Input	-0.7	--	30	
Input Filter	Capacitor Filter				

**Output Specifications**

Item	Operating Condition	Min.	Typ.	Max.	Unit
Output Power		0.1	--	1	W
Output Voltage Accuracy	Nominal input, full load	--	±2	±5	%
Load Regulation	10% ~100% Load	3.3Vdc output	--	20	
		Other output	--	15	
Line Regulation	Input voltage change ±1%	3.3Vdc output	--	±1.5	
		Other output	--	±1.2	
Ripple & Noise ①	Nominal input, full load 20MHZ bandwidth	Other output	--	75	mVp-p
		24Vdc output	--	100	
Temperature Drift Coefficient	100% load	--	--	±0.03	%/°C
Output Short Circuit Protection ②	12V input	no			
	Other input	Continuous, Self-recovery			

Note: ① Ripple & Noise tested by twisted-pair method,

② There is a small portion can only be guaranteed to be within 5 second.

General Specifications		
Switching Frequency	typical	100KHz (Typ.)
Operating Temperature	Refer to Temperature Derating Curve	-40°C ~ +85°C
Storage Temperature		-55°C ~ +125°C
Case temperature rise when working	Within Temperature Derating Curve	25°C(Typ.)
Storage Humidity	No condensing	5%~95%
Case Material		Black flame-retardant heat-resistant Plastic(UL94 V-0)
Product Weight		2.4g (Typ.)
Isolation Voltage	Test 1 minute, leakage current<0.5mA	3000Vdc
Isolation Capacitor	Input/ Output ,100KHz/0.1V	20 pF (Typ.)
MTBF	MIL-HDBK-217F@25°C	35X10 <sup>5</sup> Hrs

### Typical Product List

Model	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise (Max.)	Efficiency (%)
	Nominal	Range	Voltage(V)	Current(mA)	Full load Typ.	No Load Typ.			

#### Single Output:

NN1-3V3S3V3B3N	3.3	3.0 - 3.6	3.3	300	421	40	47	100	72
NN1-3V3S05B3N			5	200	410		47		74
NN1-3V3S09B3N			9	110	410		22		74
NN1-3V3S12B3N			12	83	410		22		74
NN1-3V3S15B3N			15	67	410		22		74
NN1-05S3V3B3N	5	4.5 - 5.5	3.3	300	270	30	47	100	74
NN1-05S05B3N			5	200	263		47		76
NN1-05S09B3N			9	110	260		22		77
NN1-05S12B3N			12	83	260		22		77
NN1-05S15B3N			15	67	256		22		78
NN1-05S24B3N			24	42	260		10		120
NN1-09S3V3B3N	9	8.1 - 9.9	3.3	300	150	22	47	100	74
NN1-09S05B3N			5	200	146		47		76
NN1-09S09B3N			9	110	144		22		77
NN1-09S12B3N			12	83	144		22		77
NN1-09S15B3N			15	67	144		22		77
NN1-09S24B3N			24	42	146		10		120
NN1-12S3V3B3N	12	10.8 - 13.2	3.3	300	113	16	47	100	74
NN1-12S05B3N			5	200	108		47		77
NN1-12S09B3N			9	110	108		22		77
NN1-12S12B3N			12	83	108		22		77
NN1-12S15B3N			15	67	107		22		78
NN1-12S24B3N			24	42	108		10		120
NN1-15S3V3B3N	15	13.5 - 16.5	3.3	300	90	12	47	100	74
NN1-15S05B3N			5	200	88		47		76
NN1-15S09B3N			9	110	88		22		76
NN1-15S12B3N			12	83	87		22		77

NN1-15S15B3N			15	67	87		22	100	77
NN1-15S24B3N			24	42	88		10	120	76
NN1-24S3V3B3N	24	21.6	3.3	300	57	8	47	100	73
NN1-24S05B3N			5	200	55		47		76
NN1-24S09B3N		-	9	110	54		22		77
NN1-24S12B3N		26.4	12	83	54		22		77
NN1-24S15B3N			15	67	53		22		78

**Positive Negative Dual Output:**

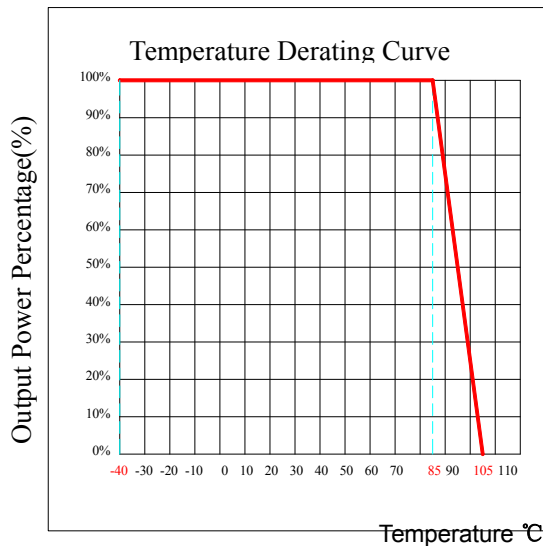
NN1-3V3D05B3N	3.3	3.0	±5	±100	410	40	22	100	74
NN1-3V3D09B3N			±9	±55	410		10		74
NN1-3V3D12B3N		3.6	±12	±42	410		10		74
NN1-3V3D15B3N			±15	±33	410		10		74
NN1-05D05B3N	5	4.5	±5	±100	263	30	22	100	76
NN1-05D09B3N			±9	±55	260		10		77
NN1-05D12B3N		5.5	±12	±42	260		10		77
NN1-05D15B3N			±15	±33	256		10		78
NN1-05D24B3N			±24	±21	260		4.7		120
NN1-09D05B3N	9	8.1	±5	±100	146	22	22	100	76
NN1-09D09B3N			±9	±55	144		10		77
NN1-09D12B3N		9.9	±12	±42	144		10		77
NN1-09D15B3N			±15	±33	144		10		77
NN1-09D24B3N			±24	±21	146		4.7		120
NN1-12D3V3B3N	12	10.8	±3.3	±150	108	16	33	100	72
NN1-12D05B3N			±5	±100	108		22		77
NN1-12D09B3N		13.2	±9	±55	108		10		77
NN1-12D12B3N			±12	±42	108		10		77
NN1-12D15B3N			±15	±33	107		10		78
NN1-12D24B3N			±24	±21	108		4.7		120
NN1-15D05B3N	15	13.5	±5	±100	88	12	22	100	76
NN1-15D09B3N			±9	±55	88		10		76
NN1-15D12B3N		16.5	±12	±42	87		10		77
NN1-15D15B3N			±15	±33	87		10		77
NN1-15D24B3N			±24	±21	88		4.7		120
NN1-24D05B3N	24	21.6	±5	±100	55	8	22	100	76
NN1-24D09B3N			±9	±55	54		10		77
NN1-24D12B3N		26.4	±12	±42	54		10		77
NN1-24D15B3N			±15	±33	53		10		78

Note: 1. “” are models under developing.

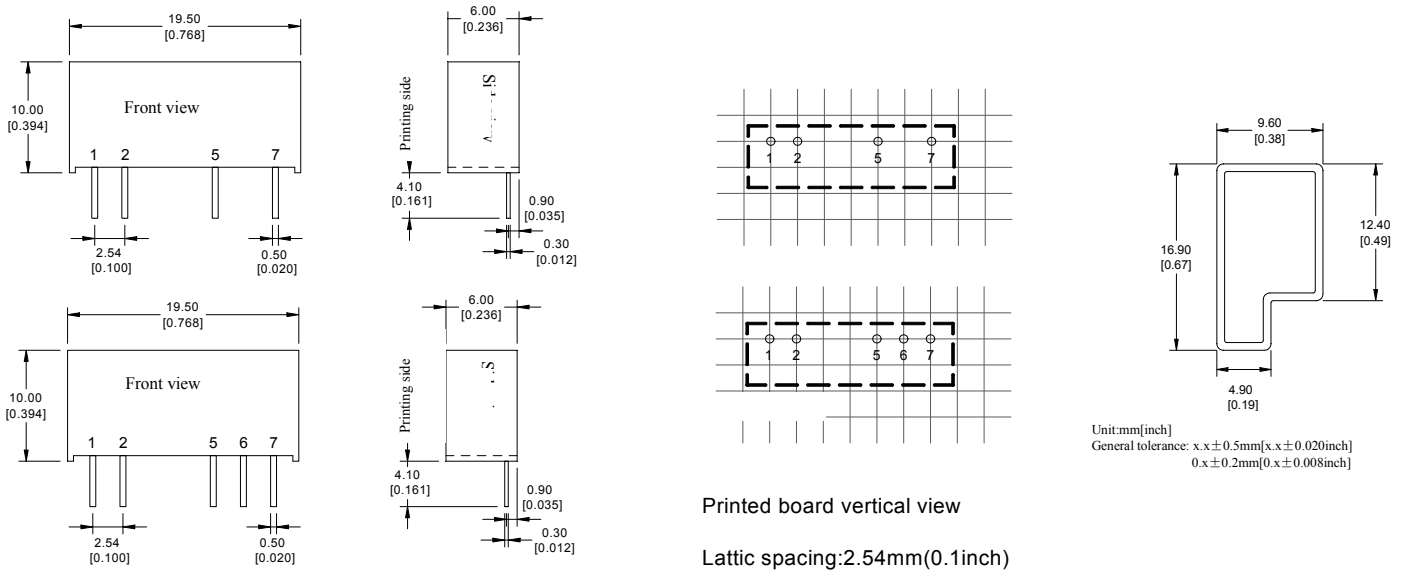
2. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance recommended equal to 10% nominal power.

3. The capacitive loads of positive and negative outputs are identical.

**Temperature Derating Curve**



### Packing Dimension, Pin Function, Recommended PCB layout



Pin Function	Single(S) Dual(D)	1	2	3	4	5	6	7
		+Vin	GND	--	--	-Vo	--	+Vo
		+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.

### Packing Dimension

Packing Code	L x W x H	
B	19.50× 6.00 × 10.00mm	0.768 × 0.236 × 0.394inch

### Design and Application Circuit Recommended

#### 1.Output Load Request

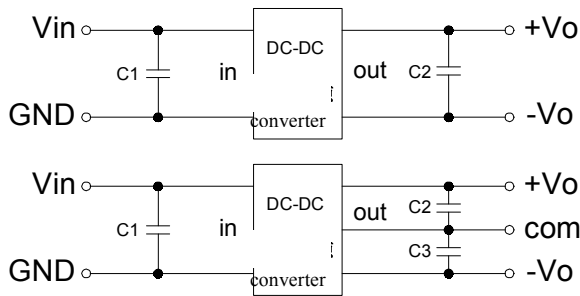
a. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance equal to 10% nominal load.

b. The maximum capacitive load is tested under nominal input full load, and cannot exceed the maximum capacitive load of output terminal under operation, otherwise it will cause it difficult to start up and damage the product.

## 2.Recommended Circuit

In order to ensure the input/output ripple and noise decreased, capacitor filter net could be connected to input and output side, application circuit as below photo 1; choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running safely and reliably, the recommended capacitive load values as shown in Table 1. (But for the actual output power of application circuit is less than 0.5W, suggest not to connect external capacitor)

Photo 1



Recommended capacitive load value(Table 1)

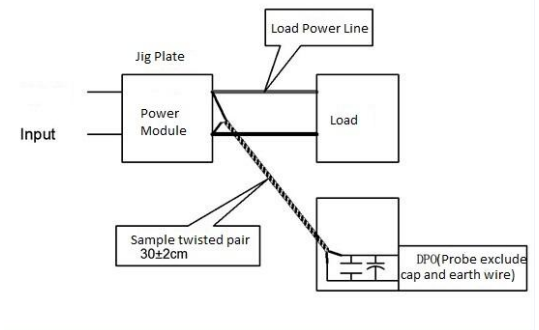
Vin (Vdc)	C1 (μF)	Vout (Vdc)	C2 (μF)	Vout (Vdc)	C2,C3 (μF)
3.3/5	4.7	3.3/5	10	±3.3/±5	4.7
12	2.2	9	4.7	±9	2.2
15	1	12	2.2	±12	1
24	1	15	1	±15	0.47
--	--	24	0.47	±24	0.22

## 3. 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 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

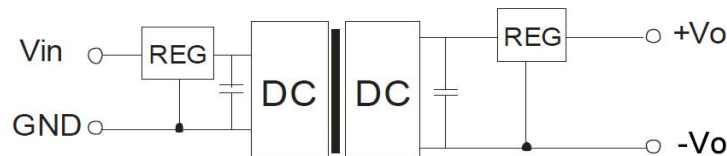
b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



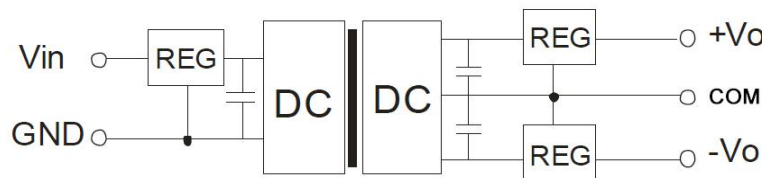
## 4.Output regulated voltage and over voltage protection circuit

The simplest device to protect output regulated voltage, over voltage and over current is to cascade a linear regulator with overheat protection at input or output terminal, and connect a capacitor filter net(see below picture), filter capacitive value recommended see table 1, Linear regulator is chosen according to the actual voltage, current needed in working, or choose our NW series products.

Single Output



Positive Negative Dual Output



Note:

1. This product cannot be used in parallel, and do not support hot-plugging;
2. If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in this datasheet;
3. All index testing methods in this datasheet are based on our Company's corporate standards
4. The product specification may be changed at any time without prior notice.