

### Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 1W
- ◆ High Efficiency up to 83%
- ◆ Small compact SIP packing
- ◆ No external component required
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Plastic Case, meet UL94-V0 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 (%)	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.			Min.	Typ.
FN1-3V3S3V3B	3.3	2.97	3.3	303	421	40	3000	100	70	72
FN1-3V3S05B		- 3.96	5	200	390	30	3000	150	62	64
FN1-05S3V3B	5	4.5 - 5.5	3.3	303	257	19	3000	100	68	70
FN1-05S05B			5	200	255	31	3000	100	76	78
FN1-05S09B			9	111	235	23	3000	100	75	77
FN1-05S12B			12	83	235	22	3000	150	77	79
FN1-05S15B			15	67	210	25	3000	100	76	78
FN1-05S24B			24	42	231	33	3000	100	77	79
FN1-12S3V3B			12	10.8 - 13.2	3.3	303	110	15	3000	100
FN1-12S05B	5	200			100	10	3000	100	79	81
FN1-12S09B	9	111			102	15	3000	100	78	80
FN1-12S12B	12	83			99	14	3000	100	81	83
FN1-12S15B	15	67			99	13	3000	100	81	83
FN1-12S24B	24	42			101	14	3000	150	81	83
FN1-15S05B	15	13.5	5	200	83	11	3000	100	75	77
FN1-15S15B			15	67	79	11	3000	100	83	85

FN1-15S24B		16.5	24	42	88	10	1000	100	74	76
FN1-24S3V3B	24	21.6 - 26.4	3.3	303	56	7	3000	100	73	75
FN1-24S05B			5	200	52	7	1000	100	79	81
FN1-24S09B			9	111	51	7	3000	100	79	81
FN1-24S12B			12	83	50	7	3000	100	81	83
FN1-24S15B			15	67	51	7	3000	100	82	84
FN1-24S24B			24	42	50	7	3000	150	82	84
FN1-05D05B			5	4.5 - 5.5	±5	±100	238	17	1500	100
FN1-05D09B	±9	±56			238	26	1500	100	74	76
FN1-05D12B	±12	±42			238	27	1500	150	75	77
FN1-05D15B	±15	±33			234	31	1500	150	78	80
FN1-12D05B	12	10.8 - 13.2	±5	±100	99	9	1500	100	80	82
FN1-12D09B			±9	±56	104	15	1500	100	78	80
FN1-12D12B			±12	±42	101	14	1500	100	82	84
FN1-12D15B			±15	±33	98	12	1500	100	85	87
FN1-15D05B	15	13.5 - 16.5	±5	±100	83	11	1500	100	76	78
FN1-15D12B			±12	±42	83	15	1500	100	77	79
FN1-15D15B			±15	±33	81	14	1500	100	81	83
FN1-24D05B	24	21.6 - 26.4	±5	±100	53	7	1500	100	77	79
FN1-24D09B			±9	±56	52	7	1500	100	81	83
FN1-24D12B			±12	±42	50	8	1500	100	81	83
FN1-24D15B			±15	±33	50	9	1500	100	81	83

- Note:
- Efficiency is tested under full load, input nominal voltage.
  - 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.
  - The capacitive loads of positive and negative outputs are identical.

**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	
	12Vdc Input	-0.7	-	18	
	15Vdc Input	-0.7	-	21	
	24Vdc Input	-0.7	-	30	

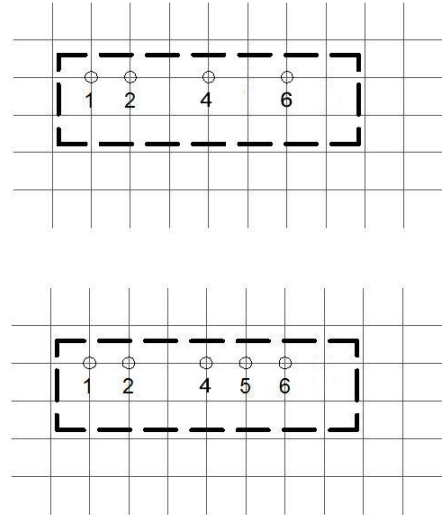
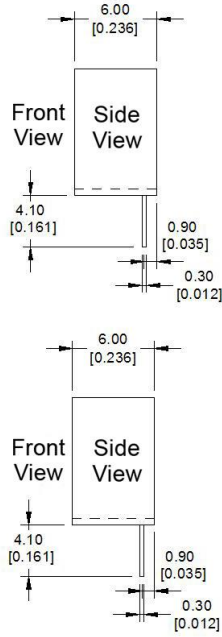
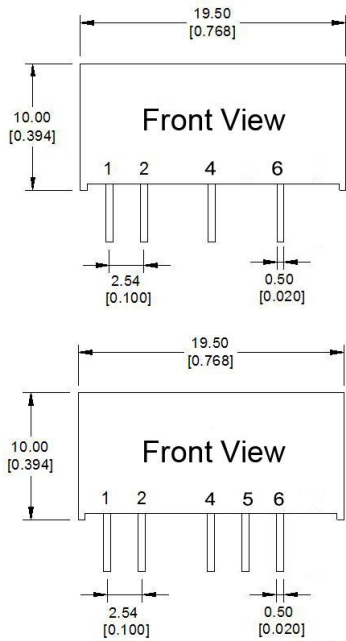


Input Filter		Capacitor Filter				
<b>Output Specifications</b>						
ITEM	Working Conditions	Min.	Typ.	Max.	Unit	
Output Power		0.1	--	1	W	
Output Voltage Accuracy	Nominal input, Full load	--	±2	±5	%	
Load Regulation	10% ~ 100% nominal load	3.3Vdc output	--	--		20
		Other output	--	--		15
Line Voltage Regulation	Input Voltage Change±1%	3.3Vdc output	--	--		±1.5
		Other output	--	--		±1.2
Ripple & Noise①	Nominal input,full load, 20MHZ bandwidth	Other output	--	75	100	mVp-p
Temperature Drift Coefficient	100% Full Load	--	--	±0.03	%/°C	
Output Short Circuit Protection②	Not Available					

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

<b>General Specifications</b>		
Switching Frequency	typical	100KHz (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
Relative Humidity	No condensing	5%~95%
Case Material		Black flame-retardant heat-resistant Plastic(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		2.1g(Typ.)
Packing	Tube(525*18*10mm)	25PCS
	Box(542*110*155mm)	2000PCS(Total 80Tubes)

**Packing Dimension**



Print board vertical view  
Grid: 2.54mm(0.1inch)

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

**Pin Function**

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

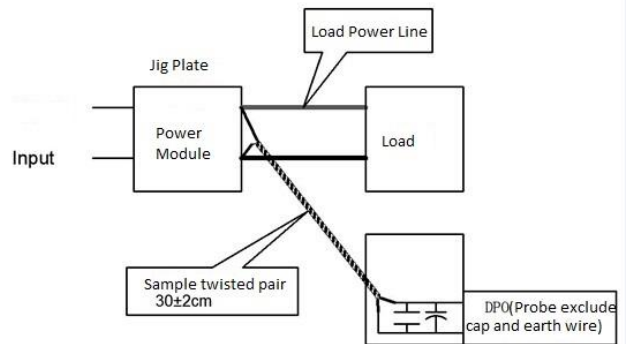
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

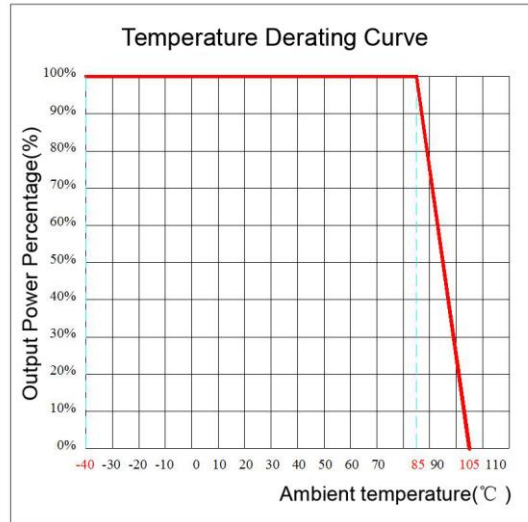
Test Method:

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.



**Temperature Curve**



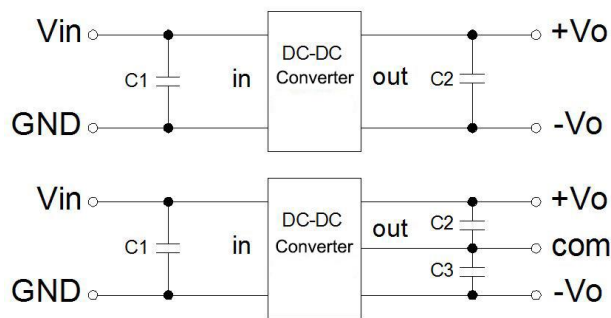
**Design and Application Circuit Recommended**

**1. Output load requirements**

- 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 terminal, 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)

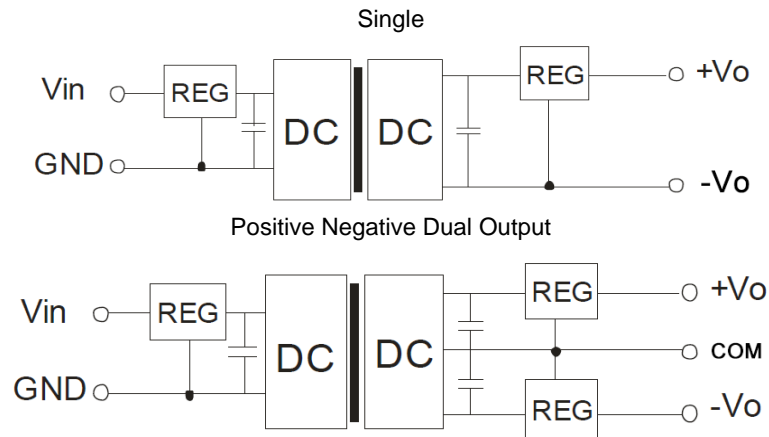


Recommended capacitive load value(Table 1)

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. 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.



**Note:**

1. This product cannot be used in parallel, and do not support hot-plugging;
2. If the product works below the minimum required load, it cannot guarantee that the product performance meets all performance indicators in this manual;
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.