Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 1W
- ◆ High Efficiency up to 81%
- ◆ Small compact SIP packing
- ◆ No external component required
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40℃～+85℃
- ◆ 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℃

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	Ripple & Noise (Max.)	Efficiency (%)full load, input nominal voltage	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.	uF	mVp-p	Min.	Typ.
FN1-3V3S3V3B	3.3	3.0 - 3.6	3.3	300	421	40	220	100	70	72
FN1-3V3S05B			5	200	410	40	220	100	72	74
FN1-3V3S09B			9	110	410	40	100	100	72	74
FN1-3V3S12B			12	83	410	40	100	100	72	74
FN1-3V3S15B			15	67	410	40	100	100	72	74
FN1-05S3V3B	5	4.5 - 5.5	3.3	300	263	25	220	100	74	76
FN1-05S05B			5	200	253	25	220	100	77	79
FN1-05S09B			9	110	250	25	100	100	78	80
FN1-05S12B			12	83	250	25	100	100	78	80
FN1-05S15B			15	67	247	25	100	100	79	81
FN1-05S24B			24	42	263	25	47	120	74	76
FN1-09S3V3B	9	8.1 - 9.9	3.3	300	146	20	220	100	74	76
FN1-09S05B			5	200	141	20	220	100	77	79
FN1-09S09B			9	110	139	20	100	100	78	80
FN1-09S12B			12	83	139	20	100	100	78	80

FN1-09S15B			15	67	139	20	100	100	78	80
FN1-12S3V3B	12	10.8 - 13.2	3.3	300	110	15	220	100	74	76
FN1-12S05B			5	200	105	15	220	100	77	79
FN1-12S09B			9	110	104	15	100	100	78	80
FN1-12S12B			12	83	104	15	100	100	78	80
FN1-12S15B			15	67	103	15	100	100	79	81
FN1-12S24B			24	42	110	15	47	120	74	76
FN1-15S3V3B	15	13.5 - 16.5	3.3	300	88	10	220	100	74	76
FN1-15S05B			5	200	84	10	220	100	77	79
FN1-15S09B			9	110	84	10	100	100	77	79
FN1-15S12B			12	83	83	10	100	100	78	80
FN1-15S15B			15	67	83	10	100	100	78	80
FN1-15S24B			24	42	88	10	47	100	74	76
FN1-24S3V3B	24	21.6 - 26.4	3.3	300	56	7	220	100	73	75
FN1-24S05B			5	200	53	7	220	100	77	79
FN1-24S09B			9	110	52	7	100	100	78	80
FN1-24S12B			12	83	52	7	100	100	78	80
FN1-24S15B			15	67	52	7	100	100	78	80
FN1-24S24B			24	43	56	7	47	100	73	75
FN1-3V3D05B	3.3	3.0 - 3.6	±5	±100	415	40	415	100	72	73
FN1-3V3D09B			±9	±55	410	40	410	100	72	74
FN1-3V3D12B			±12	±42	410	40	410	100	72	74
FN1-3V3D15B			±15	±33	410	40	410	100	72	74
FN1-3V3D24B			±24	±21	421	40	421	100	70	72
FN1-05D05B	5	4.5 - 5.5	±5	±100	253	25	253	100	77	79
FN1-05D09B			±9	±55	250	25	250	100	78	80
FN1-05D12B			±12	±42	250	25	250	100	78	80
FN1-05D15B			±15	±33	247	25	247	100	79	81
FN1-05D24B			±24	±21	263	25	263	100	74	76
FN1-09D05B	9	8.1 - 9.9	±5	±100	141	20	141	100	77	79
FN1-09D09B			±9	±55	139	20	139	100	78	80
FN1-09D12B			±12	±42	139	20	139	100	78	80
FN1-09D15B			±15	±33	139	20	139	100	78	80
FN1-09D24B			±24	±21	137	20	137	100	79	81

FN1-12D05B	12	10.8 - 13.2	±5	±100	105	15	105	100	77	79
FN1-12D09B			±9	±55	104	15	104	100	78	80
FN1-12D12B			±12	±42	104	15	104	100	78	80
FN1-12D15B			±15	±33	103	15	103	100	79	81
FN1-12D24B			±24	±21	110	15	110	100	74	76
FN1-15D05B	15	13.5 - 16.5	±5	±100	84	10	84	100	77	79
FN1-15D09B			±9	±55	84	10	84	100	77	79
FN1-15D12B			±12	±42	83	10	83	100	78	80
FN1-15D15B			±15	±33	83	10	83	100	78	80
FN1-15D24B			±24	±21	88	10	88	100	74	76
FN1-24D05B	24	21.6 - 26.4	±5	±100	53	7	53	100	77	79
FN1-24D09B			±9	±55	52	7	52	100	78	80
FN1-24D12B			±12	±42	52	7	52	100	78	80
FN1-24D15B			±15	±33	52	7	52	100	78	80
FN1-24D24B			±24	±21	56	7	56	100	73	75

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.

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				

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	

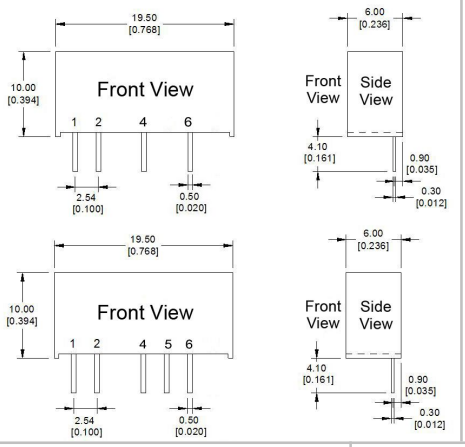
Line Voltage Regulation	Input Voltage Change±1%	3.3Vdc output	--	--	±1.5	
		Other output	--	--	±1.2	
Ripple & Noise①	Nominal input,full load, 20MHZ bandwidth	Other output	--	75	100	mVp-p
		24Vdc output		100	120	
Temperature Drift Coefficient	100% Full Load		--	--	±0.03	%/°C
Output Short Circuit Protection②	Not Available					

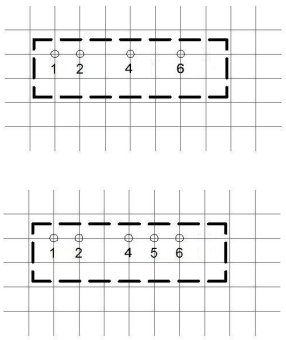
NOTE:①Ripple & Noise tested by twisted-pair method,

General Specifications

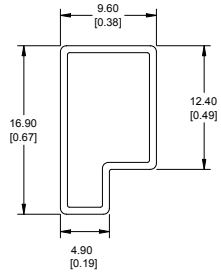
Switching Frequency	typical	100KHz (Typ.)
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +85℃
Storage Temperature		-55℃ ~ +125℃
Shell temperature rise during work	Within Temperature Derating Curve	25℃
Relative Humidity	No condensing	5%~95%
Case Material		Black flame-retardant heat-resistant Plastic(UL94-V0)
Product Weight		2.4g(Typ.)
Isolation Voltage	Test 1 minute, leakage current＜0.5mA	1500Vdc ≤ 0.5mA / 1min
Isolation Capacitor	Input/Output,100KHz/0.1V	20 pF (Typ.)
MTBF	MIL-HDBK-217F@25℃	35X10^{5}Hrs

Packing Dimension





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



Note:
Unit: mm[inch]
General tolerance: x.xx±0.5mm[x.xx±0.020 inch]
x.x±0.2mm[x.x±0.008 inch]

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

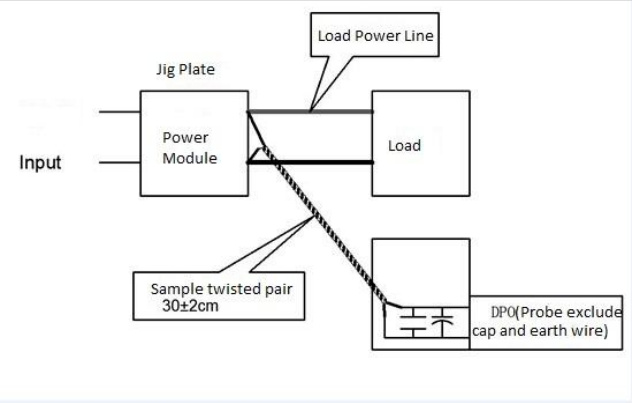
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

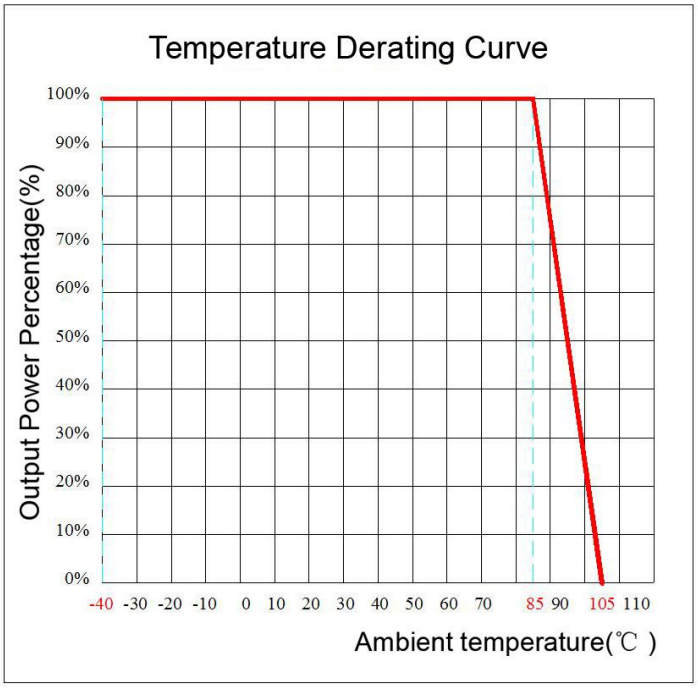
Test Method:

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

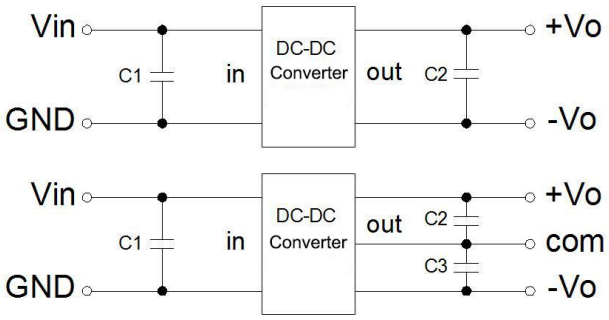
1. Output load requirements

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)



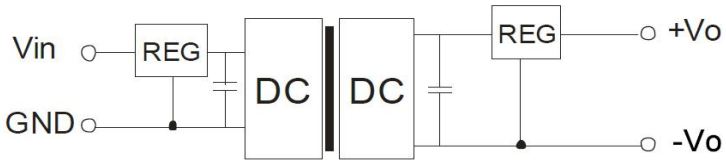
Recommended capacitive load value(Table 1)

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

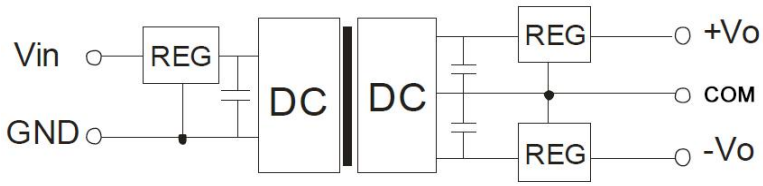
3. Output regulated voltage and over voltage protection circuit

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.

Single



Positive Negative Dual Output



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.