

Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 1W
- ◆ High Efficiency up to 87%
- ◆ Small compact SIP packing
- ◆ No external component required
- ◆ Isolation Voltage 1500VDC
- ◆ 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

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.
FN1-3V3S3V3AN	3.3	2.97	3.3	303	404	30	220	150	68	72
FN1-3V3S05AN		-	5	200	404	30	220	150	72	76
FN1-3V3S12AN		3.63	12	83	347	45	470	150	76	80
FN1-05S3V3AN	5	4.5 - 5.5	3.3	300	277	25	470	150	68	72
FN1-05S05AN			5	200	239	17	470	150	76	80
FN1-05S09AN			9	110	277	20	470	150	76	80
FN1-05S12AN			12	83	277	20	470	150	76	80
FN1-05S15AN			15	67	277	20	470	150	76	80
FN1-05S24AN			24	42	277	20	470	150	76	80
FN1-12S3V3AN	12	10.8 - 13.2	3.3	300	116	15	470	150	68	72
FN1-12S05AN			5	200	101	11	470	150	76	80
FN1-12S09AN			9	110	108	15	470	150	76	80
FN1-12S12AN			12	83	101	16	470	150	76	80
FN1-12S15AN			15	67	99	13	470	150	76	80
FN1-12S24AN			24	42	115	15	470	150	76	80



FN1-15S05AN	15	13.5	5	200	82	10	470	150	76	80
FN1-15S12AN		-	12	83	82	12	470	150	76	80
FN1-15S15AN		16.5	15	67	82	10	470	150	85	87
FN1-24S3V3AN	24	21.6 - 26.4	3.3	300	57	7	470	150	68	72
FN1-24S05AN			5	200	48	7	470	150	79	83
FN1-24S09AN			9	110	57	7	470	150	76	80
FN1-24S12AN			12	83	50	8	470	150	76	80
FN1-24S15AN			15	67	52	8	470	150	76	80
FN1-24S24AN			24	42	52	8	470	150	76	80

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					
	FN1-24S24AN without SCP					

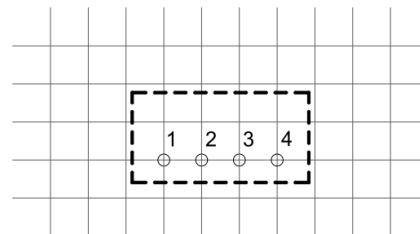
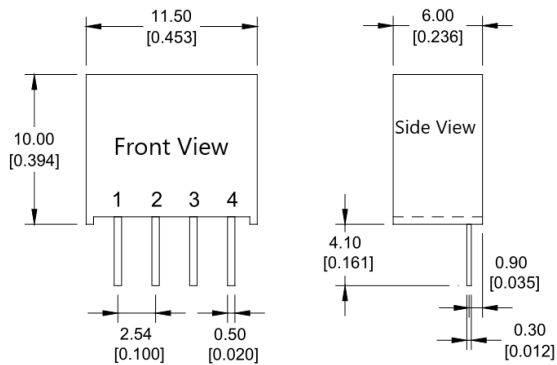
NOTE:① Ripple & Noise Tested by twisted-pair method, for details please check Design and Application Circuit.



General Specifications

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(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)

Packing Dimension



Printed board vertical view

Lattice spacing:2.54mm(0.1inch)

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

Pin Function

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

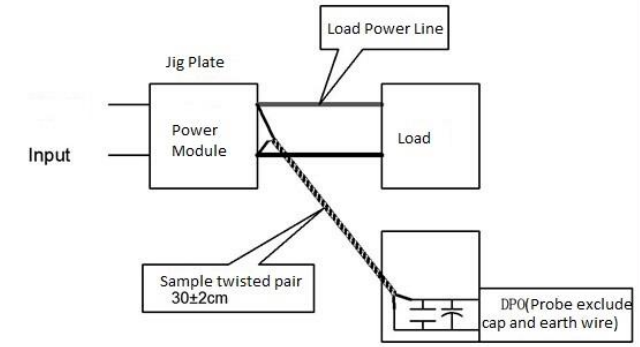
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

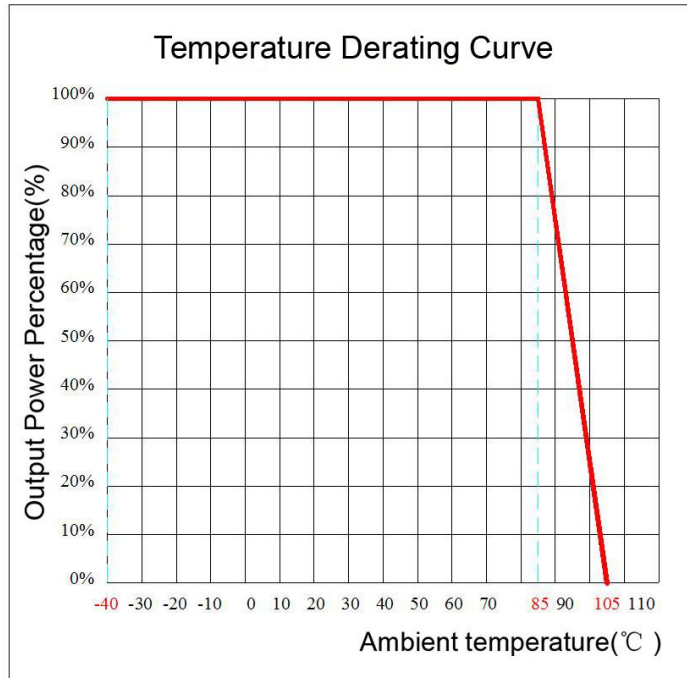
Test Method:

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



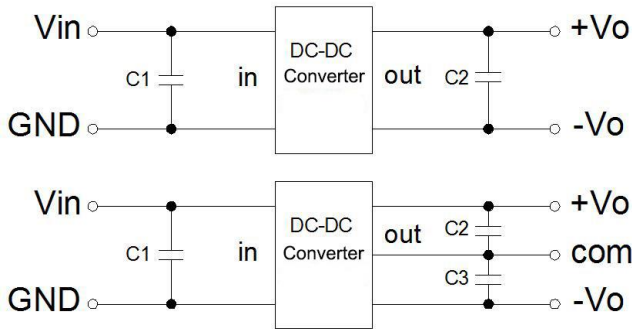
Design and Application Circuit Recommended

1. Output load requirements

- a. In order to ensure 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

a. 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)

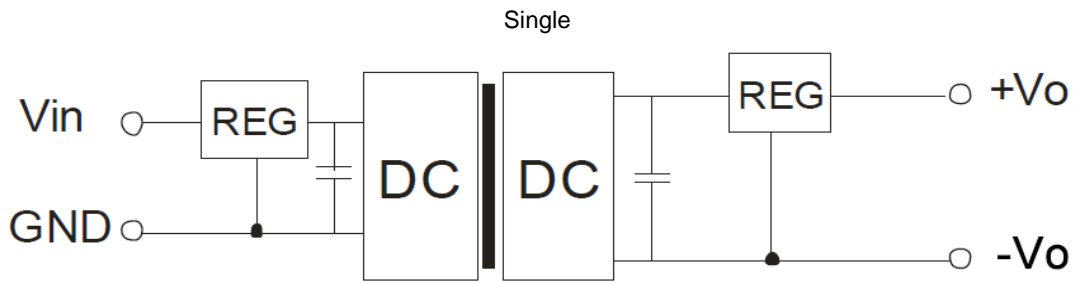


Recommended capacitive load value(Table 1)

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.