

Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 2W
- ◆ High Efficiency up to 86%
- ◆ Small compact SIP packing
- ◆ No external component required
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40℃ ~ +85℃
- ◆ 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℃

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

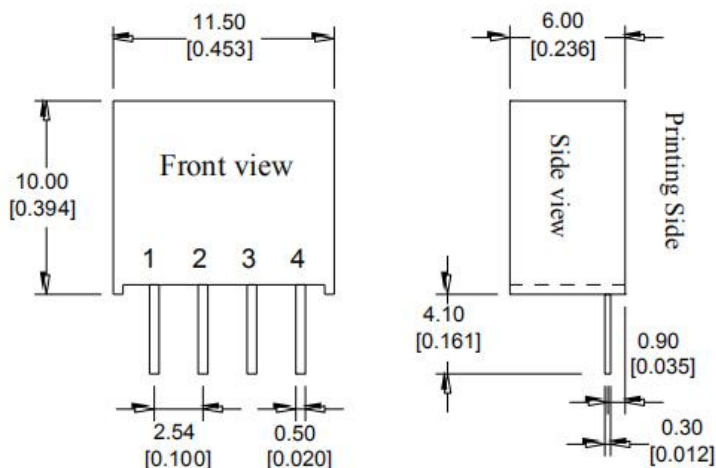
Model	Input Voltage Range (VDC)		Output Voltage/ Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise (Max.)	Efficiency (%)	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX/MIN	Full load Typ.	No Load Typ.	uF	mVp-p	Min.	Typ.
NN2-05S05ANR3	5	4.5 - 5.5	5	400/40	476	6	2400	150	76	80
NN2-05S12ANR3			12	167/17	455	18	560	150	76	80
NN2-05S15ANR3			15	133/13	470	20	560	150	76	80
NN2-12S3V3ANR3	12	10.8 - 13.2	3.3	400/40	195	10	2400	150	79	82
NN2-12S05ANR3			5	400/40	195	10	2400	150	81	84
NN2-12S7V2ANR3			7.2	278/28	194	10	1000	150	83	86
NN2-12S12ANR3			12	167/17	190	10	560	150	83	86
NN2-12S15ANR3			15	133/13	192	10	560	150	80	83
NN2-12S24ANR3			24	83/8	190	15	470	150	80	84
NN2-24S05ANR3	24	21.6 - 26.4	5	400/40	98	8	2400	150	79	82
NN2-24S5V5ANR3			5.5	364/36	96	8	2400	150	80	83
NN2-24S7V2ANR3			7.2	278/28	96	8	1000	150	83	86
NN2-24S12ANR3			12	167/17	95	8	560	150	83	86
NN2-24S15ANR3			15	133/13	98	8	560	150	80	83

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;

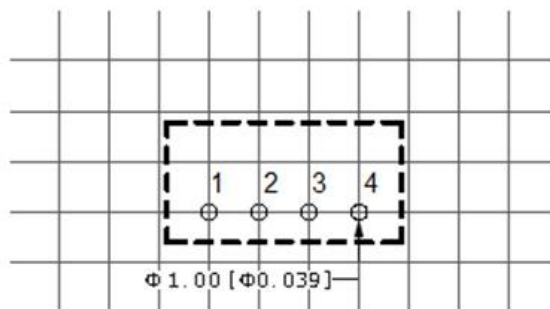
Input Specifications

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

Input Filter		Capacitor Filter				
Output Specifications						
ITEM	Working Conditions		Min.	Typ.	Max.	Unit
Output Power			0.2	--	2	W
Output Voltage Accuracy	--		See the error envelope curve graph			
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 & Noise ①	Nominal input, full load, 20MHZ bandwidth		--	75	150	mVp-p
Temperature Drift Coefficient	100% Full Load		--	--	±0.03	%/°C
Output Short Circuit Protection	Continuous short-circuit protection, self-recovery					
NOTE:① Ripple & Noise Tested by twisted-pair method, for details please check Design and Application Circuit.						
General Specifications						
Switching Frequency	5Vdc Input		260KHz (Typ.)			
Operating Temperature	Refer to Temperature Derating Curve		-40℃ ~ +85℃			
Storage Temperature			-55℃ ~ +125℃			
Shell temperature rise during work	Within Temperature Derating Curve		25℃(Typ.)			
Relative Humidity	No condensing		5%~95%			
Case Material			Black flame-retardant heat-resistant Plastic(UL94 V-0)			
Pin Resistance To Welding Temperature	The solder spot is 1.5mm away from the shell, 10s		300℃ 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℃		35X10 ⁵ Hrs			
Product Weight			1.4g(Typ.)			
Package	Tube (525*18*10mm)		43pcs			
	Carton (542*110*155mm)		3440pcs (total 80 tubes)			
Packing Dimension						



Packing Dimension

Printed board vertical view
Lattice spacing: 2.54mm (0.1 inch)

Dimensions in: mm[inch]
Terminal section tolerance: ± 0.10 [0.004]
Unmarked tolerances: ± 0.50 [0.020]

Recommended PCB layout

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

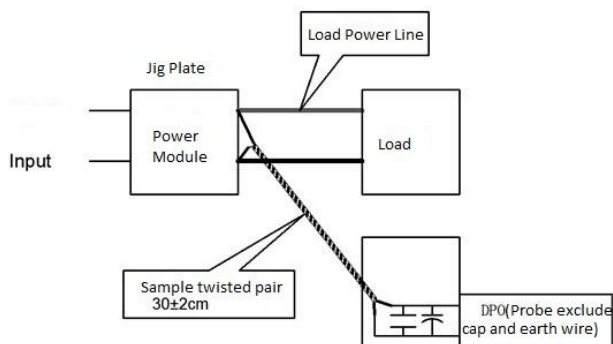
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

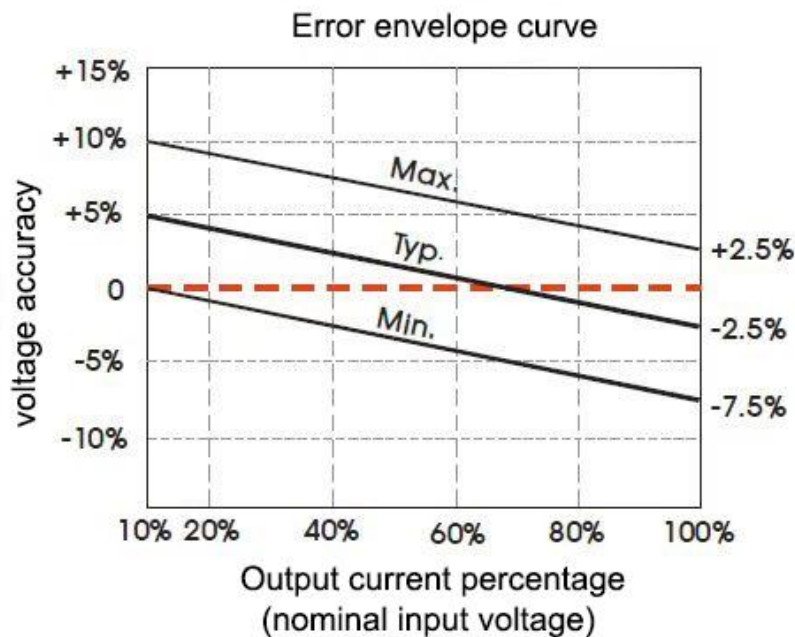
Test Method:

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.

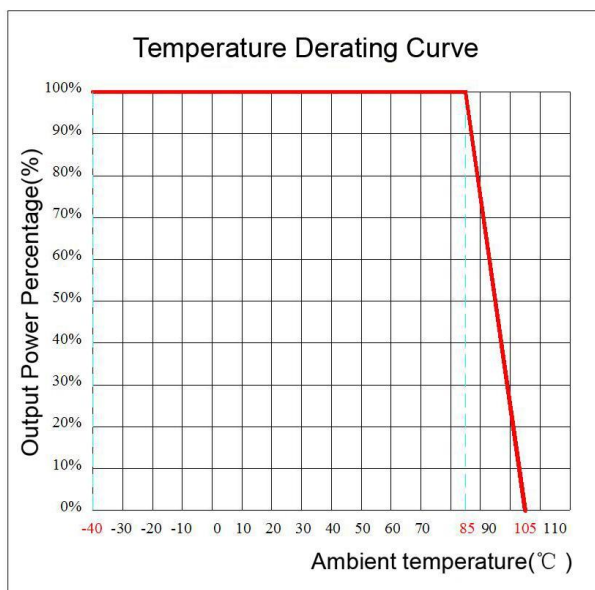
b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm ± 2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Output voltage error envelope curve



Temperature Derating Curve



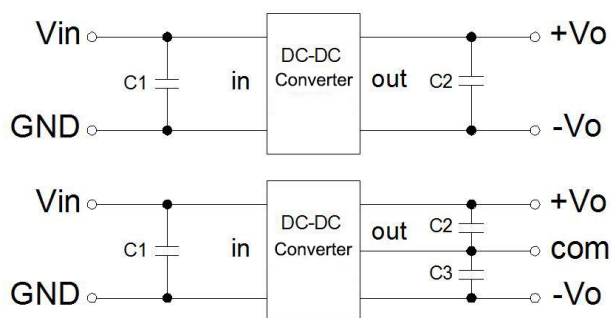
Design and Application Circuit Recommended

1. Output load requirements

- 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.
- 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)

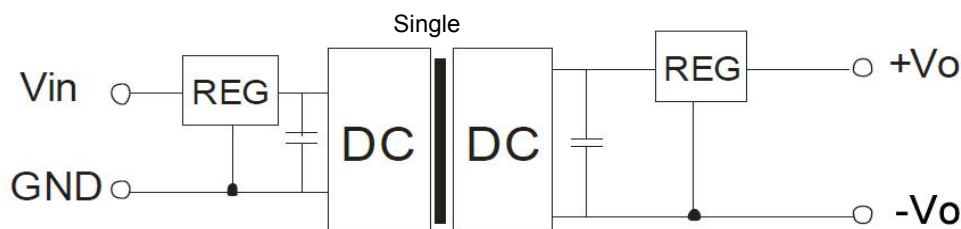


Recommended capacitive load value(Table 1)

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.

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