

Typical Features

- ◆ Fixed input voltage, Isolated & unregulated output, Output power 2W
- ◆ High Efficiency up to 84%
- ◆ Continuous short circuit protection
- ◆ Full load 8kV impact withstand voltage
- ◆ Isolation Voltage: 5000VAC or 7000VDC, reinforced insulation
- ◆ Operating Temperature: -40℃ ~ +105℃
- ◆ Isolation capacitance as low as 7pF
- ◆ 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

NN2-XXSXXD7R3 — is specially designed for applications in high-voltage power systems such as photovoltaics and energy storage that require the generation of a set of voltages isolated from the input power supply. This product is suitable for:

1. The voltage of the input power supply is relatively stable (voltage change range $\pm 10\%V_{in}$);
2. The isolation voltage required between input and output is $\leq 5000VAC$ or $7000VDC$.

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.
*NN2-12S05D7R3	12	10.8	5	400/40	210	20	1000	150	80	83
NN2-12S12D7R3		13.2	12	167/17	200	20	470	150	81	84

1. "*" means models under development;
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.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input Overshoot Voltage (1Second.max.)	5Vdc Input	-0.7	-	18	VDC
Input Filter	Capacitor Filter				
Hot Plug	Unavailable				

Output Specifications

ITEM	Working Conditions	Min.	Typ.	Max.	Unit
Output Power		0.2	--	2	W
Output Voltage Accuracy	Nominal input, full load	--	±3	±5	%

Load Regulation	10% ~ 100% nominal load	5Vdc output	--	--	±15	%
		12Vdc output	--	--	±20	
Line Voltage Regulation	Input Voltage Change±1%		--	--	±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.

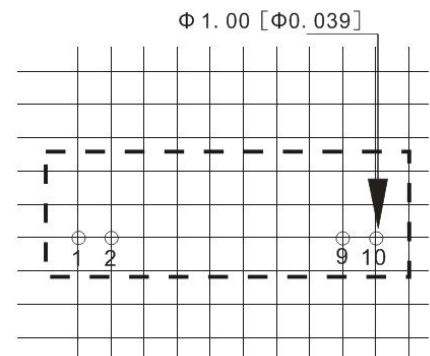
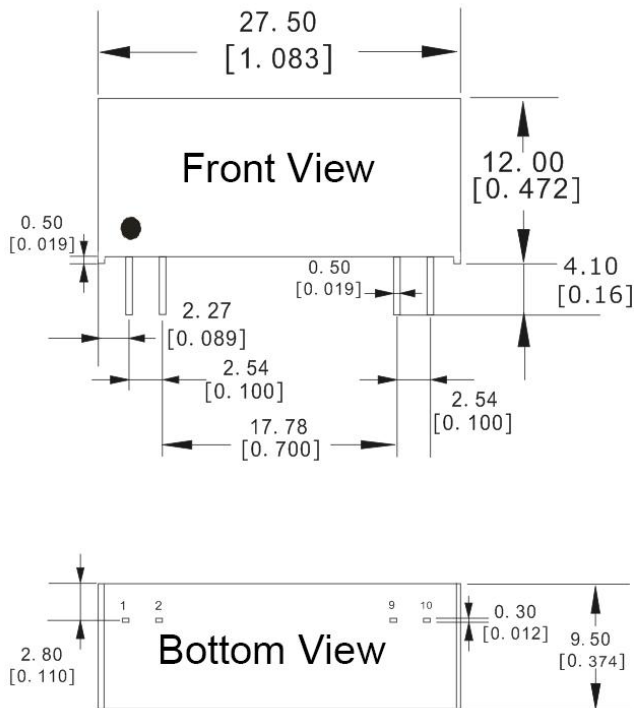
General Specifications

Switching Frequency	Typical value	260KHz (Typ.)
Operating Temperature	Temperature $\geq 71^{\circ}\text{C}$, use with derating, refer to the temperature derating curve.	$-40^{\circ}\text{C} \sim +105^{\circ}\text{C}$
Storage Temperature		$-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
Wave soldering Temperature	Peak temperature $T_c \leq 245^{\circ}\text{C}$, maximum time above 217°C is 60S	
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 Resistance To Welding Temperature	The solder spot is 1.5mm away from the shell, 10s	300°C MAX
Isolation Voltage	Test 1 minute, leakage current < 0.5mA	$\leq 5000\text{VAC}$
		$\leq 7000\text{VAC}$
Insulation resistance	Input-Output Insulation voltage 500VDC	$1000\text{M}\Omega$
Isolation Capacitor	Input/Output, 100KHz/0.1V	7 pF (Typ.)
MTBF	MIL-HDBK-217F@ 25°C	35×10^5 Hrs
Product Weight		1.4g(Typ.)

EMC characteristics

EMI	CE	CISPR32/EN55032 CLASS B (See EMC recommended circuit)
	RE	CISPR32/EN55032 CLASS B (See EMC recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Air±8kV, Contact±6kV perf.Criteria B

Packing Dimension



Note:

Lattice Spacing: 2.54*2.54mm

Unit: mm [inch]

Terminal section tolerance: ± 0.10 [0.004]

Unmarked tolerance: ± 0.50 [± 0.020]

Packing Dimension

Recommended Layout

Packing Code	L x W x H	
D7	27.50X9.50X12.00 mm	1.083X0.374X0.472inch

Pin Function

Single(S)	1	2	9	10
	Vin	GND	0V	+Vo

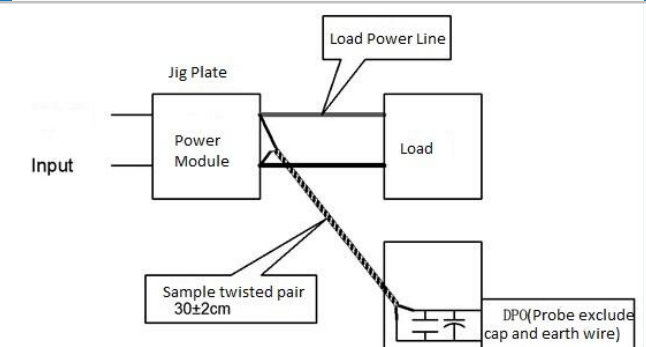
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

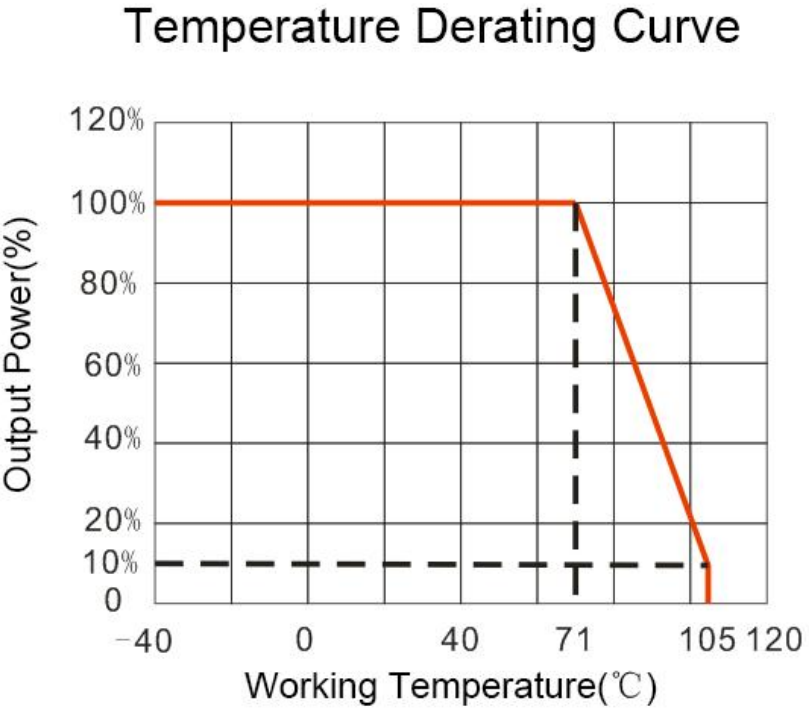
Test Method:

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 \pm 2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Product Characteristic Curve



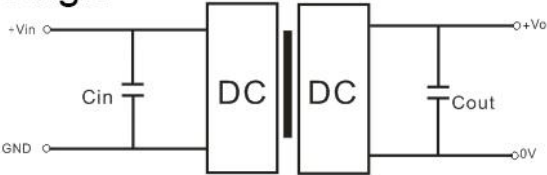
Design and Application Circuit Recommended

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

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.

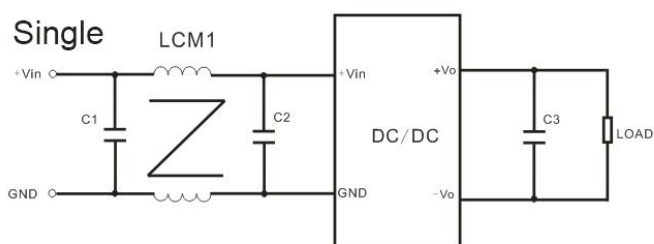
Single



Recommended Capacitive Load Value(Table 1)

Vin	Cin	Single Vout	Cout
12Vdc	4.7 μF/25V	5Vdc	10 μF/16V
		12Vdc	4.7 μF/25V

3. EMC typical recommended circuit



Input Voltage		12VDC
EMI	C1/C2	22 μ F / 25V
	C3	Refer to the parameters of Cout in Table 1
	LCM1	4. 7mH

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. The maximum capacitive load is tested under input voltage range and full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;
5. All index test methods in this manual are based on the company's corporate standards;
6. Our company can provide product customization. For specific conditions, please contact our technical personnel directly.

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