Typical Features

- ◆ Fixed input voltage, isolated & unregulated, output 1W
- ◆ Efficiency up to 88% (Typ.)
- ◆ Mini size SMD package, standard pin-out alignment
- ◆ Isolation voltage 1500VDC
- ◆ Continuous short circuit protection, self-recovery
- ◆ Operating temperature from -40℃ to +105℃
- ◆ Plastic case, flame class UL94 V-0

Application Field

This series of products can be widely used in the fields of instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @Nominal volt.		Max Capacitive Load	Efficiency @Full load/ nominal volt.	
		Nominal (VDC)	Range (VDC)	Vo (VDC)	Io(mA) Max/Min	Full Load	No Load	(uF)	Min (%)	Typ. (%)
CE	NN1-3V3S3V3ANT	3.3	2.97 - 3.63	3.3	303/30	370	5	2400	74	76
CE	NN1-3V3S05ANT			5	200/20	370	5	2400	80	82
CE	NN1-3V3S09ANT			9	111/11	357	5	1000	83	85
CE	NN1-3V3S12ANT			12	83/8	348	10	560	85	87
CE	NN1-3V3S15ANT			15	67/7	348	10	560	85	87
CE	NN1-3V3S24ANT			24	42/4	357	20	220	83	85
CE	NN1-05S3V3ANT	5	4.5 - 5.5	3.3	303/30	244	5	2400	78	80
CE/CB/UL	NN1-05S05ANT			5	200/20	233	6	2400	83	85
-	NN1-05S06ANT			6	167/17	233	6	2400	83	85
CE	NN1-05S09ANT			9	111/11	233	6	1000	84	86
CE	NN1-05S12ANT			12	83/8	225	15	560	85	87
CE	NN1-05S15ANT			15	67/7	225	15	560	85	87
CE	NN1-05S24ANT			24	42/4	244	30	220	86	88
-	NN1-12S3V3ANT	12	10.8 - 13.2	3.3	303/30.	96	6	2400	80	82
CE/UL/CB	NN1-12S05ANT			5	200/20	96	6	2400	84	86
-	NN1-12S06ANT			6	166/17	96	6	2400	84	86
-	NN1-12S09ANT			9	111/11	89	6	1000	84	86
UL/CB	NN1-12S12ANT			12	83/8	89	6	560	84	86
-	NN1-12S15ANT			15	67/6	93	7	560	84	86
ETL/ UL/CB	NN1-12S24ANT			24	42/4	93	8	220	84	86

-	NN1-15S05ANT	15	13.5 - 16.5	5	200/20	78	5	2400	83	85
-	NN1-15S12ANT			12	83/9	76	10	1000	84	86
UL/CB	NN1-15S15ANT			15	67/6	78	5	560	84	86
-	NN1-15S24ANT			24	42/5	75	10	470	83	85
-	NN1-24S3V3ANT	24	21.6 - 26.4	3.3	303/30	47	3	2400	80	82
-	NN1-24S05ANT			5	200/20	47	3	2400	84	86
-	NN1-24S09ANT			9	111/11	48	5	1000	84	86
-	NN1-24S12ANT			12	83/8	48	5	560	84	86
-	NN1-24S15ANT			15	67/6	48	6	560	84	86
-	NN1-24S24ANT			24	42/4	48	8	220	84	86

Note 1: The maximum capacitive load is the capacitance allowed to be used when the power supply starts up at full load. The converter may not start if the capacitor exceeds this value.

Note 2: The efficiency is tested at the nominal input voltage and the rated load.

Note 3: Please contact Aipu sales for other output voltages requirements of this series but not listed in this table.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input inrush voltage (1Sec 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				
Hot plug	Unavailable				

Output Specifications

Item	Test Condition		Min.	Typ.	Max.	Unit
Output power			0.1	--	1	W
Output voltage accuracy	Refer to the Output Voltage Deviation Graph (Figure 1)					
Load regulation	10% - 100% load	3.3V output	--	15	20	%
		Others	--	10	15	%
Line voltage regulation	Input voltage change ±1%	3.3V output	--	--	1.5	%
		Others	--	--	1.2	%
Temperature drift coefficient			--	--	±0.03	%/°C
Ripple & Noise	0%-100% load, 20MHz bandwidth		--	100	150	mVp-p
Short circuit protection	Continuous, self-recovery					

Note: The Ripple & Noise is tested by the Twisted Pair Method, please refer to the following test instruction.

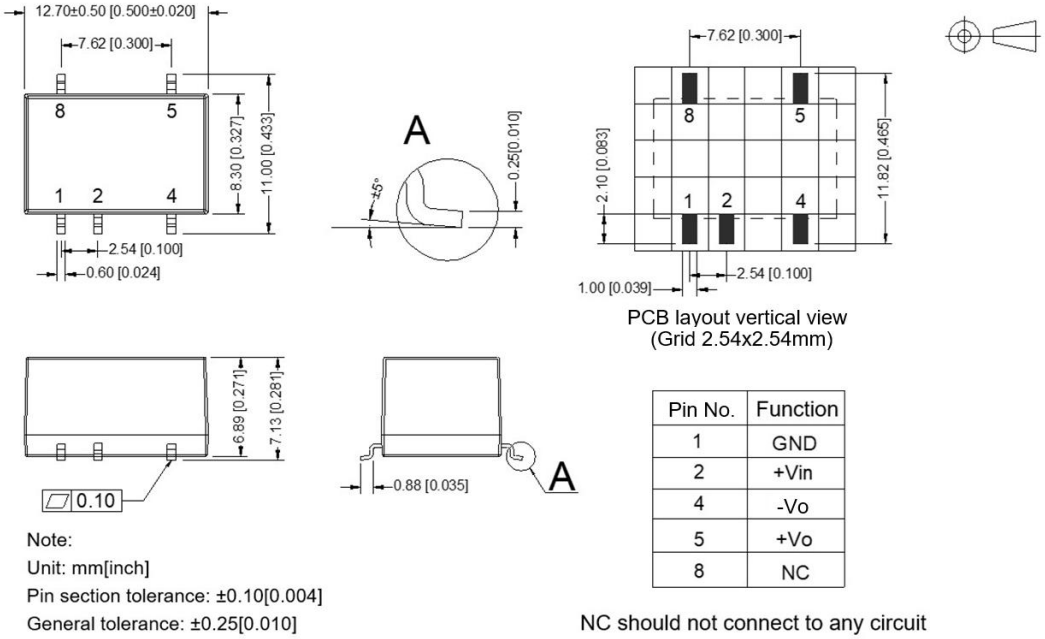
General Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load	--	260	--	KHz
Operating temperature	Refer to the Temperature Derating Graph (Figure 2)	-40	--	105	℃
Storage temperature		-55	--	+125	℃
Case temperature rise	Within the operating derating range	--	30°	--	℃
Pin soldering temperature	1.5mm from the case, soldering time 10S	--	--	300	℃
Reflow Temperature	Peak temperature Tc≤250℃, the maximum time 60S above 217℃				
Relative humidity	No condensing	5	--	95	%RH
Isolation voltage	I/P-O/P, test 1 minute, leakage current <1mA	1500	--	--	VDC
Insulation resistance	I/P-O/P, @ 500VDC	1000	--	--	MΩ
Isolation capacitance	I/P-O/P, 100KHz/0.1V	--	20	--	pF
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z				
Case material	Plastic in Black, flame class UL94-V0				
Unit weight	1.4g (Typ.)				
Cooling method	Natural air				
Packing by tube	Tube size (525x18x10mm)	39PCS/Tube			
	Carton size (542x110x155mm)	3120PCS/Carton (Total 80 Tubes)			
Packing by reel	Reel size (Φ330 × 24.5mm)	500PCS/Reel			
Unit dimensions	L x W x H	12.70X11.00X7.13 mm		0.500 × 0.433 × 0.281 inch	

EMC Performance

Item		Test Standard	Performance/Class
EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended EMC circuit)
	RE	CISPR32/EN55032	CLASS B (with the Recommended EMC circuit)
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV, air ±8KV perf. Criteria B

Mechanical Dimensions



PCB layout vertical view
(Grid 2.54x2.54mm)

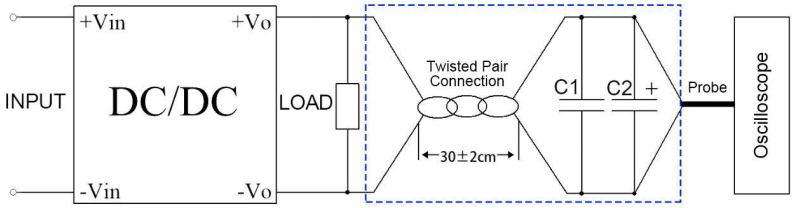
Pin No.	Function
1	GND
2	+Vin
4	-Vo
5	+Vo
8	NC

NC should not connect to any circuit

Note:
Unit: mm[inch]
Pin section tolerance: ±0.10[0.004]
General tolerance: ±0.25[0.010]

Note: Please take the pin definition on the product label as the right one if it is different than the data sheet description.

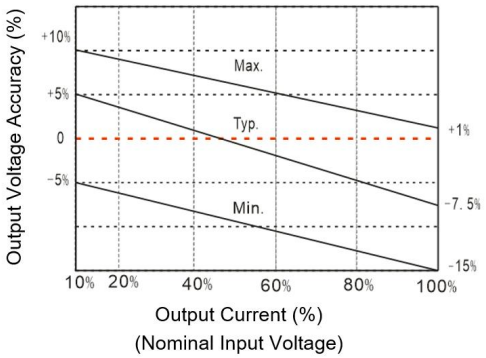
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)



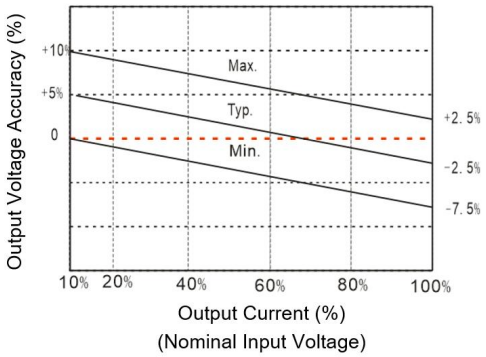
1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load. The test can start after the input power on.

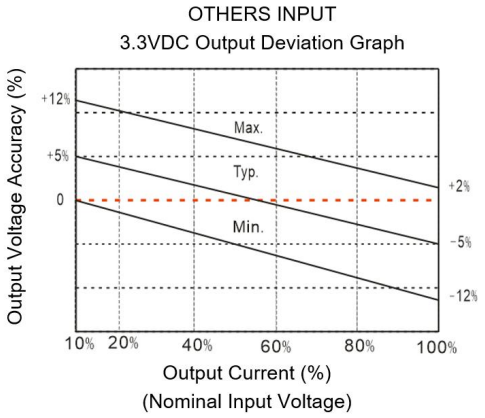
Product Characteristics Graphs

3.3VDC INPUT
3.3VDC Output Deviation Graph



3.3V/5VDC INPUT
Others Output Deviation Graph





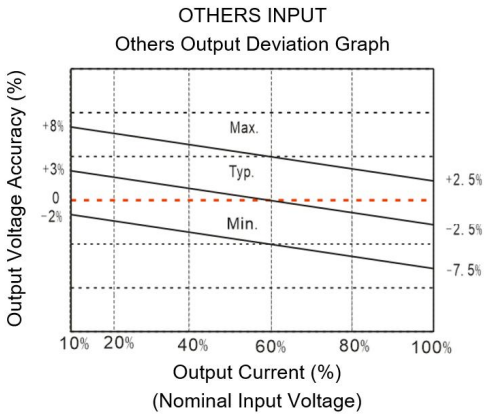


Figure 1

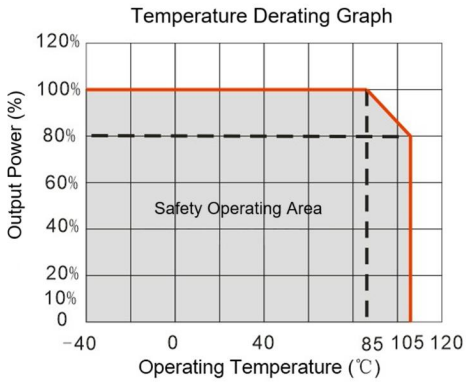


Figure 2

Recommended Circuits for Application

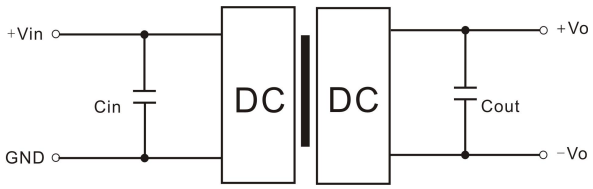
1. Requirement for Output load

a. To ensure the converter operating efficiently and reliably, its minimum load should not be less than 10% of the rated load. It is recommended to connect a resistor in parallel to the output when the real load is less than 10% (the sum of the power consumed should be bigger than or equal to 10% of the rated power).

b. The maximum capacitive load is tested at the full load. The converter may not start or be damaged at the capacitive over-load.

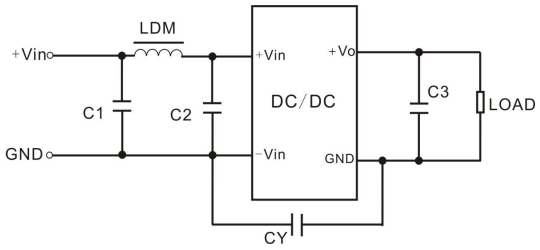
2. Typical application circuits

To ensure effectively decrease the input and output ripple and noise, a capacitor filter can be connected at the input and output, the application circuit is shown in the figure below. The suitable filter capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not start if the capacitance is too big.



Recommended Capacitive Load Values (Table 1)			
Vin (Vdc)	Cin	Vout (Vdc)	Cout
3.3	10uF/16V	3.3	10uF/16V
5	4.7uF/16V	5 & 6	10uF/16V
12	2.2uF/25V	9	4.7uF/16V
15	2.2uF/50V	12	2.2uF/25V
24	1uF/50V	15	1uF/50V
		24	1uF/50V

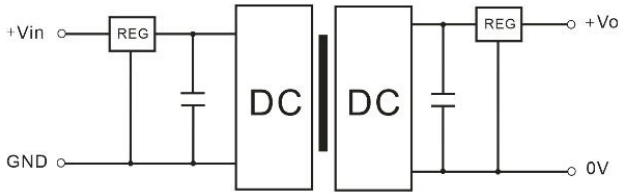
3. Recommended EMC circuit diagram



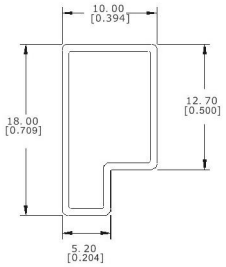
Input Voltage		3.3/5Vdc	12/15/24Vdc
EMI	C1/C2	4.7uF/16V	4.7uF/50V
	CY	270pF/2KVdc	270pF/2KVdc
	C3	Refer to Cout values in Table 1	
	LDM	6.8uH	6.8uH

4. Output voltage regulation and overvoltage protection

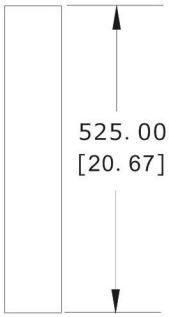
The simple solution to achieve the output regulated voltage, over voltage and over current protections is to connect a linear regulator with overheat protection at input or output, and a capacitor filter connected in parallel as below circuit. Filter capacitive value recommended see table 1, Linear regulator should be chosen according to the actual voltage & current for operating. Or Aipu NW series products are recommended instead.



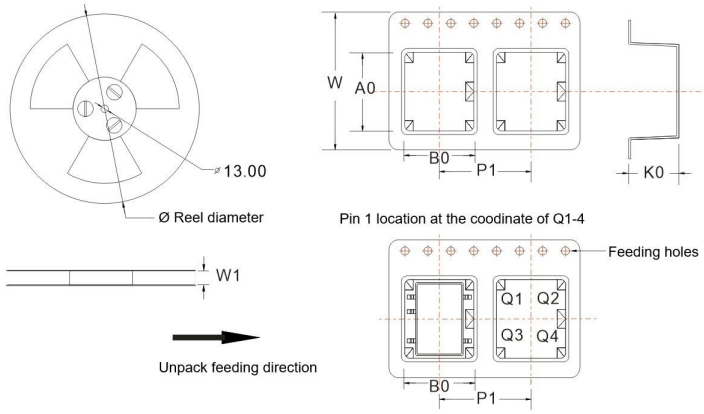
Packing Information



Note:
Unit: mm[inch]
General tolerance: ±1.50[±0.059]
Packing QTY: 39pcs/Tube
Packing QTY: 3120pcs/Carton
Tube size: 525x18x10mm
Carton size: 542x110x155mm



Tube packing



Part No.	Packaging Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W1 (mm)	Pin1 Location
NNX...SXXA(3)NT	SMD	5	500	330.0	24.5	13.65	12.40	7.7	16.0	24.0	Q1

Reel packing (500pcs per Reel)

Application Notice

1.This series of products cannot be connected in parallel to increase the output power, and do not support hot-plug.

2.The product should be used according to the specifications, otherwise it could be permanently damaged.

3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance cannot be guaranteed if it works under the over-load condition.

5. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

8. Aipupower can provide customization service.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: https://www.aipupower.com