Typical Feature

- ◆ Fixed Input Voltage, isolated & Unregulated Single Output power 2W
- ◆ Continuous short circuit protection
- ◆ Operating Temperature: -50℃ to +115℃
- ◆ Small SMD package, International standard pin-out
- ◆ Isolation Voltage 3000VDC
- ◆ High efficiency up to 88%
- ◆ No load input current as low as 5mA
- ◆ ESD meet Contact 8KV

Application Filed

NN2-XXSXXANT *is suitable for pure digital systems, low frequency analog circuits, relay-driven circuits. It is specially designed for applications where an isolated voltage is required in a distributed power supply system.*

It could be widely used in the below products:

1. *The voltage of the input power supply is relatively stable (voltage change range:±10%Vin)*
2. *Isolation between input and output is required (Isolation Voltage≤3000VDC);*
3. *Low requirements for output voltage stability and output ripple noise;*

Typical Product List

Part No	Input Voltage (VDC) Range	Output Voltage/Current Voltage (VDC)	Current (mA) Max / Min	Max. Capacitive Load(Max) u F	Ripple & Noise 20MHz (Typ/Max) mVp-p	Efficiency (Min/Typ) %
*NN2-3V3S3V3ANT	3.3 (2.97-3.63)	3.3	606/60	10000	50/100	78/80
*NN2-3V3S05ANT		5	400/40	10000	50/100	80/82
*NN2-3V3S09ANT		9	222/22	10000	100/150	80/82
*NN2-3V3S12ANT		12	167/17	10000	100/150	82/84
*NN2-3V3S15ANT		15	133/13	10000	100/150	82/84
*NN2-3V3S24ANT		24	83/8	10000	100/150	80/82
NN2-05S3V3ANT	5 (4.5-5.5)	3.3	600/60	10000	50/100	78/80
NN2-05S05ANT		5	400/40	10000	50/100	82/84
NN2-05S09ANT		9	222/22	10000	100/150	84/86
NN2-05S12ANT		12	167/17	10000	100/150	86/88
NN2-05S15ANT		15	133/13	10000	100/150	86/88
NN2-05S24ANT		24	83/8	10000	100/150	86/88

Note 1: The typical output efficiency is based on that product is full loaded and burned-in after half an hour.

Note 2: The fluctuation range of full load efficiency(%,TYP) is ±2%, full load output efficiency= total output power/module's input power.

Note 3: Ripple & Noise Tested by twisted-pair method, for details please check Ripple&Noise Test Method.

Input Specifications

Item	Operating Condition		Min.	Typ.	Max.	Unit
Input Current (Full load/No load)	3.3Vdc Input	3.3Vdc output	-	758/10	777/15	mA
		5Vdc/ 9Vdc output	-	739/20	758/25	
		12Vdc/15Vdc output	-	722/30	739/35	
		24Vdc output	-	758/40	777/50	
	5Vdc output	3.3Vdc output	-	500/5	513/10	
		5Vdc output	-	476/5	488/10	
		9Vdc output	-	465/10	476/20	
		12Vdc/15Vdc output	-	455/20	465/30	
		24Vdc output	-	488/30	500/40	
Reflected Ripple Current	-		-	15	-	
Overshoot Voltage	3.3V Input		-0.7	-	9	VDC
	5Vdc Input		-0.7	-	11	
Overshoot Current	-		-	0.8	-	A
Input Filter Type	-		Capacitor Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Condition		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	-		See Regulation Curve			
Line Regulation	Input voltage change ±1%	3.3Vdc/5Vdc output	-	-	±1.5	%
		Other voltage output	-	-	±1.2	
Load Regulation	10%-100% load	3.3Vdc/5Vdc output	-	15	20	%
		Other voltage output	-	10	15	
Temperature Drift Coefficient	Full load		-	-	±0.03	%/℃
Short Circuit Protection	-		Continuous, Self-recovery			

General Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Insulation Withstand Voltage	Input-output, Test 1min, leakage current≤0.5mA	3000	-	-	VDC
Insulation Resistance	Input-output, Insulation Voltage 500VDC	1000	-	-	MΩ
Isolation Capacitor	Input-output, 100KHz/0.1V	-	20	-	PF
Operating Temperature	Temperature≥105℃,see Temperature Derating Curve	-50	-	115	℃

Case Rising Temperature	Test Environment Temperature 25℃	-	15	-	
Storage Temperature	-	-55	-	135	
Reflow Temperature	Peak Value Temperature 270℃℃≤Tc≤280℃, Only 1 time over Oven; Peak Value Temperature Tc≤270℃, only 3 times over Oven				
Storage Humidity	No condensing	-	-	95	%RH
Switching Frequency	Full load, Input Standard Voltage	-	200	-	KHz
MTBF	MIL-HDBK-217F@25℃	3000			Khours

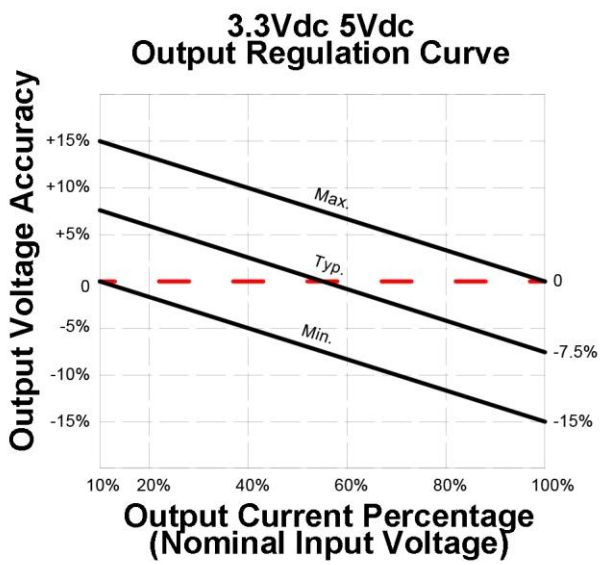
Material Characteristics

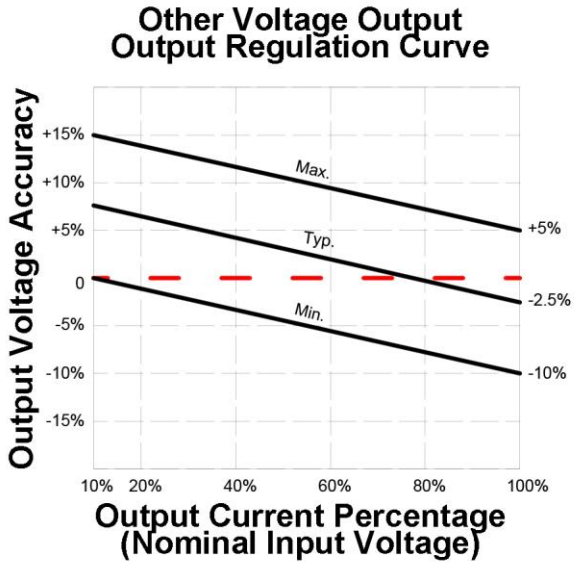
Case Material		Black flame-retardant heat-resistant plastic (UL94V-0)
Packing Dimension	SMD Package	12.7X11.20X7.25 mm
Product Weight		1.4g (TYP.)
Cooling Method		Natural air cooling

EMC Characteristic

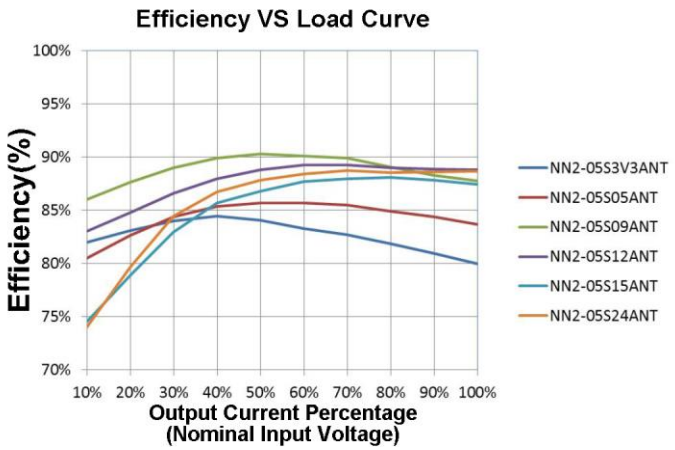
EMI	CE	CISPR32/EN55032 CLASS B (See EMC Recommended Circuit below)
	RE	CISPR32/EN55032 CLASS B (See EMC Recommended Circuit below)
EMS	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±8kV perf. Criteria B

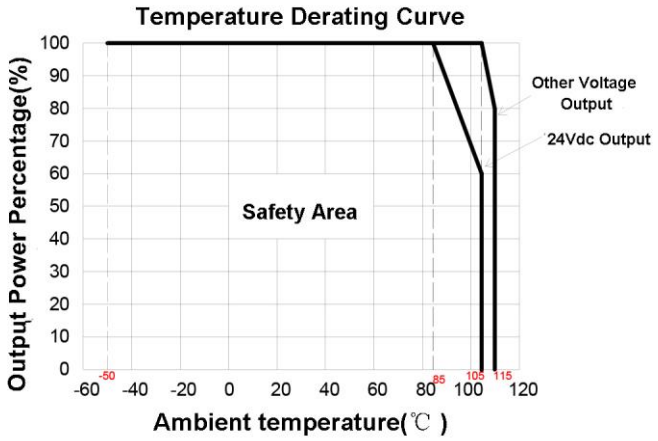
Output Voltage Regulation Curve





Product Character Curve

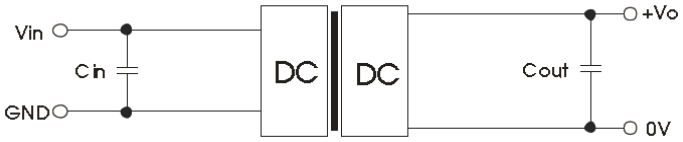




Application Circuit

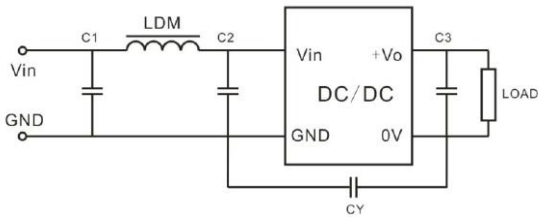
1. Typical Application

In order to ensure the input/output ripple and noise decreased, capacitor filter net could be connected to input and output side, application circuit as below photo 3; choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance.



Note 1: Cin is 4.7uF/50V, Cout is 10uF/50V

2. EMC Typical Recommended Circuit



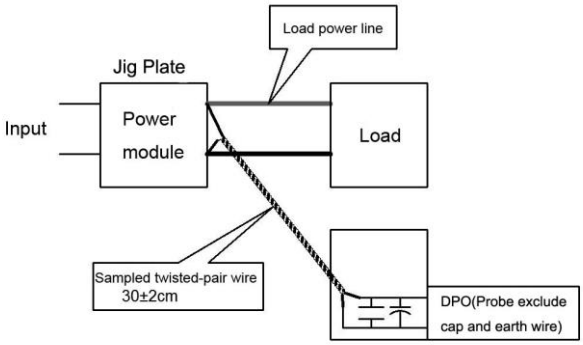
Note 2:C1,C2 is 4.7uF/50V, LDM is 6.8uH, CY is 1uH/250Vac, for C3, please refer to the Typical Circuit.

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

1).12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

2). Ripple& Noise Test Method:

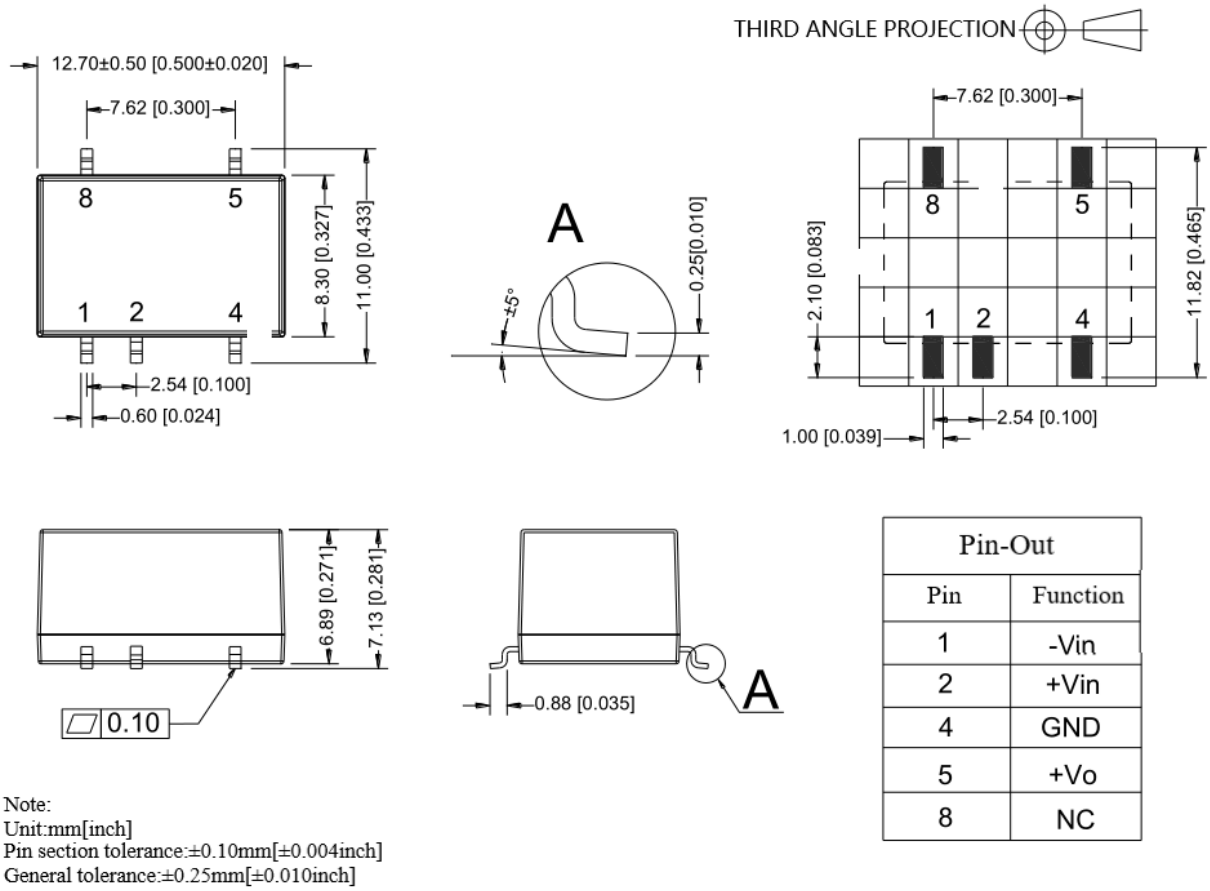
Input terminal connect to power supply, output terminal connect to electronic load through jig plate. Use 30cm±2 cm sampling line. Power line selected from corresponding diameter wire with insulation according to the flow of output current.



4.Output Load Requirement

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 actual using power and the power of the resistor should be more than 10% rated power)

Dimension

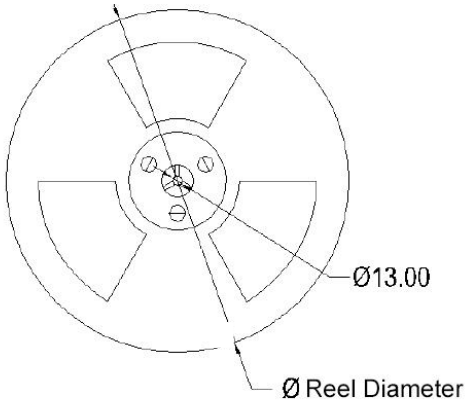


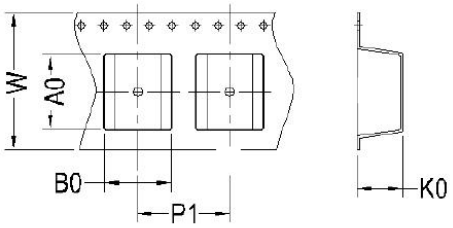
Pin-Out	
Pin	Function
1	-Vin
2	+Vin
4	GND
5	+Vo
8	NC

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

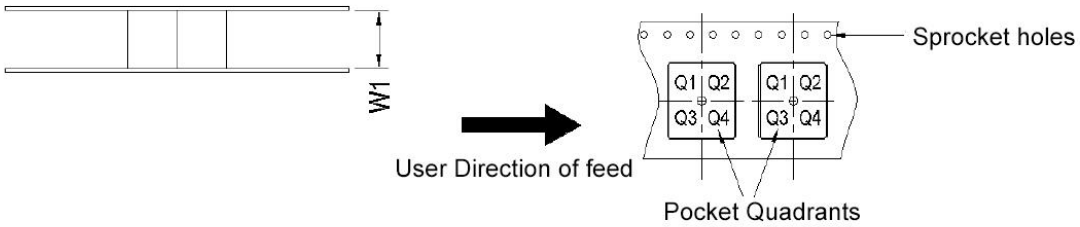
Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

Packing





Quadrant assignments for Pin 1 orientation in tape



Device	Package Type	PIN	SPQ	Reel Diameter (mm)	Reel Width W1(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	PIN1 Quadrant
NN2-XXSXXANT	SMD	5	500	330	24.5	13.1	11.7	7.5	16.0	24	Q1

Note:

1. If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in this datasheet;
2. The maximum capacitive load is tested under nominal input voltage range and full load condition;
3. Unless otherwise specified, data in this datasheet are tested under conditions of **Ta=25℃**, **humidity<75%** when inputting nominal voltage and outputting rated load(pure resistance load);
4. All index testing methods in this datasheet are based on our Company's corporate standards.
5. We can provide customized product service;