

Typical Features

- ◆ Fixed input voltage, Isolated & unregulated, Output power 3W
- ◆ Efficiency up to 85% (Typ.)
- ◆ Mini size SIP packaging
- ◆ Isolation Voltage 3000VDC
- ◆ Continuous Short-Circuit Protection, Self-recovery
- ◆ Operating Temperature from -40°C to +105°C
- ◆ Plastic Case, flame class UL94 V-0



Test Condition: Unless otherwise specified, all parameter values had been tested at nominal input voltage, pure resistive rated load, and at room temperature 25°C.

Application Fields

This series of products can be widely used in instrumentation, communications, pure digital circuits, general low-frequency analog circuits, relay drive circuits, data switching circuits, etc.

Selection Guide

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @Nominal Voltage		Max. Capacitive Load	Efficiency (%) @full load/nom. voltage	
		Nom.	Range	Vo (VDC)	Io(mA) Max/Min	Full Load	No Load	uF	Min	Typ.
CE	NN3-05S05C3N	5	4.5-5.5	5	600/60	665	12	1200	80	83
-	NN3-05S09C3N			9	333/33	665	18	560	80	83
-	NN3-05S12C3N			12	250/30	650	18	560	80	83
-	NN3-05S15C3N			15	200/20	650	20	560	80	83
-	NN3-05S24C3N			24	125/13	680	20	470	80	83
-	NN3-12S05C3N	12	10.8- 13.2	5	600/60	295	12	1200	80	83
-	NN3-12S09C3N			9	333/33	295	12	560	80	83
-	NN3-12S12C3N			12	250/30	290	12	560	81	84
-	NN3-12S15C3N			15	200/20	285	12	560	80	83
	NN3-12S20C3N			20	150/15	285	12	560	80	83
	NN3-12S24C3N			24	125/13	285	12	470	80	83
-	NN3-15S15C3N	15	13.5-16.5	15	200/20	248	12	560	80	83
-	NN3-24S05C3N	24	21.6-26.4	5	600/60	148	8	1200	80	83
-	NN3-24S09C3N			9	333/33	148	8	560	80	83
-	NN3-24S12C3N			12	250/30	138	8	560	81	84
-	NN3-24S15C3N			15	200/20	135	8	560	82	85
	NN3-24S24C3N			24	125/13	135	8	470	81	84

Note 1: Max. Capacitive Load is the maximum output capacitance allowed at full load startup; exceeding this may cause startup failure.

Note 2: Efficiency is measured at nominal input voltage and rated load.

Note 3: This list is for reference only. For products not listed, please contact our sales department.

Input Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Input Inrush Voltage (1Sec max.)	3.3Vdc input	-0.7	-	7	VDC
	5Vdc input	-0.7	-	9	VDC
	9Vdc input	-0.7	-	12	VDC
	12Vdc input	-0.7	-	18	VDC
	15Vdc input	-0.7	-	21	VDC
	24Vdc input	-0.7	-	30	VDC
Input Filter	Capacitor Filter				
Hot Plug	N/A				

Output Specifications

Item	Operating Condition		Min.	Typ.	Max.	Unit
Output Power			0.3	--	3	W
Output Voltage Accuracy	Refer to the Output Voltage Deviation Graph (Figure 1)					
Load Regulation	10% -100% load	3.3Vdc output	--	15	20	%
		Others	--	10	15	
Line Voltage Regulation	Input voltage change $\pm 1\%$	3.3Vdc output	--	--	1.5	--
		Others	--	--	1.2	
Temp. Drift Coefficient	100% Load		--	--	± 0.03	%/ $^{\circ}\text{C}$
Ripple & Noise	0%-100% Load, 20MHz Bandwidth	Others	-	80	150	mVp-p
		24Vdc output	-	100	150	mVp-p
Short Circuit Protection	Continuous, self-recovery					
Note: Ripple & noise are measured by the twisted-pair method. Refer to the "Ripple & Noise Test Instruction" section for details.						

General Specifications

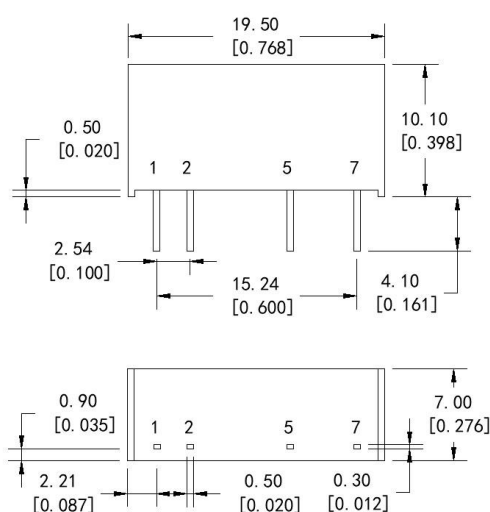
Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	Nominal input voltage, full load	--	260	--	KHz
Operating Temperature	Refer to the Temperature Derating Graph (Figure 2)	-40	--	+105	$^{\circ}\text{C}$
Storage Temperature	/	-55	--	+125	
Case temperature rise	Within Derating Curve	--	25 $^{\circ}$	--	
Lead Soldering Temp.	1.5mm from the case, 10S	--	--	300	
Relative Humidity	No condensing	5	--	95	%RH
Isolation Voltage	I/P-O/P, test 1 minute, leakage current $< 1\text{mA}$	3000	--	--	VDC
Insulation Resistance	I/P-O/P, @ 500VDC	1000	--	--	M Ω
Isolation Capacitor	I/P-O/P, 100KHz/0.1V	--	20	--	pF

Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z				
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Case Material	Plastic in Black, flame class UL94-V0				
Unit Weight	2.5g (Typ.)				
Cooling Method	Natural air				
Packing	Tube size (525x18x10mm)		25PCS/Tube		
	Carton size (542x110x155mm)		2000PCS/Carton (Total 80 Tubes)		
Unit Dimensions	L x W x H	19.50× 7.00 × 10.10 mm		0.768 × 0.276 × 0.398 inch	

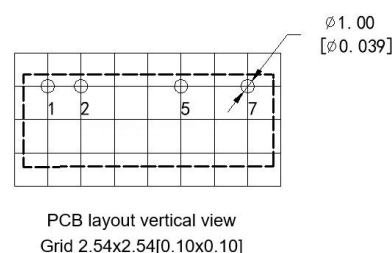
EMC Performance

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 Air±8kV / Contact±6kV Perf.Criteria B

Mechanical Dimensions



Mechanical Dimensions



Unit: mm[inch]
Pin Grid Pitch: 2.54mm×2.54mm
Pin section tolerance $\pm 0.10\text{mm}$ [± 0.004 inch]
General tolerance $\pm 0.50\text{mm}$ [± 0.020 inch]

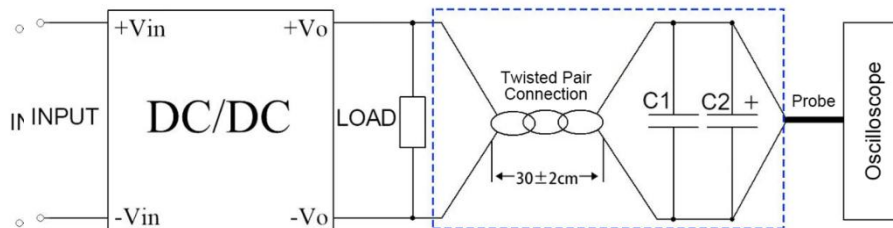
Recommended PCB Layout (Top View)

Pin Function Description

Pin No.	1	2	3	4	5	6	7
Single	+Vin	GND	NP	NP	-Vo	NP	+Vo
output(S)	Positive Input	Input Ground	No Pin	No Pin	Negative Output	No Pin	Positive Output

Note: If pin definitions differ from the selection manual, the labels on the actual product shall prevail.

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



Ripple & Noise Measurement:

Measured with a 20MHz bandwidth oscilloscope using a 100MHz probe (with cap and ground lead removed). Two capacitors (0.1μF ceramic and 10μF high-frequency electrolytic) are connected in parallel at the probe tip. The oscilloscope is set to Sample mode using a #12 twisted pair wire.

Test Setup:

Connect the input to the power source and the output to an electronic load via a fixture. Samples are taken directly from the output port using a 30cm ± 2cm sampling cable. Power cables should be insulated and sized according to the output current.

Application Notes:

1. Max. Capacitive Load: Measured under pure resistive full load conditions.
2. Minimum Load: A minimum 10% load or a > 100μF high-frequency low-ESR electrolytic capacitor is recommended; otherwise, output ripple and noise may increase.
3. Custom Solutions: We provide total power solutions and customized products. For further information, please contact our technical support team.

Product Characteristics Curves

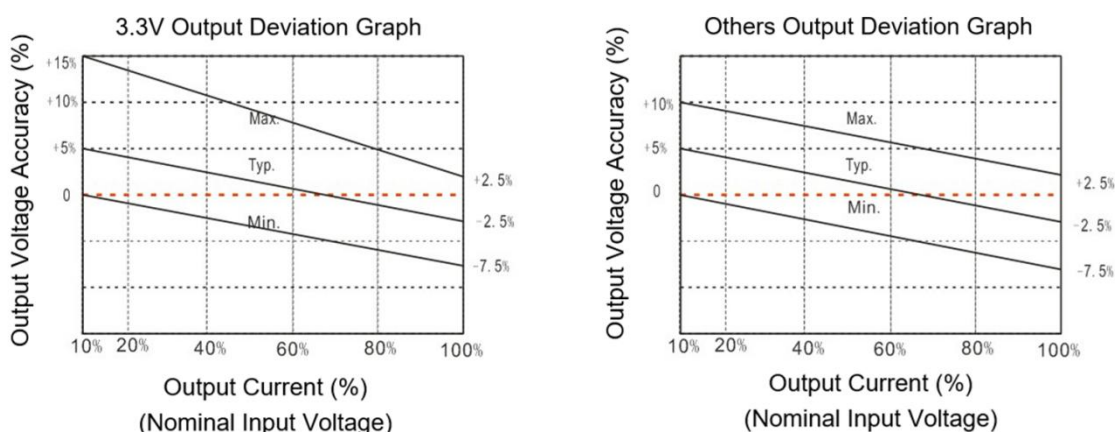


Figure 1

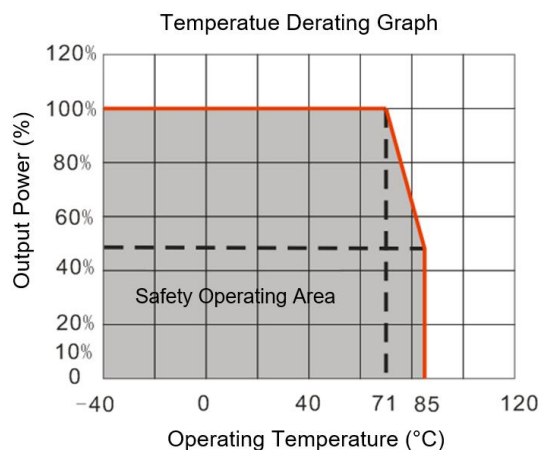
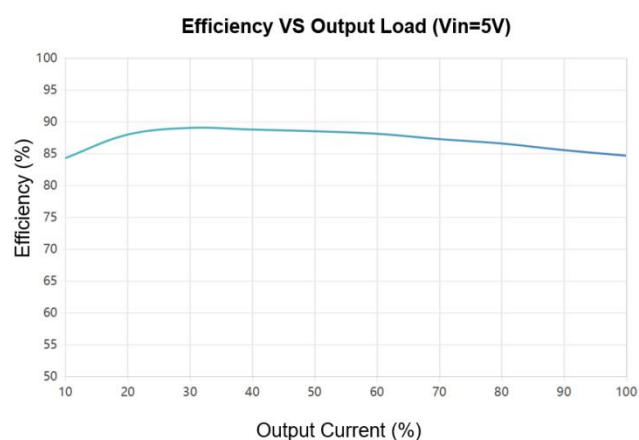
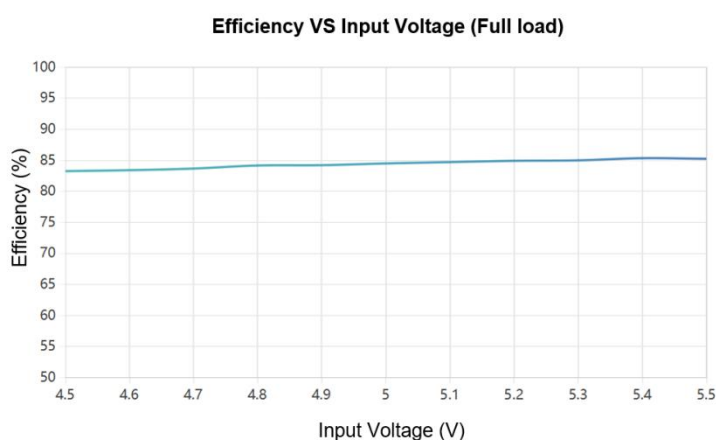


Figure 2



Recommended Circuits for Application

1. Output load requirements

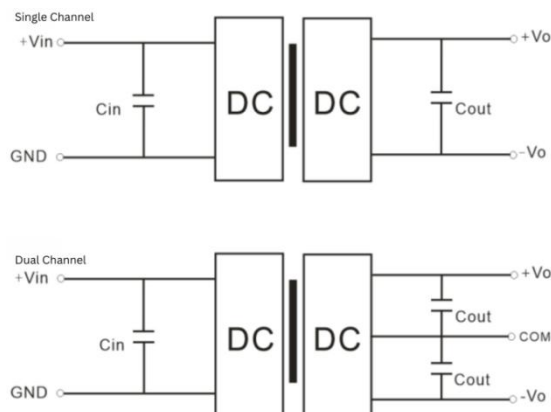
a. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance equal to 10% nominal load.

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

To effectively reduce input/output ripple and noise, an external capacitor filter network can be connected (see the application circuit below). Ensure appropriate capacitance is selected; excessive capacitance may hinder startup. For safe and reliable operation, refer to Table 1 for recommended maximum capacitive loads.

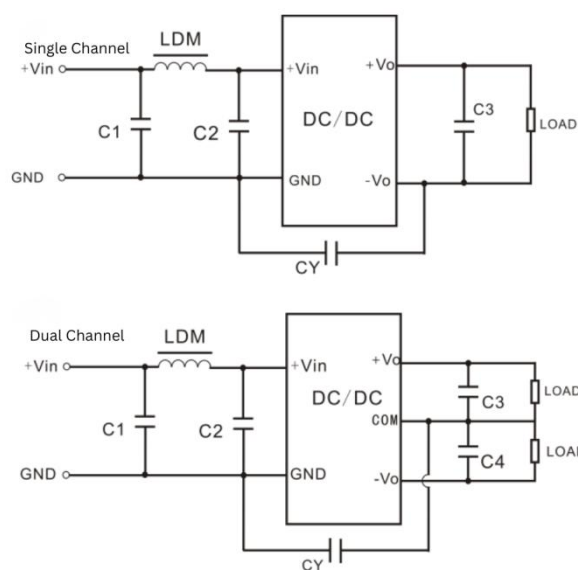
➤ Recommended EMC Circuit



Recommended Capacitive Load Values Table (Table 1)

Vin Vdc	Cin	Single Vout (Vdc)	Cout	Dual Vout (Vdc)	Cout
3.3	10uF/16V	3.3	10uF/16V	±3.3	4.7μF/16V
5	10μF/16V	5	10μF/16V	±5	4.7μF/16V
12	2.2μF/25V	9	2.2μF/25V	±9	2.2μF/25V
15	2.2μF/25V	12	2.2μF/25V	±12	1μF/50V
24	1μF/50V	15	2.2μF/25V	±15	1μF/50V
/	/	24	1μF/50V	±24	470nF/50V

➤ EMC Typical Recommended Circuit

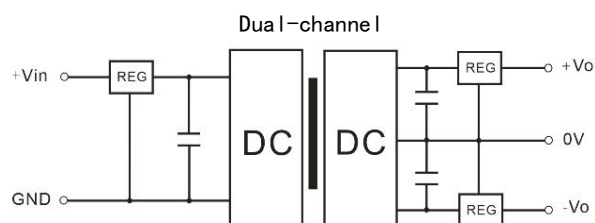
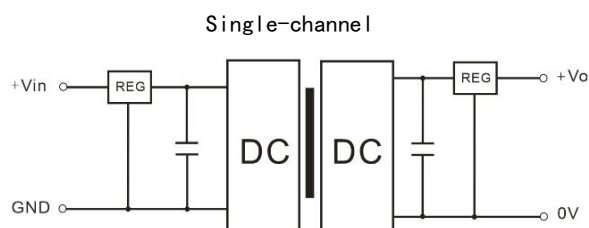


Input Voltage (Single Channel)		3.3/5Vdc	9/12/15/24Vdc
EMI	C1/C2	4.7μF/16V	4.7μF/50V
	CY	270pF/3KVdc	270pF/3KVdc
	C3	Refer to the Cout parameter in Table 1	Refer to the Cout parameters in Table 1
	LDM	6.8μH	6.8μH

Input Voltage (Dual Channel)		3.3/5Vdc	9/12/15/24Vdc
EMI	C1/C2	4.7μF/16V	4.7μF/50V
	CY	270pF/3KVdc	270pF/3KVdc
	C3	Refer to the Cout parameter in Table 1	Refer to the Cout parameters in Table 1
	LDM	6.8μH	6.8 μH

➤ Output voltage regulation and overvoltage protection

The simplest device for output voltage regulation, overvoltage, and overcurrent protection involves connecting a linear voltage regulator with thermal protection in series at the input or output, along with a Capacitor Filter (see figure below). Recommended values for filter capacitors are detailed in (Table 1). Select the linear voltage regulator based on actual operating voltage and current requirements; alternatively, use our FW series products.



Notes:

1. This product cannot be used in parallel and does not support Hot Plug;
2. The product must be used within its specified parameters; otherwise, permanent damage may occur.
3. When operating below the minimum required load, product performance cannot be guaranteed to meet all Performance Specifications outlined in this manual;
4. If the product operates beyond its load range, compliance with all Performance Specifications in this manual cannot be guaranteed;
5. Unless otherwise specified, all data above is measured at Ta=25°C, humidity <75%, Nominal Input Voltage, and rated output load (resistive load);
6. All testing methods for the above specifications comply with our company's standards;
7. The Performance Specifications listed above apply to the product models specified in this manual. Non-standard models may exceed certain requirements; please contact our technical personnel directly for specific details.
8. Customized products are available upon request.

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