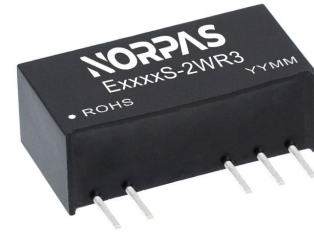


FEATURES

1. Continuous short-circuit protection
2. No-load input current as low as 8mA
3. Operating ambient temperature range: -40°C to +105°C
4. High efficiency up to 86%
5. High power density
6. I/O isolation test voltage 3k VDC
7. Industry standard pin-out



**3 years
Warranty**

Selection Guide

Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load*(μ F) Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
E0503S-2WR3	5 (4.5-5.5)	\pm 3.3	\pm 303/ \pm 30	71/75	1200
E0505S-2WR3		\pm 5	\pm 200/ \pm 20	80/84	1200
E0509S-2WR3		\pm 9	\pm 111/ \pm 11	81/85	470
E0512S-2WR3		\pm 12	\pm 83/ \pm 8	81/85	220
E0515S-2WR3		\pm 15	\pm 67/ \pm 7	82/86	220
E0524S-2WR3		\pm 24	\pm 42/ \pm 4	82/86	100
F0503S-2WR3		3.3	400/40	74/78	2400
F0505S-2WR3		5	400/40	80/84	2400
F0507S-2WR3		7.2	278/28	80/84	1000
F0509S-2WR3		9	222/22	81/85	1000
F0512S-2WR3		12	167/17	81/85	560
F0515S-2WR3		15	133/13	82/86	560
F0524S-2WR3		24	83/8	82/86	220
E1203S-2WR3		12 (10.8-13.2)	\pm 3.3	\pm 303/ \pm 30	71/75
E1205S-2WR3	\pm 5		\pm 200/ \pm 20	76/80	1200
E1207S-2WR3	\pm 7.2		\pm 139/ \pm 13	76/80	470
E1209S-2WR3	\pm 9		\pm 111/ \pm 11	78/82	470
E1212S-2WR3	\pm 12		\pm 83/ \pm 8	79/83	220
E1215S-2WR3	\pm 15		\pm 67/ \pm 7	79/83	220
E1224S-2WR3	\pm 24		\pm 42/ \pm 4	79/83	100
F1205S-2WR3	5		400/40	78/82	2400
F12X6S-2WR3	6.4		312/31	78/82	1000
F1209S-2WR3	9		222/22	78/82	1000
F1212S-2WR3	12		167/17	80/84	560
F1215S-2WR3	15		133/13	81/85	560
F1224S-2WR3	24		83/8	82/86	220

E1505S-2WR3	15 (13.5-16.5)	±5	±200/±20	76/80	1200
E1515S-2WR3		±15	±67/±7	78/82	220
F1505S-2WR3		5	400/40	76/80	2400
F1509S-2WR3		9	222/22	76/80	1000
F1512S-2WR3		12	167/17	77/81	560
F1515S-2WR3		15	133/13	77/81	560
F1524S-2WR3		24	83/8	77/81	220
E2403S-2WR3	24 (21.6-26.4)	±3.3	±303/±30	70/76	1200
E2405S-2WR3		±5	±200/±20	74/80	1200
E2407S-2WR3		±7.2	±139/±13	74/80	470
E2409S-2WR3		±9	±111/±11	75/81	470
E2412S-2WR3		±12	±83/±8	77/83	220
E2415S-2WR3		±15	±67/±7	77/83	220
E2424S-2WR3		±24	±42/±4	77/83	100
F2403S-2WR3		3.3	400/40	70/76	2400
F2405S-2WR3		5	400/40	74/80	2400
F2407S-2WR3		7.2	278/27	74/80	1000
F2409S-2WR3		9	222/22	75/81	1000
F2412S-2WR3		12	167/17	78/84	560
F2415S-2WR3		15	133/13	80/86	560
F2418S-2WR3		18	111/11	80/86	220
F2424S-2WR3		24	83/8	80/86	220

Note: * The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load / no-load)	5VDC input	3.3VDC output	-	534/8	564/--	mA
		5VDC/7.2VDC output	-	477/8	500/--	
		9VDC/12VDC output	-	471/8	494/--	
		15VDC/24VDC output	-	466/8	488/--	
	12VDC input	3.3VDC output	-	222/8	235/--	
		5VDC/7.2VDC output	-	208/8	219/--	
		9VDC output	-	203/8	214/--	
		12VDC/15VDC/24VDC output	-	201/8	211/--	
	15VDC input	5VDC/9VDC output	-	167/8	176/--	
		12VDC/15VDC/24VDC output	-	165/8	173/--	
	24VDC input	3.3VDC output	-	110/8	119/--	
		5VDC/7.2VDC output	-	104/8	112/--	
		9VDC output	-	103/8	111/--	
		12VDC output	-	99/8	107/--	
		15VDC/18VDC/24VDC output	-	97/8	104/--	
	Reflected Ripple Current*		-	15	-	
Surge Voltage (1sec. max.)	5VDC input	-0.7	-	9	VDC	
	12VDC input	-0.7	-	18		
	15VDC input	-0.7	-	21		
	24VDC input	-0.7	-	30		
Input Filter		Capacitance filter				
Hot Plug		Unavailable				

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Voltage Accuracy			See output regulation curve (Fig. 1)				
Linear Regulation	Input voltage change: ±1%	3.3VDC output	-	-	±1.5	-	
		Others	-	-	±1.2		
Load Regulation	10%-100% load	5VDC input	3.3VDC output	-	10	20	%
			5/7.2VDC output	-	8	15	
			9/12/15 output	-	7	10	
			24VDC output	-	5	10	
		12/15/24VDC input	3.3VDC output	-	15	20	
			5VDC output	-	7	15	
			6.4VDC output	-	10	15	
			7.2VDC output	-	6	15	
			9/12VDC output	-	5	10	
			15VDC output	-	4	10	
Ripple & Noise*	20MHz bandwidth	5V input	-	75	200	mVp-p	
		12/15/24V input	-	75	180		
Temperature Coefficient	Full load		-	±0.02	-	%/°C	
Short-circuit Protection			Continuous, self-recovery				

Note: * The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.	3000	-	-	VDC	
Insulation Resistance	Input-output resistance at 500VDC	1000	-	-	MΩ	
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	-	20	-	pF	
Operating Temperature	Derating when operating temperature ≥ 85°C (see Fig. 2)	-40	-	105	°C	
Storage Temperature		-55	-	125	°C	
Case Temperature Rise	Ta=25°C	-	25	-		
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	300		
Storage Humidity	Non-condensing	5	-	95	%RH	
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z				
Switching Frequency	Full load, nominal input voltage	5V input	-	220	-	kHz
		12/15/24V input	-	260	-	
MTBF	MIL-HDBK-217F @ 25°C	3500	-	-	k hours	

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 7.05 x 10.16 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

Note: Refer to Fig. 4 for recommended circuit test

Typical Characteristic Curves

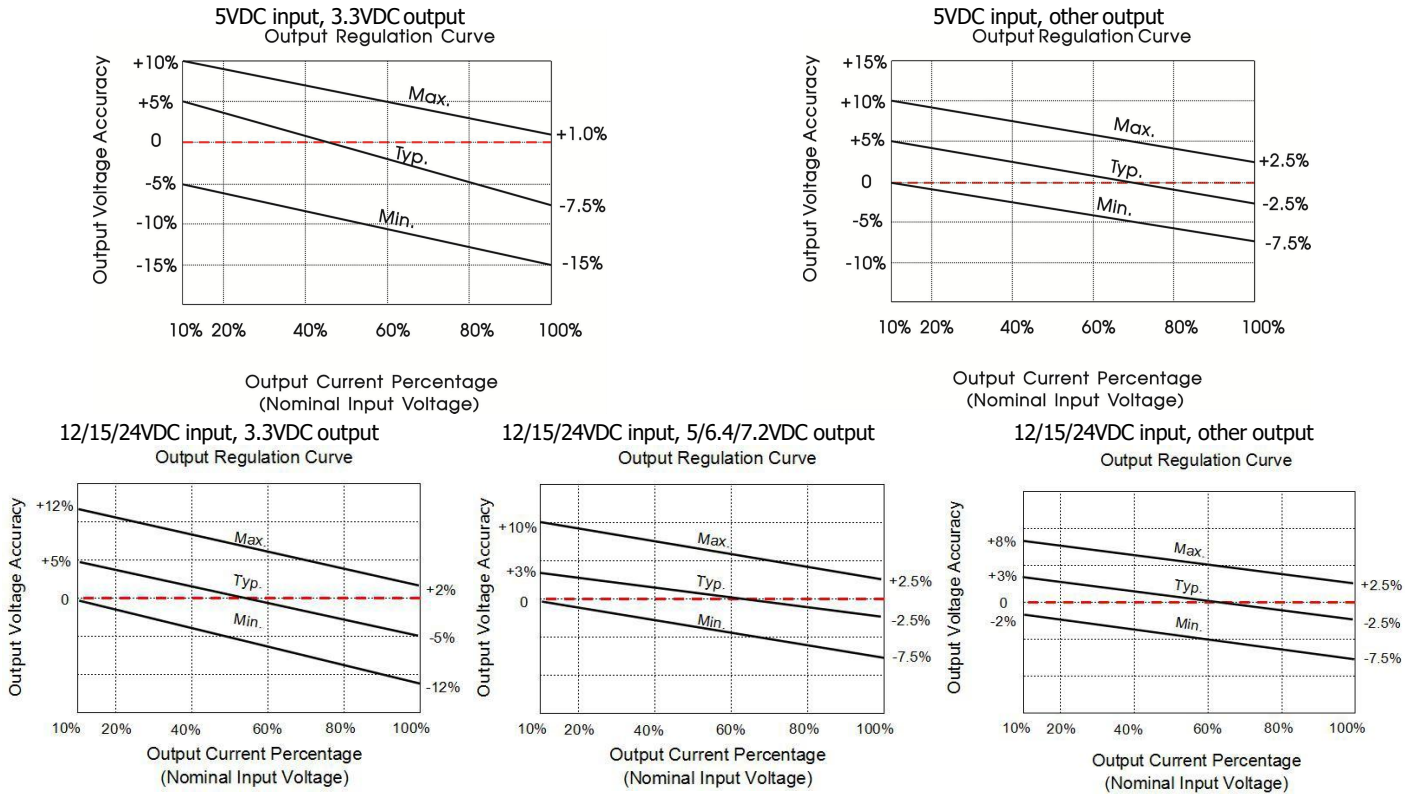


Fig. 1

Temperature Derating Curve

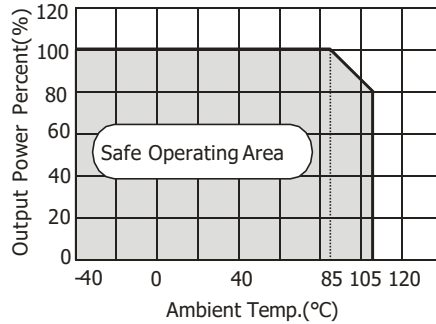
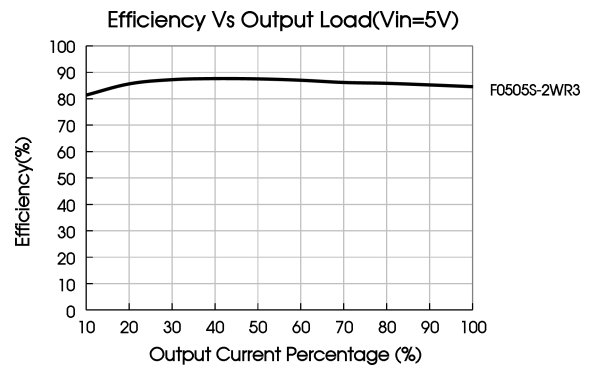
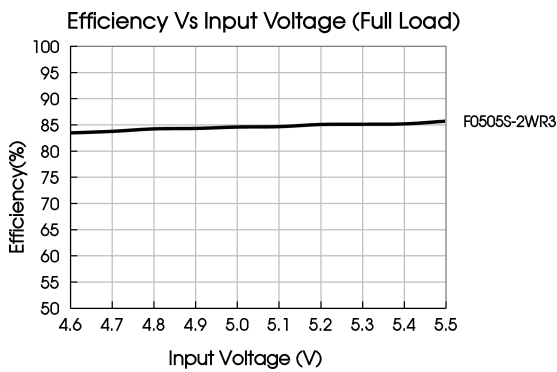


Fig. 2



Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

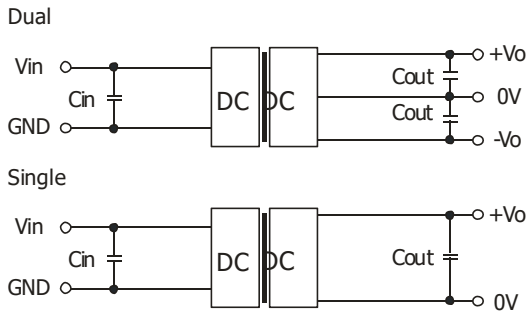


Fig. 3

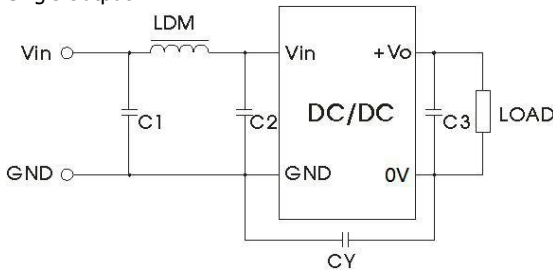
Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10µF/16V	3.3VDC	10µF/16V	±3.3VDC	4.7µF/16V
12VDC	2.2µF/25V	5VDC	10µF/16V	±5VDC	4.7µF/16V
15VDC	2.2µF/25V	6.4VDC	4.7µF/16V	±7.2VDC	2.2µF/25V
24VDC	1µF/50V	7.2VDC	2.2µF/25V	±9VDC	2.2µF/25V
-	-	9VDC	2.2µF/25V	±12VDC	1µF/25V
-	-	12VDC	2.2µF/25V	±15VDC	1µF/25V
-	-	15VDC	1µF/25V	±24VDC	0.47µF/50V
-	-	18VDC	1µF/50V	-	-
-	-	24VDC	1µF/50V	-	-

Note: *The capacitor value of the positive and the negative output is identical.

2. EMC compliance circuit

Single Output



Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7µF /16V	4.7µF /50V
	CY	270pF/4kV	
	C3	Refer to Cout in Fig. 3	
	LDM	6.8µH	

Dual Output

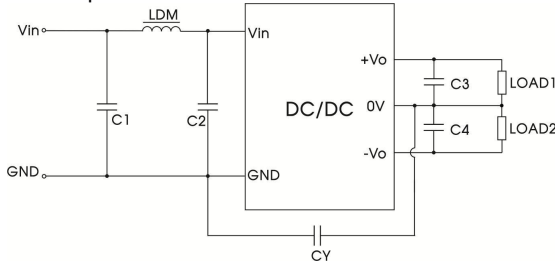
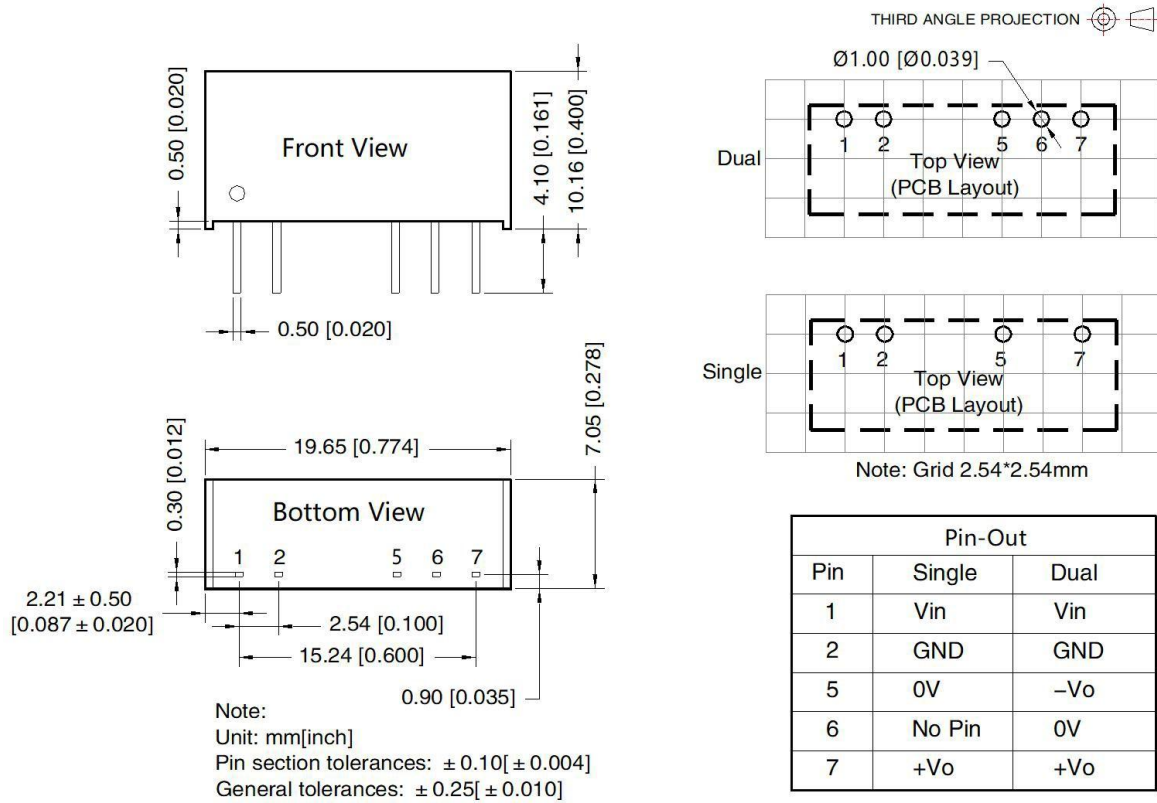


Fig. 4

Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7µF /16V	4.7µF /50V
	CY	270pF/4kV	
	C3/C4	Refer to Cout in Fig. 3	
	LDM	6.8µH	

Dimensions and Recommended Layout



Notes & Instructions

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;