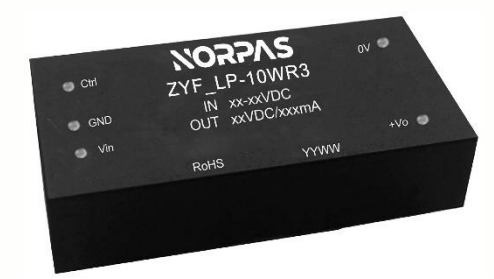
FEATURES

1. Ultra-wide 4:1 input voltage range
2. High efficiency up to 87%
3. No-load power consumption as low as 0.12W
4. I/O isolation test voltage:3kVDC
5. Input under-voltage protection, output short-circuit, over-voltage, over-current protection
6. Operating ambient temperature range: -40℃ to +85℃
7. Meets CISPR32/EN55032 CLASS A, without extra components
8. Industry standard pin-out



RoHS CE 3 years Warranty

Selection Guide

Part No.	Input Voltage (VDC)		Output		Full Load Efficiency(%) Min./Typ.	Capacitive Load (μF)Max.
	Nominal (Range)	Max.	Voltage (VDC)	Current (mA) Max./Min.		
ZYF2403LP-10WR3	24 (9-36)	40	3.3	2400/0	76/78	5400
ZYF2405LP-10WR3			5	2000/0	80/82	5400
ZYF2409LP-10WR3			9	1111/0	82/84	680
ZYF2412LP-10WR3			12	833/0	82/84	470
ZYF2415LP-10WR3			15	667/0	85/87	330
ZYF2424LP-10WR3			24	416/0	84/86	100
ZYF4803LP-10WR3	48 (18-75)	80	3.3	2400/0	77/79	5400
ZYF4805LP-10WR3			5	2000/0	80/82	5400
ZYF4812LP-10WR3			12	833/0	84/86	470
ZYF4815LP-10WR3			15	667/0	85/87	330
ZYF4824LP-10WR3			24	416/0	85/87	100

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage	3.3VDC output	--	423/5	434/12	mA
		Others	--	514/5	527/12	
	48VDC nominal input series, nominal input voltage	3.3VDC output	--	208/5	214/12	
		Others	--	254/5	260/12	
Reflected Ripple Current	24VDC nominal input series, nominal input voltage		--	40	--	
	48VDC nominal input series, nominal input voltage		--	30	--	
Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
	48VDC nominal input series		-0.7	--	100	
Start-up Voltage	24VDC nominal input series		--	--	9	
	48VDC nominal input series		--	--	18	
Input Under-voltage Protection	24VDC nominal input series		5.5	6.5	--	
	48VDC nominal input series		12	15.5	--	
Start-up Time	Nominal input voltage & constant resistance load		--	10	--	ms
Input Filter			Pi filter			
Hot Plug			Unavailable			
Ctrl*	Module on		Ctrl pin open or pulled high (3.5-12VDC)			
	Module off		Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off		--	5	10	mA
Note: * The Ctrl pin voltage is referenced to input GND.						

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy①	0% - 100% load		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
		Vo2	--	±0.5	±1.0	
Load Regulation②	5% - 100% load	Vo1	--	±0.5	±1	
		Vo2	--	±0.5	±1.5	
Cross Regulation	Dual outputs, Vo1 load at 50%, Vo2 load at range of 10% - 100%		--	--	±5	
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation			--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise③	20MHz bandwidth, 5% - 100% load		--	60	120	mV p-p
Over-voltage Protection	Input voltage range		110	130	160	%Vo
Over-current Protection			110	140	190	%Io
Short-circuit Protection			Continuous, self-recovery			
Note: ①Output voltage accuracy of ±5VDC output for 0% - 5% load is ±5% max;						

②Load regulation for 0% - 100% load increases to ±5%;
③Ripple & Noise at ≤5% load is 5%Vo max. 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	--	500	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	℃
Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency*	PWM mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours
Note:* Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.					

Mechanical Specifications

Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	51.50 × 26.50 × 12.00 mm
Weight	21.2g (Typ.)
Cooling method	Free air convection

EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig. 3-②for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig. 3-②for recommended circuit)	
EMC	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (see Fig. 3-①for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig. 3-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70%	perf. Criteria B

Typical Characteristic Curves

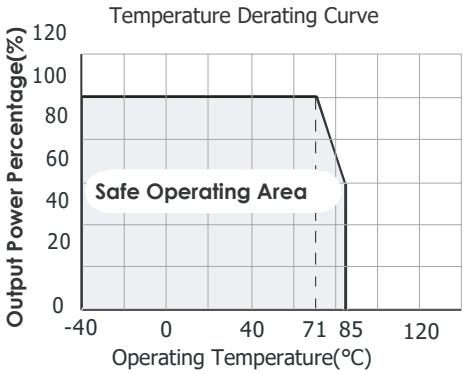
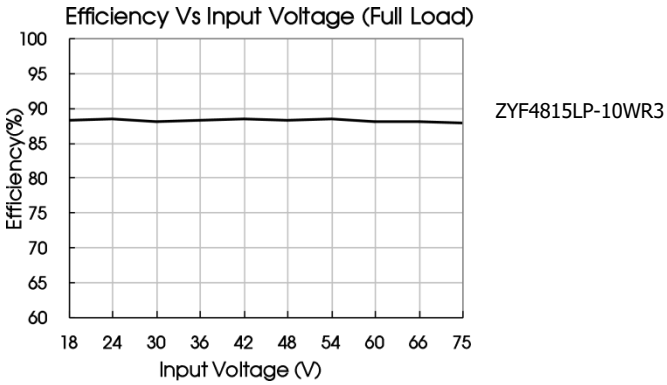
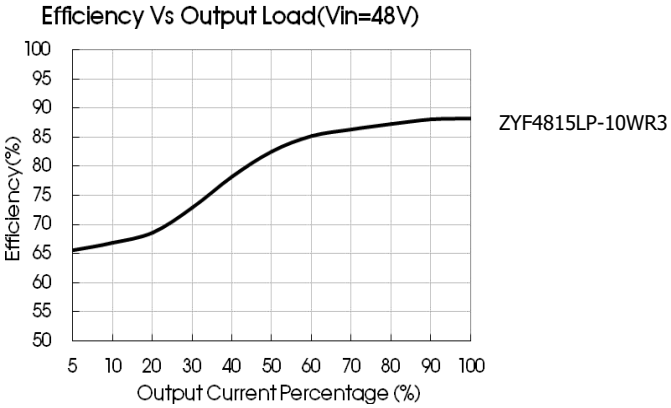


Fig. 1



ZYF4815LP-10WR3



ZYF4815LP-10WR3

Circuit Design and Application

1. **Typical application**

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

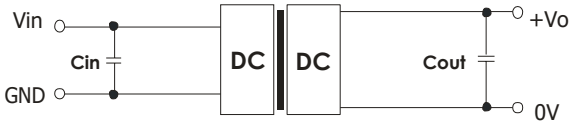


Fig. 2

Cin	Cout
10μF - 47μF/100V	10μF/63V

2. **EMC compliance circuit**

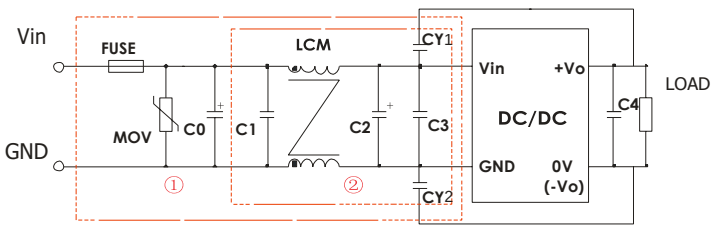


Fig. 3

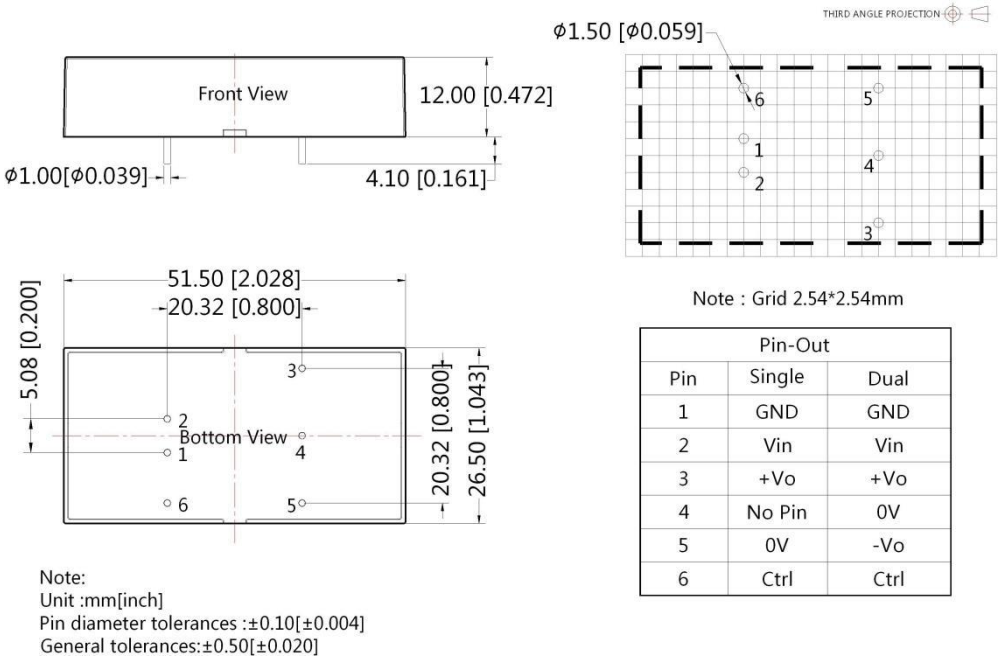
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

List of components:

Model	ZYF_LP-10WR3	
	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	680μF/100V
C1	1μF/50V	1μF/100V
C2	330μF/50V	330μF/100V
C3	4.7μF/50V	4.7μF/100V
LCM	4.7mH	6.8mH
C4	Refer to the Cout in Fig.2	
CY1/CY2	1nF/3KV	

3. The products do not support parallel connection of their output

Dimensions and Recommended Layout



Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo
6	Ctrl	Ctrl

Note:
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℃, 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;