



Typical Features

- ◆ Wide input voltage range (4:1), Output Power 30W
- ◆ Transfer Efficiency up to 91%
- ◆ Output super-fast start up
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Input under voltage, output over voltage, short circuit, over current protection
- ◆ Switching Frequency 280KHz
- ◆ Isolation Voltage 1500VDC
- ◆ Operating Temperature: -40°C~+105°C
- ◆ International standard pin-out



Application Field

PFD30-XXSXXA3R2 is a newly designed DIP 1X1 packed, 30W output power, ultra wide input range 4:1, low stand-by power consumption, isolated regulated output DC-DC converter, could be widely used for industrial control, instrument, communication, power electricity, internet of things field. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Typical Product List

Certificate	Part No	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Max. Capacitive Load(μF)	Ripple & Noise(mV) Typ./Max.	Efficiency (%)@nominal input, output full load	
		Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min			Min	Typ
-	PFD30-18S3V3A3R2	24	9-36	3.3	6000/0	10000	50/100	85	87
-	PFD30-18S05A3R2			5	6000/0	10000		86	88
-	PFD30-18S06A3R2			6	5000/0	8000		87	89
-	PFD30-18S09A3R2			9	3333/0	3000		88	90
-	PFD30-18S12A3R2			12	2500/0	2000		89	90
-	PFD30-18S15A3R2			15	2000/0	1500		89	90
-	PFD30-18S24A3R2			24	1250/0	750		88	90
-	PFD30-36S3V3A3R2	48	18-75	3.3	6000/0	10000	50/100	85	87
-	PFD30-36S05A3R2			5	6000/0	10000		87	88
-	PFD30-36S09A3R2			9	3333/0	3000		88	90
-	PFD30-36S12A3R2			12	2500/0	2000		89	91
-	PFD30-36S15A3R2			15	2000/0	1500		89	91
-	PFD30-36S24A3R2			24	1250/0	750		88	90



Note 1: "R" is with control pin and output adjustment pin together, "C" is for control function only, "-T" for adjustment function, "N" suffix mean no extra functions;

Note 2: Suffix "-H" is with heatsink, "-TH" for chassis mounting with heatsink, "TSH" for DIN-Rail mounting with heatsink, DIN-Rail width is: 35mm;

Note 3: Max capacitive load is, when the power supply is fully loaded, the max capacity could be connected to output, if exceed, the power supply cannot start-up;

Input Specification

Stand-by Consumption	Other Output @Nominal input	1W(TYP)
	24V Output @Nominal input	0.08 W(TYP)
Input Filter	π filter	
Input Under-Voltage Protection	PFD30-18SXXA3R2	7V(Typ)
	PFD30-36SXXA3R2	13V(Typ)
CTRL*	Module turn-on	CTRL suspended or TTL high level (3.3-12VDC)
	Module turn-off	CTRL connect to -Vin or low level (0-1.2VDC)
	Input current when switched off	2mA (TYP)

Note: *The voltage of the CTRL control pin is relative to the input pin -Vin.

Output Specification

Output Voltage Accuracy	Input voltage range, 0%~100% load	Vo	TYP:±1% ; MAX ±3%
Voltage Regulation	Nominal load, full voltage range	Vo	TYP:±0.2% ; MAX ±0.5%
Load Regulation	10% ~ 100% nominal load	Vo	TYP:±0.5% ; MAX ±1%
Ripple & Noise	20MHz bandwidth, twisted pair method		50mV Typ; 100mV max
Output Over-voltage Protection	120%~200%Vo		
Output Over-load Protection	110%~260%Io		
Output Short circuit Protection	Hiccup, Continuous, Self-recovery		
Dynamic Response	25% nominal load step change @nominal input	≤6V Output	±5% typ, ±8% max /500us
		Other Output	±3% typ, ±5% max /500us
Output Voltage Adjustment	Available(if with Trim pin) ±10% (Max)		

Note: *Ripple& Noise is tested by Twisted Pair Method.

General Specification

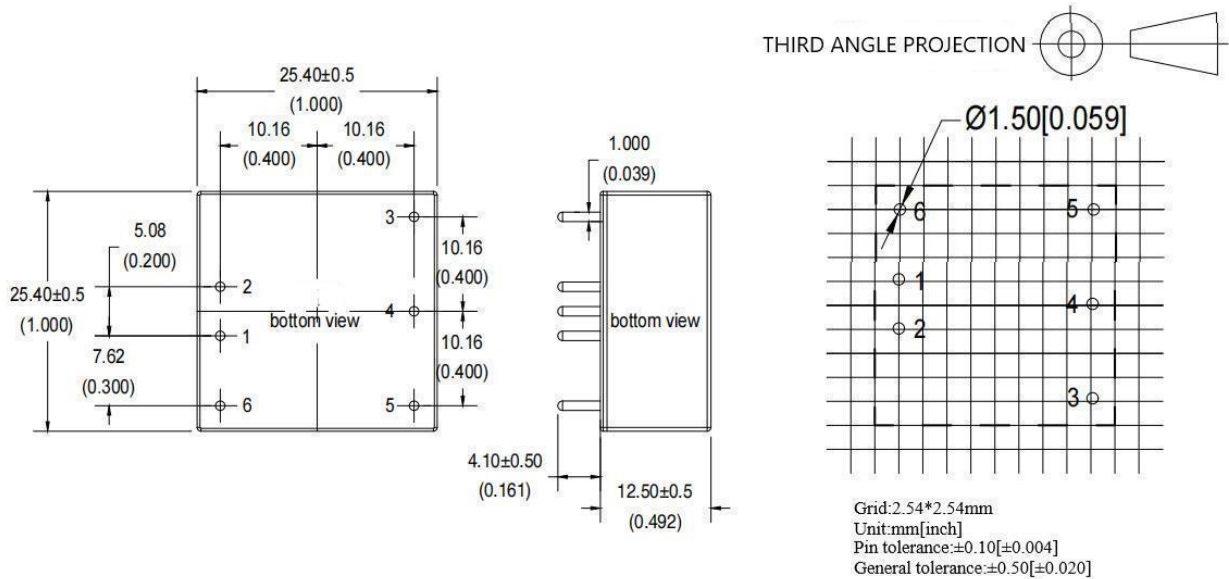
Switching Frequency	Typical	280KHz
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +105℃
Storage Temperature		-55℃ ~ +125℃
Relative Humidity	No condensing	5%~95%
Case Material		Aluminum Metal Case
Cooling Method		Free air convection

Isolation Voltage	Input to Output	1500Vdc ≤ 1mA / 1min
Insulation Resistance	Input to Output	500Vdc ≥ 1000MΩ
Isolation Capacitor	Input to Output	1nF@100kHz/0.1V
MTBF	MIL-HDBK-217F 25°C	1000K hours(Min)
Product Weight	Average	18g

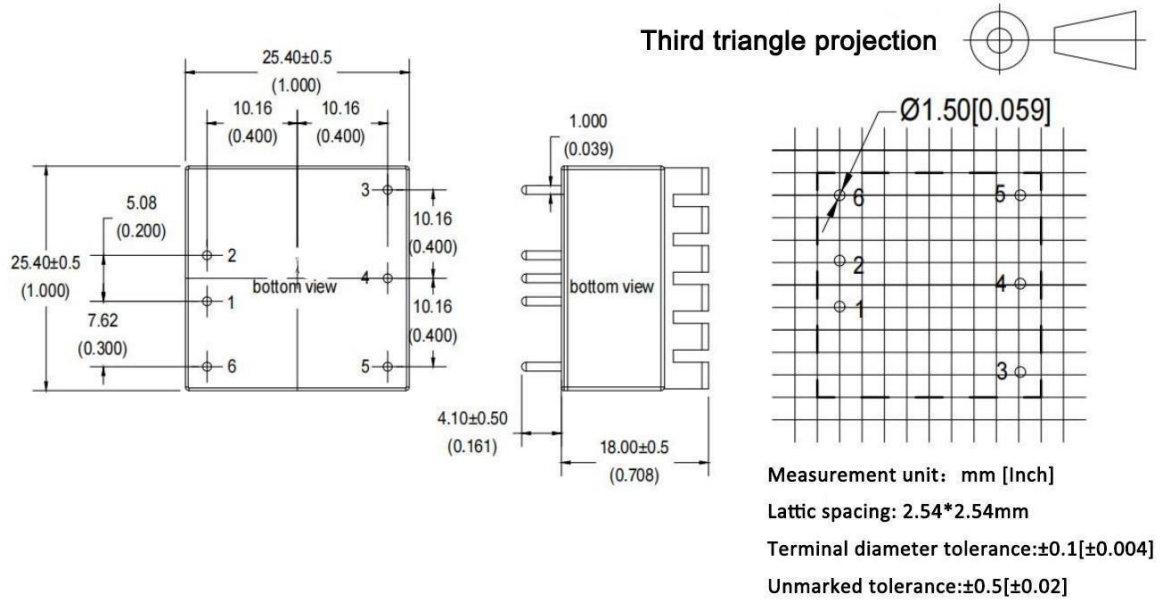
EMC Characteristics

Total Items		Sub Items	Test Standard	Class	
EMI		CE	CISPR22/EN55032	CLASS B	(see recommended circuit photo 3)
		RE	CISPR22/EN55032	CLASS B	(see recommended circuit photo 3)
EMS		RS	IEC/EN61000-4-3	10V/m	Perf.Criteria A
		CS	IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria A
		ESD	IEC/EN61000-4-2	Contact ±6KV	Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV	Perf.Criteria B (see recommended circuit photo 3)
		EFT	IEC/EN61000-4-4	±2KV	Perf.Criteria B (see recommended circuit photo 3)

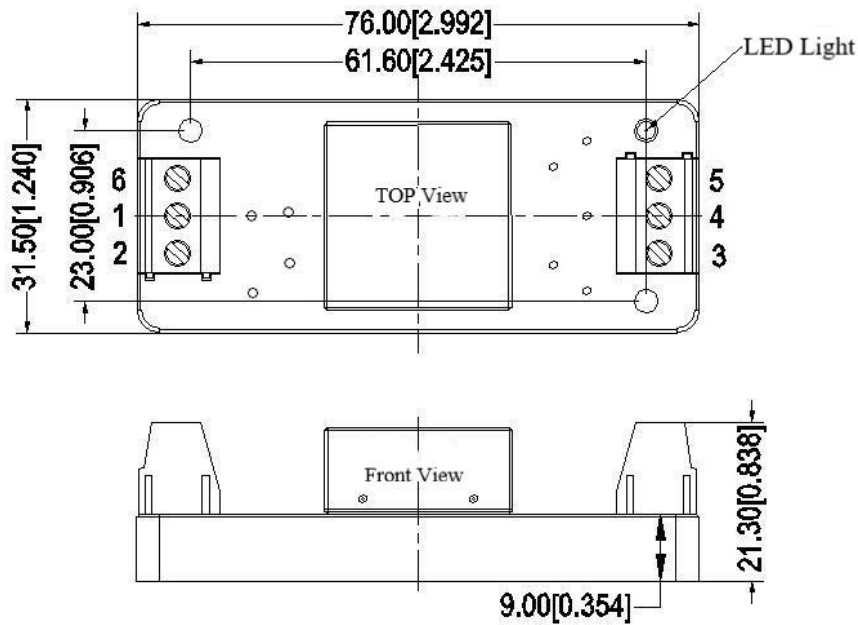
A3 Packing Dimension(Without Heat Sink)



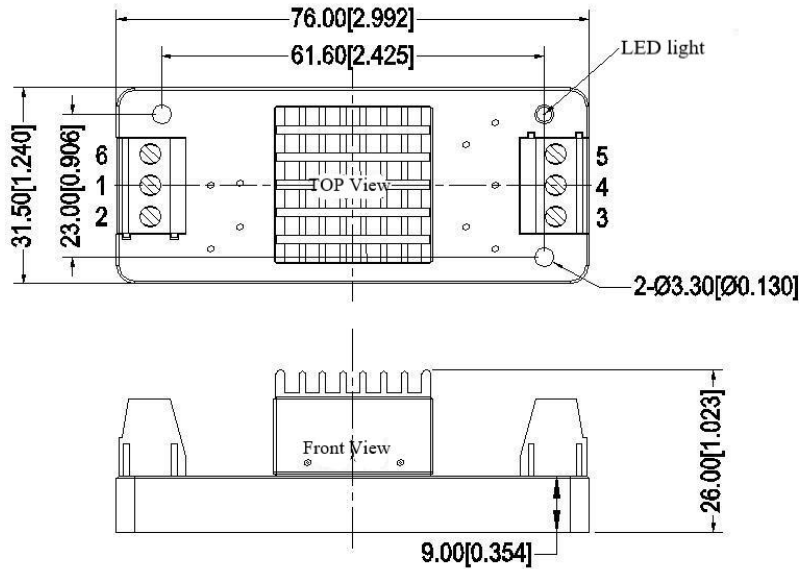
A3-H Packing Dimension (With Heat Sink)



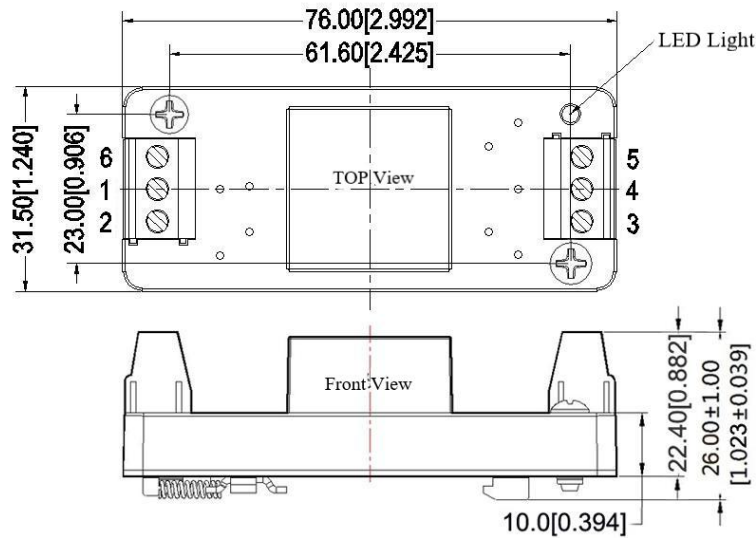
A3-T Packing Dimension (Without Heat Sink)



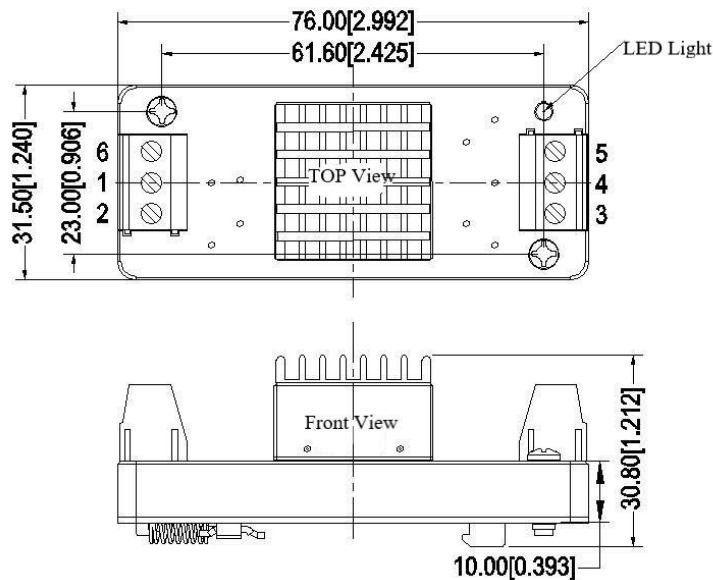
A3-TH Packing Dimension (With Heat Sink)



A3-TS Packing Dimension(Without Heat Sink)



A3-TSH Packing Dimension(With Heat Sink)



Packing Code	L x W x H
A3 (Without Heat Sink)	25.4X 25.4X12.5 mm
A3-H (With Heat Sink)	25.4X25.4X18.0mm
A3-T(Without Heat Sink)	76X31.5X21.3mm
A3-TH(With Heat Sink)	76X31.5X26.0mm
A3-TS (Without Heat Sink)	76X31.5X26mm
A3-TSH (With Heat Sink)	76X31.5X30.8mm

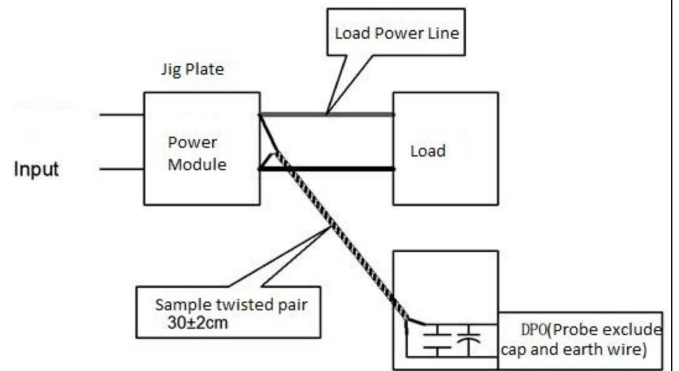
Pin Definition

Item	1	2	3	4	5	6
PFD30-XXSXXA3N2	-Vin	+ Vin	+ Vout	NP	GND	NP
PFD30-XXSXXA3C2	-Vin	+ Vin	+ Vout	NP	GND	Ctrl
PFD30-XXSXXA3T2	-Vin	+ Vin	+ Vout	Trim	GND	NP
PFD30-XXSXXA3R2	-Vin	+ Vin	+ Vout	Trim	GND	Ctrl

Ripple & Noise Test: (Parallel Line Test Method 20MHz bandwidth)

Test Method:

- 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.
- 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.



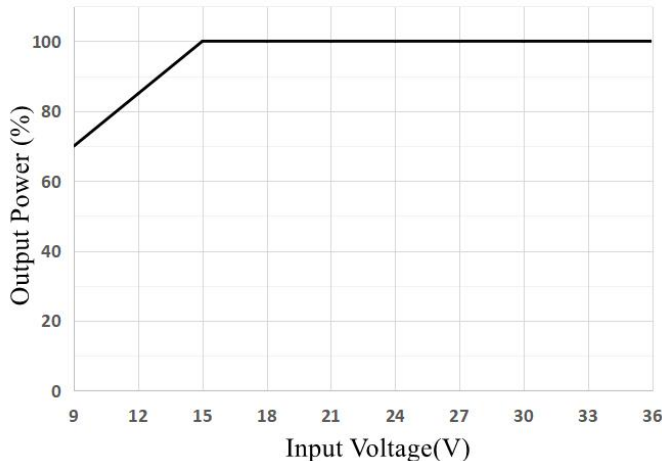
Application reference:

- The maximum capacitive load is measured under pure resistive full load conditions.

Product Characteristic Curve

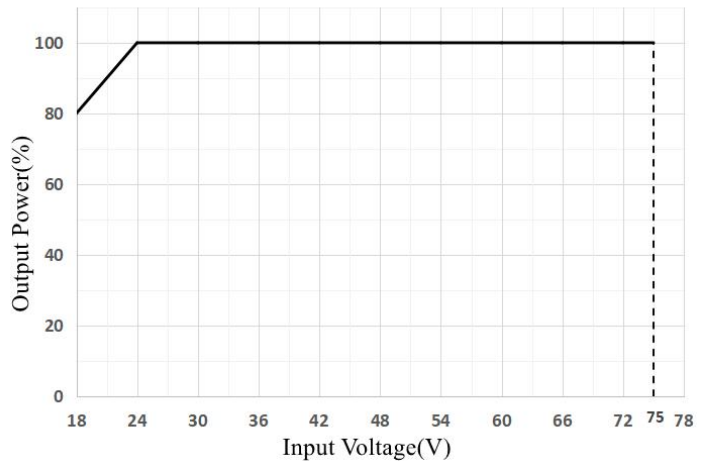
PFD30-18SXXA3R2 Series

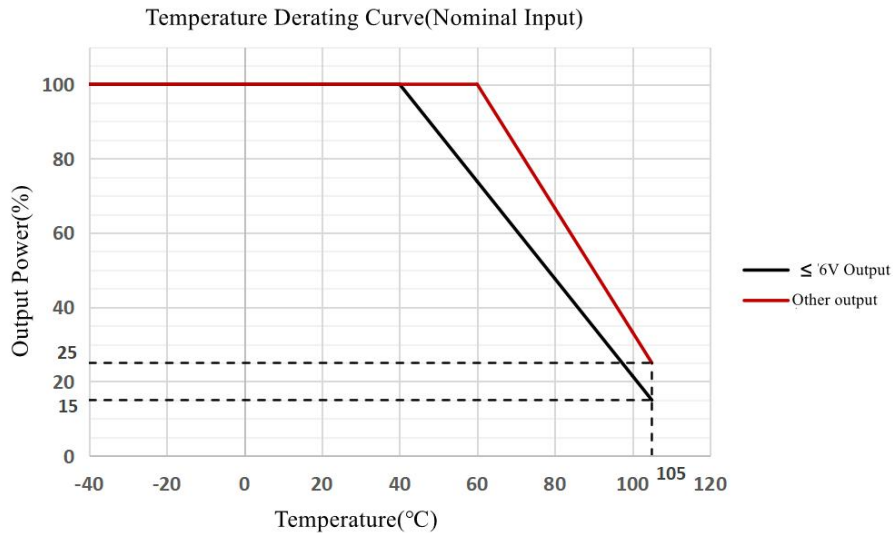
Input Voltage Derating Curve



PFD30-36SXXA3R2 Series

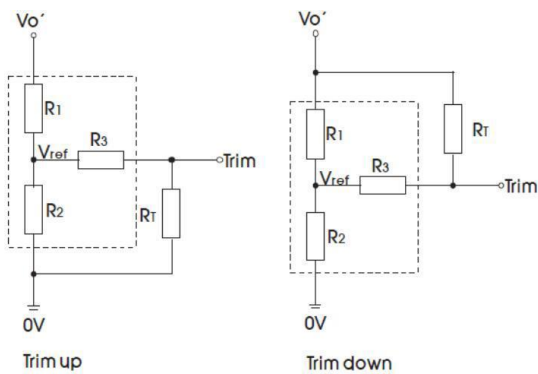
Input Voltage Derating Curve





Note: During the actual application of the product, it is necessary to ensure that the surface temperature of the shell is $\leq 110^{\circ}\text{C}$, and the product can be judged to be in a stable working range.

The use of Trim and the calculation of Trim resistance



Calculating Trim resistor values:

$$\begin{aligned} \text{up: } R_T &= \frac{\alpha R_2}{R_2 - \alpha} - R_3 & \alpha &= \frac{V_{ref}}{V_{O'} - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{\alpha R_1}{R_1 - \alpha} - R_3 & \alpha &= \frac{V_{O'} - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

R_T = Trim Resistor value;
 α = self-defined parameter, no actual meaning;
 $V_{O'}$ is the actual voltage to increase or decrease;

The circuit for Trim (The dashed area is the inside of product):

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.22	2.55	12	1.25
5	5.1	5.1	20	2.5
6	6.2	4.44	20	2.5
9	9.31	3.58	24	2.5
12	18	4.75	33	2.5
15	18	3.6	25.5	2.5
24	30	3.48	30	2.5



Recommended circuit

1. DC/DC test circuit:

All products of this series are tested according to the recommended test circuit (Figure 2) before leaving the factory.

C1:100uF/100V; C2:100uF/50V

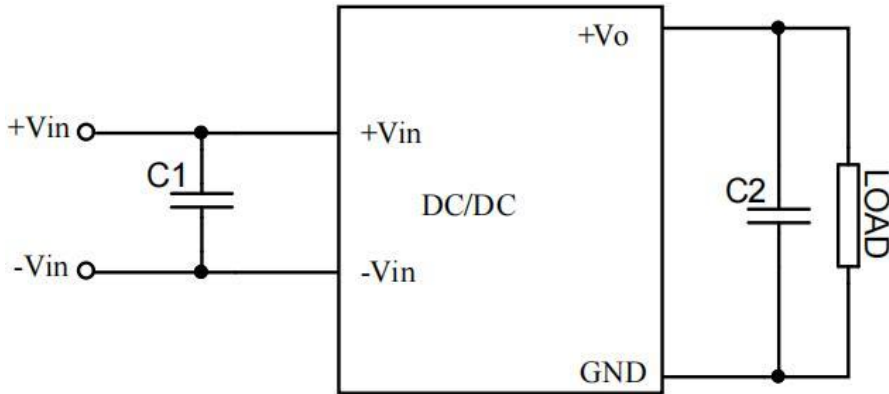


Photo 2: Recommended test circuit

2. EMC external recommended circuit:

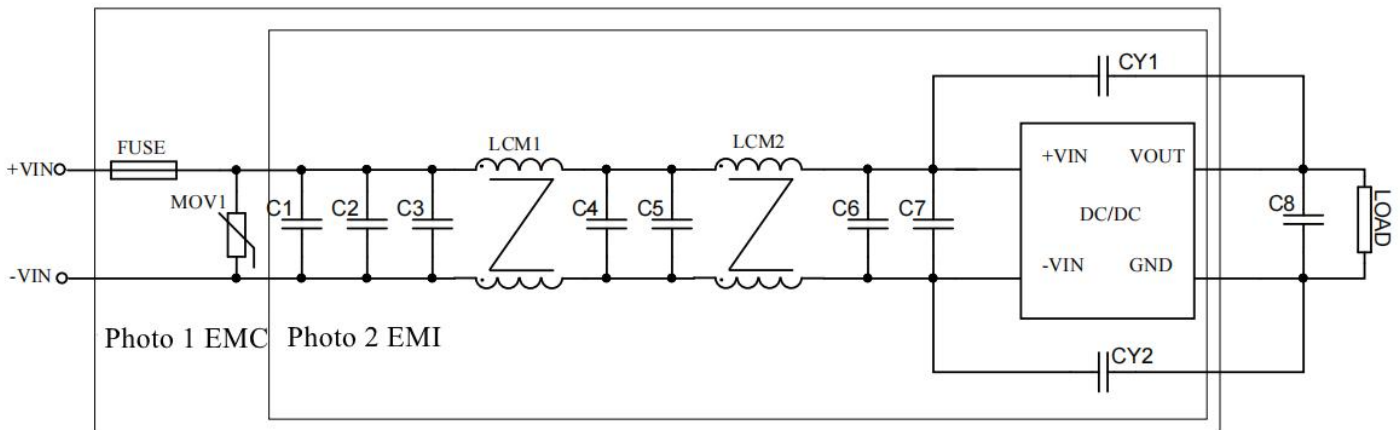


Photo 3: EMC recommended circuit

Recommended Spec:

Component	PFD30-18SXXA3R2 Input	PFD30-36SXXA3R2 Input
FUSE	According to customer's request	
MOV1	14D560K	14D101K
C1	1000uF/50V	470uF/100V
C7	470uF/50V	470uF/100V
C2/C3/C4/C5/C6	10uF/50V	10uF/100V
LCM1	5mH	
LCM2	250uH	
C8	100uF/50V	100uF/100V
CY1,CY2	2.2nF/2000V	

**Note:**

1. The product should be used under the specification range, otherwise it will cause permanent damage to it.
2. If the product worked beyond the load range or below the minimum load, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
3. Unless otherwise specified, data in this datasheet should be tested under conditions of $T_a=25^{\circ}\text{C}$, 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.The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
6. We can provide customized product service;
7. The product specification may be changed at any time without prior notice.