Typical Features

- ◆ Wide input voltage range (4:1)
- ◆ Transfer Efficiency up to 88%
- ◆ Stand-by Power Consumption as low as 0.12W
- ◆ Operating Temperature:-40°C~+85°C
- ◆ Input under voltage , output short circuit, over current, over voltage protection
- ◆ Isolation voltage: 3000VDC
- ◆ International standard pin-out

Application Field

PFD6-XXS&DXXE2(C)3 Series *products have an output power of 6W, a 4:1 ultra-wide voltage input range, an isolation voltage of 3000VDC, output short circuit, overcurrent, and overvoltage protection functions, meet the operating temperature of –40 ℃ to +85 ℃, and have remote control functions. They can be widely used in industrial control, instrumentation, communications, power, Internet of Things and other fields. When the product is used in an environment with relatively harsh electromagnetic compatibility, please refer to the application circuit provided by our company.*

Typical Product List

Certificate	Model no.	Input Voltage Range (VDC)		Output Voltage/Current (VDC/mA)		Input Current (mA) Nominal Voltage		Capacitive Load (uF)	Ripple & Noise		Efficiency (%)@output full load,	
		Nominal	Range	Voltage	Current Max./Min	Full load Typ.	No load Typ.	Max.	mVp-p Typ	mVp-p Max	Min	Typ
-	PFD6-18S3V3E2(C)3	24	9~36	3.3	1500/0	267	5	2200	50	100	75	77
-	PFD6-18S05E2(C)3			5	1200/0	301		2200			81	83
-	PFD6-18S09E2(C)3			9	667/0	298		1000			82	84
-	PFD6-18S12E2(C)3			12	500/0	294		680			83	85
-	PFD6-18S15E2(C)3			15	400/0	291		680			84	86
-	PFD6-18S24E2(C)3			24	250/0	291		680			84	86
-	PFD6-18S25E2(C)3			25	200/0	294		680			83	85
-	PFD6-18D05E2(C)3			±5	±600/0	305		1000			80	82
-	PFD6-18D09E2(C)3			±9	±333/0	298		330			82	84
-	PFD6-18D12E2(C)3			±12	±250/0	294		330			83	85
-	PFD6-18D15E2(C)3			±15	±200/0	291		330			84	86
-	PFD6-18D18E2(C)3			±18	±167/0	291		220			84	86
-	PFD6-18D24E2(C)3			±24	±125/0	291		220			84	86
-	PFD6-36S3V3E2(C)3	48	18~75	3.3	1500/0	129	4	2200			78	80
-	PFD6-36S05E2(C)3			5	1200/0	149		2200			82	84
-	PFD6-36S09E2(C)3			9	667/0	147		1000			83	85
-	PFD6-36S12E2(C)3			12	500/0	144		680			85	87
-	PFD6-36S15E2(C)3			15	400/0	142		680			86	88

-	PFD6-36S24E2(C)3			24	250/0	144		680			85	87
-	PFD6-36D05E2(C)3			±5	±600/0	151		1000			81	83
-	PFD6-36D09E2(C)3			±9	±333/0	149		330			82	84
-	PFD6-36D12E2(C)3			±12	±250/0	144		330			85	87
-	PFD6-36D15E2(C)3			±15	±200/0	142		330			86	88
-	PFD6-36D24E2(C)3			±24	±125/0	145		220			84	86

Note:

1: Model description: C means with control pin, N means without control pin.

2: The above efficiency is measured by nominal input voltage and output rated load;

3: Maximum capacitive load refers to the maximum capacity allowed by the external output capacitor when the power supply is started at rated load. If the capacity is exceeded, the power supply may not start;

4: In order to reduce no-load power consumption and improve light-load efficiency, the IC will reduce the frequency when working at no-load and light-load.

5: The above is only a partial product list. If you need products outside the list, please contact our sales department.

Input Specifications

Item	Working conditions	Min	Typical	Max	Unit
Standby power consumption	Nominal input voltage, no load	/	0.12	/	W
Input impulse voltage (1sec.max)	Nominal 24Vdc Input	-0.7	/	50	VDC
	Nominal 48Vdc Input	-0.7	/	100	
Starting voltage	Nominal 24Vdc Input	/	/	9	
	Nominal 48Vdc Input	/	/	18	
Input under-voltage protection	Nominal 24Vdc Input	5.5	6.5	/	
	Nominal 48Vdc Input	12	15	/	
Hot-plug	/	Not support			
Input filter	/	Π filter			
Reflected ripple current	Refer to recommended peripheral circuits, nominal input voltage	20mA(Typ.)			

Output Specification

Item	Working conditions		Min	Typical	Max	Unit
Output Voltage Accuracy	5% ~ 100% load		/	±1	±3	%
	0% ~ 5% load	Single output	/	±1	±3	
		Dual output	/	±2	±5	
Output Voltage Balance	Dual output, balanced load		/	±0.5	±1.5	
Voltage Regulation	Full voltage range, full load	Positive output	/	±0.2	±0.5	
		Negative output	/	±0.5	±1	
Load Regulation	5% ~ 100%load	Positive output	/	±0.5	±1	
		Negative output	/	±0.5	±1.5	
Ripple & Noise	5% ~ 100% nominal load, 20M Hz bandwidth		/	50	100	mVp-p
Dynamic Response Deviation	25% step change in nominal load		/	±3	±5	%
Dynamic Response Time	25% nominal load step, input voltage range		/	300	500	us

Temperature Drift Coefficient	Full load	/	/	±0.03	%/℃
Turn-on Delay Time	Nominal input voltage and constant resistance load	/	10	/	ms
Output Over-voltage Protection	Input voltage range	110	/	160	%Vo
Output Over-current Protection		110	150	260	%Io
Output Overshoot		/	/	10	%Vo
Short Circuit Protection		Continuous, Self-recovery			

Note: 0% - 5% load ripple & noise is less than or equal to 5%Vo; the ripple & noise test adopts the twisted pair test method, see the ripple & noise test instructions for details.

General Specification

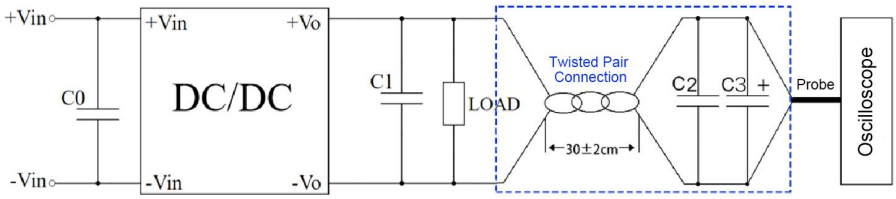
Items	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Operating Mode(PWM)	/	300	/	KHz
Operating Temperature	Refer to Temperature Derating Curve	-40	/	+85	℃
Storage Temperature	/	-55	/	+125	
Pin Withstand Soldering Temperature	Distance to shell is 1.5mm,10 seconds	/	/	300	
Relative Humidity	No condensing	5	/	95	%RH
Isolation Voltage	Input to output, test 1min, leakage current<1mA	3000	/	/	VDC
Insulation Resistance	Input to output , voltage 500VDC	1000	/	/	MΩ
Isolation Capacitance	Input to output, 100KHz/0.1V		1000		pF
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Free air convection				
Case Material	Metal Aluminum				

Weight/Package	Package model	Weight Typ.	L x W x H	
	PFD6-XXS&DXXE2(C)3	12g	31.6× 20.30 × 10.2mm	1.244× 0.800 × 0.401inch

EMC Characteristics

Total Items		Sub items	Test standard	Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B（EMC Recommended Circuit）
		RE	CISPR32/EN55032	CLASS B（EMC Recommended Circuit）
	EMS	CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria A
		RS	IEC/EN61000-4-3	10V/m Perf.Criteria A
		ESD	IEC/EN61000-4-2	Contact ±4KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV（EMC Recommended Circuit） Perf.Criteria B
		EFT	IEC/EN61000-4-4	±2KV（EMC Recommended Circuit） Perf.Criteria B
		Voltage dips, short interruptions and voltage variations	IEC/EN61000-4-29	0%~70% Perf.Criteria B

Ripple& Noise Test: (Twisted Pair Method)

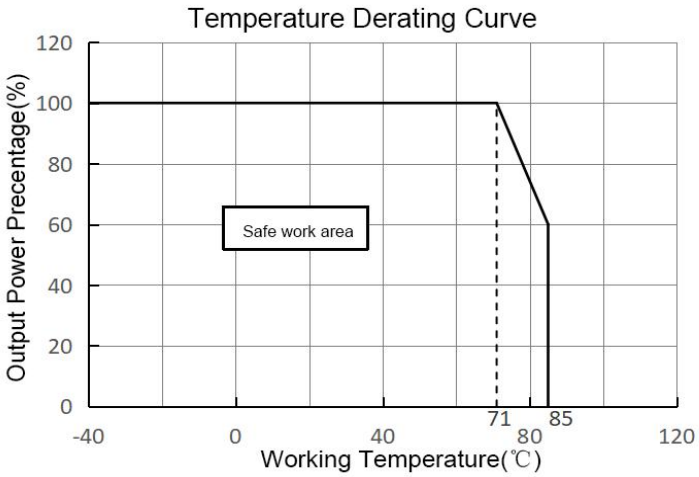


Test conditions:

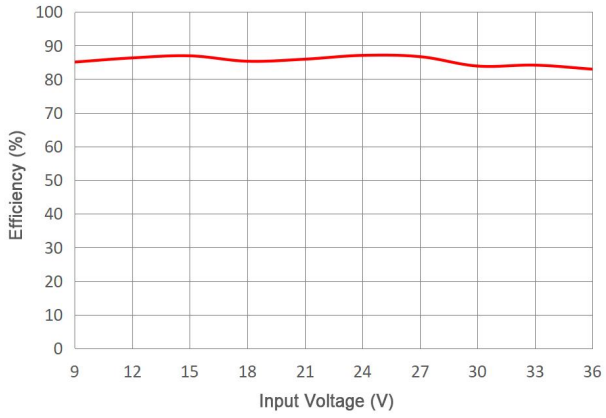
1. Ripple noise is connected using 12# twisted pair cable, the oscilloscope sampling uses the sampling mode, the oscilloscope bandwidth is set to 20MHz, a 100M bandwidth probe is used, and the probe cap and ground clip are removed; and C2 (0.1uF) polypropylene capacitor and C3 (10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel at the probe end of the twisted pair cable, and the capacitance values of C0 and C1 refer to the design application circuit data;

2. Ripple noise test: The module input end (INPUT) is connected to the input power supply, and the power supply output is connected to the electronic load (LOAD) through the power line. The test is sampled from the power output port using a 30±2 cm twisted pair cable alone, and connected to the oscilloscope probe according to the polarity.

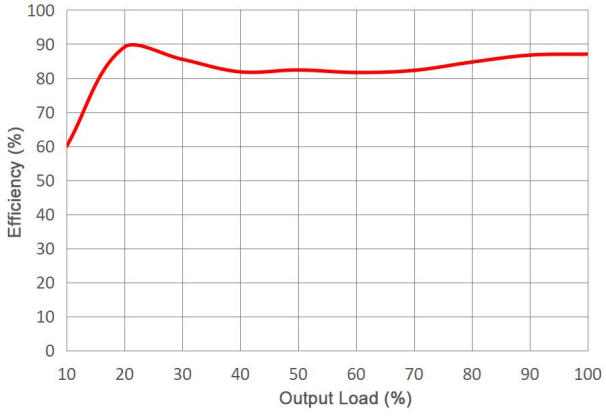
Product Characteristic Curve



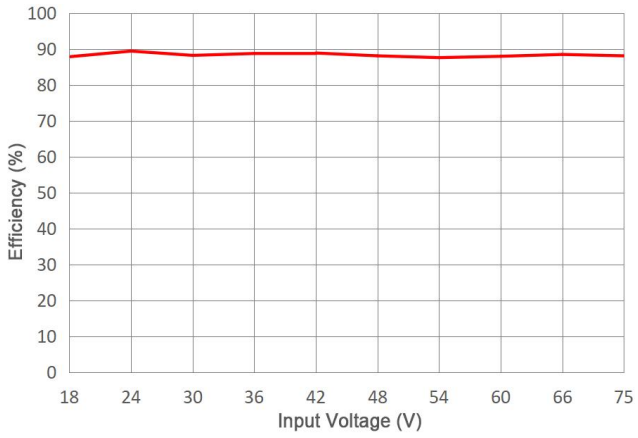
Efficiency VS Input Voltage（PFD6-18D15E2(C)3）



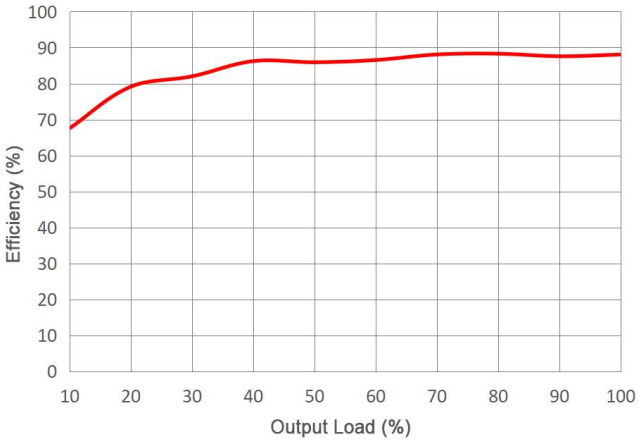
Efficiency VS Output Load（PFD6-18D15E2(C)3）



Efficiency VS Input Voltage（PFD6-36S12E2(C)3）



Efficiency VS Output Load（PFD6-36S12E2(C)3）

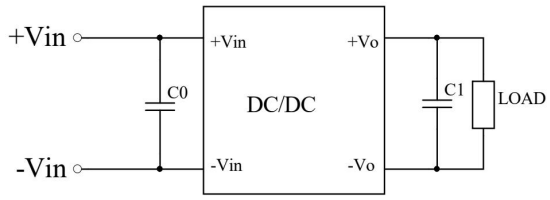


Design Reference Application

Recommended circuit

1. This series of module power supplies are tested according to this peripheral circuit before leaving the factory.

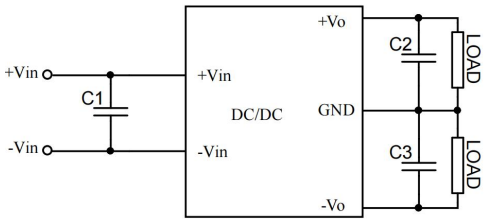
Single



Parameter Description:

Single	
Components	Parameter
C0	100uF/100V
C1	10uF/50V

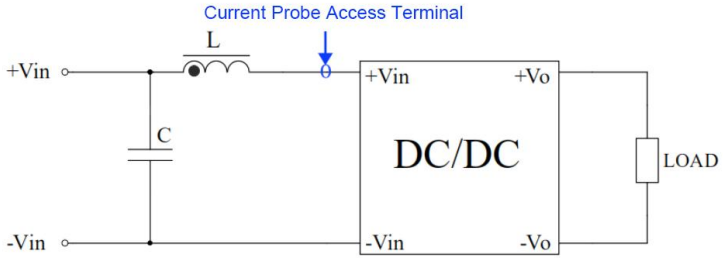
Dual



Parameter Description:

Dual	
Components	Parameter
C1	100uF/100V
C2，C3	10uF/50V

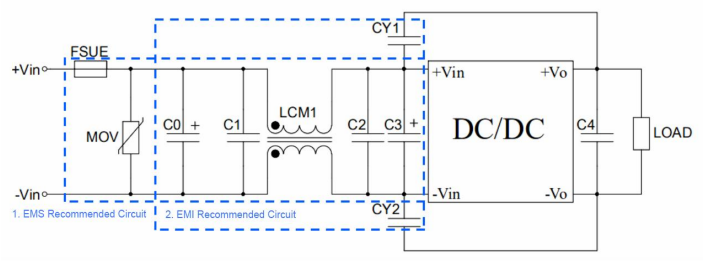
2. Input reflected ripple current test peripheral circuit



Parameter Description:

Components	Parameter
C	100uF/100V
L	4.7uH

3. Recommended EMC external circuits



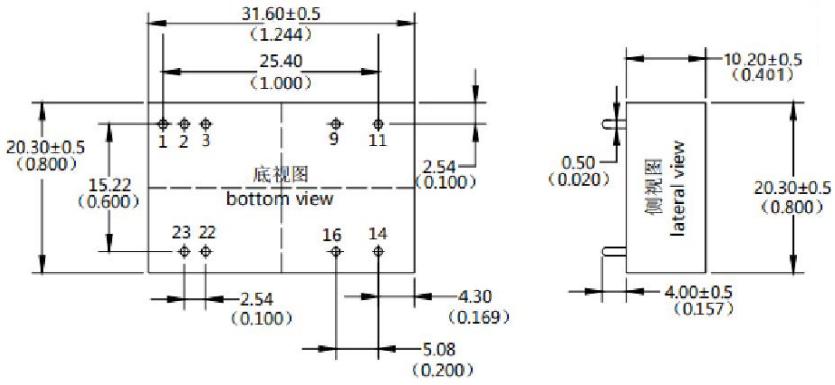
EMC Recommended Circuit

Parameter Description:

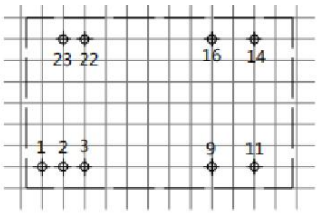
Components	24VDCInput	48VDC Input
FUSE	Choose according to customer needs	
MOV1	10D470K	10D101K
C0,C3	330uF/50V	100uF/100V
C1,C2,C4	10uF/50V	10uF/100V
LCM1	10mH	
CY1,CY2	1nF/3KV	

Note: Part 1 in the picture is used for EMS testing, part 2 in the picture is used for EMI filtering, and can be adjusted according to the situation.

E2 Packing Dimension



Dimension unit: mm [inch]
Printed Board Vertical View
Lattic spacing: 2.54mm (0.1inch)
Unmarked tolerance: ±0.50 [±0.020]
Terminal diameter tolerance: ±0.10 [±0.004]



Pin Definition

Pin	1	2、3	22、23	14	16	9	11
PFD6-XXSXXE2C3	Ctrl	-Vin	+Vin	+Vo	GND	NP	NC
PFD6-XXSXXE2N3	NP	-Vin	+Vin	+Vo	GND	NP	NC
PFD6-XXDXXE2C3	Ctrl	-Vin	+Vin	+Vo	GND	GND	-Vo
PFD6-XXDXXE2N3	NP	-Vin	+Vin	+Vo	GND	GND	-Vo

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;
2. The product does not support parallel output to increase power;
3. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
4. If the product works beyond the product load range, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
5. Unless otherwise specified, the above data are measured at Ta=25℃, humidity<75%, input nominal voltage and output rated load (pure resistance load);
6. All the above index test methods are based on our company's standards;
7. The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard model products will exceed the above requirements. Please consult our technical personnel for details;
8. Our company can provide product customization;
9. Product specifications are subject to change without prior notice. Please pay attention to the latest manual published on our official website.

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