

CPFD6-XXSXXE2N6 Series DC/DC Converter



Typical Features

- ◆ Wide input voltage range (4:1)
- ◆ Transfer Efficiency up to 90%
- ◆ Stand-by Power Consumption as low as 0.12W
- ◆ Reinforced insulation, input to output 6000VDC, 2MOPP high isolation
- ◆ Under 240VAC/60Hz operating conditions, leakage current <5uA
- ◆ Creepage distance reaches 8mm, electrical clearance reaches 5mm
- ◆ Operating Temperature:-40°C~+85°C
- ◆ Input under voltage, output over voltage, short circuit, over current protection
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Meet EN60601-1 third edition medical certification
- ◆ International standard pin-out



Test Condition: Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25°C

Application Field

CPFD6-XXSXXE2N6 series products have an output power of 6W, an ultra-wide voltage input of 9-36VDC, 18-75VDC, and an isolation voltage of 6000VDC. Equipped with output overvoltage protection and output short-circuit protection functions. The model meet EN60601-1 certification and are widely used in medical and other requirements. In high isolation situations, power electronics will also use this kind of high isolation power supply, and its low no-load power consumption is widely used in energy storage systems.

Typical Product List

Certificate	Model no.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise		Efficiency (%)@output full load,	
		Nominal	Range	Voltage (VDC)	Current (mA) MAX./Min	Full load typ	No load typ	uF	mVp-p		Min	Typ
									Typ	Max		
-	CPFD6-18S05E2N6	24	9-36	5	1200/0	308	5	3000	100	150	79	81
-	*CPFD6-18S06E2N6			6	1000/0	305	5	2500	100	150	80	82
-	*CPFD6-18S09E2N6			9	667/0	298	5	2000	100	150	82	84
-	CPFD6-18S12E2N6			12	500/0	294	5	1500	100	150	83	85
-	*CPFD6-18S15E2N6			15	400/0	291	5	1200	100	150	84	86
-	*CPFD6-18S18E2N6			18	333/0	291	5	1200	100	150	84	86
-	CPFD6-18S24E2N6			24	250/0	294	5	680	100	150	83	85
-	CPFD6-36S05E2N6	48	18-75	5	1200/0	152	4	3000	100	150	80	82
-	CPFD6-36S09E2N6			9	667/0	149	4	2000	100	150	82	84
-	CPFD6-36S12E2N6			12	500/0	147	4	1500	100	150	83	85
-	*CPFD6-36S15E2N6			15	400/0	145	4	1200	100	150	84	86
-	CPFD6-36S24E2N6			24	250/0	147	4	680	100	150	83	85

1: "*" are models being developing;

- 2: The above efficiency is measured by nominal input voltage and output rated load;
- 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;
- 4: In order to reduce the no-load power consumption and improve the light-load efficiency, the IC works in the state of frequency jitter at no-load and light-load, and the output cannot be no-load. At least an electrolytic capacitor with a 10% load or a high-frequency resistance above 330uF is required, otherwise it will cause Increased output voltage ripple;
- 5: Due to limited space, the above is only a partial list of products. If you need products other than those listed, please contact the sales department of our company.

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)	24V Input	-0.7	/	50	VDC
	48V Input	-0.7	/	100	
Starting voltage	24V Input	/	/	9	
	48V Input	/	/	18	
Input under-voltage protection	24V Input	5.5	6.5	/	
	48V Input	12	15.5	/	
Hot-plug	/		Not support		
Input filter	/		Π filter		
Reflected ripple current	Refer to recommended peripheral circuits, nominal input voltage		20mA(Typ.)		

Output Specification

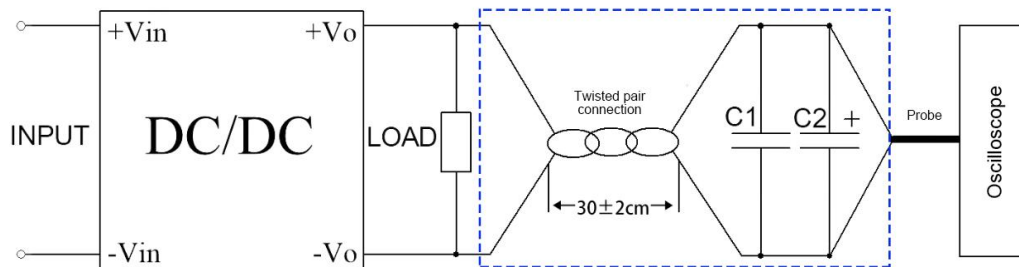
Item	Working conditions	Min	Typical	Max	Unit
Output Voltage Accuracy	Nominal load, full voltage range	/	±1	±3	%
Voltage Regulation	Full voltage range, full load	/	±0.2	±0.5	
Load Regulation	5% ~ 100% nominal load	/	±0.5	±1	
Ripple & Noise	5% ~ 100% nominal load, 20M Hz bandwidth	/	100	150	mVp-p
Dynamic 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	%/°C
Turn-on Delay Time	Nominal input voltage and constant resistance load	/	10	/	ms
Output Over-voltage Protection	Full 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,10seconds	/	/	300	
Relative Humidity	No condensing	5	/	95	%RH
Isolation Voltage	Input to output, test 1min, leakage current<1mA	6000	/	/	VDC
Insulation Resistance	Input to output , voltage 500VDC	10000	/	/	MΩ
Isolation Capacitance	Input to output, 100KHz/0.1V	/	13	20	pF
Leakage Current	240VAC/60Hz	/	3.6	5	uA
Application Part	/	CF Type			
Reinforced insulation	Transformer creepage distance	8	/	/	mm
	Transformer clearance	5	/	/	
	PCB electrical clearance & creepage distance	8	/	/	
	Optocoupler clearance	8	/	/	
Safety standards	/	EN60601-1: 2006+A1: 2013			
Insulation protection level	240VAC/60Hz	2xMOPP			
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Free air convection				
Case Material	Black flame-retardant heat-resistant Plastic(UL94 V-0)				
Weight/Package	Package model	Weight Typ.	L x W x H		
	CPFD6-XXSXXE2N6	12g	31.6× 20.30 × 10.2mm		1.244× 0.800 × 0.402inch

EMC Characteristics					
Total Items		Sub items		Test standard	Class
EMC	EMI	CE	Other	CISPR32/EN55032	CLASS A (bare board)
			CPFD6-18S18E2N6	CISPR32/EN55032	CLASS B (see recommended EMC circuit)
		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 (see recommended EMC circuit) Perf.Criteria B
		EFT		IEC/EN61000-4-4	±2KV (see recommended EMC circuit) Perf.Criteria B
		Voltage dips, short interruptions and voltage variations		IEC/EN61000-4-29	0%~70% Perf.Criteria B

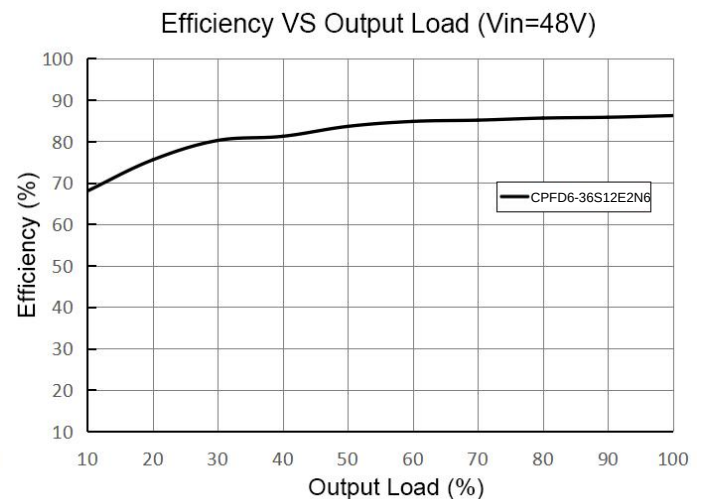
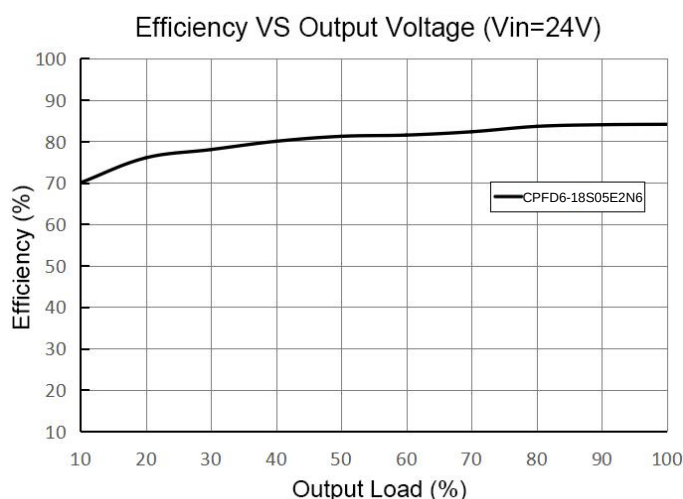
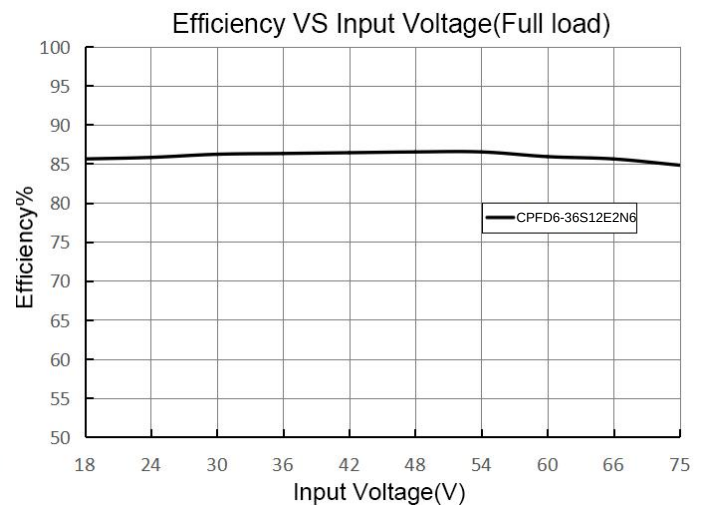
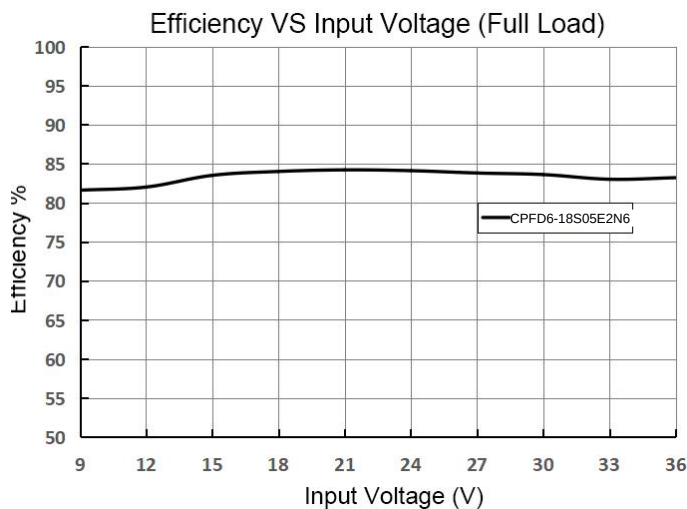
Ripple & Noise Test: (Twisted Pair Method)

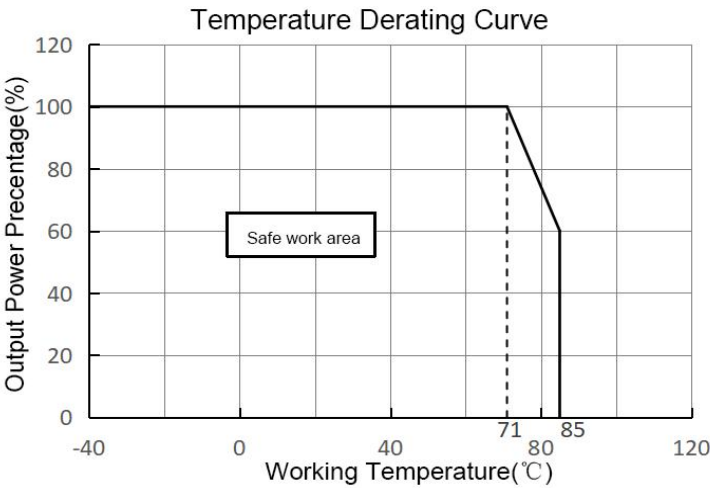


Test conditions description:

1. Use 12# twisted pair to connect the ripple noise, use the Sample mode for oscilloscope sampling, set the oscilloscope bandwidth to 20MHz, use a 100M bandwidth probe, remove the probe cap and ground clamp; and connect the probe ends in parallel on the twisted pair C1 (0.1uF) polypropylene capacitor and C2 (10uF) high frequency low resistance electrolytic capacitor;
2. Ripple noise test: The module input terminal (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 uses a 30 ± 2 cm twisted pair to sample from the power supply output port separately, and according to the polarity Connect to oscilloscope probe.

Product Characteristic Curve

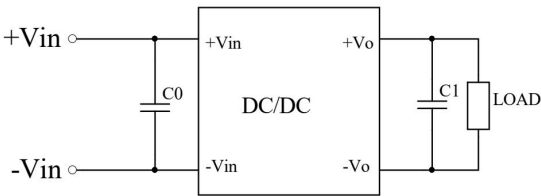




Design Reference Application

Recommended circuit

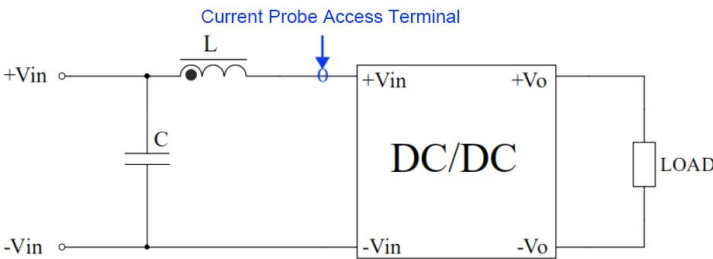
1. This series of module power supplies are tested according to this peripheral circuit before leaving the factory. Increasing the capacity of C1 can reduce the output ripple, but the output capacity must be less than the maximum capacitive load.



Parameter Description:

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

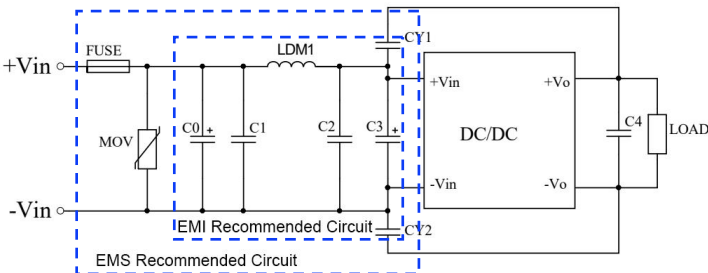
2. Input reflected ripple current to test external circuits



Parameter Description:

Components	Parameter
C	100uF/100V
L	4.7uH

3. Recommended EMC external circuits

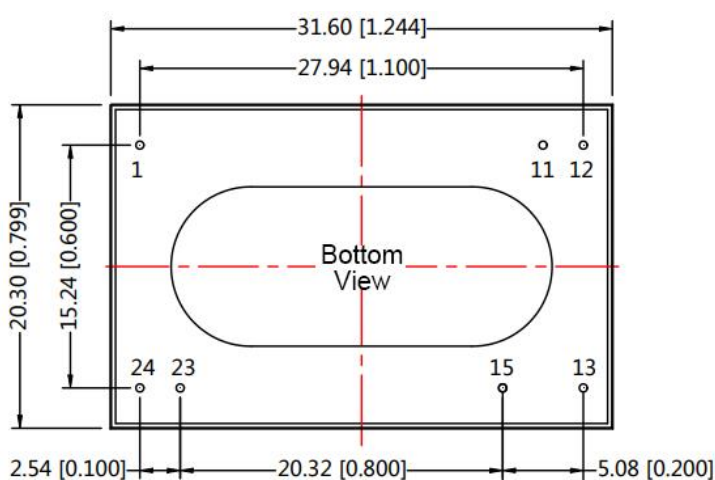
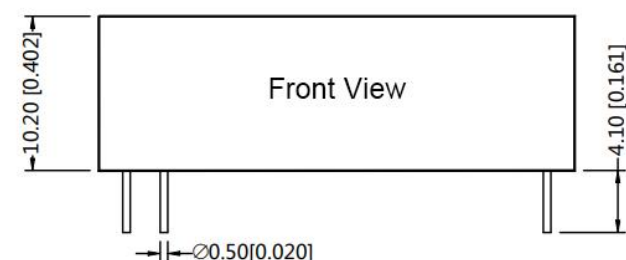


Parameter Description:

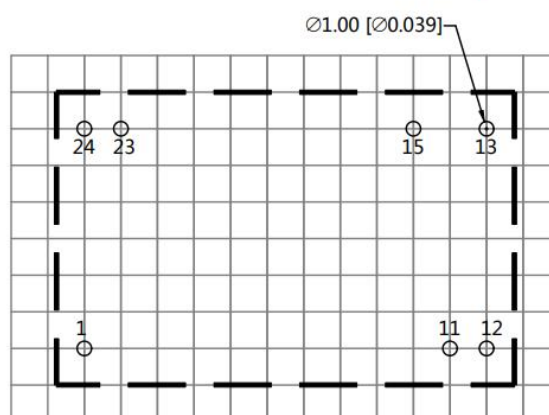
Components	24VDC Input	48VDC Input
FUSE	Choose according to customer needs	
MOV1	20D470K	14D101K
C0,C3	330uF/50V	330uF/100V
C1,C2	10uF/50V	10uF/100V
C4	10uF/50V	
LDM1	10uH	
CY1,CY2	1nF/6KV	

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



Third Angle Projection 



Note: Grid 2.54*2.54mm

Note:

Dimension unit:mm[inch]

Terminal diameter tolerance: $\pm 0.10[\pm 0.004]$

Unmarked tolerance: $\pm 0.50[\pm 0.020]$

Pin Definition

Pin	1	11	12	13	15	23	24
CPFD6-XXSXXE2N6	+Vin	NP	GND	+Vout	NP	-Vin	-Vin

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;
- 2.
3. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all the 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 the performance indicators in this manual;
5. Unless otherwise specified, the above data is measured when $T_a=25^{\circ}\text{C}$, humidity $<75\%$, input nominal voltage and output rated load (pure resistance load);
5. All the above index test methods are based on the company's standards;

7. The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard products will exceed the above requirements. For specific information, please contact our technical staff directly;

8. Our company can provide product customization;

9. Product specifications are subject to change without notice. Please pay attention to the latest manual published on our official website.