CPFD6-XXS&DXXE2(C)3 Series
DC/DC Converter

Typical Features

- Wide input voltage range (4:1)
- Efficiency up to 88% (Typ.)
- No-load power consumption 0.12W (Typ.)
- Operating temperature from -40°C to +105°C
- Input under voltage, output short circuit, over current, over voltage protections
- Isolation voltage 3000VDC
- Standard pin-out alignment

Application Field

CPFD6-XXS&DXXE2(C)3 Series -- *DC-DC converters with output power 6W, 4:1 wide voltage input range, 3000VDC isolation voltage, output short circuit, over-current and over-voltage protections, operating temperature from –40℃ to +105℃, and the remote-control ON/OFF function. This series of products can be widely used in the fields of Industrial control, Instrumentation, Communications, Electric power and Internet of Things, etc. The additional EMC circuit diagram is recommended in this data sheet for the application with higher EMC requirement.*

Typical Product List

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @Nominal Volt		Capacitive Load	Ripple & Noise		Efficiency (%) @Full load	
		Nom.	Range	Vo (VDC)	Io(mA) Max/Min	Full load	No load	(uF) Max	mVp-p Typ	mVp-p Max	Min	Typ
CE	CPFD6-18S3V3E2(C)3	24	9~36	3.3	1500/0	267	5	2200	50	100	75	77
	CPFD6-18S05E2(C)3			5	1200/0	301		2200			81	83
	CPFD6-18S09E2(C)3			9	667/0	298		1000			82	84
	CPFD6-18S12E2(C)3			12	500/0	294		680			83	85
	CPFD6-18S15E2(C)3			15	400/0	291		680			84	86
	CPFD6-18S24E2(C)3			24	250/0	291		680			84	86
	CPFD6-18S25E2(C)3			25	240/0	294		680			83	85
CE	CPFD6-18D05E2(C)3			±5	600/0	305		1000			80	82
	CPFD6-18D09E2(C)3			±9	333/0	298		330			82	84
	CPFD6-18D12E2(C)3			±12	250/0	294		330			83	85
	CPFD6-18D15E2(C)3			±15	200/0	291		330			84	86
	CPFD6-18D18E2(C)3			±18	167/0	291		220			84	86
	CPFD6-18D24E2(C)3			±24	125/0	291		220			84	86
CE	CPFD6-36S3V3E2(C)3	48	18~75	3.3	1500/0	129	4	2200			78	80
	CPFD6-36S05E2(C)3			5	1200/0	149		2200			82	84
	CPFD6-36S09E2(C)3			9	667/0	147		1000			83	85
	CPFD6-36S12E2(C)3			12	500/0	144		680			85	87

	CPFD6-36S15E2(C)3			15	400/0	142		680			86	88
	CPFD6-36S24E2(C)3			24	250/0	144		680			85	87
	CPFD6-36D05E2(C)3			±5	600/0	151		1000			81	83
	CPFD6-36D09E2(C)3			±9	333/0	149		330			82	84
CE	CPFD6-36D12E2(C)3			±12	250/0	144		330			85	87
	CPFD6-36D15E2(C)3			±15	200/0	142		330			86	88
	CPFD6-36D24E2(C)3			±24	125/0	145		220			84	86

Note:

1. In the Parts Numbers C indicates the part with remote Control ON/OFF function, N indicates NO Control.
2. The typical value of efficiency is tested at nominal input voltage and rated load.
3. The maximum capacitive load is the capacitance allowed to be used when the power supply operates at full load. The converter may not start if the capacitor exceeds this value.
4. The control chip could work at lower frequency at no load or low load to decrease the no load power and improve the efficiency.
5. Please contact Aipu sales for other output voltages requirement in this series but not listed in this table.

Input Specifications

Item	Operating conditions	Min	Typ.	Max	Unit
Standby power consumption	Nominal input voltage, no load	/	0.12	/	W
Input inrush voltage (1sec.max)	Nominal 24Vdc Input series	-0.7	/	50	VDC
	Nominal 48Vdc Input series	-0.7	/	100	
Start-up voltage	Nominal 24Vdc Input series	/	/	9	
	Nominal 48Vdc Input series	/	/	18	
Input under-voltage protection	Nominal 24Vdc Input series	5.5	6.5	/	
	Nominal 48Vdc Input series	12	15	/	
Hot-plug	/	NA			
Input filter	/	π filter			
Reflected ripple current	With the recommended circuit @nominal volt.	20mA (Typ.)			

Output Specifications

Item	Operating conditions		Min	Typ.	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% load, 20MHz bandwidth		/	50	100	mVp-p

Dynamic Response Deviation	25% rated load step change	/	±3	±5	%
Dynamic Response Time	25% rated load step, full input voltage range	/	300	500	uS
Temperature Drift Coefficient	Full load	/	/	±0.03	%/℃
Turn-on Delay Time	Nominal voltage, constant resistance load	/	10	/	mS
Over-voltage Protection	Full input voltage range	110	/	200	%Vo
Over-current Protection		110	150	260	%Io
Output Overshoot		/	/	10	%Vo
Short Circuit Protection		Continuous, Self-recovery			

Note: The ripple & noise ≤5%Vo at 0-5% load, it is tested by the twisted pair method according to the following test instruction.

General Specifications

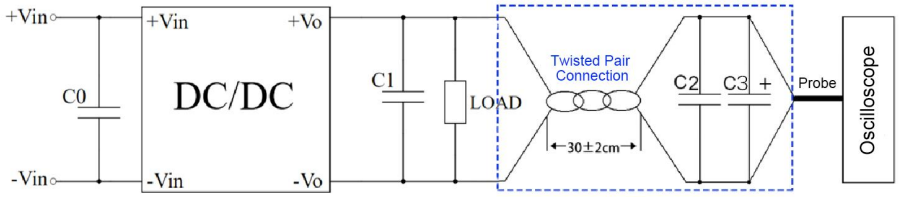
Item	Operating conditions	Min	Typ.	Max	Unit
Switching Frequency	Operating Mode (PWM)	/	300	/	KHz
Operating Temperature	Refer to Temperature Derating Graph	-40	/	+105	℃
Storage Temperature	/	-55	/	+125	
Pin Soldering Temperature	1.5mm from the case, 10S	/	/	300	
Relative Humidity	No condensing	5	/	95	%RH
Isolation Voltage	Input to output, test 1min, leakage current <1mA	3000	/	/	VDC
Insulation Resistance	Input to output @ 500VDC	1000	/	/	MΩ
Isolation Capacitance	Input to output, 100KHz/0.1V	/	1000	/	pF
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Nature air				
Case Material	Plastic in black, flame class UL94-V0				

Weight/Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	CPFD6-XXS&DXXE2(C)3	12g	31.60×20.30×10.20 mm	1.244×0.799×0.402 inch

EMC Performance

Total Items		Sub items	Test standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B（with the Recommended EMC Circuit）
		RE	CISPR32/EN55032	CLASS B（with the Recommended EMC 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 (with the Recommended EMC Circuit) Perf.Criteria B
		EFT	IEC/EN61000-4-4	±2KV (with the Recommended EMC Circuit) Perf.Criteria B
		Voltage dips, short interruptions & voltage variations	IEC/EN61000-4-29	0%~70% Perf.Criteria B

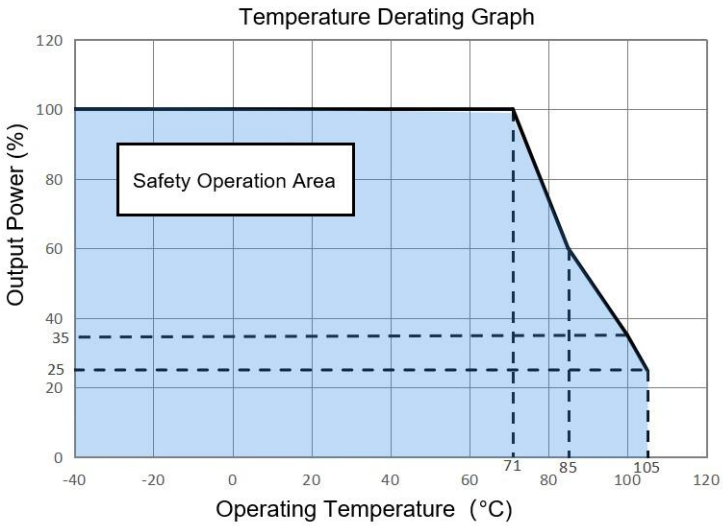
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)



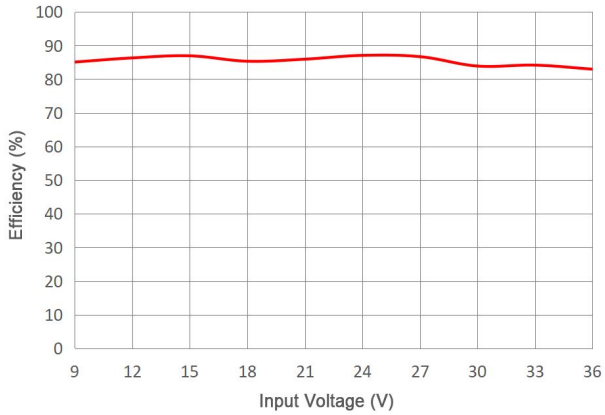
1) The Ripple & noise test need 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C2(0.1uF) polypropylene capacitor and C3(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair. C0 & C1 refer to the application circuit recommended.

2) The power supply output connects to the load by the cables. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the polarity of the output and the oscilloscope probe should not be reversed. The test can be start after input power on.

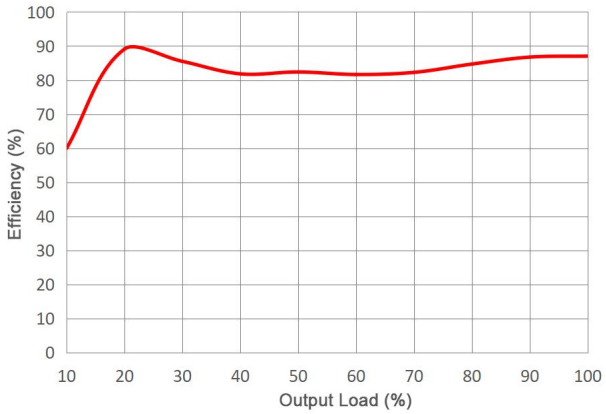
Product Characteristics Graphs



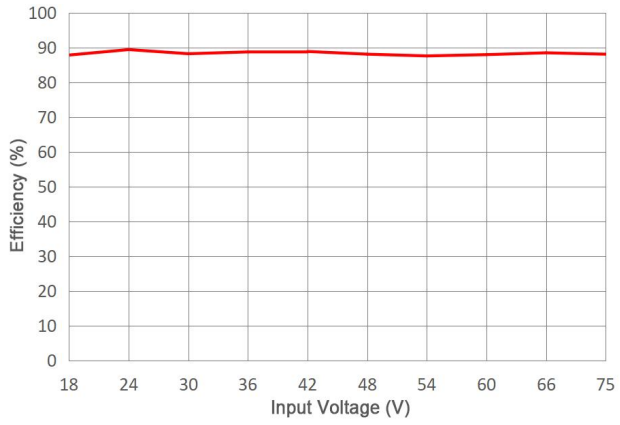
Efficiency VS Input Voltage（CPFD6-18D15E2C3）



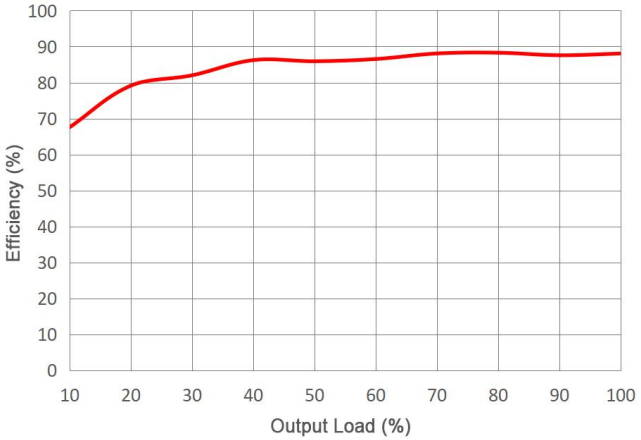
Efficiency VS Output Load（CPFD6-18D15E2C3）



Efficiency VS Input Voltage （CPFD6-36S12E2C3）



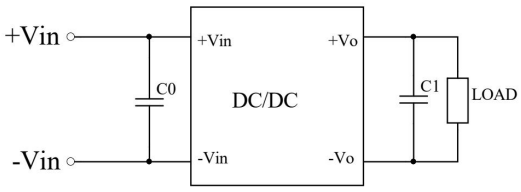
Efficiency VS Output Load （CPFD6-36S12E2C3）



Recommend circuits diagrams for Application

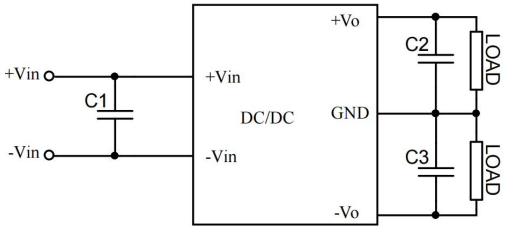
1. All this series of converters will be tested according to the circuits below before shipping.

Single output



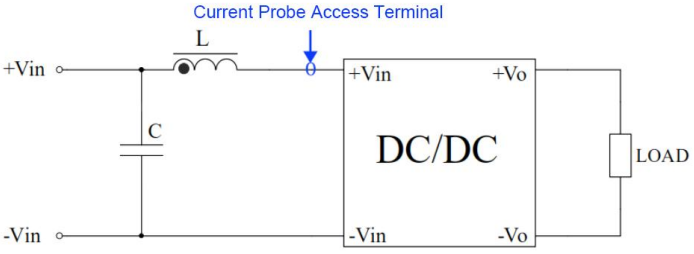
Single output	
Components	Parameters
C0	100uF/100V
C1	10uF/50V

Dual outputs



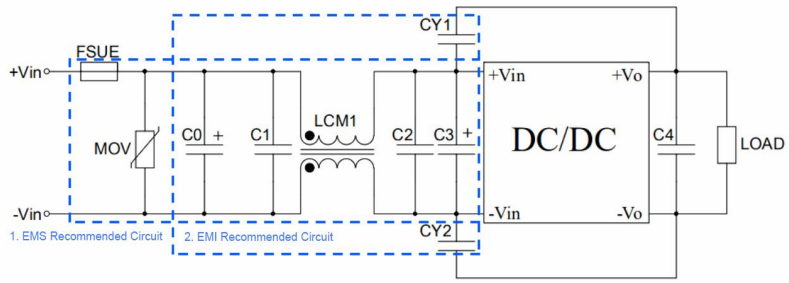
Dual outputs	
Components	Parameters
C1	100uF/100V
C2, C3	10uF/50V

2. Input reflected ripple current test circuit diagram



Components	Parameters
C	100uF/100V
L	4.7uH

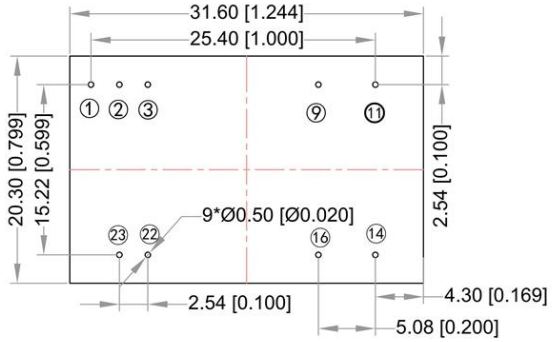
3. Recommended EMC circuit diagram

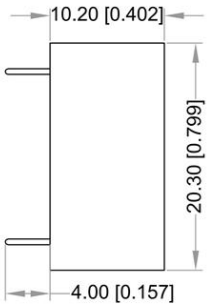


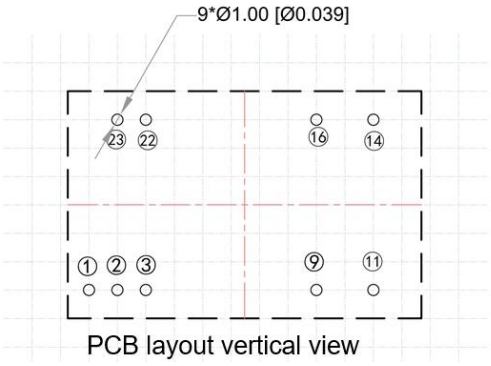
Components	Vin 24VDC	Vin 48VDC
FUSE	TBD by the customer	
MOV	10D470K	10D101K
C0, C3	330uF/50V	100uF/100V
C1, C2, C4	10uF/50V	10uF/100V
LCM1	10mH	
CY1, CY2	1nF/3KV	

Note: Part 1 in the circuit is for EMS test, part 2 for EMI filtering, both can be adjusted according to the actual situation.

Mechanical Dimensions







Unit: mm [inch]
Grid: 2.54x2.54 [0.10x0.10]
General tolerance: ±0.50 [±0.020]
Pin diameter tolerance: ±0.10 [±0.004]

Pin-out Function Description

Pin No.	1	2, 3	22, 23	14	16	9	11
CPFD6-XXSXXE2C3	Ctrl	-Vin	+Vin	+Vout	GND	No Pin	No Connection
CPFD6-XXSXXE2N3	No Pin	-Vin	+Vin	+Vout	GND	No Pin	No Connection
CPFD6-XXDXXE2C3	Ctrl	-Vin	+Vin	+Vout	GND	GND	-Vout
CPFD6-XXDXXE2N3	No Pin	-Vin	+Vin	+Vout	GND	GND	-Vout

Application notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.

2. It is not recommended to connect the converters in parallel to achieve a bigger power output.

3. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.

5. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators in this datasheet had been tested based on test specifications.

7.The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.