DC/DC Converter
FK10-XXSXXE2C3 Series

Typical Features

- Wide input voltage range (4:1), Output Power 10W
- Transfer Efficiency up to 88%
- Stand-by Power Consumption as low as 0.05W
- Output fast start up
- Continuous Short Circuit protection, Self-recovery
- Input under voltage, short circuit, over current protection
- Isolation Voltage 2250VDC
- Operating Temperature: -40°C~+85°C
- Good EMI performance
- International standard pin-out

Application Field

FK10-XXSXXE2C3 ------- *is our newly developed DC-DC module power supply, SIP package, 10W output power, ultra-wide voltage input range, ultra-low standby power consumption, isolated and regulated single output, which can be widely used in industrial control, instrumentation, communication, power, Internet of Things, BMS and other fields.*

Typical Product List

Certificate	Part No	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) @ Nominal Voltage		Max. Capacitive Load	Ripple & Noise (mVp-p)		Full Load Efficiency (%)	
		Nominal	Range	Voltage (VDC)	Current (mA) Max./ Min.	Full load (Typ.)	No Load (Typ.)	u F	Typ.	Max.	Min.	Typ.
CE/ ROHS	FK10-18S3V3E2C3	24	9-36	3.3	2400	478	33	2200	100	150	82	84
	FK10-18S05E2C3	24	9-36	5	2000	467	40	2200	100	150	85	87
	FK10-18S09E2C3	24	9-36	9	1111	473	10	680	100	150	85	87
	FK10-18S12E2C3	24	9-36	12	834	474	10	470	100	150	86	88
	FK10-18S15E2C3	24	9-36	15	667	479	10	330	100	150	86	88
	FK10-18S18E2C3	24	9-36	18	556	479	10	330	100	150	86	88
	FK10-18S24E2C3	24	9-36	24	416	468	10	220	100	150	86	88
	FK10-36S3V3E2C3	48	18-72	3.3	2400	478	33	2200	100	150	82	84
	FK10-36S05E2C3	48	18-72	5	2000	467	40	2200	100	150	85	87
	FK10-36S09E2C3	48	18-72	9	1111	473	10	680	100	150	85	87
	FK10-36S12E2C3	48	18-72	12	834	474	10	470	100	150	86	88
	FK10-36S15E2C3	48	18-72	15	667	479	10	330	100	150	86	88
	FK10-36S24E2C3	48	18-72	24	416	468	10	220	100	150	86	88

Note 1: C is the control pin;
Note 2: The maximum capacitive load refers to the capacitance that the output is allowed to connect when the power supply is fully loaded. If the capacitance exceeds this value, the power supply may not start;
Note 3: In order to reduce no-load power consumption and improve light-load efficiency, the IC works in a frequency-shaking state when it is no-load and light-loaded. The output cannot be no-loaded. It must be at least 10% loaded or an electrolytic capacitor with a high-frequency resistance of more than 470uF, otherwise the output voltage ripple will increase;
Note 4: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

Input Specification

Item	Working conditions	Min	Typ.	Max	Unit
Standby power consumption	Input voltage range	/	0.2	/	W
Input under voltage protection	24Vdc Normal Input	5	/	9	VDC
	48Vdc Normal Input	11	/	18	
Input surge voltage (1sec.max)	24Vdc Normal Input	-0.7	/	50	
	48Vdc Normal Input	-0.7	/	100	
Hot Plug	N/A				
Input filter	Capacitor filter				
CTRL	Module is turned on	CTRL is left floating or connected to high level（3.5V-12VDC）			
	Module shutdown	CTRL connected to-Vin or low level（0-1.2VDC）			
	Input current at shutdown	5mA (TYP)			

*Ctrl controls the voltage on the pin relative to the input -Vin pin.

Output Specification

Items	Test Conditions		Min	Typ.	Max	Unit
Output Voltage Accuracy	Input voltage range		/	±1	±2	%
Voltage Regulation	Full voltage range, full load		/	±0.2	±0.5	%
Load Regulation	10%~100% load		/	±0.5	±1	%
Ripple & Noise	10%-100%load, 20MHz bandwidth		/	100	150	mVp-p
Dynamic Response	25% of nominal load step, nominal input voltage	/	/	300	500	us
Dynamic Response Deviation		3.3V, 5V output	/	±5	±8	%
		Other output	/	±3	±5	
Temperature drift coefficient	Full load		/	/	±0.03	% /℃
Start delay time	Input nominal voltage		/	100	/	ms
Output voltage adjustable (Trim)	Input voltage range		Unavailable			
Output over-current Protection			110	160	250	%Io
Output start-up overshoot voltage			/	/	10	%Vo
Output Short circuit Protection			Self-recovery after short circuit is released			

Note: 0% - 15% 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	

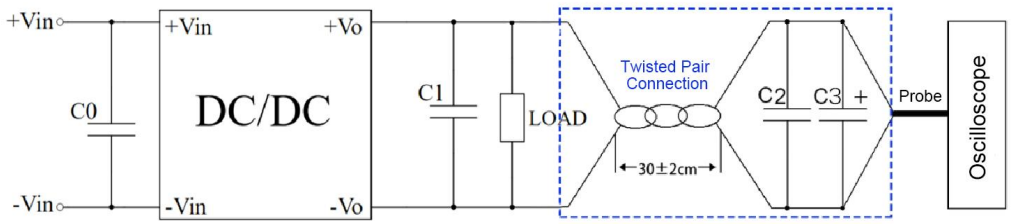
Max Case Temperature	Refer to product characteristic curve	/	/	+105	℃
Pin resistance soldering temperature	The distance between the soldering point and the shell is 1.5mm, 10 seconds	/	/	300	
Relative Humidity	No condensation	5	/	95	%RH
Isolation Voltage	I/P-O/P, test for 1min, leakage current is less than 0.5mA	2250	/	/	VDC
Isolation capacitor	I/P-O/P, 100KHz/0.1V	/	1000	/	pF
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K Hrs
Cooling method	Natural air cooling				
Shell material	Black flame retardant heat resistant plastic				

Weight/ Dimension	Model No.	Weight (Typ)	L x W x H	
	FK10-XXSXXE2C3	5g	22.0X 9.5X12.0 mm	0.866 X0.374X 0.472inch

EMC Characteristics

EMI	CE	CISPR32/EN55032	CLASS B	（EMC Recommended Circuit）
	RE	CISPR32/EN55032	CLASS B	（EMC Recommended Circuit）
EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B	（EMC Recommended Circuit）
	CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B	（EMC Recommended Circuit）
	ESD	IEC/EN61000-4-2	Contact ±6KV Perf.Criteria B	
	Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B	（EMC Recommended Circuit）
	EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B	（EMC Recommended Circuit）
	Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B	

Ripple & Noise Test (Twisted Pair Method)



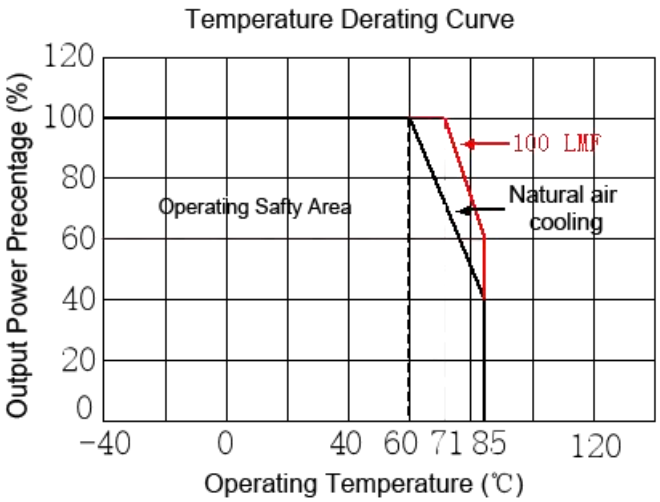
Test conditions:

1. Ripple noise is connected using 12# twisted pair cable, oscilloscope sampling uses sampling mode, oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe is used, 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 supply output port using a 30±2 cm twisted pair cable alone, and connected to the oscilloscope probe according to polarity.

3. It is recommended to output a minimum 10% load or connect an electrolytic capacitor with a high-frequency resistance of more than 470uF, otherwise the output voltage ripple will increase;

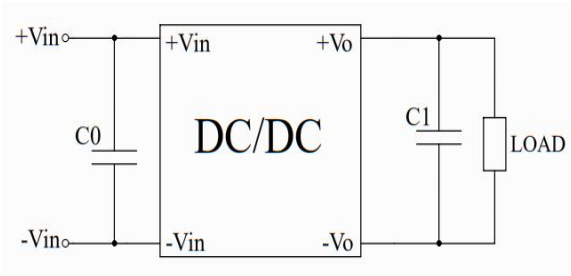
Characteristic Curve



Design and Application Reference

Recommended circuit

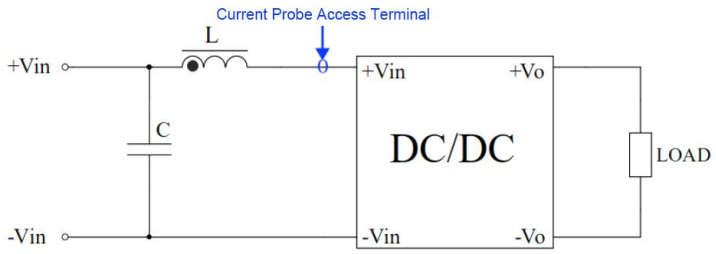
1. This series of module power supplies are tested according to this peripheral circuit before leaving the factory. Increasing the capacity of C0 or C1 can reduce the output ripple, but the output capacity must be less than the maximum capacitive load;



Parameter Description:

Components	Parameter
C0	100-220uF/100V
C1	470uF/50V

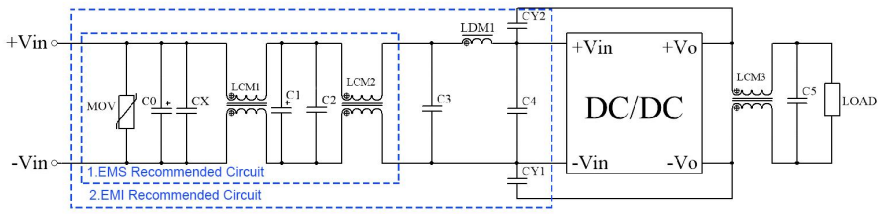
2. Input reflected ripple current test peripheral circuit:



Parameter Description:

Components	Parameter
C	220uF/100V
L	4.7uH/15A

3. Recommended EMC peripheral circuits:



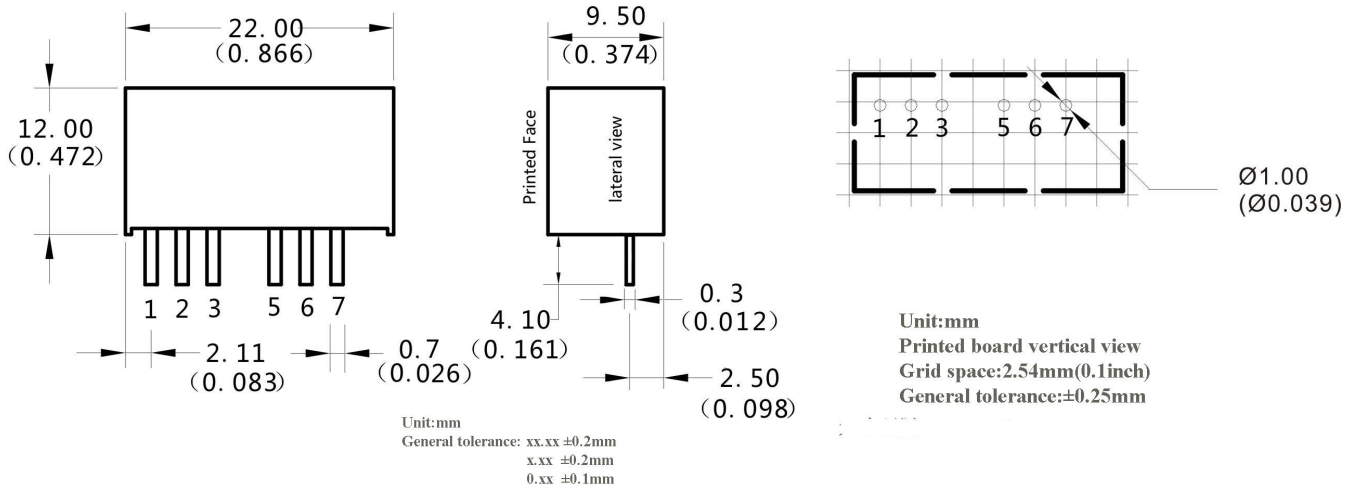
EMC Recommended Circuit

Note: Part 1 in EMC Recommended Circuit is for EMS testing, and part 2 in the figure is for EMI filtering, which can be adjusted according to the situation.

Parameter Description:

Components	Vin:24VDC	Vin:48VDC
FUSE	Choose according to customer needs	
MOV	14D560K	20D101K
CX	0.47uF	0.47uF
LDM1	4.7uH	4.7uH
C0	1000uF/50V	1000uF/100V
C1	220uF/50V	220uF/100V
C2、C3、C4	1uF/50V	1uF/100V
C5	47uF/50V	47uF/50V
LCM1	10mH	10mH
LCM2	3~5mH	1mH
LCM3	30uH	30uH
CY1,CY2	2.2nF/2KV	2.2nF/2KV

B1 Package (without Heat-sink) Dimension



Pin Definition

FK10-XXSXXE2C3	1	2	3	5	6	7
	-Vin	+Vin	Ctrl	NC	+Vo	GND

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;
2. 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;
3. 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;
4. Unless otherwise specified, the above data are measured at Ta=25℃, humidity<75%, input nominal voltage and output rated load (pure resistance load);
5. All the above index test methods are based on our company's standards;
6. 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. For specific circumstances, please contact our technical personnel directly;
7. Our company can provide product customization;
8. Product specifications are subject to change without prior notice. Please pay attention to the latest manual published on our official website.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: https://www.aipupower.com

