

### Typical Features

- ◆ Wide input voltage range (4:1), Output Power 6W
- ◆ Transfer Efficiency up to 87%
- ◆ Stand-by Power Consumption as low as 0.12W
- ◆ Output super-fast start up
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Protections: Input under voltage, output short circuit, over current
- ◆ Switching Frequency 350KHz
- ◆ Isolation Voltage 3000 VDC
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Good EMI performance
- ◆ International standard pin-out



### Application Field

**FK6-XXSXXE2C3** The newly developed DC-DC module power supply for our company, SIP package, 6W output power, ultra-wide voltage input range, ultra-low standby power consumption, isolated and regulated single output, can be widely used in industrial control, instrumentation, communication, Electricity, Internet of Things, BMS and other fields.

### Typical Product List

| Part no.       | Input Voltage Range (VDC) |       | Output Voltage/Current (Vo/Io) |                   | Input Current (mA) (Nominal Voltage) |              | Max. Capacitive Load | Ripple & Noise |       | Efficiency(%) Output full load, I/P nominal voltage |      |
|----------------|---------------------------|-------|--------------------------------|-------------------|--------------------------------------|--------------|----------------------|----------------|-------|---|------|
|                | Nominal                   | Range | Voltage (VDC)                  | Current (mA) MAX. | Full load typ.                       | No Load typ. |                      | uF             | mVp-p |   | Min. |
|                |                           |       |                                |                   |                                      |              | Typ.                 |                | Max   |   |      |
| FK6-18S3V3E2C3 | 24                        | 9-36  | 3.3                            | 1350              | 238                                  | 5            | 1800                 | 50             | 120   | 76  | 80   |
| FK6-18S05E2C3  | 24                        | 9-36  | 5                              | 1200              | 305                                  | 5            | 1000                 | 50             | 120   | 80  | 82   |
| FK6-18S09E2C3  | 24                        | 9-36  | 9                              | 667               | 298                                  | 10           | 470                  | 50             | 120   | 82  | 84   |
| FK6-18S12E2C3  | 24                        | 9-36  | 12                             | 500               | 298                                  | 10           | 470                  | 60             | 120   | 84  | 86   |
| FK6-18S15E2C3  | 24                        | 9-36  | 15                             | 400               | 298                                  | 10           | 220                  | 80             | 120   | 85  | 87   |
| FK6-18S24E2C3  | 24                        | 9-36  | 24                             | 250               | 298                                  | 10           | 100                  | 100            | 120   | 83  | 85   |
| FK6-18S48E2C3  | 24                        | 9-36  | 48                             | 125               | 300                                  | 10           | 100                  | 120            | 200   | 84  | 86   |
| FK6-36S3V3E2C3 | 48                        | 18-75 | 3.3                            | 1600              | 158                                  | 5            | 1200                 | 50             | 120   | 76  | 79   |
| FK6-36S05E2C3  | 48                        | 18-75 | 5                              | 1200              | 158                                  | 5            | 680                  | 50             | 120   | 80  | 83   |
| FK6-36S09E2C3  | 48                        | 18-75 | 9                              | 667               | 143                                  | 10           | 330                  | 50             | 120   | 82  | 84   |
| FK6-36S12E2C3  | 48                        | 18-75 | 12                             | 500               | 143                                  | 10           | 330                  | 60             | 120   | 84  | 86   |
| FK6-36S15E2C3  | 48                        | 18-75 | 15                             | 400               | 143                                  | 10           | 150                  | 80             | 120   | 85  | 87   |
| FK6-36S24E2C3  | 48                        | 18-75 | 24                             | 250               | 143                                  | 10           | 68                   | 100            | 120   | 85  | 87   |

1. The maximum capacitive load refers to the capacity of the capacitor that is allowed to be connected when the power supply is fully loaded. If the capacity is exceeded, the power supply may not be able to start;
2. 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 470uF is required, otherwise Will cause the output voltage ripple to increase;

### Input Specification

|                                |                                 |  |  |
|--------------------------------|---------------------------------|--|--|
| Stand-by Consumption           | 0.12 W(TYP)                     |  |  |
| Input Filter                   | Capacitor filter                |  |  |
| Input Under-Voltage Protection | 5~9VDC                          | @FK6-18SXXE2 input                           |  |
|                                | 12.5~14.5VDC                    | @FK6-36SXXE2 input                           |  |
| CTRL*                          | Module turn-on                  | CTRL suspended or TTL high level (3.5-12VDC) |  |
|                                | Module turn-off                 | CTRL connect to GND or low level (0-1.2VDC)  |  |
|                                | Input current when switched off | 6mA (TYP)                                    |  |

Note: \*The voltage of CTRL pin is relative to GND pin.

### Output Specification

|                                  |  |                      |                          |
|----------------------------------|--|----------------------|--------------------------|
| Output Voltage Accuracy          | 24VDC Full voltage full load   | Vo                   | ±2.0%                    |
|                                  | 48VDC Full voltage full load   |                      | ±3.0%                    |
| Line Regulation                  | Nominal load, full voltage range                                       | Vo                   | ±1.0%                    |
| Load regulation                  | 5% ~ 100% nominal load   | Vo                   | ±1.5%                    |
| Ripple & Noise                   | Other voltage, 5%~10% load, Twisted Pair Test Method, 20M Hz Bandwidth | 80mv(Typ)            | 120mV(max)               |
|                                  | 48V output, 5%~10% load, Twisted Pair Test Method, 20M Hz Bandwidth    | 120mv(Typ)           | 200mV(max)               |
| Output Over-load Protection      | 110%~230%  |                      |                          |
| Output Short circuit Protection  | Continuous, self-recovery  |                      |                          |
| Dynamic Response                 | 25% nominal load step<br>$\Delta Vo / \Delta t$                        | 3.3V/5V Output       | ±5% typ., ±8% max /500us |
|                                  |  | Other voltage output | ±3% typ., ±5% max /500us |
| Output Voltage Adjustment        | No adjustment  |                      |                          |
| Turn-on delay time               | Typical  | 100ms                |                          |
| Output Turn-on Overshoot Voltage | ≤10%Vo   |                      |                          |

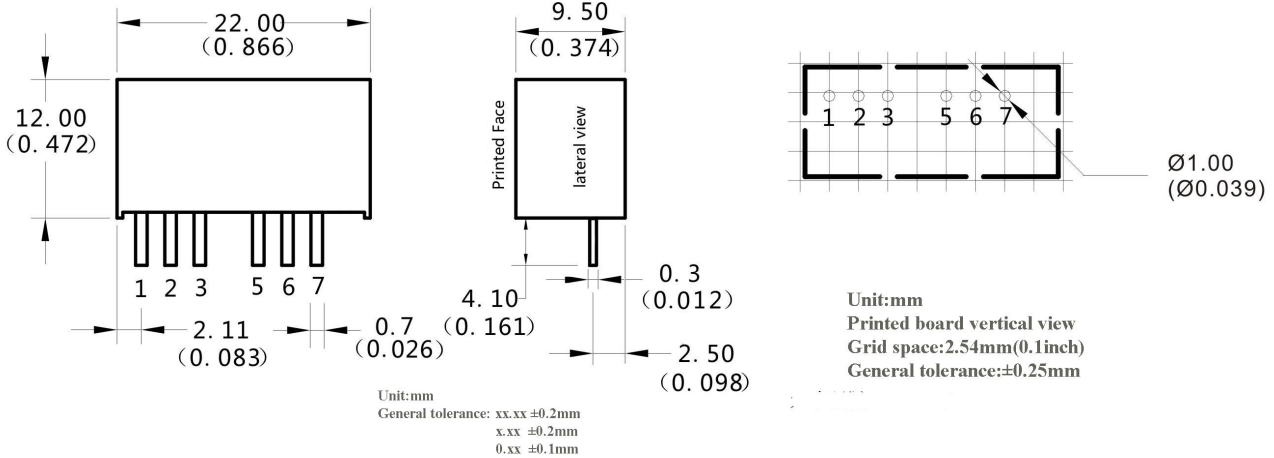
### General Specification

|                       |                                     |  |
|-----------------------|-------------------------------------|--|
| Switching Frequency   | Typical                             | 350KHz   |
| Operating Temperature | Refer to Temperature Derating Curve | -40°C ~ +85°C                                    |
| Storage Temperature   |                                     | -55°C ~ +125°C                                   |
| Max Case Temperature  | Within Operating Curve              | +105°C   |
| Relative Humidity     | No condensing                       | 5%~95%   |
| Case Material         |                                     | Black flame-retardant and heat-resistant plastic |
| Cooling Method        |                                     | Natural cooling                                  |
| Isolation Voltage     | Input to Output                     | 3000Vdc ≤0.5mA / 1min                            |
| MTBF                  | MIL-HDBK-217F@25°C                  | 2X10 <sup>5</sup> Hrs                            |
| Product Weight        | Average                             | 5g   |

### EMC Characteristics

| Total Items |     | Sub Items                         | Test Standard    | Class  |
|-------------|-----|-----------------------------------|------------------|--|
| EMC         | EMI | CE                                | CISPR22/EN55032  | CLASS B (see recommended circuit photo②)                 |
|             |     | RE                                | CISPR22/EN55032  | CLASS B (see recommended circuit photo②)                 |
|             | EMS | RS                                | IEC/EN61000-4-3  | 10V/m Perf.Criteria B (see recommended circuit photo2)   |
|             |     | CS                                | IEC/EN61000-4-6  | 3Vr.m.s Perf.Criteria B (see recommended circuit photo2) |
|             |     | ESD                               | IEC/EN61000-4-2  | Contact ±4KV Perf.Criteria B                             |
|             |     | Surge                             | IEC/EN61000-4-5  | ±2KV Perf.Criteria B (see recommended circuit photo1)    |
|             |     | EFT                               | IEC/EN61000-4-4  | ±2KV Perf.Criteria B (see recommended circuit photo1)    |
|             |     | Voltage dips, short interruptions | IEC/EN61000-4-11 | 0%~70% Perf.Criteria B                                   |

**Packing Dimension**



|              |               |
|--------------|---------------|
| Packing Code | L x W x H     |
| E            | 22X 9.5X12 mm |

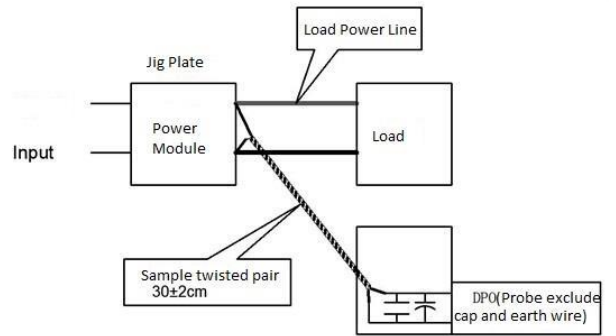
**Pin out Specifications**

|                   |      |      |      |    |       |     |
|-------------------|------|------|------|----|-------|-----|
|                   | 1    | 2    | 3    | 5  | 6     | 7   |
| Single output (S) | -Vin | +Vin | CTRL | NC | +Vout | GND |

**Ripple& Noise Test: (Twisted Pair Test Method 20MHz bandwidth)**

1. 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.

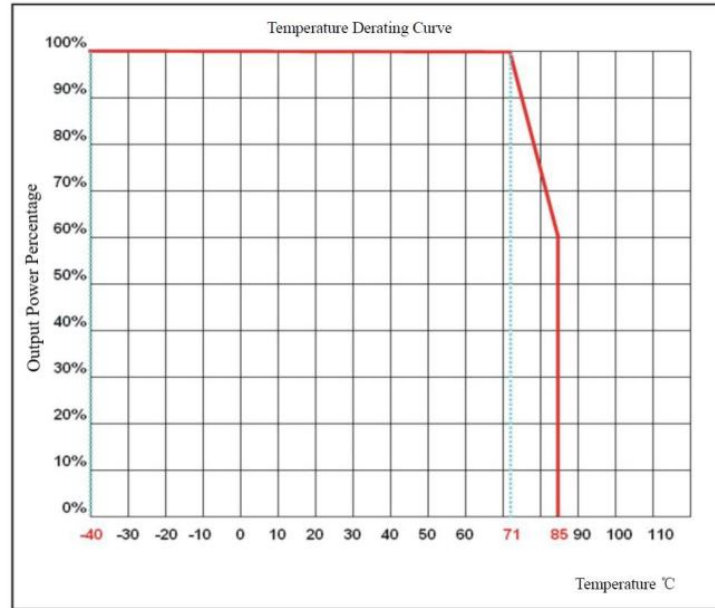
2. Output Ripple& Noise Test Method:  
 Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



**Application reference:**

1. It is recommended to output a minimum of 10% load or connect an electrolytic capacitor with a high-frequency resistance above 470uF, otherwise it will increase the output voltage ripple;
2. It is recommended that the load imbalance of dual output products is less than ±5%;
3. The maximum capacitive load is the result of the pure resistance full load condition test;
4. Our company can provide overall power supply solutions, or product customization;

**Product Characteristic Curve**

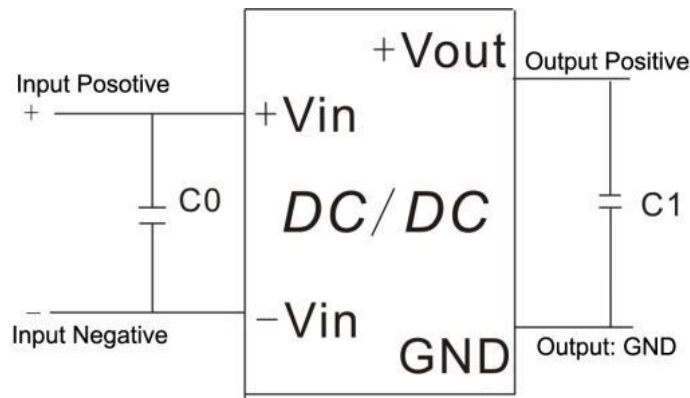


**Design Reference Application**

**Recommended circuit**

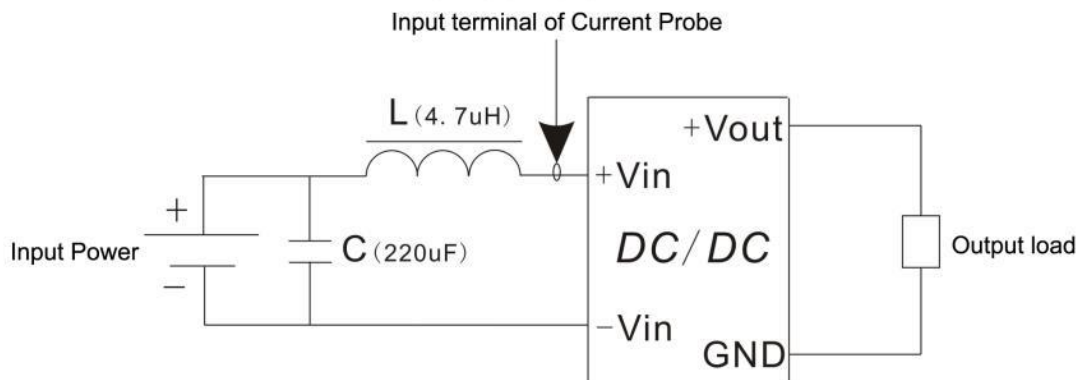
**1. DC/DC test circuit:**

Normal recommended capacitors: C0:47-100uF; C1:470uF.

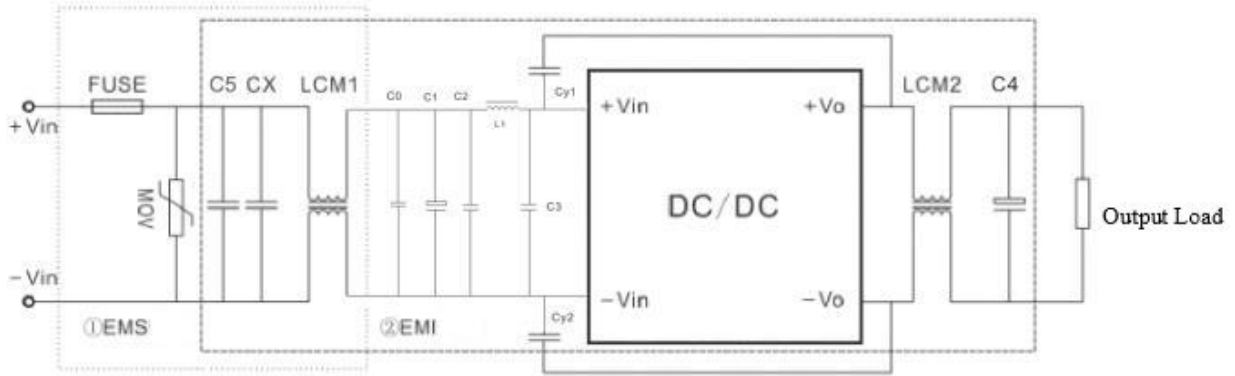


**2. Input reflecting ripple current test circuit:**

Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage;



**3.EMC external recommended circuit:**



**Recommended Spec:**

| Component | FK6-18SXXE2 Input               | FK6-36SXXE2 Input |
|-----------|---------------------------------|-------------------|
| FUSE      | According to customer's request |                   |
| MOV       | 14D560K                         | 14D101K           |
| CX        | 0.47uF/50V                      | 0.47uF/100V       |
| LCM1      | 20mH                            | 20mH              |
| C5        | 1000uF/50V                      | 500uF/100V        |
| C0        | 1uF/50V                         | 1uF/100V          |
| C1        | 220uF/50V                       | 220uF/100V        |
| C2,C3     | 1uF/50V                         | 1uF/100V          |
| L1        | 4.7uH                           | 4.7uH             |
| LCM2      | 30uH                            | 30uH              |
| C4        | 47uF/63V                        | 47uF/50V          |
| CY1,CY2   | 2.2nF/400V                      | 2.2nF/400V        |

**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 Ta=25°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. Please pay attention to the latest manual published on our official website.

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