CFK3-XXXXXE Series
DC-DC Converter

CONTRA solution

Typical Features

- ◆Ultra Wide Input Voltage Range (2:1), Output Power
- ◆High Efficiency up to 86%
- ◆With remote control Switch-off function
- ◆Continuous Short Circuit protection, Self-recovery
- ◆No overshoot when switching on and off
- ◆Isolation Voltage 1500VDC
- ◆Operating Temperature: -40℃～+85℃
- ◆Plastic Case, meet UL94 V-0 standard

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℃

Application Field

It could be widely used for instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise (Max.)	Efficiency (%)	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX./Min.	Full load Typ.	No Load Typ.	uF	mVp-p	Min.	Typ.
CFK3-05S3V3E	5	4.5 - 9	3.3	758	735	53	2200	100	66	68
CFK3-05S05E			5	600	801	38	2200	100	73	75
CFK3-05S09E			9	333	769	54	1000	100	72	74
CFK3-05S12E			12	250	763	39	1000	100	77	79
CFK3-05S15E			15	200	829	50	680	100	74	76
CFK3-05S18E			18	167	826	50	680	100	74	76
CFK3-05S24E			24	125	769	67	330	100	74	76
CFK3-12S3V3E	12	9 - 18	3.3	758	278	15	2200	100	70	72
CFK3-12S05E			5	600	313	6	2200	100	76	78
CFK3-12S06E			6	500	306	14	1000	100	78	80
CFK3-12S12E			12	250	306	18	1000	100	80	82
CFK3-12S15E			15	200	314	25	680	100	80	82
CFK3-12S24E			24	125	313	29	330	100	79	81
CFK3-24S3V3E	24	18 - 36	3.3	758	140	12	2200	100	72	74
CFK3-24S05E			5	600	155	6	2200	100	76	78
CFK3-24S09E			9	333	153	6	1000	100	78	80

CFK3-24S12E			12	250	152	4	1000	100	81	83
CFK3-24S15E			15	200	148	5	680	100	84	86
CFK3-24S24E			24	125	146	11	470	100	84	86
CFK3-48S05E	48	36 - 75	5	600	77	2	2200	100	80	82
CFK3-48S12E			12	250	74	1	1000	100	84	86
CFK3-48S15E			15	200	78	6	470	100	82	84
CFK3-48S24E			24	125	74	6	470	100	84	86
CFK3-05D05E	5	4.5 - 9	±5	±300	811	47	1000	100	72	74
CFK3-05D12E			±12	±125	807	41	680	150	72	74
CFK3-05D15E			±15	±100	876	51	470	100	70	72
CFK3-05D18E			±18	±84	730	70	330	100	74	76
CFK3-05D24E			±24	±62	769	67	330	100	76	78
CFK3-12D05E	12	9 - 18	±5	±300	316	7	2200	100	77	79
CFK3-12D12E			±12	±125	302	17	680	100	81	83
CFK3-12D15E			±15	±100	313	22	330	100	78	80
CFK3-24D05E	24	18 - 36	±5	±300	156	10	1000	100	78	80
CFK3-24D12E			±12	±125	141	10	680	100	83	85
CFK3-24D15E			±15	±100	144	10	330	100	84	86
*CFK3-48D05E	48	36 - 75	±5	±300	82	4.5	1000	100	77	79
*CFK3-48D12E			±12	±125	78	5	470	100	80	82
*CFK3-48D15E			±15	±100	78	6	330	100	78	80

1. "*" indicates a model under development;
2. In order to ensure that the module can work efficiently and reliably, its minimum output load cannot be less than 10% of the rated load when in use. If the power you need is indeed small, please connect a resistor in parallel at the output end. The recommended resistance value is equivalent to 10% of the rated power.
3. The capacitive load of the positive and negative outputs is the same.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Max Input Overshoot Voltage (1 Sec.)	4.5-9V Input	-0.7	-	16	VDC
	9-18V Input	-0.7	-	25	
	18-36V Input	-0.7	-	50	
	36-75V Input	-0.7	-	100	
Turn-on Voltage	4.5-9V Input	3.5	4	4.5	VDC
	9-18V Input	4.5	8	9	
	18-36V Input	11	16	18	

	36-75V Input	24	33	36	
Stand-by Power Consumption	0.5W (Max.)				
Input Filter	Capacitor Filter				

Output Specifications

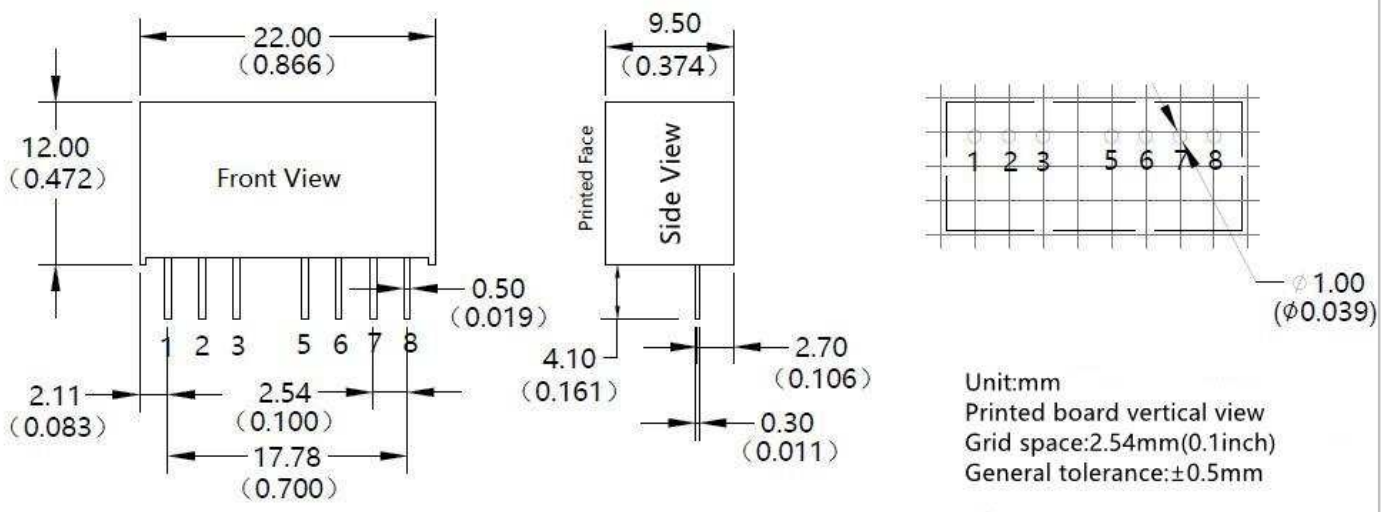
Positive Output Voltage Accuracy	Full voltage full load	+Vo	≤±2.0%
Negative Output Voltage Accuracy		-Vo	≤±3.0%
No Load Output Voltage Accuracy		Vo	Primary Output:≤±3.0%, Secondary Output:≤±5.0%
Line Regulation	Nominal load, full voltage range	Vo	Primary Output:≤±0.2%, Secondary Output:≤±0.5%
Load Regulation	10% ~ 100% rated load	Vo	Primary Output:≤±0.5%, Secondary Output:≤±3%
Cross Regulation	Dual output, Primary output 50% load, secondary output 10%-100% load		≤±5.0%
Ripple & Noise	Nominal load, nominal voltage		≤100mVp-p （20MHz bandwidth）
Temperature Drift Coefficient	100％ full load		±0.03%/℃
Dynamic Response	25% nominal load step change	△Vo /△t	≤±5.0%/0.5ms(Typ.)
Output Short Circuit Protection	Continuous, Self-recovery		

Note: 1.Un-balancing loads of dual output:±5%;
2. Ripple & Noise Tested by twisted-pair method, for details please check Design and Application Circuit.

General Specifications

Switching Frequency	typical	450KHz (Typ.)
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +85℃
Storage Temperature		-55℃ ~ +125℃
Max Case Temperature	Within Temperature Derating Curve	+105℃
Relative Humidity	No condensing	5%~95%
Case Material		Black flame-retardant heat-resistant Plastic(UL94 V-0)
Pin withstand welding temp	Distance to case 1.5mm, 10s	300℃ MAX
Isolation Voltage	Input to Output	1500Vdc ≤ 0.5mA / 1min
MTBF	MIL-HDBK-217F@25℃	$2X10^5$Hrs
Product Weight		4.5g(Typ.)
Package	Tube(225*20.5*12.5mm)	9PCS/Tube
	Inner Box(245*155*85mm)	432PCS(Total 48Tubes)

Packing Dimension



Packing Code	L x W x H	
E	22X9.5X12mm	0.866X0.374X0.472inch

Pin Function

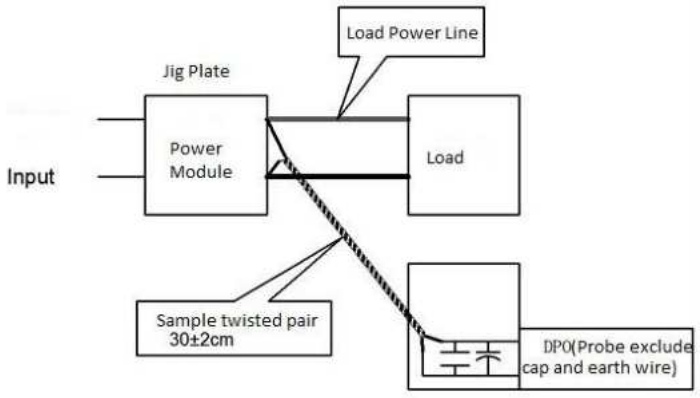
Pin	1	2	3	4	5	6	7	8
Single(S)	GND	+Vin	Ctrl	NP	NC	+Vo	0V	CS
Dual(D)	GND	+Vin	Ctrl	NP	NC	+Vo	0V	-Vo

Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

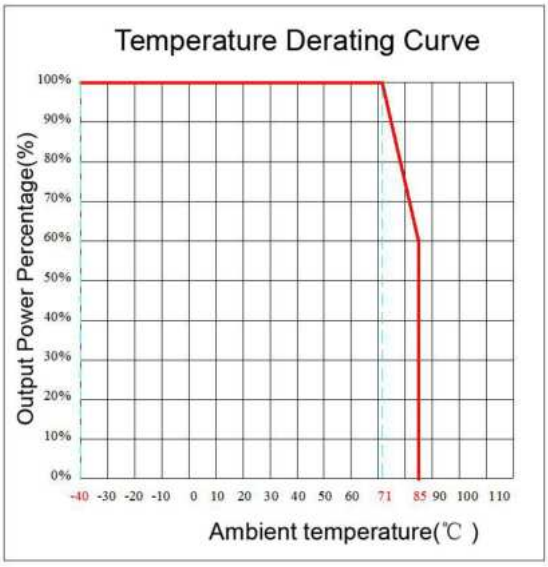
Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)

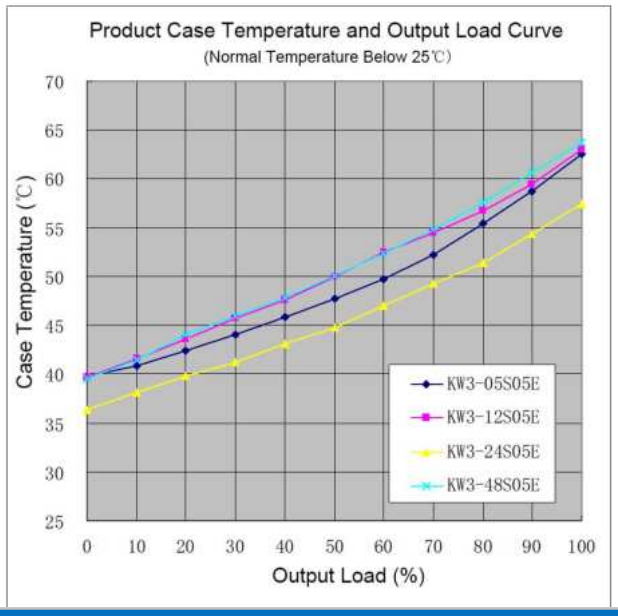
a.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

b. 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.



Temperature Curve





Design and Application Circuit Recommended

1.CS terminal

This terminal provides a connection point to connect the inside main filter capacitor of output terminal for the DC/DC converter(capacitor positive) , and can further improve the output ripple and noise through connecting a low ESR capacitor(Normal CS≤47uF) between this terminal and the 7 pin (capacitor negative).

2. Output Load Request

a. To ensure this module operate efficiently and reliably, the minimum load recommended not to be less than 10% of the nominal load. If the actual power is too small, please connect a resistor in parallel at output terminal, the resistance equal to 10% nominal load. If use positive negative dual output product, please try to avoid big unbalances between loads, or the original output voltage accuracy cannot be ensured.

b. The maximum capacitive load is tested under nominal input full load; if use it under no load condition, should try to decrease the output capacitive load or connect a resistor in parallel at output terminal, the resistance equal to 10% nominal load, otherwise it may cause the output voltage be un-stable or even exceed the original output voltage accuracy range

3.Recommended Circuit

DC/DC test circuit: If customers want to further decrease input& output ripple, the capacitance of external capacitor can be increased properly, but the maximum capacitance of the filter capacitor should be less than the maximum capacitive load, otherwise it will make it difficult to turn-on the module.

General recommendation:

Ci: 100uF (5V&12V) / 10uF (24V&48V)

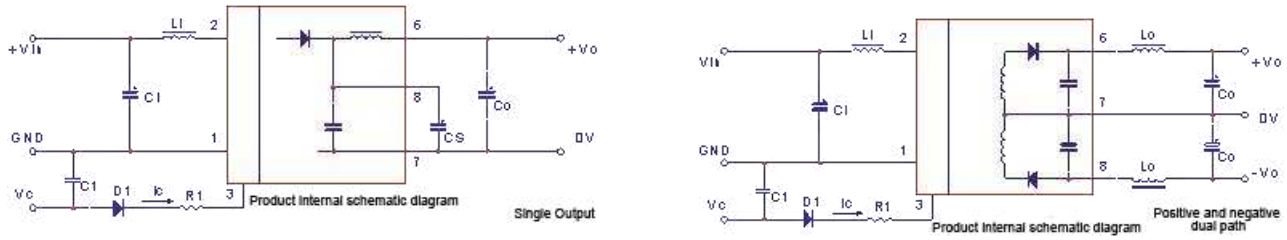
Li: 4.7uH～120uH

CS: 10uF～22uF

Co: 100uF (Typ.)

Lo: 2.2uH～10uH

C1: 47nF/100V



Recommended Circuit 1&2

4. CTRL Terminal

When it is suspended or high impedance, the module outputs normally; when it is connected to a high level (relative to the input ground), the module is shut down.

Note: The current flowing into this pin should be 5-10mA. If the current exceeds its maximum value (generally 20mA), the module will be permanently damaged. The R value can be calculated according to the following formula:

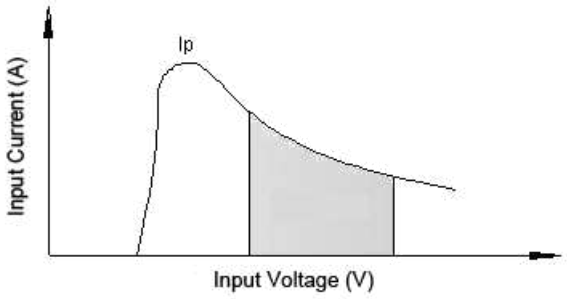
$$R = \frac{Vc - Vd - 0.7}{Ic} - 330$$ **（see Recommended Circuit 1&2)**

Where Vc is the input voltage of the Ctrl pin, Vd is the forward voltage drop of D1, 0.7V and 330Ω are the voltage drop of the module transistor and the internal connection resistance of the control pin input, and Ic is the current flowing into the control terminal.

5. Input current

When using an unstable power supply, please ensure that the output voltage fluctuation range and ripple voltage of the power supply do not exceed the indicators of the module itself. The output current of the input power supply must be sufficient to cope with the instantaneous startup current Ip of the DC/DC module (see the figure below).

General: $Ip \le 1.4 * Iin_{max}$



Note:

1. This product cannot be used in parallel and does not support hot swapping;
2. All indicator test methods in this article are based on our company's corporate standards
3. The product specification may be changed at any time without prior notice.