Typical Feature

- Wide input voltage range (4:1),Output Power 12W
- Transfer Efficiency up to 89%
- Stand-by Power Consumption as low as 0.1W
- Output super-fast start up
- Continuous Short Circuit protection, Self-recovery
- Input under voltage, output over voltage, short circuit, over current protection
- Switching Frequency 350KHz
- Isolation Voltage 1500VDC
- Operating Temperature: -40°C~+85°C
- Good EMI performance, bare board meet CISPR32/EN55032 CLASS A
- International standard pin-out

Application Field

FD12-XXSXXA3(C)2 *is a newly designed DIP 1X1 packed, 12W output power, ultra wide input range 4:1, low stand-by power consumption, isolated regulated output DC-DC converter, could be widely used for industrial control, instrument, communication, power electricity, internet of things field. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.*

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		Efficiency (%)@output full load, input nominal voltage	
		Nominal	Range	Voltage (VDC)	Current(mA)MAX. /Min.	Full load typ.	No Load typ.	uF	mVp-p Typ.	mVp-p Max.	Min	Typ
CE UL	FD12-18S3V3A3(C)2	24	9-36	3.3	2400/0	407	2	6000	50	100	79	81
CE UL	FD12-18S05A3(C)2	24	9-36	5	2000/0	502	2	3000	50	100	81	83
CE UL	FD12-18S09A3(C)2	24	9-36	9	1333/0	588	2	2000	50	100	83	85
CE UL	FD12-18S12A3(C)2	24	9-36	12	1000/0	575	2	2000	50	100	85	87
CE UL	FD12-18S15A3(C)2	24	9-36	15	800/0	568	2	1500	50	100	86	88
CE UL	FD12-18S24A3(C)2	24	9-36	24	500/0	568	2	600	50	100	86	88
-	FD12-36S3V3A3(C)2	48	18-75	3.3	2400/0	211	2	6000	50	100	76	78
-	FD12-36S05A3(C)2	48	18-75	5	2000/0	251	2	3000	50	100	81	83
-	FD12-36S09A3(C)2	48	18-75	9	1333/0	291	2	2000	50	100	84	86

-	FD12-36S12A3(C)2	48	18-75	12	1000/0	287	2	2000	50	100	85	87
-	FD12-36S15A3(C)2	48	18-75	15	800/0	281	2	1500	50	100	87	89
-	FD12-36S24A3(C)	48	18-75	24	500/0	284	2	800	50	100	86	88

1.. Suffix "C" is with control function; "N" is without control function. "-H"is with heatsink, "-T(H)" for chassis mounting(with heatsink),"-TS(H)" for DIN-Rail mounting(with heatsink), DIN-Rail width is: 35mm;

2. 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;

3. To reduce no load power consumption and improve efficiency of light-load, IC will be flitter frequency under no-load and light-load operating, output cannot be no load, at least with 10% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise;

Input Specification

Stand-by Consumption	0.1 W	
Input Filter	π filter	
Input Under-Voltage Protection	5~9VDC FD12-18SXXA3 Input	
	11~18VDC FD12-36SXXA3 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	5mA (TYP)

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

Output Specification

Output Voltage Accuracy	Full voltage full load	Vo	±2.0%
Line Regulation	Nominal load, full voltage range	Vo	±0.5%
Load Regulation	10% ~ 100% nominal load	Vo	±1.0%
Ripple & Noise	Nominal load, nominal voltage, Twisted Pair Method,20M Hz bandwidth;	≤15% load	5%Vo mVp-p typ.
		≥15% load	50mVp-p typ. 100mVp-p
Output Over-voltage Protection	120%~200%Vo		
Output Over-load Protection	110%~220%Io		
Output Short circuit Protection	Continuous, Self-recovery		
Dynamic Response	25% nominal load step change △Vo/△t	3.3V/5V Output	±3% typ, ±8% max /500us
		Others Output	±3% typ, ±5% max /500us
Output Voltage Regulation	Not Available		
Turn-on delay time	Typical	150ms	

Output Turn-on Overshoot Voltage		≤10%Vo

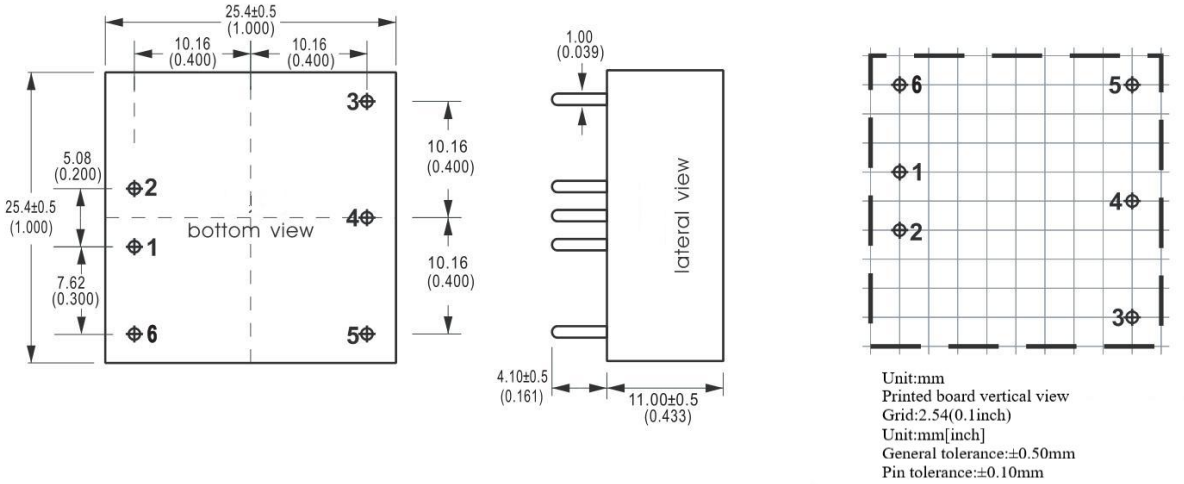
General Specification

Switching Frequency	Typical	350KHz
Operating Temperature	Refer to Temperature Derating Curve	-40℃ ~ +85℃
Storage Temperature	-	-55℃ ~ +125℃
Max Case Temperature	Within Operating Curve	+105℃
Relative Humidity	No condensing	5%~95%
Case Material	-	Aluminum Metal Case
Cooling Method	-	Free air convection
Isolation Voltage	Input to Output	1500Vdc ≤ 0.5mA / 1min
MTBF	MIL-HDBK-217F@25℃	$2X10^5$Hrs
Product Weight	Average	15g

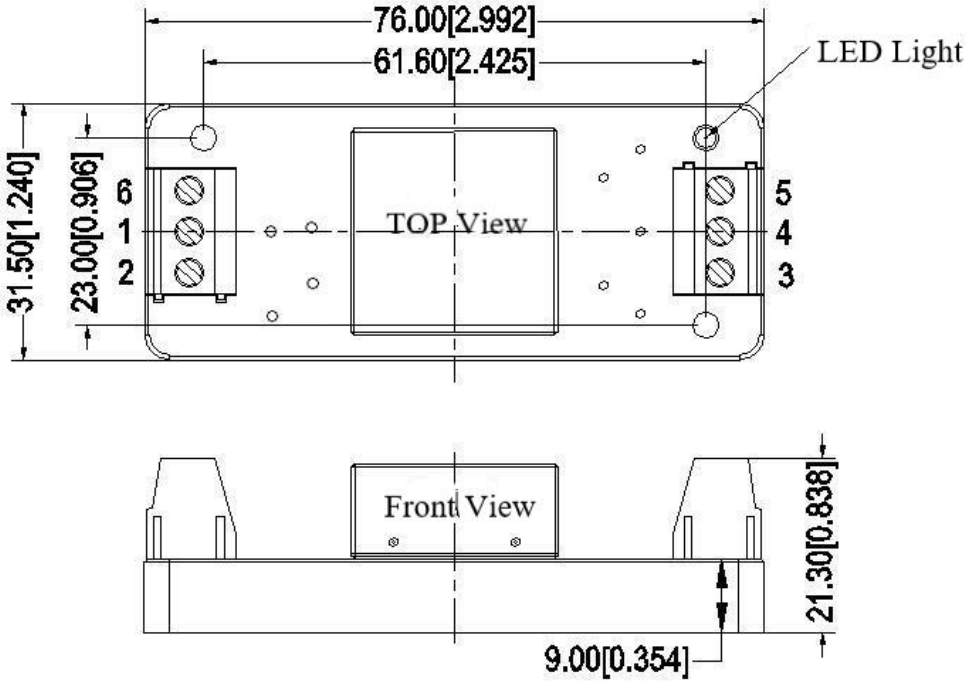
EMC Characteristics

Total Items		Sub Items	Test Standard	Class
EMC	EMI	CE	CISPR22/EN55032	1.CLASS A bare board 2.CLASS B (see recommended circuit photo ②)
		RE	CISPR22/EN55032	1.CLASS A bare board 2.CLASS B (see recommended circuit photo ②)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (see recommended circuit photo 2)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (see recommended circuit photo 2)
		ESD	IEC/EN61000-4-2	±4KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B (see recommended circuit photo 1)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B (see recommended circuit photo 1)
		Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%~70% Perf.Criteria B

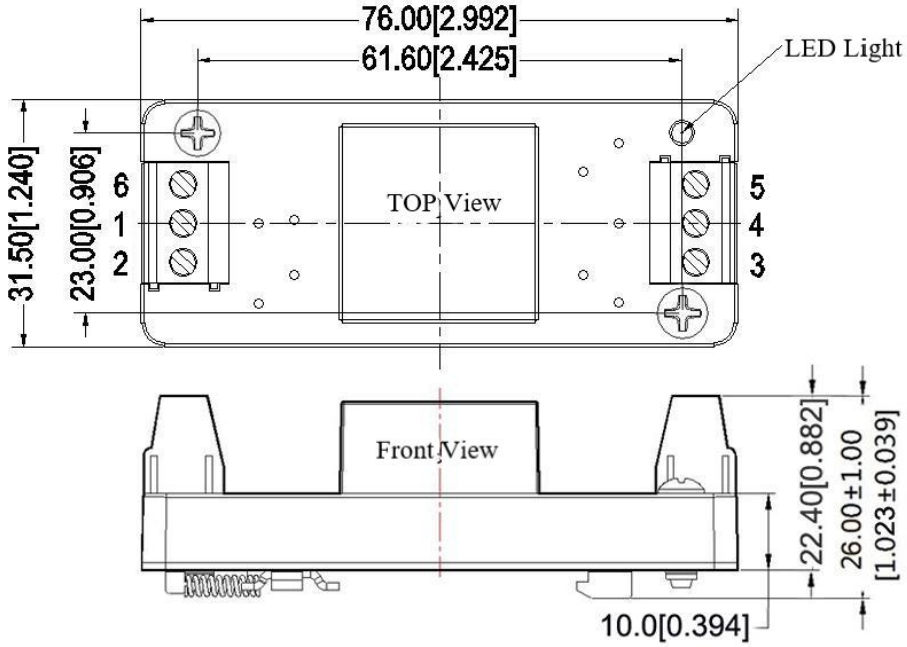
A3 Packing Dimension



A3-T Packing Dimension



A3-TS Packing Dimension



Packing Code	L x W x H	
A3	25.4X 25.4X11 mm	1X1 X0.433inch
A3-H	25.4X 25.4X16 mm	1X1 X0.630inch
A3-T	76X31.5X21.3mm	2.99X1.24X0.838inch
A3-TS	76X31.5X26mm	2.99X1.24X1.023inch

Pin-out

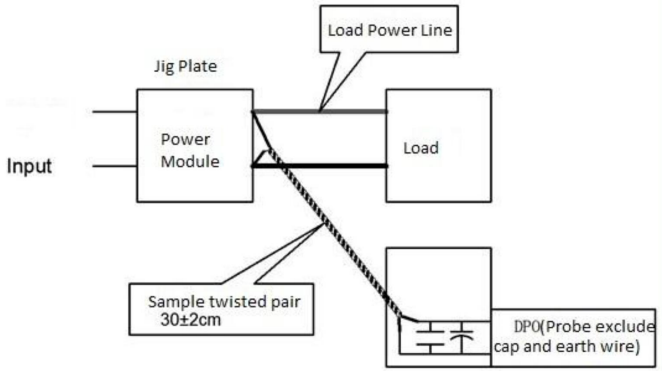
Pin-Out	1	2	3	4	5	6
FD12-XXSXXA3C2	-Vin	+Vin	+Vout	NP	GND	CTRL
FD12-XXSXXA3N2	-Vin	+Vin	+Vout	NP	GND	NP

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)

Test Method:

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.



Application Reference:

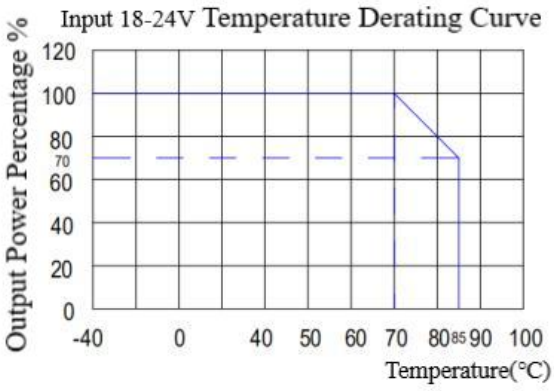
1.The recommended minimum load is 10% or above 470uF high frequency low resistance electrolytic capacitor, or output ripple will rise;

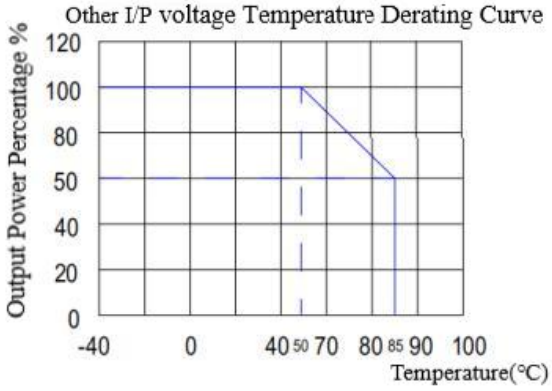
2.Recommend the unbalance loads of dual output to be ≤±5%;

3.The maximum capacitive load is tested under pure resistance and full load condition;

4.Our company could provide whole power supply solution, or customized made items; Due to space limitation, please contact our team for more information.

Product Characteristic Curve



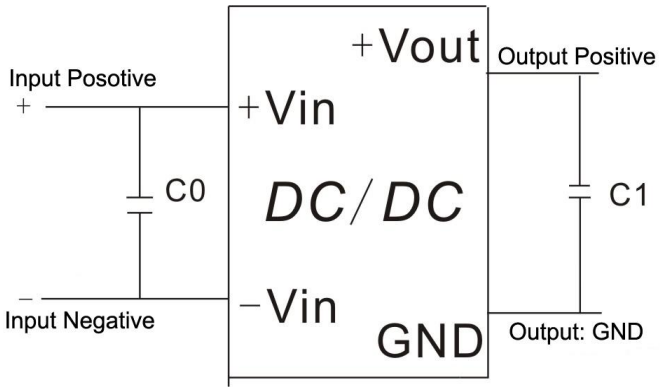


Design Application

Recommended circuit

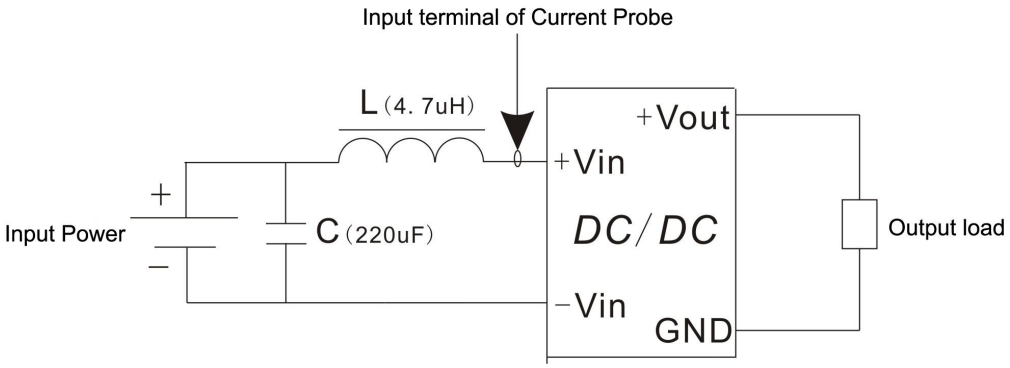
1. DC/DC test circuit:

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

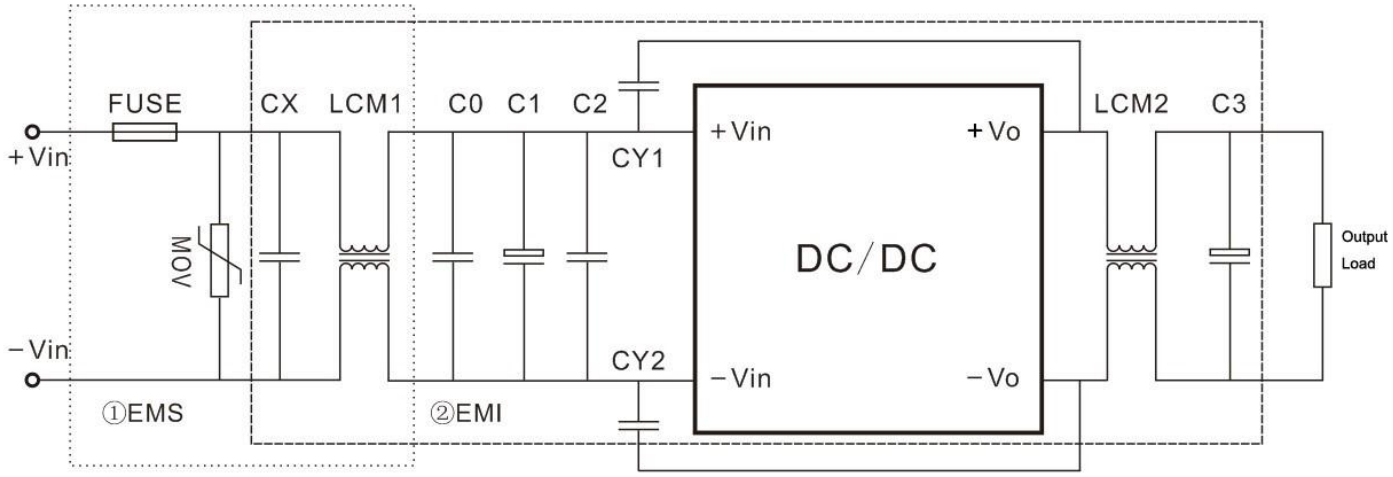


2. Input reflecting ripple current test circuit:

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



3.EMC external recommended circuit:(Photo 1 and Photo 2)



Recommended Spec:

Component	FD12-18SXXA3 Input	FD12-36SXXA3 Input
FUSE	According to customer's request	
MOV	14D560K	14D101K
CX	0.47uF	0.47uF
LCM1	10mH	10mH
C0	0.1uF/250V	0.1uF/250V
C1	220uF/100V	220uF/100V
C2	0.1uF/250V	0.1uF/250V
LCM2	30uH	30uH
C3	47uF/50V	47uF/50V
CY1,CY2	2.2nF/2000V	

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℃, 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.

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