

Product Typical Features

- ◆ Wide input voltage range (4:1), Output Power 6W
- ◆ Transfer Efficiency up to 85%
- ◆ Stand-by Power Consumption as low as 0.05W
- ◆ Output super-fast start up
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Input under voltage, output over voltage, short circuit, over current protection
- ◆ Switching Frequency 250KHz
- ◆ Isolation Voltage: 2150Vac
- ◆ Operating Temperature: -40°C~+85°C
- ◆ Good EMI performance
- ◆ International standard pin-out



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°C.

Application Field

FD6-110SXXA3N4 is a newly designed DIP 1X1 packed, 6W 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.

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, input nominal voltage	
	Nominal	Range	Voltage (VDC)	Current (mA) MAX./Min.	Full load typ.	No Load typ.	uF	mVp-p		Min.	Typ.
								Typ.	Max.		
FD6-110S3V3A3N4	110	40-160	3.3	1818/0	70	1	6000	50	100	75	77
FD6-110S05A3N4	110	40-160	5	1200/0	67	1	6000	50	100	78	81
FD6-110S09A3N4	110	40-160	9	667/0	66	1	3000	50	100	80	82
FD6-110S12A3N4	110	40-160	12	500/0	65	1	2000	50	100	83	85
FD6-110S15A3N4	110	40-160	15	400/0	65	1	1000	50	100	83	85
FD6-110S24A3N4	110	40-160	24	250/0	64	1	500	50	100	84	86

1. * marked part has been developed in process

2. The maximum capacitive load is the capacitance allowed to be used when the power supply operate at full load. The convertor may

not start up if the capacitor exceeds this value.

3. The chip could operate at jitter frequency situation at no load or light load to decrease no-load power consumption, so no load is not available. $\geq 10\%$ load or a high-frequency resistance E-cap ($\geq 470\mu\text{F}$) load is recommended, to avoid the output ripple increasing.

4. In the part numbers C indicates the part with Control function, T indicates with Trim function, N indicates with none of Control or Trim.

Input Specification

Stand-by Consumption	0.05 W(TYP)		
Input Filter	π filter		
Input Under-Voltage Protection	34VDC Input		
CTRL*	Module turn-on	CTRL suspended or connect to TTL high level (2.5-12VDC)	
	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 -Vin pin.

Output Specification

Output Voltage Accuracy	Full voltage full load	Vo	$\pm 2.0\%$ (max)
Voltage Regulation	Nominal load, full voltage range	Vo	$\leq \pm 0.5\%$
Load Regulation	10% ~ 100% nominal load	Vo	$\leq \pm 1.0\%$
Ripple & Noise	Nominal load, nominal voltage Twisted Pair Method, 20M Hz bandwidth;	$\leq 15\%$ load,	5%Vo mVp-p typ
		$\geq 15\%$ load,	50mVp-p typ, 100mVp-p max
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	$\Delta V_o / \Delta t$	$\leq 6\% / 500\mu\text{s}$
Output Voltage Adjustment	Not Available		
Turn-on delay time	Typical	30ms	
Output Voltage Set-up Time	Rated Input, satisfy output	2mS	
Output Turn-on Overshoot Voltage		$\leq 10\% V_o$	

General Specification

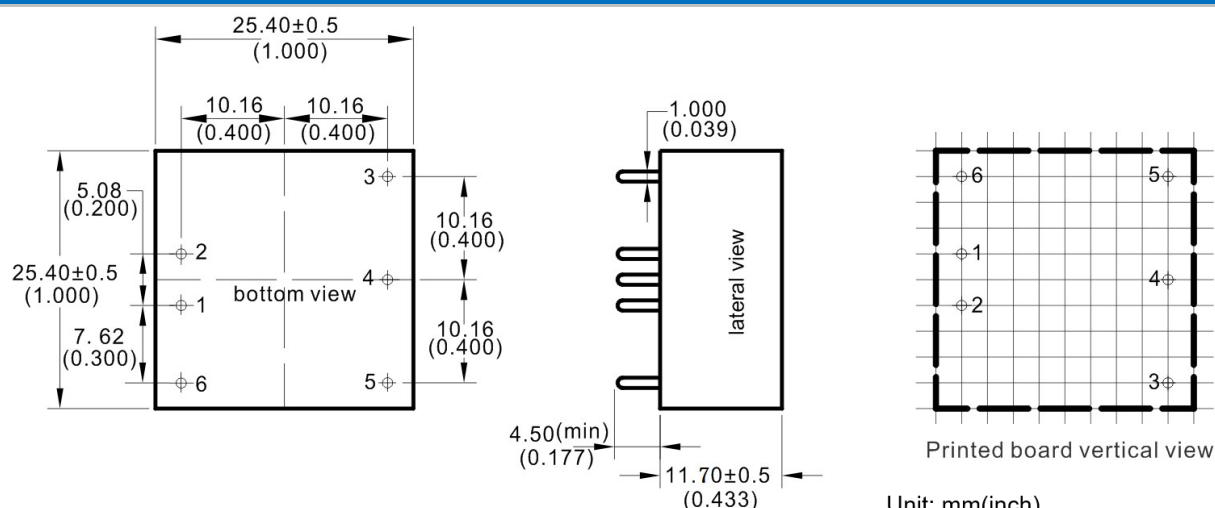
Switching Frequency	Typical	250KHz
Operating Temperature	Refer to Temperature Derating Curve	$-40^\circ\text{C} \sim +85^\circ\text{C}$
Storage Temperature		$-55^\circ\text{C} \sim +125^\circ\text{C}$

Max Case Temperature	Within Operating Curve	+105°C
Relative Humidity	No condensing	5%~95%
Case Material		Aluminum Metal Case
Cooling Method		Free air convection
Isolation Voltage	Input to Output	2100Vac ≤ 5mA / 1min
Meantime Between Failure	MIL-HDBK-217F@25°C	2X10 ⁵ Hrs
Product Weight	Average	15g

EMC Performances

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

Mechanical Dimensions



Unit: mm(inch)
Grid: 2.54x2.54(0.10x0.10)
General tolerance: ±0.25(±0.010)
Pin diameter tolerance: ±0.10(±0.004)

Packing Code	L x W x H	
A3	25.4X 25.4X11.7 mm	1X1 X0.433 inch

Pin out Definition

Single (S)	1	2	3	4	5	6
	-Vin	+Vin	+Vout	NP	GND	CTRL
Dual (D)	1	2	3	4	5	6
	-Vin	+Vin	+Vout	COM	-Vout	CTRL

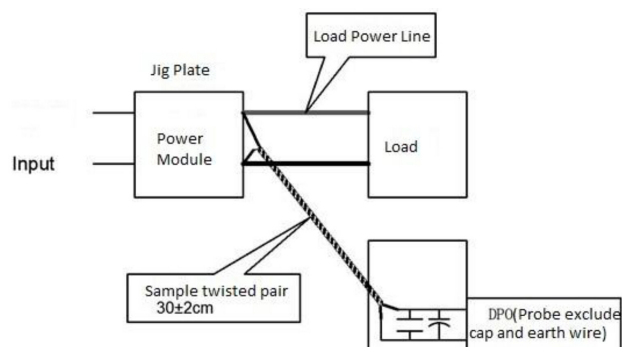
Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

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

Test Method:

1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set on the Sample Mode.

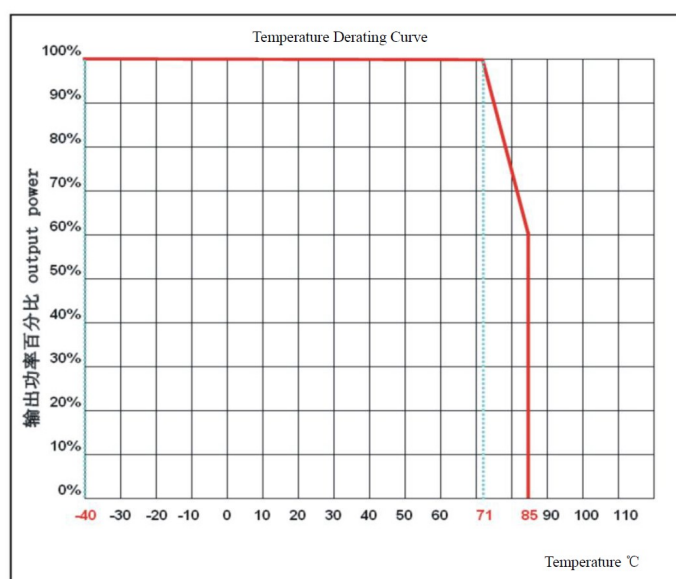
2) The output ripple noise test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Note:

1. It is recommended to connect a $\geq 10\%$ load or a high-frequency resistance E-cap ($\geq 470\mu\text{F}$) load at output to avoid the output ripple increasing.
2. Recommend the unbalance loads of dual output to be $\leq \pm 5\%$.
3. The maximum capacitive load is tested at pure resistance and full load condition.

Product Performance Curve

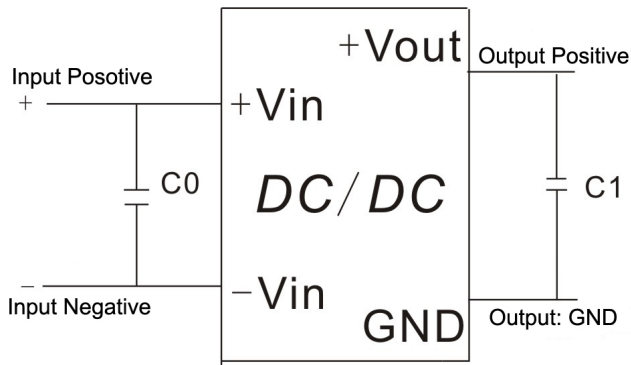


Recommended Circuits for Application

1. Recommended for typical application

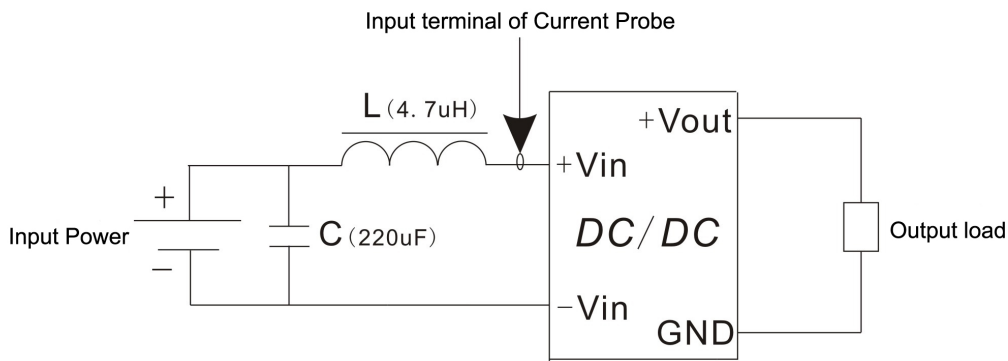
DC/DC test circuit:

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

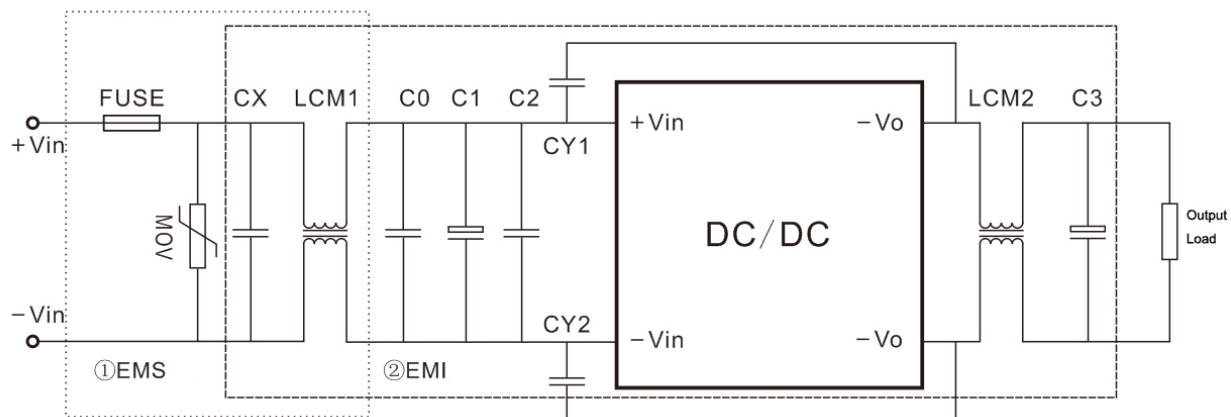


2. Input reflecting ripple current test circuit

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



3. Recommended EMC circuit



Component	Recommended specification
FUSE	TBD by customer
MOV	14D201K
CX	0.47 uF
LCM1	10mH
C0	1uF/250V
C1	100uF/200V
C2	1uF/250V
LCM2	30uH
C3	47uF/50V
CY1,CY2	2.2nF/2000V

Application Notice:

1. The products should be used according to the specifications in this manual, otherwise it could be permanently damaged.
2. The product performances in this manual cannot be guaranteed if it works at a lower load than the minimum load defined.
3. Unless otherwise specified, all values or indicators in this manual are tested at Ta=25℃, humidity<75%RH, rated input voltage and rated load (pure resistance load).
4. All values or indicators in this manual had been tested based on Aipupower test specifications.
5. The specifications are specially for the parts listed in this manual, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirement.
6. Aipupower can provide customization service.
7. The product specifications may be modified without a prior notice. Please refer to the published data sheet in Aipupower website.

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