

5ACF1W_4 series

5W - AC-DC converter

AC-DC Converter

5 Watt

- ⊕ Wide input voltage range: 90-528VAC/127-746VDC
- ⊕ No-load power: $\leq 0.2W$ (230VAC)
- ⊕ Transfer efficiency up to 80% (230VAC)
- ⊕ Switching frequency: 65kHz (typ.)
- ⊕ Protections: short circuit and over current
- ⊕ Isolation voltage: 4000VAC
- ⊕ PCB mounting

Introducing our new 5ACF1W_4 series: featuring a wide input voltage range of 90-528VAC/127-746VDC, this converter ensures flexibility and reliability in various applications. With no-load power consumption of $\leq 0.2W$ (230VAC) and transfer efficiency up to 80% (230VAC), it delivers efficient performance.

Operating at a typical switching frequency of 65kHz, the converter includes essential protections against short circuit and over current. It provides robust isolation with a voltage of 4000VAC and is designed for easy PCB mounting, ensuring seamless integration into your projects.



Common specifications

Short circuit protection	Long-term short-circuit, self-recovery - Hiccup
Over current protection	Enter the full range - $\geq 130\%$ Io self-recovery - Hiccup
Switching frequency	60 KHz (min.) 65 KHz (typ.) 70 KHz (max.)
Operating temperature	-40°C - +85°C (The temperature derating needs to be performed on the basis of the temperature derating curve. The derating curve diagram can be seen in the back - product characteristic curve).
Storage temperature	-40°C - +105°C
Soldering temperature	Wave soldering 260 \pm 4°C, time 5-10S Manual soldering 360 \pm 8°C, time 4-7S
Relative humidity	10-90% RH
Hot plug	Not support
Remote control terminal	No remote control
Vibration	10-55Hz,10G,30Min,alongX,Y,Z
MTBF (MIL-HDBK-217F@25°C)	>300,000 Hours

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	AC input	90	230	528	VAC
	DC input	127	325	746	VDC
Input frequency range		47	50	63	Hz
Input current	115VAC			0.15	A
	230VAC			0.10	A
Surge current	115VAC			10	A
	230VAC			17	A
No-load power consumption	Input 230VAC			0.2	W
	Output 480VAC			0.5	W
External fuse	2.0A/500VAC,Slow fuse (required)				
Leakage current	0.25mA TYP / 230VAC/50HZ				
Recommended external Input fuse	1A-3A/250VAC slow fusing				

Example:

5ACF1W_05S4

5 = 5Watt; AC = AC-DC; F = Open Frame; E1 = Cost effective;

W = Wide input; 05 = 5Vout; S = Single output; 4 = 4 kVAC isolation

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	Input full voltage range		± 1.0	± 2.0	%
	Any load				
Linear regulation rate	Nominal load			± 0.5	%
Load regulation	Input nominal voltage 20%~100% load			± 0.5	%
Minimum load	Single Output	0			%
Start up delay time	Input 230VAC (Full Load)		500		mS
Power-off holding time	Input 115VAC (full load)		50		mS
	Input 220VAC (full load)		80		mS
Power down hold time	Input 400VAC (Full load)		100		mS
Dynamic response	Overshoot range 25%~50%~25%	-5.0		+5.0	%
	Recovery time 50%~75%~50%	-5.0		+5.0	mS
Output overshoot	Input full voltage range		$\leq 10\%V_o$		%
Drift coefficient		-	$\pm 0.03\%$	-	%/°C
Ripple noise*	Vout = 5V		80	120	mV
	Vout = 12V		100	150	mV
	Vout = 24V		120	200	mV

The test method of ripple and noise adopts the twisted pair test method. For the specific test method and collocation, please refer to the following (ripple & noise test description).

Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Isolation voltage	Input-Output - Test for 1 minute, leakage current $\leq 5mA$	4000			VAC
Insulation resistance	Input-Output @ DC500V	100			MΩ

- The product should be used within the specification range, otherwise it will cause permanent damage to the product;
- The input end of the product must be connected to insurance;
- If the product works below the minimum required load, the product performance cannot be guaranteed to meet all the performance indicators in this manual;
- 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;
- Unless otherwise specified, the above data are all measured at $T_a = 25^\circ C$, humidity <75%, input nominal voltage and output rated load (pure resistive load);
- All the above index test methods are based on the company's standards;
- The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff directly;
- Our company can provide product customization;
- Product specifications are subject to change without notice. Please pay attention to the latest manual published on our official website.

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EMC specifications

EMC	EMI	CE	CISPR22/EN55022, CLASS B (Recommended circuit is shown in Figure 3)	
EMC	EMI	RE	CISPR22/EN55022, CLASS B (Recommended circuit is shown in Figure3)	
EMC	EMS	ESD	IEC/EN 61000-4-2 ±4KV / ±8KV	perf. Criteria B (Recommended circuit is shown in Figure2)
EMC	EMS	RS	IEC/EN 61000-4-3 10V/m	perf. CriteriaB (Recommended circuit is shown in Figure3)
EMC	EMS	EFT	IEC/EN 61000-4-4 ±2KV	perf. Criteria B (Recommended circuit is shown in Figure2)
EMC	EMS	Surge	IEC/EN 61000-4-4 ±4KV	perf. Criteria B (Recommended circuit is shown in Figure3)
EMC	EMS	CS	IEC/EN 61000-4-5 line to line ±1KV (Recommended circuit is shown in Figure2)	
			IEC/EN 61000-4-5 line to line ±2KV/line to ground ±4KV (Recommended circuit is shown in Figure3)	
			IEC/EN 61000-4-6 10 Vr.m.s perf. Criteria B (Recommended circuit is shown in Figure3)	

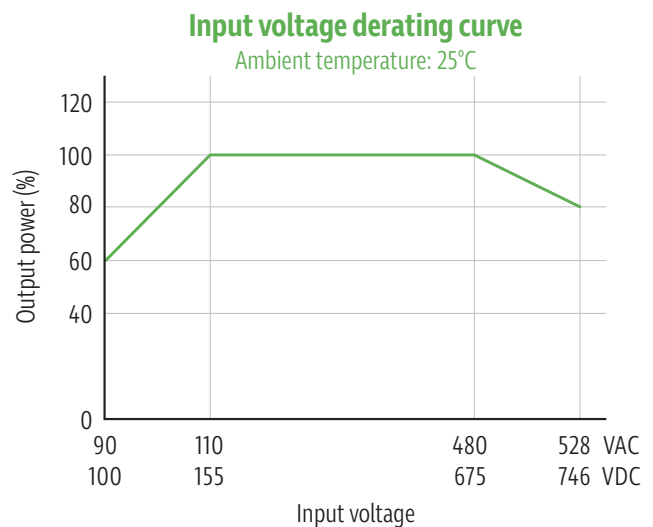
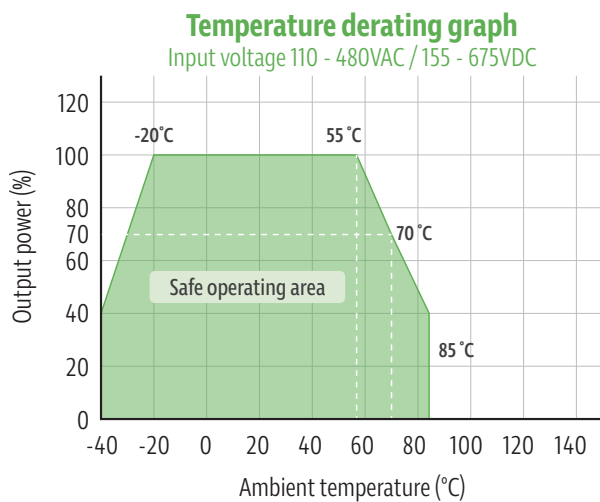
Product Selection Guide

Approval	Model	Output Power (W)	Output Voltage Vo(V)	Output Current Io(mA)	Max. Capacitive Load (uF)	Ripple & Noise 20MHz (Max)	Efficiency Full Load, 220VAC Typ. (%)
	5ACF1W_05S4	5	5	1000	3000	80	76
	5ACF1W_12S4	5	12	420	2200	120	78
	5ACF1W_15S4	5	15	300	2000	120	79
	5ACF1W_24S4	5	24	210	600	120	80

Note:

- 1: The ripple test needs to be tested under the condition of adding peripherals;
- 2: The typical value of output efficiency is based on the product aging for 30mins under full load;
- 3: The minimum efficiency is defined as -2% of the typical value due to the instrumental error of the test equipment;
- 4: Due to the limited space, the above is only a partial list of products. If you need products other than the list, please contact the sales department of our company.
- 5: Please us suffix „/L“ for L-bent shaped pinout version: i.e. 5ACF1W_24S4/L

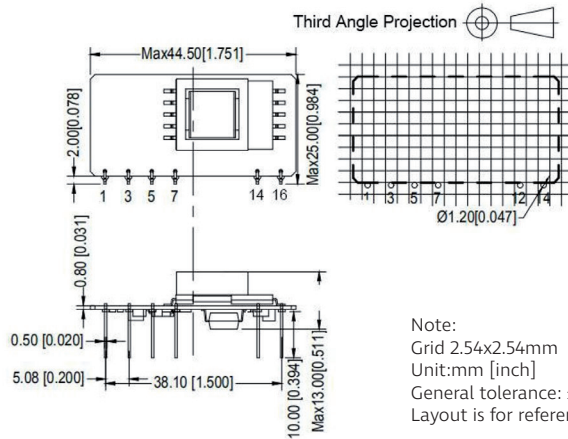
Product characteristic curve



Note

- 1: Input Voltage should be derated based on Input voltage derating curve when it is 85-100VAC/277-305VAC/120-140VDC/ 390-430VDC
- 2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

Dimensions and recommended layout - L-shaped pins

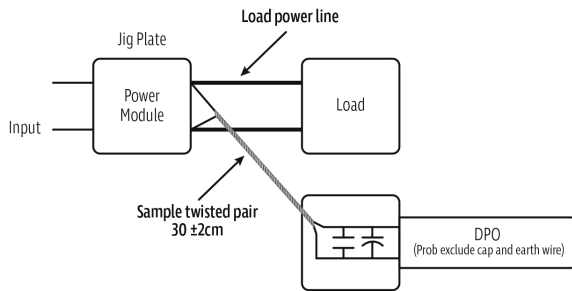


Note:
 Grid 2.54x2.54mm
 Unit:mm [inch]
 General tolerance: ±1.00mm[±0.039inch]
 Layout is for reference, please refer to actual item

Pin	1	3	5	7	14	16
Single	AC (N)	AC (L)	+V (CAP)	-V (CAP)	-V0	+V0

Ripple & noise test: (twisted pair method 20MHz bandwidth)

Twisted pair method (20MHz bandwidth)



Test Method:

1. Connect the twisted pair, set the oscilloscope bandwidth to 20MHz, use a 100M bandwidth probe, and terminate with a 0.1uF polypropylene capacitor and a 10uF high-frequency low-resistance electrolytic capacitor in parallel. Configure the oscilloscope to sample mode.
2. Connect the input terminal to the power supply and the output terminal to the electronic load using a jig plate. Use a 30cm (±2 cm) sampling line, and select the power line from appropriately insulated wires of the corresponding diameter according to the output current flow.

Typical application circuit

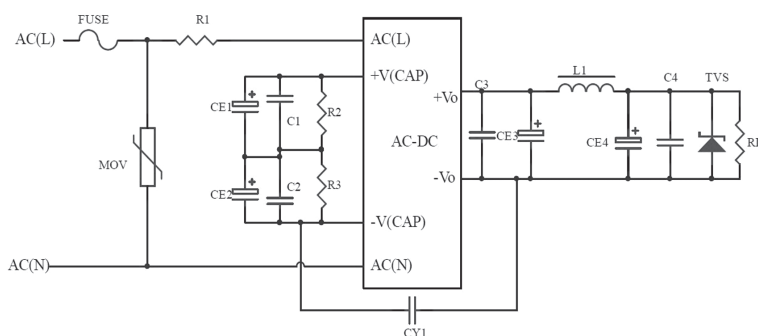


Figure 2

Note:

1. FUSE is a fuse, the recommended specification is 2A/500VAC, slow break (required);
2. MOV is a varistor, 14D102K (required);
3. R1 is metal sheath/cement resistance, 20Ω/1W (required);
4. CE1 and CE2 are electrolytic capacitors, 33uF/450V (required);
5. R1 and R2 are discharge resistors, 3M/1206. (required);
6. TVS is a transient suppression diode, SMBJ20A;
7. CY1 is a Y capacitor, 470pF/500V (required).

Products Number	CE3,CE4(Required)	C1, C2	C3,C4	L1 (Required)	TVS1
5ACF1W_05S4	470uF/10V	0.1uF/630V	0.1uF/50V	4.7uH/3A	SMBJ7.0A
5ACF1W_12S4	220uF/16V	0.1uF/630V	0.1uF/50V	4.7uH/3A	SMBJ20A
5ACF1W_24S4	220uF/35V	0.1uF/630V	0.1uF/50V	5.6uH/3A	SMBJ30A

Note:
 1) C1: AC input, C1 is input filter electrolytic capacitor (necessary), recommended value is 33uF/450V; DC input, C1 is big filter capacitor in the EMC filter (necessary), recommended value is 33uF/450V;
 2) R1 is limited resistor, recommended value is 12Ω, 5W;
 3) MOV1 is piezoresistor, recommended model is 10D561K;

EMC Solutions and Recommended Circuits

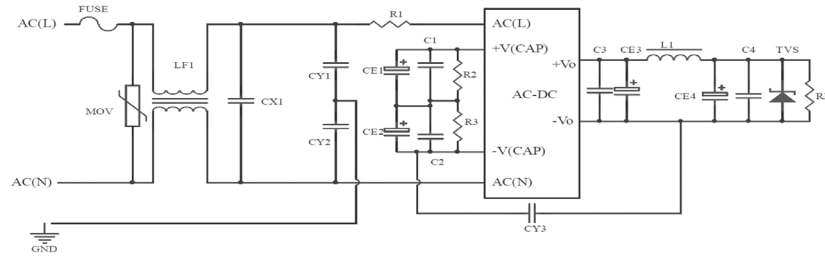


Figure 3

Recommended parameters:

1. FUSE is a fuse, the recommended specification is 2A/500VAC, slow break (required);
2. MOV is a varistor, 14D102K (required);
3. R1 is metal sheath/cement resistance, 20Ω/1W (required);
4. CY1, CY2, CY3 are Y capacitors, 470pF/500VAC (required);
5. CX1 is the X capacitor, 0.33uF/530VAC (required);
6. LF1 is a common mode inductor, 15mH/0.5A (required).

Note: The recommended values of other components are based on the actual application and refer to the typical application circuit.