5ACOS_S series

5Watt - Single output AC-DC converter - Universal input - Non-isolated

AC-DC Converter 5 Watt

- **Ultra-wide 85-305VAC and 70-430VDC input voltage range**
- **Operating ambient temperature range: -40°C to +85°C**
- **Compact size, open frame**
- **Up to 77% efficiency**
- **Green power**
- **Industrial-grade design**
- **Flexible selection of EMC addtional circuits, simplify customer PCB layout**
- **Output short circuit, over-current protection**
- **EN62368 safety approval**

The 5ACOS_S series is one of GAPTEC's highly efficient green power AC-DC Converter series. It features wide input voltage range, accepting both DC and AC input voltage, high reliability and low power consumption. All models are widely used in industrial control instrumentation, electric power applications and smart home applications which have high requirement for dimension, the need to meet CE safety certifications and lower demand for EMC compliance levels. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Common specifications

Short circuit protection:	Hiccup, continuous, self-recovery
Operation temperature:	-40°C ~ +85°C
Storage temperature:	-40°C ~ +105°C
Storage humidity:	95%RH
Power Derating	• -40°C to -20°C 2 %/°C • +65°C to +85°C 2.5 %/°C • 85VAC - 100VAC 1.33 %/VAC • 277VAC - 305VAC 1.1 %/VAC
Safety Standard:	EN62368
Safety Certification	EN62368
MTBF:	>1,000,000 hours (MIL-HDFK-217F@25°C)
Dimensions:	16.13 x 15.10 x 9.50 mm
Cooling:	Free air convection
Weight:	4.5g Typ.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input Voltage Range	AC input DC input	85 70		305 430	mA mA
Input Frequency		47		63	Hz
Input Current	115VAC 230VAC			0.2 0.14	A A
Inrush Current	115VAC 230VAC		25 40		A A
Recommended External Input Fuse	1A/300V, slow-blow, required				
Hot Plug	Unavailable				

Example:
5ACOS_12S
5 = 5Watt; AC = AC-DC; A = case style; 12 = 12Vout; S = single output

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output accuracy	10%-100% load		±5		%
Line regulation	Rated load		±1.5		%
Load regulation			±3		%
Ripple & noise*	20MHz bandwidth (peak-to-peak value)		50	100	mVp-p
Temperature coefficient	100% load		±0.1		%/°C
Stand-by Power Consumption	230VAC input • 12V • 15V • 18V		 0.07 0.12 0.16	 0.1 0.16 0.2	 W W W
Over-current Protection	≥110%Io, self-recovery				
Minimum Load		10			%

* The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

Note:

1. External electrolytic capacitors are required to modules, more details refer to typical applications;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%, nominal input voltage (115Vac and 230Vac) and rated output load;
3. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability.
4. The module needs to be glued and fixed after assembly.
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see „Features" and „EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

EMC specifications

Emissions	CE	CISPR32/EN55032 CLASS A (See Fig. 1 for recommended circuit) CISPR32/EN55032 CLASS B (See Fig. 2 for recommended circuit)	
Emissions	RE	CISPR32/EN55032 CLASS A (See Fig. 1 for recommended circuit) CISPR32/EN55032 CLASS B (See Fig. 1 or Fig. 2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ± 6KV (See Fig. 1 or Fig. 2for recommended circuit)	perf. Criteria B
Immunity	RS	IEC/EN61000-4-3 10V/m (See Fig. 2 for recommended circuit)	perf. Criteria A
Immunity	EFT	IEC/EN61000-4-4 ±2KV (See Fig. 1 for recommended circuit) IEC/EN61000-4-4 ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B perf. Criteria B
Immunity	Surge	IEC/EN61000-4-5 line to line ±1KV (See Fig. 1 or Fig. 2 for recommended circuit)	perf. Criteria B
Immunity	CS	IEC/EN61000-4-6 10Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A
Immunity	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11 0%, 70% (See Fig. 2 for recommended circuit)	perf. Criteria B

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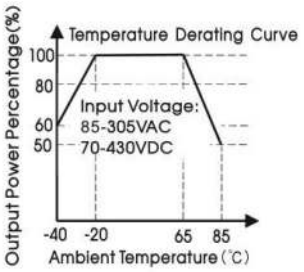
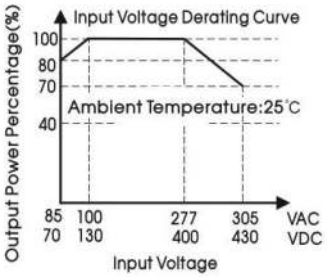
Product Selection Guide

Approval	Model	Power [W]	Output Voltage [Vo, VDC]	Rated Current [Io, mA]	Efficiency at 230VAC [%, min]	Max. Capacitive Load [uF, max]
---	5ACOS_12S	4	12	330	75	160
---	5ACOS_15S	5	15	330	76	160
---	5ACOS_18S	5	18	280	77	160

Note: Non-isolated power supply, there is no insulation protection between output and input dangerous voltage, beware of electric shock!

Typical characteristics



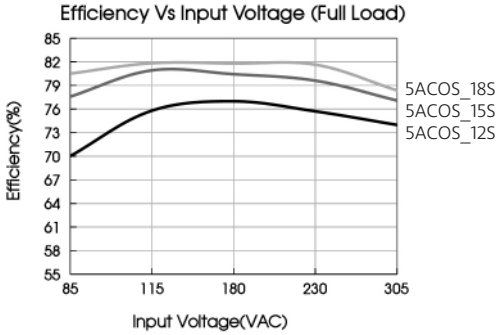


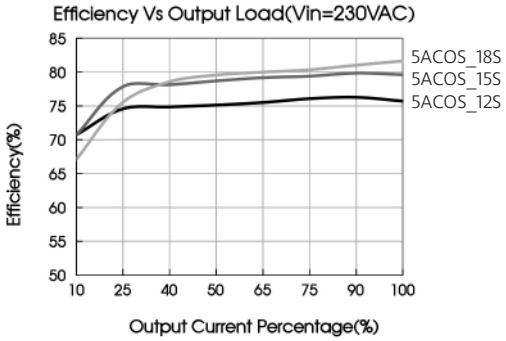
Note:

① With an AC input between 85 - 100VAC/277- 305VAC and a DC input between 70 - 130VDC/400 - 430VDC, the output power must be derated as per temperature derating curves;

② This product is suitable for applications using natural air cooling; for applications in closed environment please consult one of our FAE.

Efficiency





Recommended circuit 1

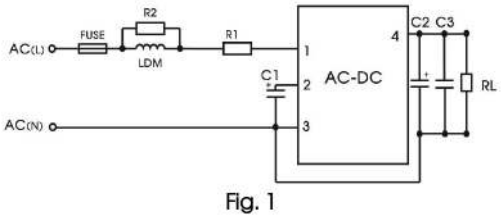


Fig. 1

Model	FUSE (required)	C1 (required)	C2 (required)	LDM (required)	R1 (wire-wound resistor, required)	C3	R2
5ACOS_12S	1A/300V (slow-blow)	10uF/400V (165-264VAC) 10uF/450V (165-305VAC) 22uF/400V (85-264VAC) 22uF/450V (85-305VAC)	470μF/16V (solid-state capacitor)	4.7mH/0.2A (C1 = 10uF) 2.2mH/0.24A (C1 = 22uF)	12Ω/3W (C1 = 10uF) 2Ω/2W (C1 = 22uF)	0.1uF/ 50V	8.2kΩ/0.25W
5ACOS_15S			470μF/35V				
5ACOS_18S							

Note:

1. C1 is used as input filter capacitor (required);
2. Output filter: We recommend using an electrolytic capacitor with high frequency, high ripple current and low ESR rating for C2 refer to manufacture's datasheet). Combined with LDM, they form a pi-type filter circuit. Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%;
3. Recommed R2 to use 1206 package chip resistor.

Recommended circuit 2

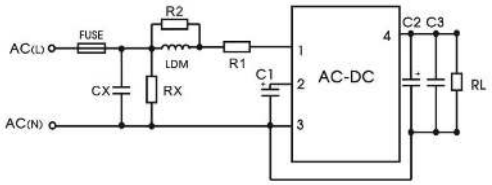
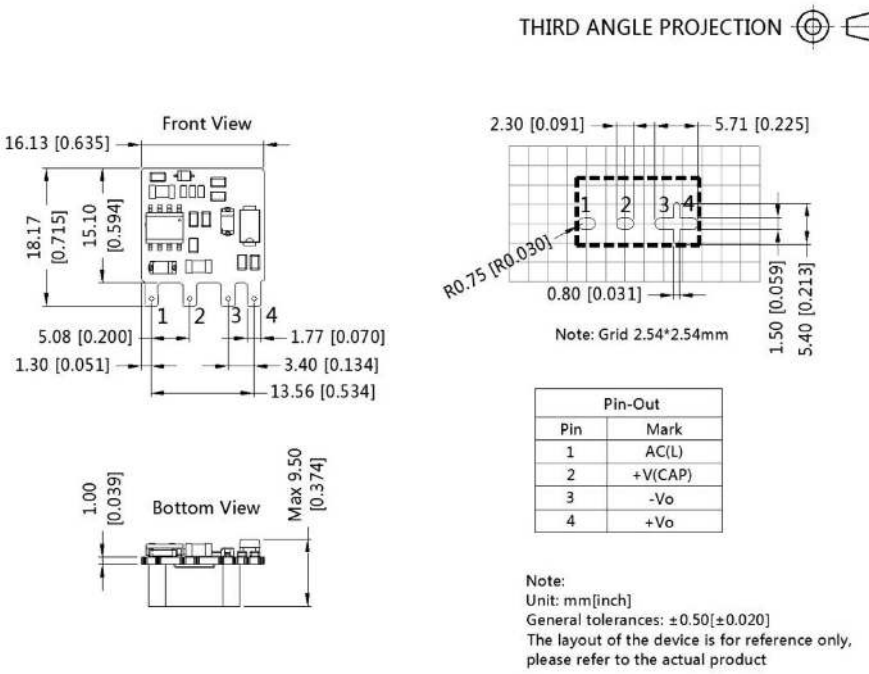


Fig 2

Model	FUSE (required)	C1 (required)	C2 (required)	LDM (required)	R1 (wire-wound resistor, required)	CX	RX*	C3	R2
5ACOS_12S	1A/300V (slow-blow)	10uF/400V (165-264VAC) 10uF/450V (165-305VAC) 22uF/400V (85-264VAC) 22uF/450V (85-305VAC)	470µF/16V (solid-state capacitor)	4.7mH/0.2A (C1 = 10uF) 2.2mH/0.24A (C1 = 22uF)	12Ω/3W (C1 = 10uF) 2Ω/2W (C1 = 22uF)	104K/ 310VAC	5MΩ~8MΩ	0.1uF/ 50V	8.2kΩ/0.25W
5ACOS_15S			470µF/35V						
5ACOS_18S									

*Note: The X capacitor needs to be connected in parallel with the bleeder resistance (RX), the recommended resistance value is between 5MΩ~8MΩ, and the actual need to be selected as series-parallel connection according to the certification standard.

Mechanical dimensions



Pin-Out	
Pin	Mark
1	AC(L)
2	+V(CAP)
3	-Vo
4	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
The layout of the device is for reference only, please refer to the actual product