5ACE1W_4R series

5W - Single Output AC-DC Converter



AC-DC Converter 5 Watt

- Input voltage range: 85-305VAC / 100-430VDC
- DIP package type
- Operating temperature range: -40°C to +85°C
- 4000VAC isolation voltage
- Up to 82% efficiency
- OVC III (meets EN61558-1)
- Input undervoltage protection
- Output short circuit (SCP)
- Over current protection
- MTBF: 2,600,000 hours

Introducing our versatile 5ACE1W_4R series with a wide input voltage range of 85-305VAC/100-430VDC, ensuring reliable performance in diverse applications. With an operating temperature range from -40°C to +85°C and transfer efficiency up to 82%, it operates efficiently even under challenging conditions. It provides robust protections against short circuits and overcurrent events. With an isolation voltage of 4000VAC, it meets stringent IEC62368/UL62368/EN62368 test standards and comes with OVC III. Designed for PCB mounting, this ultra-compact module is ideal for industrial-level applications.

SHORT CIRCUIT PROTECTED

100% RoHS compliant 6/6

c UL us
UL62368 - E347551
Pending

Common specifications

Short circuit protection	Continuous, self recovery
Over current protection	110 (typ.) %Io
Over temperature protection	Shut down output voltage; recovers automatically after temperature decreases.
Power derating	-40°C - -25°C 3.0 % / °C +50°C - +70°C, 3.3V/5V 2.25 % / °C +55°C - +70°C, other 3.0 % / °C +70°C - +85°C, 3.3V/5V 1.0 % / °C +70°C - +85°C, other 0.33 % / °C 85VAC - 100VAC 1 % / VAC 277VAC - 305VAC 0.535 % / VAC
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-40°C - +105°C
Storage humidity	95%RH (non condensing)
Soldering profile	Wave soldering, 260°C (±5°C); time: 5 - 10s Manual welding, 360°C (±10°C); time: 3 - 5s
Safety standard	IEC/EN/BS EN62368-1, EN61558-1, EN60335-1; UL62368-1
Safety class	CLASS II
MTBF	>2,600,000 h (MIL-HDBK-217F@25°C)
Hot plug	Unavailable
Case material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Package dimensions	25.40 x 25.40 x 17.60mm
Weight	23g (typ.)
Cooling method	Free air convection

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	5% - 100%, load 3.3V output 5% - 100%, load other		±3 ±2		%
Linear regulation	Nominal load		±0.5		%
Load regulation	5% - 100% Load		±1.0		%
Ripple & noise	20MHz bandwidth,10%-100% Load		60	120	mV
Temperature drift coefficient			±0.02		%/°C
Stand by power consumption	230VAC		0.10	0.5	W
Minimum load		0			%
Over current protection		110			%Io
Hold up time	230VAC		50		ms

Note: The test method for ripple and noise adopts the proximity test method, with a 10uF electrolytic capacitor and a 1uF ceramic capacitor connected in parallel at the output.

Isolation specifications

Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 5mA	4000			VAC
Isolation resistance	Input-output, isolated voltage 500VDC	100			MΩ

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage	AC Input DC Input	85 100		305 430	VAC VDC
Input current	115VAC 230VAC			0.13 0.07	A
Input frequency		47		63	HZ
Fuse	1A, Slow blow, required				
Leakage current	230VAC/50Hz	0.3mA RMS max.			

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this datasheet are based on our company's standards;
6. For specific requirements please contact our technical staff directly;
7. Product specifications are subject to change without prior notice.

Example:
5ACE1W_09S4R
5 = 5Watt; AC = AC-DC; E1 = Cost effective; W = Wide input; 09 = 9Vout; S = Single output; 4 = 4kVAC isolation; R = Revised version

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com
Specifications subject to change without notice.

EMC specifications			
EMI	CE	CISPR32/EN55032 CLASS B	
EMI	RE	CISPR32/EN55032 CLASS B	
EMS	RS	IEC/EN61000-4-3 10V/m	perf. criteria A
EMS	EFT	IEC/EN61000-4-4 ±4kV (EMC Solutions - recommended circuits figure 2)	perf. criteria B
EMS	Surge	IEC/EN61000-4-5 line to line ±1kV IEC/EN61000-4-5 line to line ±2kV (EMC solutions - recommended circuits figure 2)	perf. criteria B perf. criteria B
EMS	CS	IEC/EN61000-4-6 10Vr.m.s	perf. criteria A
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV/Air ±8kV	perf. criteria B

Product Selection Guide

Approval	Part number	Input Voltage (VAC)	Out Power (W)	Out Voltage (VDC)	Out Current (mA) max.	Full Load Efficiency % (typ.)	Capacitive Load (µF) max.
	5ACE1W_03S4R	85-305	5	3.3	1515	72	4000
	5ACE1W_05S4R	85-305	5	5	1000	76	3000
	5ACE1W_09S4R	85-305	5	9	555	79	1200
	5ACE1W_12S4R	85-305	5	12	416	79	1200
	5ACE1W_15S4R	85-305	5	15	333	79	680
	5ACE1W_18S4R	85-305	5	18	280	80	220
	5ACE1W_24S4R	85-305	5	24	208	82	220

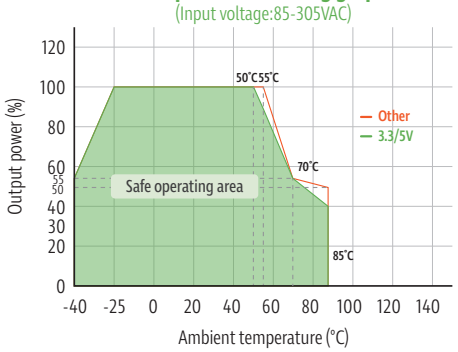
Note:

1. All the above data were tested within the parameter range of typical application circuits;
2. Please use suffix /CM for chassis mounting option; please use suffix /DR for DIN rail option (i.e. 5ACE1W_24S4R/DR).
3. The product images are for reference only. Please refer to the actual product for details.

Typical characteristics

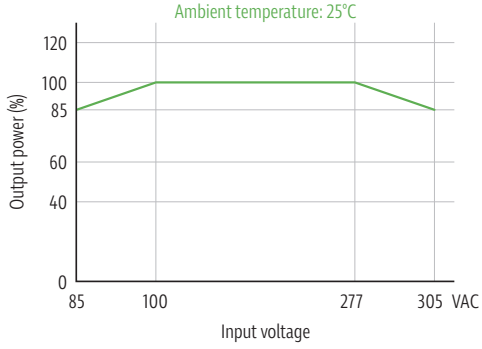
Temperature derating graph

(Input voltage:85-305VAC)



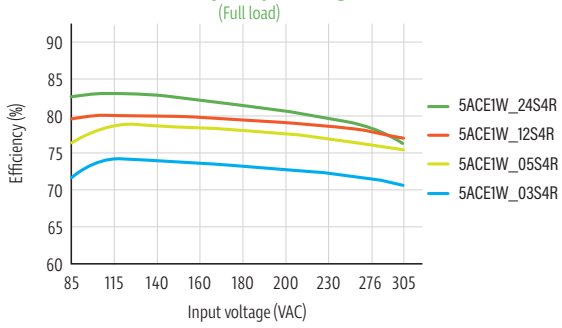
Input voltage derating curve

Ambient temperature: 25°C



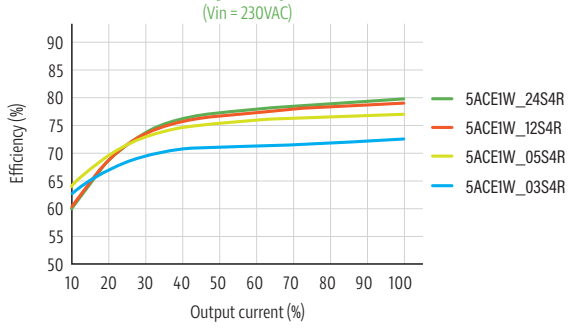
Efficiency vs input voltage

(Full load)

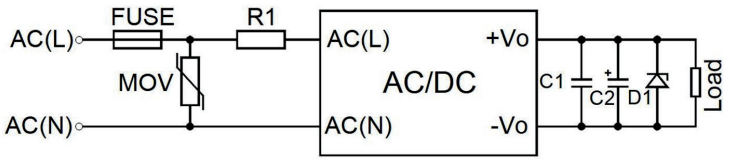


Efficiency vs output load

(Vin = 230VAC)



Application circuit



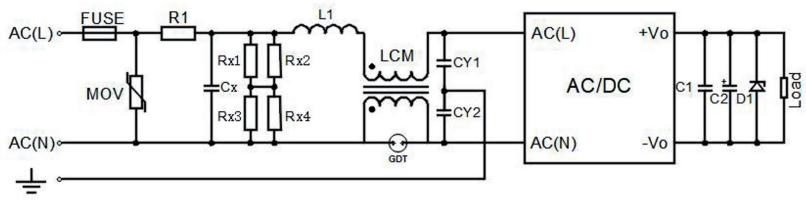
(Figure 1)

Reference Table for Selection of Peripheral Devices

Output Voltage	FUSE	MOV	R1	C1	C2	D1
3.3/5VDC	1A/300VAC Slow-blow, Required	10D561K	12Ω/3W (Wire-wound resistor,Required)	1uF/16V	150uF/16V	See Note2
9/12VDC				1uF/25V	120uF/25V	
15/24VDC				1uF/50V	100uF/35V	

Note:
1. FUSE and Mov Can be selected based on actual needs.
2. D1 is a TVS transistor that can protect the downstream circuit in case of module abnormalities. It is recommended to choose a model that is 1.2 times the output voltage.

EMC Solutions - recommended circuits

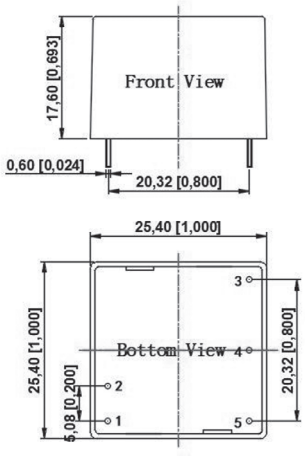


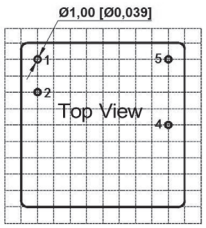
EMC recommended circuit (Figure 2)

Recommended parameter values for EMC solution circuits

Model	Recommended value
FUSE	2A/300VAC,Slow-blow, Required
MOV	14D561K
R1	33Ω/3W(Wire-wound resistor, Required)
Cx	0.33uF/305VAC
L1	1.2mH/0.3A
CY1, CY2	1nF/400VAC
GDT	300V/1KA
LCM	20mH Common mode Choke
Rx1, Rx2, Rx3, Rx4	2MΩ/1206

Mechanical dimensions and recommended layout





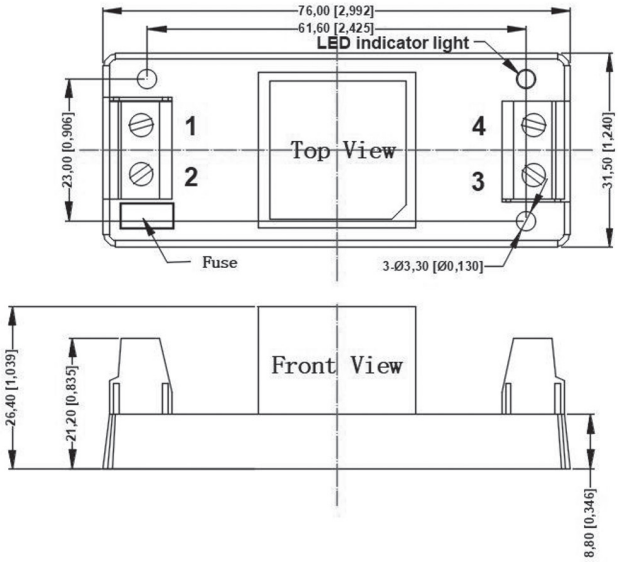
Grid size: 2.54*2.54mm

Note:
Unit: mm [inch]
Pin section tolerances:±0.10 [±0.004] General tolerances:±0.50 [±0.020]

Pin Function Table

Pin	Function
1	AC (N)
2	AC (L)
3	No Pin
4	-Vo
5	+Vo

Mechanical dimensions and recommended layout - Chassis mounting

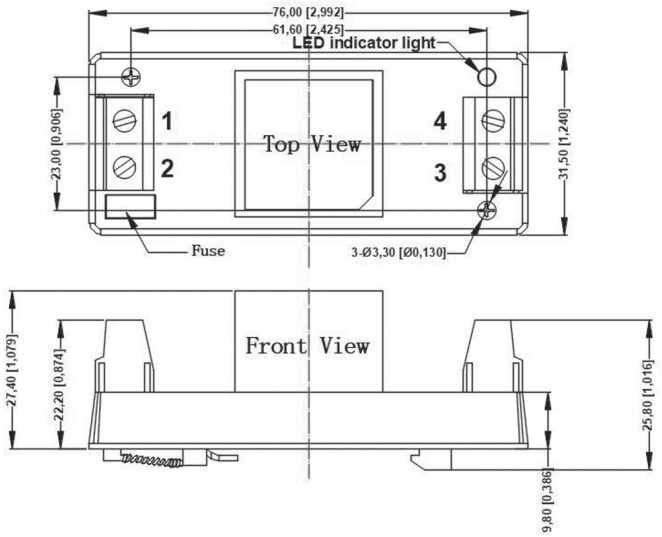


Pin Function Table

Pin	Function
1	AC (N)
2	AC (L)
3	-Vo
4	+Vo

Note:
Size unit: mm [inch]
Wire diameter: 24-12AWG
Tightening torque: Max 0.4 N ·m
Unmarked tolerance: ±1.00 [±0.039]

Mechanical dimensions and recommended layout - DIN rail



Pin Function Table

Pin	Function
1	AC (N)
2	AC (L)
3	-Vo
4	+Vo

Note:
Size unit: mm [inch]
Wire diameter: 24-12AWG
Tightening torque: Max 0.4 N ·m
Mounting rail: TS35, rail needs to connect safety ground
Unmarked tolerance: ±1.00 [±0.039]