



## 10ACEW\_4A series

10Watt - AC-DC converter

## AC-DC Converter

10 Watt

- ⊕ Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage
- ⊕ Operating ambient temperature range: -40°C to +85°C
- ⊕ Up to 85% efficiency
- ⊕ No-load power consumption <0.1W
- ⊕ 5000m altitude application
- ⊕ EMI performance meets CISPR32/EN55032 CLASS B, EN55014
- ⊕ IEC/EN/UL62368/EN60335/standards (2xMOPP) EN61558 safety approved



### Common specifications

Item	Operating condition	Min	Typ	Max	Units
Short circuit protection:	Hiccup, continuous, self-recovery				
Operating temperature		-40		+85	°C
Storage Temperature		-40		+85	°C
Storage humidity			95		%RH
Soldering Temperature	Wave-soldering Manual-welding	260 ± 5°C; time: 5 - 10s 360 ± 10°C; time: 3 - 5s			
Switching Frequency			65		kHz
Power derating	+50 to +70 °C: 3.3/5V	3.00			%/°C
	+55 to +70°C: 9/12/15/24V	2.67			%/°C
	+70 to +85°C	0.66			%/°C
	85-100VAC	1.33			%/°VAC
	277VAC - 305VAC 2000m - 5000m	0.71 0.67			%/°VAC %/Km
Safety standard	IEC/EN/UL62368/EN60335/EN61558/ IEC/EN60601-1/ANSI/AAMI ES60601-1				
Safety Certification	IEC/EN/UL62368/EN60335/EN61558				
Safety Class	Class II				
MTBF	MIL-HDBK-217F@25°C	> 3200,000 h			
Designed Life (230VAC)	Ta: 25°C 100% load	>130x10 <sup>3</sup> h			
	Ta: 55°C 100% load	>27x10 <sup>3</sup> h			
Hot plug:	Unavailable				
Case material:	Black plastic, flame-retardant and heat-resistant (UL94V-0)				
Dimension	47.60 x 26.80 x 23.50 mm				
Weight:	48				g
Cooling:	Free air convection				

### Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Isolation (Input-Output)	Electric Strength Test for 1min., leakage current <5mA	4000			VAC
Insulation Resistance (Input-Output)	At 500VDC	100			MΩ

### Example:

**10ACEW\_03S4A**  
**10 = 10Watt; AC = AC-DC; E = case style ; W = wide input**  
**03 = 3.3Vout; S = single output; 4 = 4 kVAC isolation; A = pinning**

10ACEW\_4A series AC-DC converters is one of GAPTEC's new generation compact size power converter. It features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368/EN60335/ EN61558/ IEC/EN60601-1/ANSI/AAMI ES60601-1 standards. The converters are widely used in industrial, power, medical treatment, home appliances, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

### Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	• AC Input	85		305	VAC
	• DC Input	100		430	VDC
Input frequency		47		63	Hz
Input current	• 115VAC			0.45	A
	• 230VAC			0.3	A
Inrush current	230VAC		60		A
Leakage Current	277VAC/50Hz		0.1mA RMS Max.		
Built In Fuse	2A/300V, slow-blow				

### Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy			±2		%
Line regulation	Full load		±0.5		%
Load regulation	10% - 100% load		±1		%
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		70	120	mV
Stand-by Power Consumption (230VAC)	3.3/5/9/12/15V		0.10		W
	24V		0.12		W
Temperature Coefficient			±0.02		
Over-current Protection	≥130%Io, self-recovery				
Over-voltage Protection*	3.3/5VDC output		≤7.5VDC		
	9VDC output		≤15VDC		
	12/15VDC output		≤20VDC		
	24VDC output		≤30VDC		
Min. load		0			%
Hold-up Time	115VAC input		8		ms
	230VAC input		40		
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			

\*The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

\*Output voltage clamp or hiccup

### Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

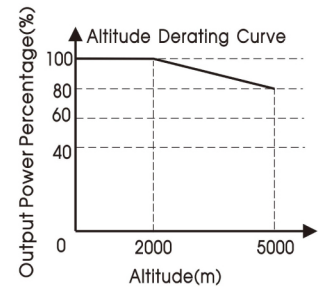
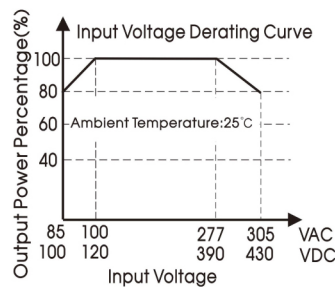
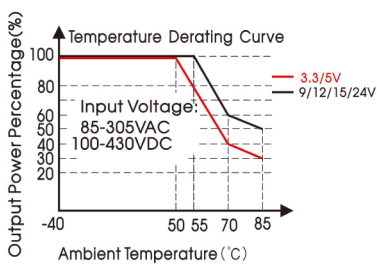
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EMC specifications			
Emissions	CE	CISPR32/EN55032 CLASS B CISPR11/EN55011 CLASS B EN55014-1	
Emissions	RE	CISPR32/EN55032 CLASS B CISPR11/EN55011 CLASS B EN55014-1	
Immunity	ESD	IEC/EN 61000-4-2 Contact $\pm 8\text{KV}$ IEC/EN55014-2	perf. Criteria B perf. Criteria B
Immunity	RS	IEC/EN61000-4-3 10V/m IEC/EN55014-2	perf. Criteria A perf. Criteria A
Immunity	EFT	IEC/EN61000-4-4 $\pm 2\text{KV}$ IEC/EN61000-4-4 $\pm 4\text{KV}$ (See Fig.2 for recommended circuit) IEC/EN55014-2	perf. Criteria B perf. Criteria B perf. Criteria B
Immunity	Surge	IEC/EN61000-4-5 line to line $\pm 1\text{KV}$ IEC/EN61000-4-5 line to line $\pm 2\text{KV}$ (See Fig.2 for recommended circuit) IEC/EN55014-2	perf. Criteria B perf. Criteria B perf. Criteria B
Immunity	CS	IEC/EN61000-4-6 10Vr.m.s IEC/EN55014-2	perf. Criteria A perf. Criteria A
Immunity	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70% IEC/EN55014-2	perf. Criteria B perf. Criteria B

Selection Guide								
Approval	Model	Power [W]	Peak Power	Output [Vo]	Output [Io]	Peak Current	Efficiency [% , typ]	Capacitive load [ $\mu\text{F}$ , max]
UL/CE	10ACEW_03S4A	10	13.2W	3.3V	3000mA	4000mA	82	6600
UL/CE	10ACEW_05S4A	10	15W	5V	2000mA	3000mA	85	5000
UL/CE	10ACEW_09S4A	10	15W	9V	1100mA	1670mA	84	3000
UL/CE	10ACEW_12S4A	10	15W	12V	830mA	1250mA	85	2000
UL/CE	10ACEW_15S4A	10	15W	15V	660mA	1000mA	85	1500
UL/CE	10ACEW_24S4A	10	15W	24V	410mA	625mA	86	680

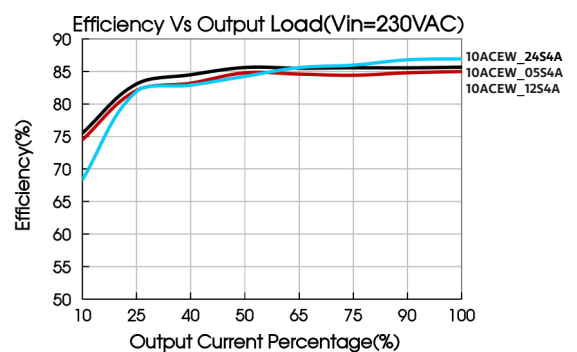
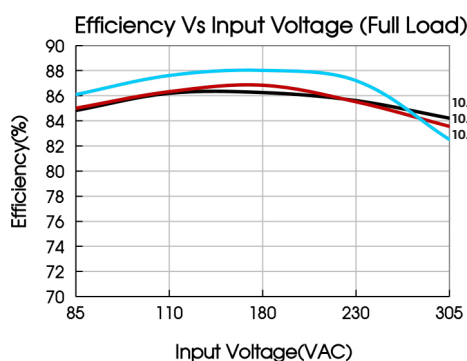
## Product Characteristic Curve



Note:

- The product takes peak power (15W) as the starting point for derating.
- With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;
- This product is suitable for applications using natural air cooling; for applications in closed environment please consult our FAE.

## Efficiency



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## Typical application

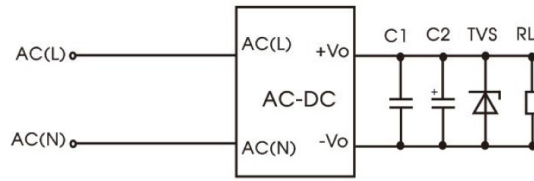


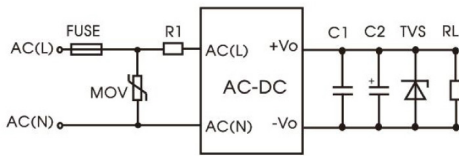
Fig. 1: Typical circuit diagram

Part No.	C1	C2	R1	TVS
10ACEW_03S4A	1μF/50V	220μF/16V	12Ω/3W	SMBJ7.0A
10ACEW_05S4A		220μF/16V		SMBJ7.0A
10ACEW_09S4A		100μF/25V		SMBJ12A
10ACEW_12S4A		100μF/25V		SMBJ20A
10ACEW_15S4A		100μF/25V		SMBJ20A
10ACEW_24S4A		100μF/35V		SMBJ30A

### Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

## EMC compliance recommended

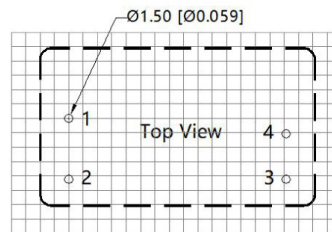
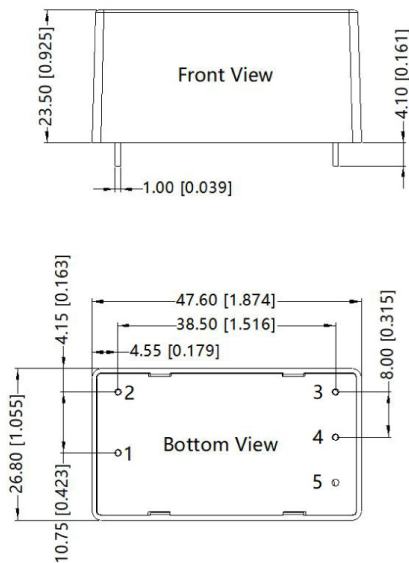


Component	Recommended value
FUSE	2A/300V,slow-blow,required
MOV	S14K350
R1	6.8Ω/3W

Fig 2: EMC application circuit with higher requirements

## Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54\*2.54mm

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

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