10ACEW_4 series

10Watt - AC-DC converter



AC-DC Converter 10 Watt

- Ultra-wide 85-305VAC and 100-430VDC input voltage range
- Operating ambient temperature range: -40°C to +85°C
- Up to 85% efficiency
- No-load power consumptio 0.1W
- EMI performance meets CISPR32/EN55032 CLASS B, EN55014
- IEC/EN/UL62368/EN60335/EN61558 safety approved
- Over-voltage class III (designed to meet EN61558)

10ACEW_4 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 standards. The converters are widely used in industrial, power, 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.

UL-62368-1 (E347551)

Common specifications

Item	Operating condition	Min	Typ	Max	Units
Short circuit protection:		Hiccup, continuous, self-recovery			
Cooling:		Free air convection			
Operating temperature:		40		85	°C
Storage Temperature		40		85	°C
Operation temperature range:	Wave-soldering Manual-welding	260 ± 5°C; time: 5 - 10s 360 ± 10°C; time: 3 - 5s			
Storage humidity:				95	%RH
Switching Frequency			65		kHz
Power derating:	-40°C to -25°C 85VAC - 115VAC +50°C to +70°C: 3.3V +55°C to +70°C: 9V/12V/15/24V +70°C to +85°C: 85VAC - 100VAC: 2000m - 5000m:	2.2 2.5 3.33 0.66 0.83 0.67			%/°C %/°C %/°C %/°VAC %/°VAC %/Km
Safety standard:		UL/EN/IEC62368/EN60335/EN61558			
Safety Standard Certification:		UL/EN/IEC62368/EN60335/EN61558			
Safety Class:		Class II			
MTBF:		MIL-HDBK-217F@25°C > 3200,000 h			
Hot plug:		Unavailable			
Case material:		Black plastic, flame-retardant and heat-resistant (UL94V-0)			
Designed Life: (230VAC)	Ta: 25°C 100% load Ta: 55°C 100% load Ta: 55°C 80% load	>130x10^3 h >20x10^3 h >27x103 h			
Dimension	DIP package Chassis mounting DIN rail mounting	40.00 x 25.40 x 21.00 mm 76.00 x 31.50 x 29.80 mm 76.00 x 31.50 x 34.40 mm			
Weight: (DIP mounting)		34			g
Weight: (Chassis mounting)		54			g
Weight: (DIN rail mounting)		74			g

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	• AC Input • DC Input	85 100		305 430	VAC VDC
Input frequency		47		63	Hz
Input current	• 115VAC • 230VAC			0.23 0.15	A A
Inrush current	• 115VAC • 230VAC		25 40		A A
Leakage Current	277VAC/50Hz		0.1mA RMS Max.		
Fuse(A2S/A4S package series include fuse)	2A/300V, slow-blow, required				

Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Isolation (Input-Output)	Electric Strength Test for 1min., leakage current vty6 ty6 vcy<5mA	4000			VAC

Example:
10ACEW_03S4
10 = 5Watt; AC = AC-DC; E = case style ; W = wide input
03 = 3.3Vout; S = single output; 4 = 4 kVAC isolation

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;
2. 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;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. 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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Specifications subject to change without notice.

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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)		50	100	mV
Stand-by Power Consumption	230VAC		0.1		W
Temperature Coefficient			±0.02		
Over-current Protection	≥110%Io, self-recovery				
Over-voltage Protection	3.3/5VDC output 9VDC output 12/15VDC output 24VDC output		≤7.5VDC (Output voltage clamp or hiccup) ≤15VDC (Output voltage clamp or hiccup) ≤20VDC (Output voltage clamp or hiccup) ≤30VDC (Output voltage clamp or hiccup)		
Min. load		0			%
Hold-up Time	115VAC input 230VAC input		8 40		ms
Soldering Temperature	Wave-soldering Manual-welding	260 ± 5°C; time: 5 - 10s 360 ± 10°C; time: 3 - 5s			

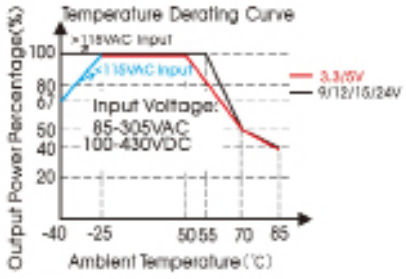
Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

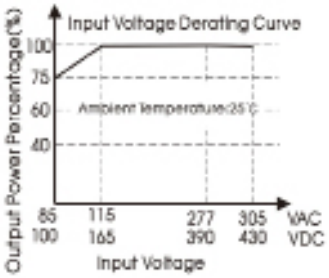
Approval	Model	Power [W]	Output [Vo]	Output [Io]	Efficiency [%, typ]	Capacitive load [µF, max]
UL	10ACEW_03S4	8.6	3.3V	2600mA	74	6600
UL	10ACEW_05S4	10	5V	2000mA	79	5000
UL	10ACEW_09S4	10	9V	1100mA	81	3600
UL	10ACEW_12S4	10	12V	830mA	84	2000
UL	10ACEW_15S4	10	15V	660mA	84	820
UL	10ACEW_24S4	10	24V	410mA	85	470

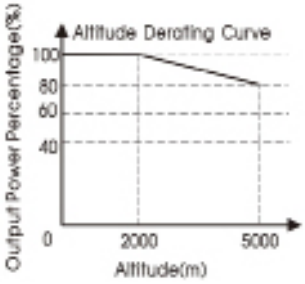
Note: * Use suffix "/CM" for chassis and suffix "/DR" for DIN-Rail mounting.

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

Product Characteristic Curve

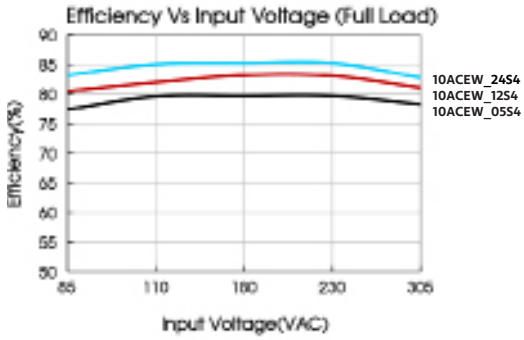


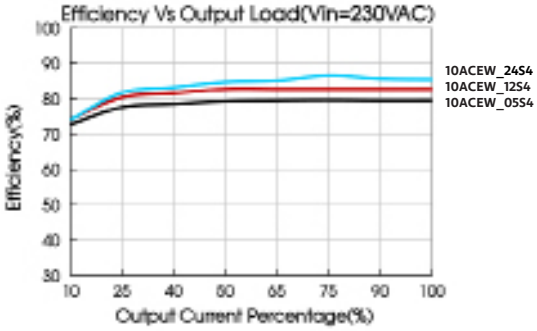




Note:
① With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

Efficiency





Typical application

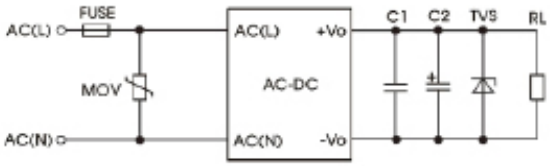
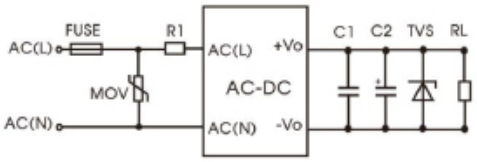


Fig. 1: Typical circuit diagram

Part No.	C1 (μF)	Part No.	FUSE	R1	Part No.	MOV
10ACEW_03S4	1μF/50V	220μF/16V	2A/300V, slow-blow, required	12Ω/3W	SMBJ7.0A	S10K350
10ACEW_05S4		220μF/16V			SMBJ7.0A	
10ACEW_09S4		100μF/25V			SMBJ12A	
10ACEW_12S4		100μF/25V			SMBJ20A	
10ACEW_15S4		100μF/25V			SMBJ20A	
10ACEW_24S4		100μF/35V			SMBJ30A	

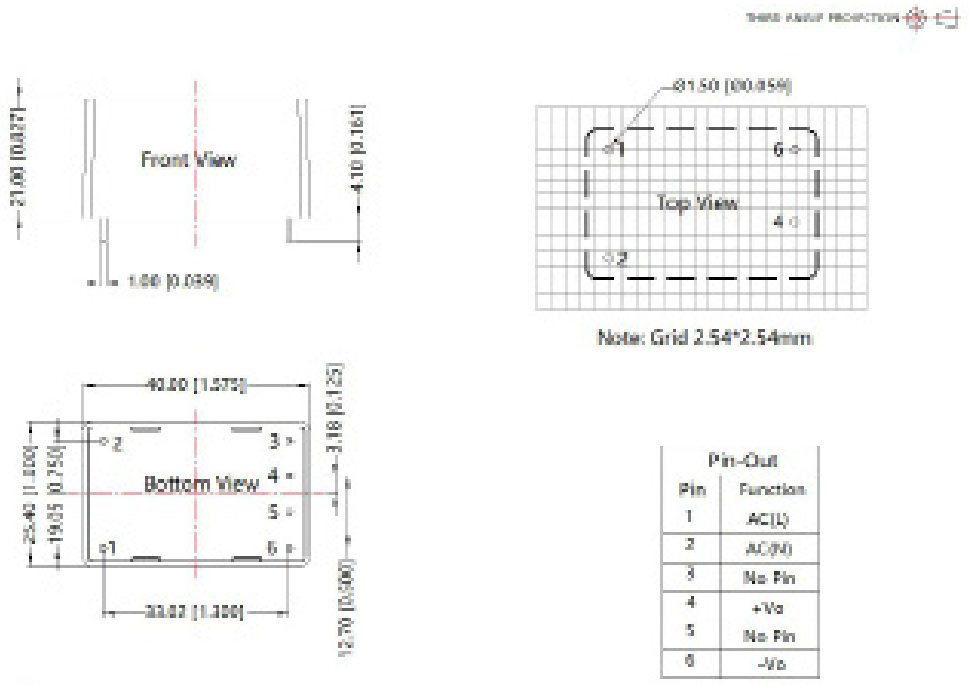
Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency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

EMC compliance recommended



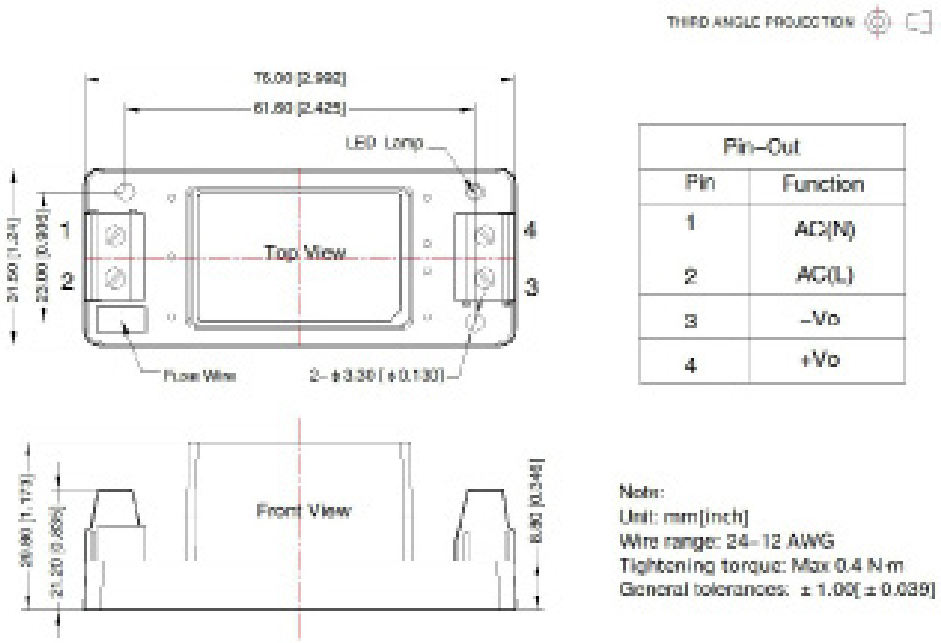
Component	Recommended value
MOV	S14K350
R1	6.8Ω/3W
FUSE	2A/300V,slow-blow,required

Dimensions and Recommended Layout



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

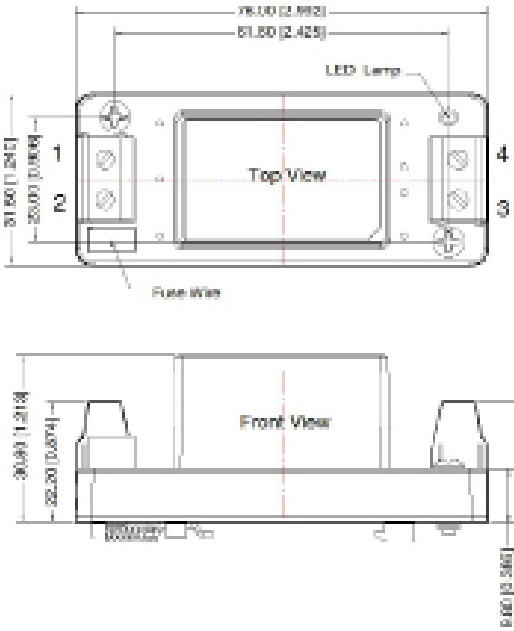
Chassis mounting



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

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 1.00[± 0.039]

DIN rail mounting



THIRD ANGLE PROJECTION

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

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ±1.00[±0.039]