



60ACAE_4 series

60W - Single Output AC-DC Converter - Universal Input - Isolated & Regulated

AC-DC Converter

60 Watt

- ⊕ Universal 85-264VAC or 100-370VDC input voltage
- ⊕ Operating ambient temp. range: -40°C to +70°C
- ⊕ High I/O isolation test voltage up to 4000VAC
- ⊕ High reliability, high power density, high efficiency
- ⊕ Regulated output, low ripple & noise
- ⊕ Output short circuit, over-current, over-voltage protection
- ⊕ Plastic case meets UL94V-0 flammability
- ⊕ EMI performance meets CISPR32 / EN55032 CLASS B
- ⊕ IEC/EN/UL62368 CB RoHS safety approved

The 60ACAE_4 series is one of GAPTEC's compact size power converter. It features universal AC input and at the same time accepts DC input-voltage, low power consumption, high efficiency, high reliability, high power density, reinforced isolation. It offers good EMC performance-compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/UL/EN62368 standards. The converters are widely used in industrial, power, 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				
Operating temperature		-40		+70	°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			
Power derating	-40 to 70°C	1.83			%/°C
	• 5V Output				
	+50 to +70°C	2.75			%/°C
	• 12, 15, 24, 48V Output	0.8			%/°VAC
Safety standard	IEC62368/EN62368/UL62368				
Safety Certification	IEC62368/EN62368/UL62368				
Safety Class	Class II				
MTBF	MIL-HDBK-217F@25°C	> 300,000 h			
Hot plug:	Unavailable				
Case material:	Black plastic, flame-retardant and heat-resistant (UL94V-0)				
Dimension	• DIP	87.00 x 52.00 x 29.50 mm			
	• Chassis mounting	135.00 x 70.00 x 37.90 mm			
	• Din-Rail mounting	137.00 x 70.00 x 42.40 mm			
Weight:	• DIP	210			g
	• Chassis mounting	290			g
	• Din-Rail mounting	360			g
Cooling:	Free air convection				

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	• AC Input	85		264	VAC
	• DC Input	100		370	VDC
Input frequency		47		63	Hz
Input current	• 115VAC			1.80	A
	• 230VAC			1.0	A
Inrush current	• 115VAC		45		A
	• 230VAC		90		A
Built In Fuse	3.15A/250V, slow-blow				

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy			±2		%
Line regulation	Full load		±0.5		%
Load regulation	0%-100% load		±1		%
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)			120	mV
Temperature Coefficient			±0.02		
Stand-by Power Consumption	230VAC, normal temperature			0.5	W
Over-current Protection	≥110%Io, self-recovery				
Over-voltage Protection**	5VDC output		≤9VDC		
	12VDC output		≤16VDC		
	15VDC output		≤25VDC		
	24VDC output		≤35VDC		
	48VDC output		≤60VDC		
Min. load		0			%
Hold-up Time	115VAC input		8		ms
	230VAC input		65		ms

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

** Output voltage clamp or hiccup

Isolation specifications

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

Example:

60ACAE_05S4

60 = 60Watt; AC = AC-DC; ; A = Pinning; E = Cost effective;

05 = 5Vout; S = Single Output; 4 = 4kVAC isolation

Note:

- 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;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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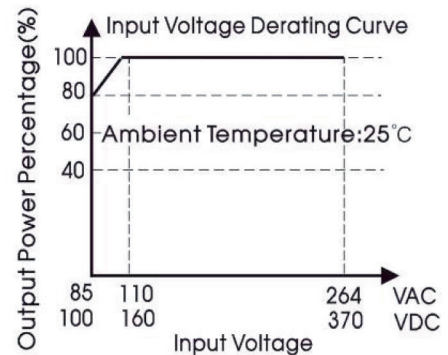
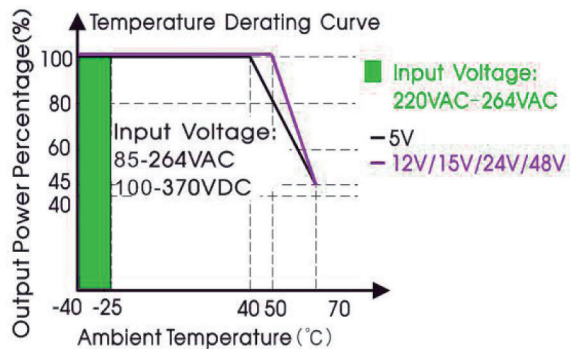
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Common specifications

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

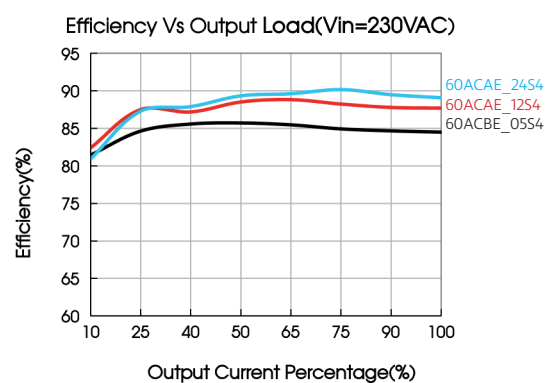
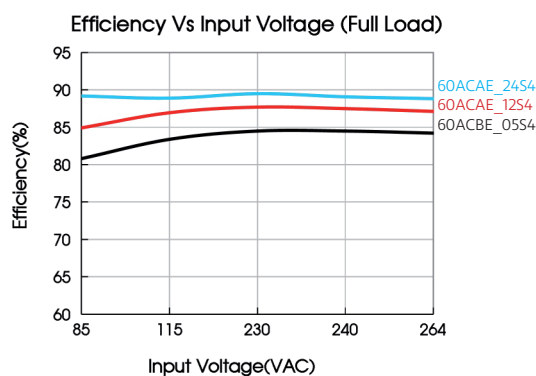
Certification	Model	Output power [W]	Output Voltage [V, Nominal]	Output Current [mA]	Efficiency @230VAC [%, typ]	Capacitive load [μF , max]
UL/CE	60ACAE_05S4	50	5	10000	84	20000
UL/CE	60ACAE_12S4	60	12	5000	87	4000
UL/CE	60ACAE_15S4	60	15	4000	88	3000
UL/CE	60ACAE_24S4	60	24	2500	89	1800
UL/CE	60ACAE_48S4	60	48	1250	90	470

Typical characteristics



Note:

- ① With an AC input between 85-110VAC and a DC input between 100-160VDC, 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.



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Typical application

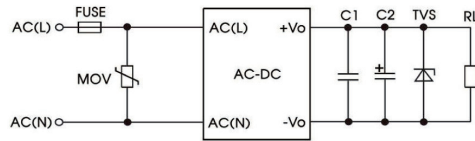


Fig. 1: Typical circuit diagram

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 arecommended suppressor diode to protect the application in case of a converter failure.

Model	C1 (μF)	C2 (μF)	Fuse	MOV	TVS
60ACAE_05S4	1	680	3.15A/250V slow-blow	S10K300	SMBJ7.0A
60ACAE_12S4	1	330	3.15A/250V slow-blow	S10K300	SMBJ20A
60ACAE_15S4	1	330	3.15A/250V slow-blow	S10K300	SMBJ20A
60ACAE_24S4	1	200	3.15A/250V slow-blow	S10K300	SMBJ30A
60ACAE_48S4	1	100	3.15A/250V slow-blow	S10K300	SMBJ64A

EMC compliance recommended circuit

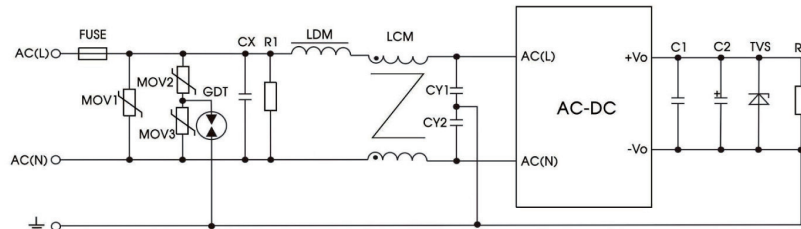
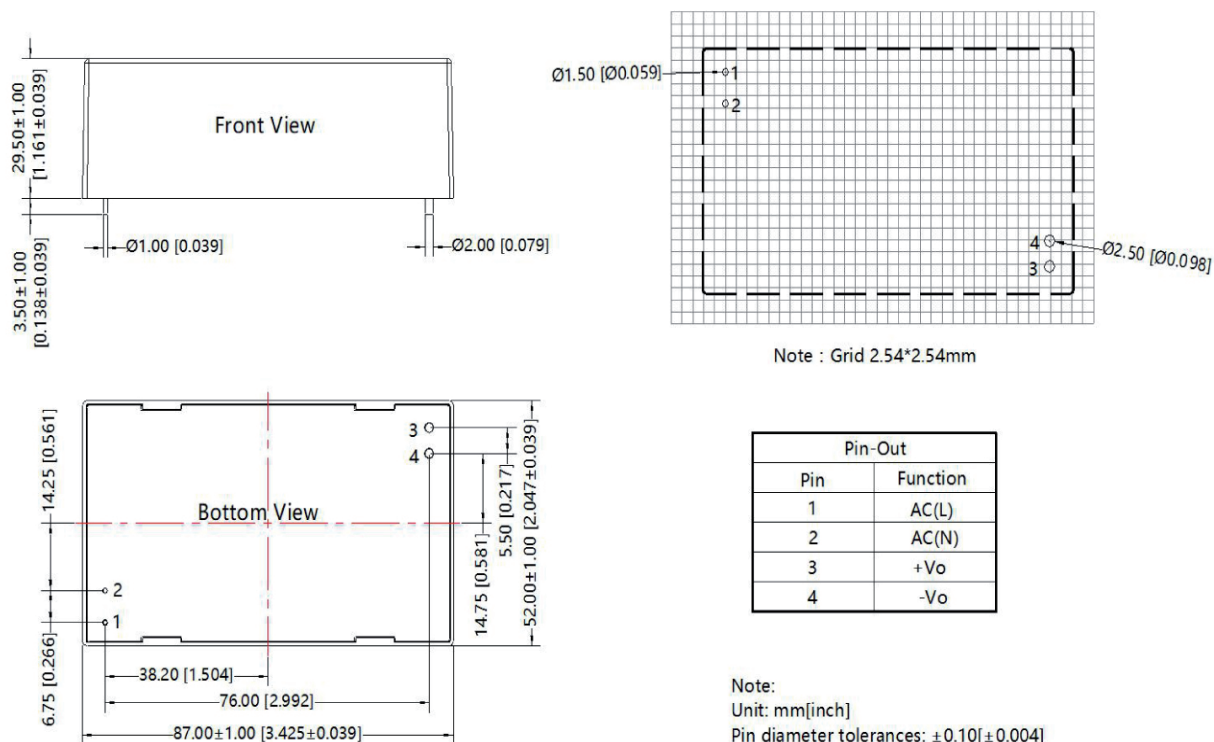


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV1	S20K300
MOV2/MOV3	S10K300
CX	0.22μF/275VAC
CY1, CY2	1nF/400VAC
R1	1MΩ/1W
LDM	4.7μH
LCM	2mH
GDT	EM3600XS
FUSE	3.15A/250V, slow-blow, required

Mechanical dimensions

THIRD ANGLE PROJECTION 

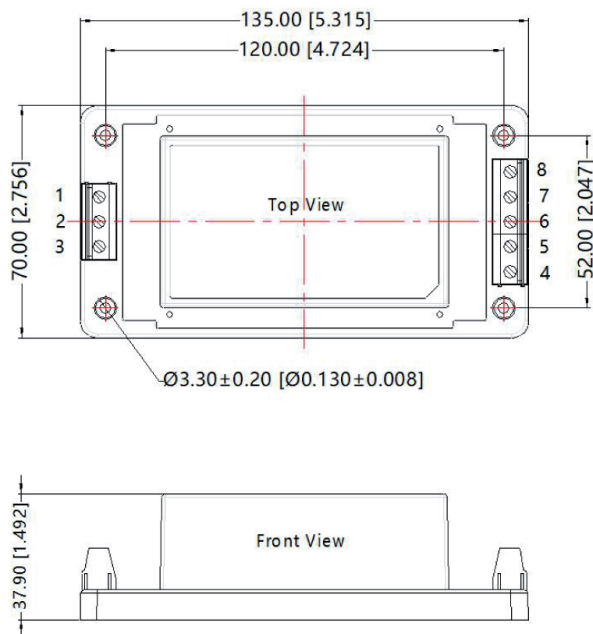
Note:
 Unit: mm[inch]
 Pin diameter tolerances: $\pm 0.10 [\pm 0.004]$
 General tolerances: $\pm 0.50 [\pm 0.020]$

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Chassis mounting

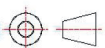
THIRD ANGLE PROJECTION 

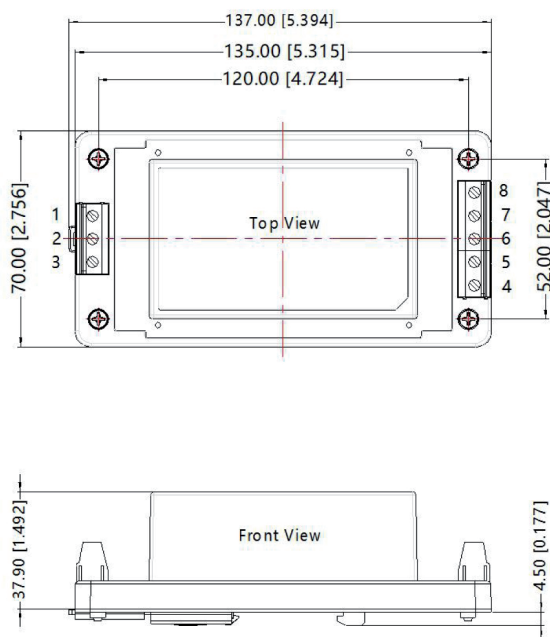


Pin-Out	
Pin	Function
1	AC(L)
2	NC
3	AC(N)
4	+Vo
5	-Vo
6	NC
7	NC
8	NC

Note:
Unit:mm[inch]
Wire range:24~12 AWG
Tightening torque: Max 0.4 N·m
General tolerances:±1.00[±0.040]

Din Rail mounting

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	AC(L)
2	NC
3	AC(N)
4	+Vo
5	-Vo
6	NC
7	NC
8	NC

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
Installed on DIN RAIL TS35
General tolerances: ±1.00[±0.040]