



## 60ACBEW\_4 series

60Watt - AC-DC converter

## AC-DC Converter

60 Watt

- ⊕ Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage
- ⊕ Operating ambient temperature range: -40°C to +85°C
- ⊕ High I/O isolation test voltage up to 4000VAC
- ⊕ High efficiency, high reliability
- ⊕ Output short circuit,
- ⊕ Over-current, over-voltage protection
- ⊕ Regulated output, low ripple & noise
- ⊕ Plastic case meets UL94V-0 flammability
- ⊕ Meets EMI CLASS B and surge level 4
- ⊕ EN62368 safety approved



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			
Switching Frequency			65		kHz
Power derating	• -40°C to -30°C	4.0			%/°C
	• +45°C to +70°C (5V output)	3.0			%/°C
	• +50°C to +70°C (12V, 15V output)	2.5			%/°C
	• +55°C to +70°C (24V, 48V output)	2.5			%/°C
	• 277VAC - 305VAC	1.0			%/°VAC
	• 2000m - 5000m	0.72			%/°VAC
Safety standard	IEC62368/EN62368/UL62368				
Safety Certification	EN62368				
Safety Class	Class I				
MTBF	MIL-HDBK-217F@25°C	> 300,000	h		
Case material:	Black plastic, flame-retardant, heat-resistant (UL94V-0)				
Hot plug:	Unavailable				
Dimension	• Horizontal package	109.00 x 58.50 x 30.00 mm			
	• chassis mounting	135.00 x 70.00 x 38.50 mm			
	• Din-Rail mounting	137.00 x 70.00 x 44.00 mm			
Weight:	• Horizontal package	300g (Typ.)			
	• chassis mounting	390g (Typ.)			
	• Din-Rail mounting	460g (Typ.)			
Cooling:	Free air convection				

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			1.4	A
	• 230VAC			0.8	A
Inrush current	• 115VAC		45		A
	• 230VAC		90		A
Leakage Current	277VAC/50Hz	0.25mA RMS Max.			
Built In Fuse	3.15A/300V slow-blow				

60ACBEW\_4 series AC-DC converters are highly efficient, environmental friendly 60W power modules. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368 standards. The converters are widely used in industrial, power, instrumentation, communication and civil applications.

### 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)			150	mV
Stand-by Power Consumption (230VAC)	• 5/12/15/24V output			0.5	W
	• 48V output			0.65	W
Temperature Coefficient			±0.02		
Over-current Protection	≥110%Io, self-recovery				
Over-voltage Protection*	• 5VDC output			≤9VDC	
	• 12VDC output			≤16VDC	
	• 15VDC output			≤24VDC	
	• 24VDC output			≤35VDC	
	• 48VDC output			≤60VDC	
Min. load		0			%
Hold-up Time	• 115VAC input		8		ms
	• 230VAC input		65		ms
Soldering Temperature	• Wave-soldering	260 ± 5°C; time: 5 - 10s			
	• Manual-welding	360 ± 10°C; time: 3 - 5s			

\* 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 turn off

### Example:

#### 60ACBEW\_05S4

60 = 60Watt; AC = AC-DC; B = Pinning E = case style ; W = wide input  
05 = 5Vout; S = single output; 4 = 4 kVAC isolation;

### Note:

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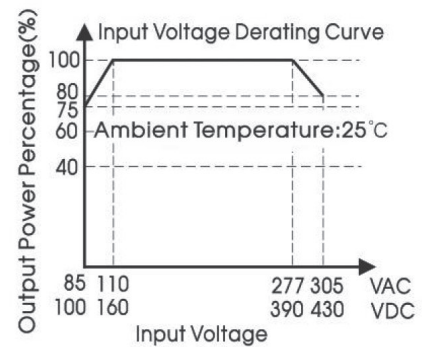
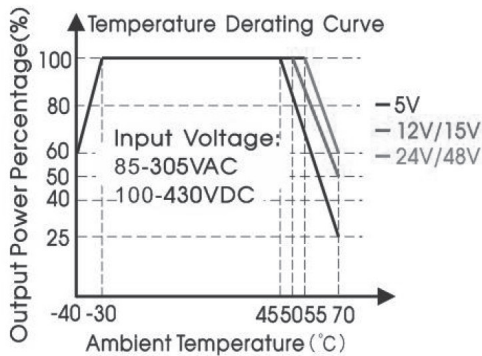
EMC specifications		
Emissions	CE	CISPR32/EN55032 CLASS B
Emissions	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN 61000-4-2 Contact $\pm 6\text{KV}$ / Air $\pm 8\text{KV}$ Perf. Criteria B
Immunity	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
Immunity	EFT	IEC/EN61000-4-4 $\pm 4\text{KV}$ perf. Criteria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

Isolation specifications					
Item	Operating Conditions	Min	Typ	Max	Units
Isolation	Electric Strength Test for 1min., leakage current <5mA				
	• Input-PE	2000			VAC
	• Input-Output	4000			VAC
	• Output-PE	500			VAC

## Product Selection Guide

Approval	Model	Power [W]	Output Voltage [Nominal, Vo]	Output Current [Io]	Efficiency at 230VAC [%, typ]	Capacitive load [ $\mu\text{F}$ , max]
CE	60ACBEW_05S4	50	5V	10000mA	82	50000
CE	60ACBEW_12S4	60	12V	5000mA	86	10000
CE	60ACBEW_15S4	60	15V	4000mA	86	8000
CE	60ACBEW_24S4	60	24V	2500mA	86	2700
CE	60ACBEW_48S4	60	48V	1250mA	86	680

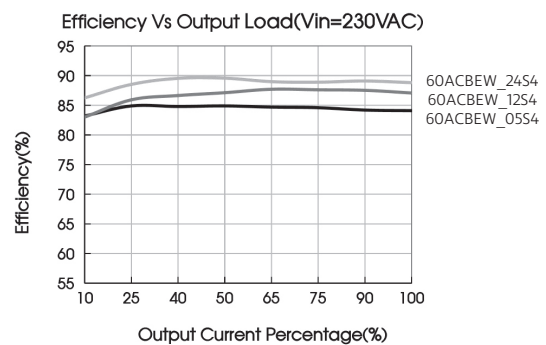
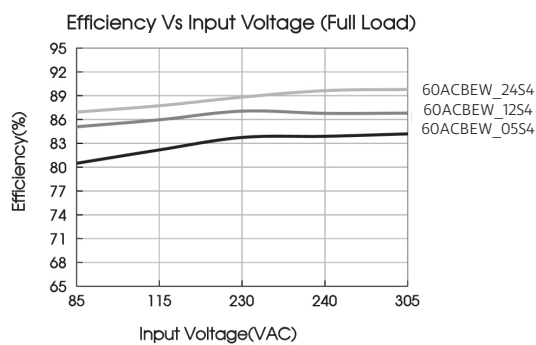
## Product Characteristic Curve



Note:

- With an AC input between 85-110V/277-305VAC and a DC input between 100-160V/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 factory or one of our FAE.

## Efficiency



## Typical application

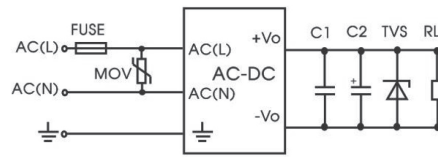


Fig. 1: Typical circuit diagram

Part No.	C1 (μF)	C2 (μF)	FUSE	MOV	TVS
60ACBEW_05S4	1	220μF/16V	3.15A/300V slow-blow	S14K350	SMBJ7.0A
60ACBEW_12S4		220μF/16V			SMBJ20A
60ACBEW_15S4		100μF/25V			SMBJ20A
60ACBEW_24S4		100μF/25V			SMBJ30A
60ACBEW_48S4		100μF/25V			SMBJ64A

### Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 . 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

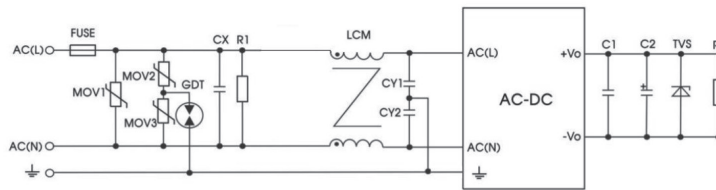
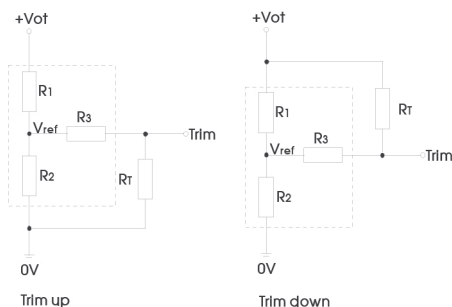


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV1	S20K350
MOV2/MOV3	S10K350
CX	0.15μF/300VAC
CY1/CY2	2.2nF/400VAC
R1	1MΩ/2W
LCM	2.2mH
GDT	B5G3600
FUSE	3.15A/300V slow-blow required

## Trim function for output voltage adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3$$

$$a = \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3$$

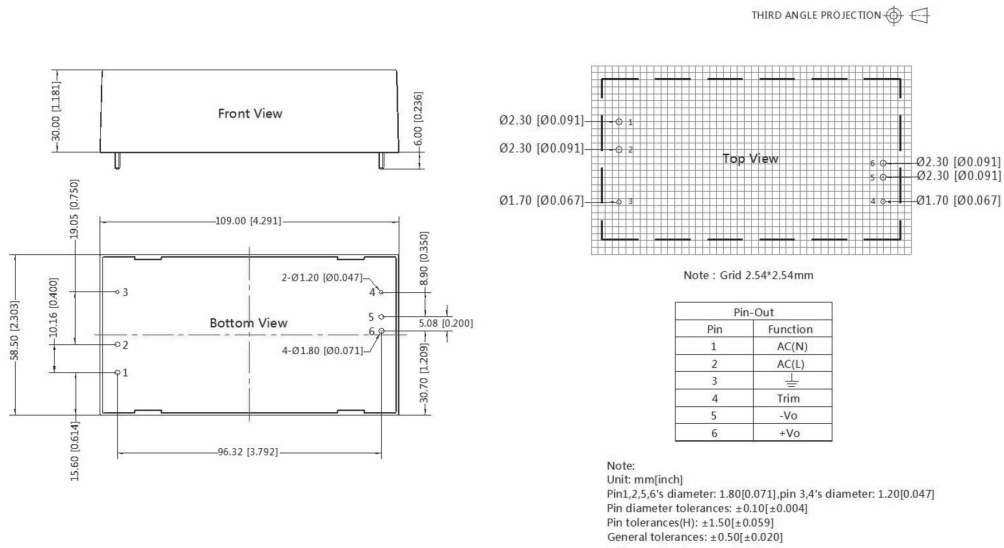
$$a = \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2$$

RT = Trim Resistor value;  
a = self-defined parameter;  
Vot = desired output voltage  
(±10%max.).

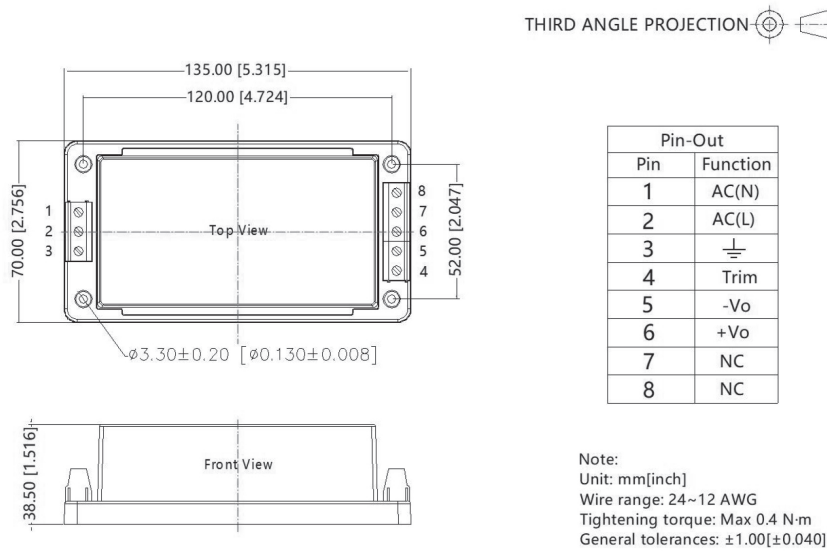
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## Dimensions and recommended layout



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