



## 40ACBEW\_4 series

40W - Single Output AC-DC Converter - Universal Input - Isolated & Regulated

### AC-DC Converter 40 Watt

- ⊕ Wide 85-305V Universal AC or 100-430VDC Input voltage
- ⊕ Operating ambient temp. range: -40°C ~ +70°C
- ⊕ High I/O isolation test voltage up to 4000VAC
- ⊕ Regulated output, low ripple & noise
- ⊕ Output short circuit, over-current, over-voltage protection
- ⊕ High efficiency, high reliability
- ⊕ Plastic case meets UL94V-0 flammability
- ⊕ Meet EMI CISPR32/EN55032 CLASS B
- ⊕ EN62368 safety approved

The 40ACBEW\_4 series a 40W high efficiency AC-DC module green power supply. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability and reinforced insulation. It offers good EMC performance compliant to IEC/EN61000-4, CISPR32/EN55032, and is safety certified to IEC/EN/UL62368 standards. The converters are widely used in areas of industrial, electricity, office and applications with unstable supply voltage. For extremely harsh EMC environment, we recommend using the application circuit show in design reference of this datasheet



UL-62368-1 (E347551)

#### Common specifications

Short circuit protection	Hiccup, continuous, self-recovery
Operating temperature range	-40°C ~ +70°C
Storage temperature range	-40°C ~ +85°C
Storage Humidity	95% MAX
Isolation (Input-output)	4000VAC ( Electric Strength Test for 1min, leakage current <10mA )
Soldering temperature	Wave-soldering: 260 ± 5°C; time: 5 - 10s Manual-welding: 360 ± 10°C; time: 3 - 5s
Power derating	
• -40°C ~ -30°C; 03/05V	4.0 %/°C MIN
• -40°C ~ -30°C; 12/15V	3.0 %/°C MIN
• -40°C ~ -30°C; 24/48V	2.0 %/°C MIN
• -45°C ~ -70°C; 03/05V	3.0 %/°C MIN
• -55°C ~ -70°C; 12/15V	3.7 %/°C MIN
• -55°C ~ -70°C; 24/48V	2.7 %/°C MIN
• 85VAC-100VAC	1.33 %/VAC MIN
• 277VAC-305VAC	0.72 %/VAC MIN
Safety standards	IEC62368/EN62368/UL62368
Safety Certification	EN62368
Safety class	CLASS II
MTBF (MIL-HDBK-217F@25°C)	>300,000h
Case material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	89.00 x 63.50 x 25.00 mm 135.00 x 70.00 x 33.50 mm (Chassis mounting) 137.00 x 70.00 x 39.00 mm (Din-rail mounting)
Weight	215g TYP 300g TYP (Chassis mounting) 360g TYP (Dinrail mounting)
Cooling	Free air convection

#### Input specifications

Item	Test conditions	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			1.0	A
	• 230VAC			0.6	A
Inrush current (Cold start)	• 115VAC		60		A
	• 230VAC		80		A
Hot plug	Unavailable				

#### Output specifications

Item	Test conditions	Min	Typ	Max	Units
Output voltage accuracy	All load rang				
	• 3.3V/5V		±2.0	±3	%
	• 12V/15V/24V/48V		±2.0		%
Line regulation	Rated load		±0.5		%
Load regulation	0% - 100% load				
	• 3.3V/5V		±1.0	±3	%
	• 12V/15V/24V/48V		±1.0	-	%
Ripple & noise*	20MHz bandwidth; peak-to-peak value		80	150	mV
Temperature coefficient	0% - 100% load		±0.02		%/°C
Stand-by power consumption				0.5	W
Over-current Protection	≥110%Io, self-recovery				
Over-voltage Protection	• 3.3V Output			≤ 5.5	V
	• 5V Output			≤ 9	V
	• 12V Output			≤ 16	V
	• 15V Output			≤ 24	V
	• 24V Output			≤ 35	V
	• 48V Output			≤ 56	V
Minimum load		0			%
Hold-up time	• 115VAC		10		ms
	• 230VAC		50		ms
Switching Frequency			65		kHz

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

\* Output voltage clamp or shut off

#### Example:

**40ACBEW\_05S4**

**40 = 40Watt; AC = AC-DC; B = case style; E = Cost effective; W = Wide input; 05 = 5Vout; S = Single Output; 4 = 4kVAC isolation**

#### Note:

1. 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;
2. All index testing methods in this datasheet are based on our company corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Products are related to laws and regulations: see „Features“ and „EMC“;
5. 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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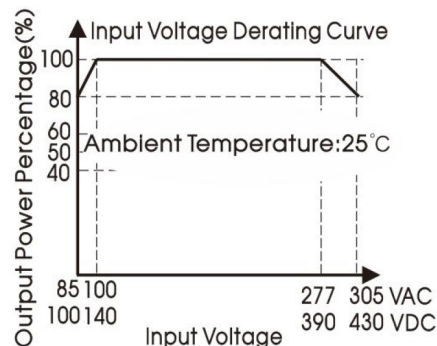
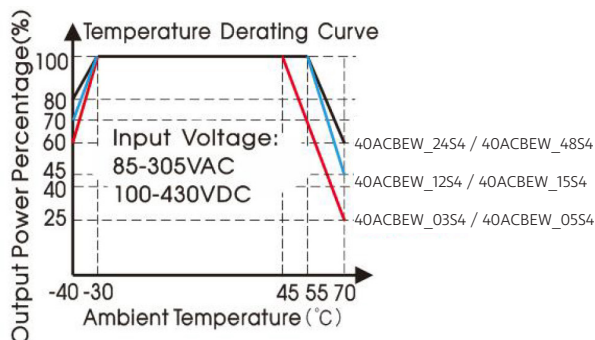
EMC specifications				
Emissions	CE	CISPR32/EN55032	CLASS B	
Emissions	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN 61000-4-2	Contact $\pm 6\text{KV}$ / Air $\pm 8\text{KV}$	perf. Criteria B
Immunity	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
Immunity	EFT	• IEC/EN 61000-4-4 • IEC/EN 61000-4-4	$\pm 2\text{kV}$ $\pm 4\text{kV}$ (see EMC recommended circuit)	perf. Criteria B 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

Certification	Model	Output power [W]	Output [V]	Output [mA]	Efficiency [%, typ]	Capacitive load [ $\mu\text{F}$ , max]
UL	40ACBEW_03S4	26.4	3.3	8000mA	77	60000
UL	40ACBEW_05S4	40	5	8000mA	80	40000
UL	40ACBEW_12S4	40	12	3330mA	84	9000
UL	40ACBEW_15S4	40	15	2660mA	84	7000
UL	40ACBEW_24S4	40	24	1670mA	84	2000
UL	40ACBEW_48S4	40	48	830mA	84	1000

\* Add suffix CM for Chassis mounting with screw terminals (e.g. 40ACBEW\_48S4CM), see different package measurements.

\* Add suffix DR for DIN rail mounting with screw terminals (e.g. 40ACBEW\_48S4DR), see different package measurements.

## Typical characteristics

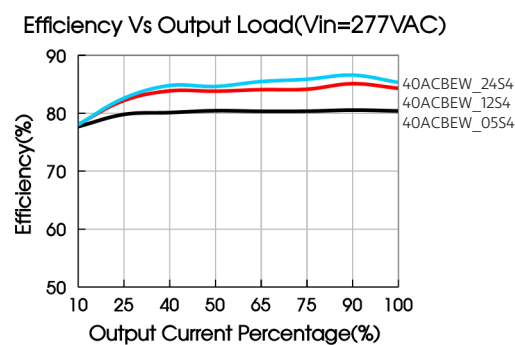
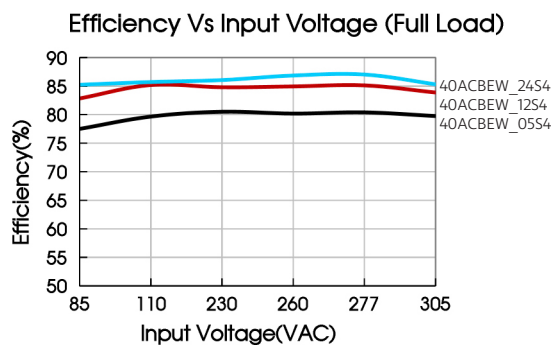


Note:

① With an AC input between 85 - 100VAC/277 - 305VAC and a DC input between 100 - 140VDC/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



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### Typical application circuit

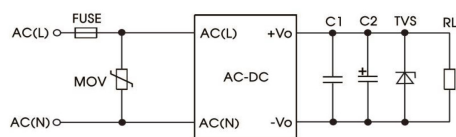


Fig. 1: Typical application circuit

**Note:**

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.

Model	C2 (μF)	C1 (μF)	TVS	MOV	Fuse
40ACBEW_03S4	680	1	SMBJ7.0A	S14K350	3.15A/300V, slow-blow, required
40ACBEW_05S4	680	1	SMBJ7.0A		
40ACBEW_12S4	220	1	SMBJ20A		
40ACBEW_15S4	220	1	SMBJ20A		
40ACBEW_24S4	120	1	SMBJ30A		
40ACBEW_48S4	100	1	SMBJ64A		

### EMC compliance recommended circuit

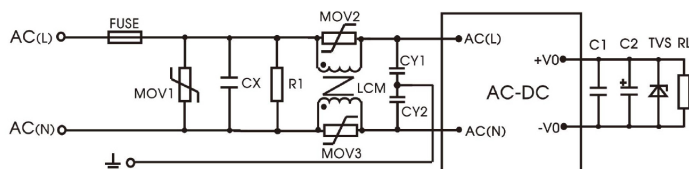
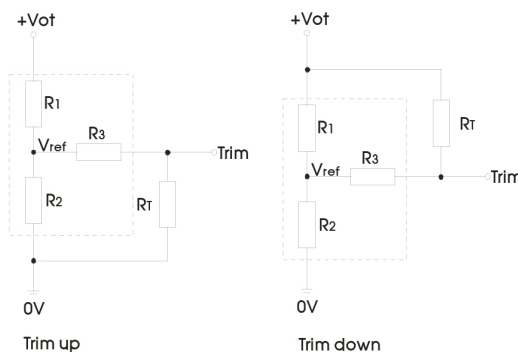


Fig.2 (Output external circuit refer to the typical application circuit)

Component	Recommended value
MOV1	S14K350
MOV2, MOV3	S07K350
CX	0.15μF/300VAC
CY1	2.2nF/400VAC
CY2	2.2nF /400VAC
R1	1MΩ/2W
LCM	2.2 mH
FUSE	3.15A/300V slow-blow, required

### Trim



Trim resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

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

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

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

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

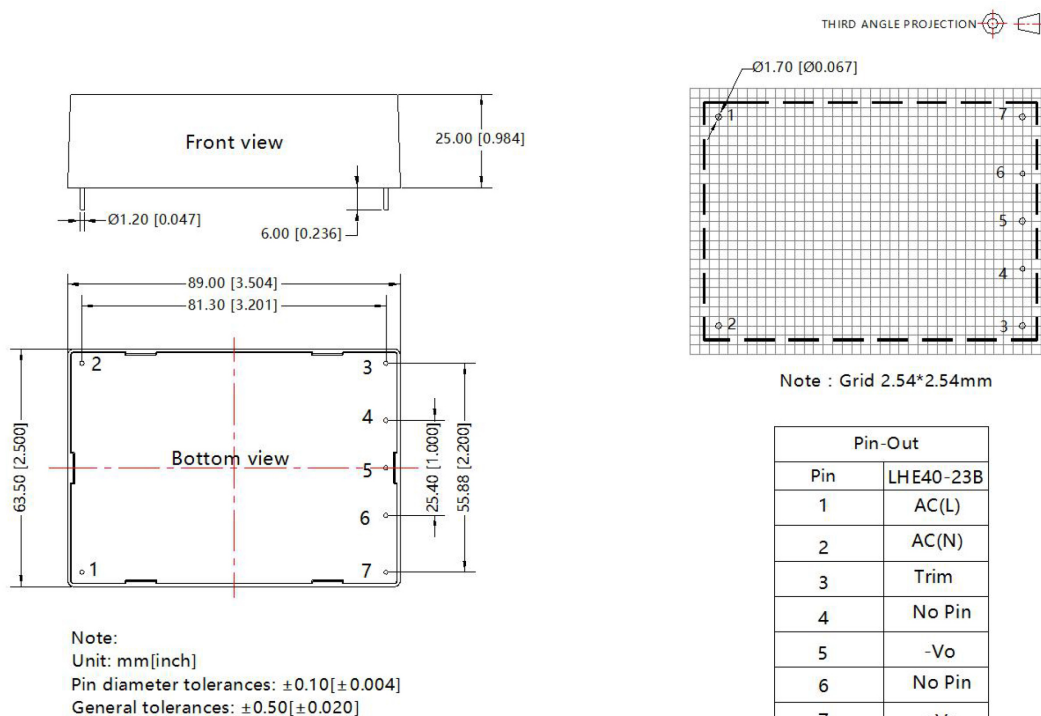
$R_T$  = Trim Resistor value;  
 $\alpha$  = Self-defined parameter;

Vout nominal	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	Vot(V)
3.3V	2	1.2	1	1.24	Resulting Trimmed Output voltage; range ≤ ±10%
5V	3.3	3.3	1	2.5	
12V	3.83	1	1	2.5	
15V	7.5	1.5	1	2.5	
24V	8.66	1	1	2.5	
48V	22	1.2	1	2.5	

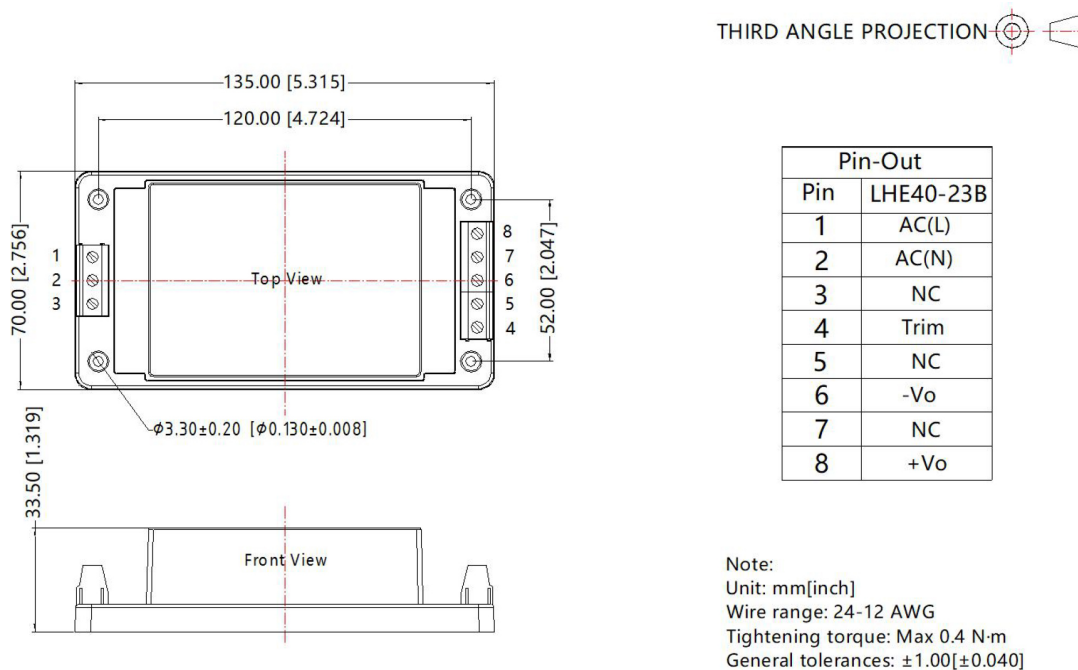
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### Mechanical dimensions



### Chassis mounting

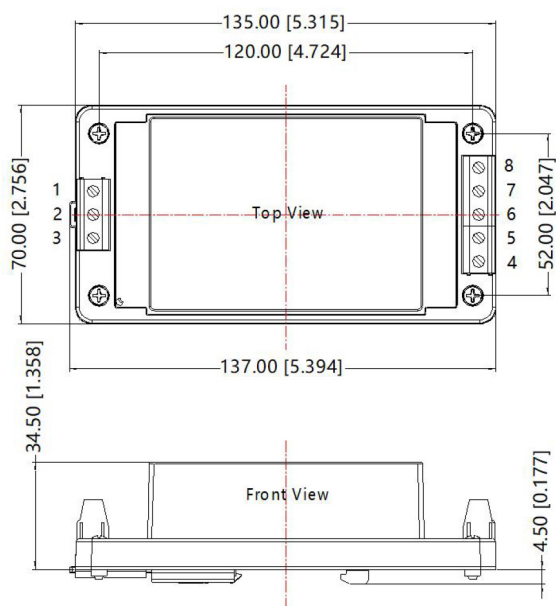


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### Din Rail mounting

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	LHE40-23B
1	AC(L)
2	AC(N)
3	NC
4	Trim
5	NC
6	-Vo
7	NC
8	+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:  $\pm 1.00[\pm 0.040]$