ZAS-15-Bxx series

15W, AC/DC Converter

DESCRIPTIONS

ZAS-15-Bxx series is one of highly efficient green power AC-DC Converter series. They feature ultra-wide input range accepting either AC or DC voltage, high efficiency, low power consumption and reinforced isolation. The converters meet UL/IEC/EN62368, EN60335, EN61558 standards. The converters are widely used in industrial control, electricity power and telecommunications applications. All models are particularly suitable for which it have high requirement for dimension and don't have high requirement on EMC. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

RoHS

FEATURES

- Universal 85-305VAC or 100-430VDC input voltage
- Accepts AC or DC input(dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 3600VAC
- Small size, high efficiency
- Low power consumption, green power
- Output short circuit, over-current, over-voltage protection
- Technical design of industrial products

APPLICATIONS

- Industrial control
- Electric power
- Smart home

Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
--	ZAS-15-B03	9.9W	3.3V/3000mA	77	20000
	ZAS-15-B05	14W	5V/2800mA	78	15000
	ZAS-15-B09	15W	9V/1670mA	82	5000
	ZAS-15-B12		12V/1250mA	82	4000
	ZAS-15-B15		15V/1000mA	84	2000
	ZAS-15-B24		24V/625mA	85	1000

Note: 1.*Due to different rectification methods, the layout of 3.3V/5V/9V and 12V/15V/24V output terminals is different.
. If the product is used in a severe vibration application, it needs to be glued and fixed.
. The product picture is for reference onl . For details, please refer to the actual product.

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Specifications

Product Specifications	Item		Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Voltage Range		AC input		85	--	305	VAC
			DC input		100	--	430	VDC
	Input Frequency				47	--	63	Hz
	Input Current		115VAC		--	--	0.4	A
			230VAC		--	--	0.25	
	Inrush Current		115VAC		--	18	--	
			230VAC		--	35	--	
	Contact Leakage Current		277VAC/50Hz		0.25mA RMS Max.			
	Recommended External Input Fuse				1A/300V, slow-blow, required			
	Hot Plug				Unavailable			
Output Specifications	Output Voltage Accuracy		3.3VDC output		--	±3	--	%
			Other output		--	±2	--	
	Line Regulation		Full load		--	±0.5	--	
	Load Regulation		0%-100% load	3.3VDC output	--	±2	--	
				5VDC output	--	±1.5	--	
				Other output	--	±1	--	
	Minimum Load				0	--	--	
	Ripple & Noise*		20MHz bandwidth (peak-to-peak value)		--	80	150	mV
	Stand-by Power Consumption		230VAC input		--	0.1	0.25	W
	Temperature Coefficient				--	±0.02	--	%/°C
	Short Circuit Protection		Recovery time <3s after the short circuit disappear.		Hiccup, continuous, self-recover			
	Over-current Protection				⩾110%Io, Hiccup, self-recover			
	Over-voltage Protection		3.3VDC output		⩽6.3VDC Output voltage hiccup or clamp,self-recover			
			5VDC output		⩽9VDC Output voltage hiccup or clamp,self-recover			
			9VDC output		⩽12VDC Output voltage hiccup or clamp,self-recover			
			12VDC output		⩽16VDC Output voltage hiccup or clamp,self-recover			
			15VDC output		⩽20VDC Output voltage hiccup or clamp,self-recover			
			24VDC output		⩽30VDC Output voltage hiccup or clamp, self-recover			
	Hold-up Time		115VAC input		--	10	--	ms
			230VAC input		--	40	--	
General Specifications	Isolation	Input-Output	Electric Strength Test for 1min., leakage current < 5mA		3600	--	--	VAC
	Insulation Resistance	Input-output	At 500VDC		50	--	--	MΩ
	Operating Temperature				-40	--	+85	°C

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	Storage Temperature		-40	--	+105	
	Storage Humidity	Non-condensing	--	--	95	%RH
	Soldering Temperature	Wave-soldering	260 ± 5℃; time：5 - 10s			
		Manual-welding	360 ± 10℃; time：3 - 5s			
	Switching Frequency		--	65	--	kHz
	Power Derating	-40°C to -25°C	4	--	--	%/°C
		+55°C to +70°C	3.34	--	--	
		+70°C to +85°C	1.33	--	--	
		85VAC - 100VAC	1.67	--	--	%/VAC
		277VAC - 305VAC	0.72	--	--	
	Safety Class		CLASS II			
	MTBF	MIL-HDBK-217F@25°C	⩾300,000 h			
Mechanical Specifications	Dimension	40.50 x 26.00 x 15.00 mm				
	Weight	12g (Typ.)				
	Cooling method	Free air convection				
Note: * The"parallel cable" method is used for ripple and noise test,						

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	CISPR32/EN55032 CLASS A (Recommended circuit 1, 4)		
			CISPR32/EN55032 CLASS B (Recommended circuit 2, 3)		
		RE	CISPR32/EN55032 CLASS A (Recommended circuit 1, 4)		
			CISPR32/EN55032 CLASS B (Recommended circuit 2, 3)		
		Harmonic current	IEC/EN6100-3-2 CLASS A		
	Immunity (EMS)	ESD	IEC/EN 61000-4-2 Contact ±6KV/Air ±8KV		perf. Criteria B
		RS	IEC/EN61000-4-3 10V/m		perf. Criteria A
		EFT	IEC/EN61000-4-4 ±2KV (Recommended circuit 1, 2)		perf. Criteria B
			IEC/EN61000-4-4 ±4KV (Recommended circuit 3, 4)		perf. Criteria B
		Surge	IEC/EN61000-4-5 line to line ±1KV (Recommended circuit 1, 2)		perf. Criteria B
			IEC/EN61000-4-5 line to line±2KV (Recommended circuit 3, 4)		perf. Criteria B
		CS	IEC/EN61000-4-6 10Vr.m.s		perf. Criteria A
		Voltage variations *	IEC61000-6-2/IEC61000-4-11	70% Un, 25/30 cycle(50/60Hz) 40% Un, 10/12 cycle(50/60Hz) 0% Un, 1 cycle	perf. Criteria B
		Voltage interruptions *	IEC61000-6-2/IEC61000-4-11	0% Un, 250/300 cycle(50/60Hz)	perf. Criteria C
Note: *Un is the maximum input nominal voltage.					

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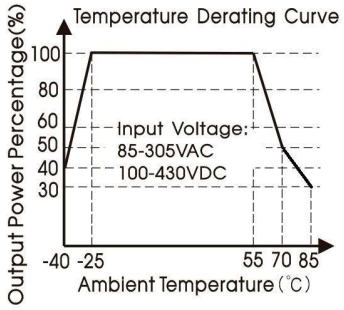
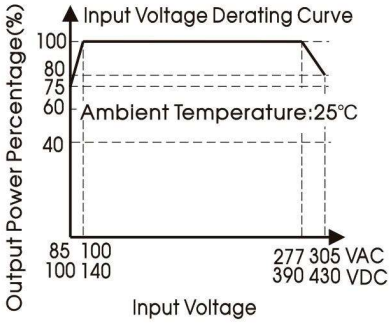
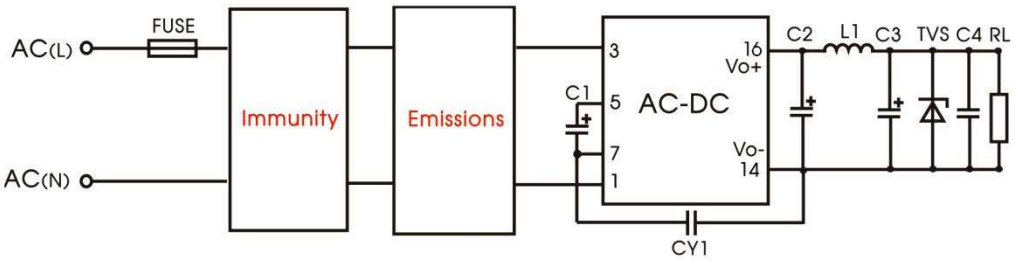
Characteristic Curve





Note: ① With an AC input between 85-100V/277-305VAC and a DC input between 100-140V/390-430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling.

Additional Circuits Design Reference



AS series additional circuits design reference

Part No.	FUSE (required)	C1 (required)	C2 (required)	L1 (required)	C3 (required)	C4	CY1 (required)	TVS
AS15-B03	1A/300V	47UF/ 450V	1500uF/6.3V (solid-state capacitor)	2.2uH (Max: 8mΩ)	470uF/16V	0.1μF/ 50V	2.2nF/ 400VAC	SMBJ7.0A
AS15-B05			1000uF/16V (solid-state capacitor)		330uF/16V			SMBJ7.0A
AS15-B09			680uF/16V (solid-state capacitor)		220uF/35V			SMBJ12A
AS15-B12								SMBJ20A
AS15-B15			1000uF/25V					SMBJ20A
AS15-B24			470uF/35V					SMBJ30A

Note:

1. C1: input capacitors, C2: output storage capacitors, they must be connected externally.
2. We recommend using an electrolytic capacitor with high frequency and low ESR rating for C3 (refer to manufacture's datasheet). Combined with C2, L1, they form a pi-type filter circuit. Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C4 is a ceramic capacitor, used for filtering high frequency noise. A suppressor diode (TVS) is recommended to protect the application in case of converter failure and specification should be 1.2 times of the output voltage.
3. The distance of the original secondary side isolation belt is greater than 6.4mm to meet the safety requirements. In the layout of the periphery, it is also necessary to pay attention to the creepage distance greater than 6.4mm, and the electrical clearance greater than 4.0mm can meet the certification together with the periphery.

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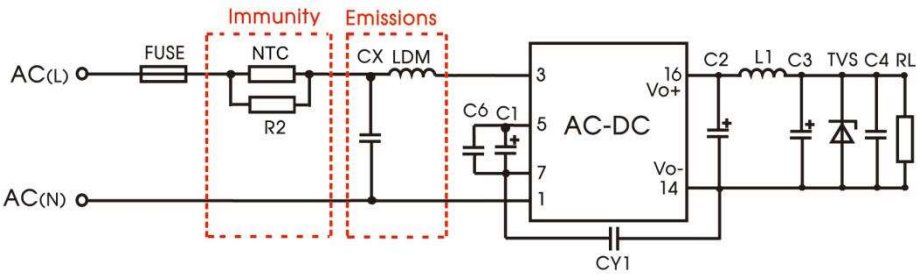
Environmental Application EMC Solution

AS series environmental application EMC solution selection table						
Recommended circuit	Application environmental	Typical industry	Input voltage range	Environment temperature	Emissions	Immunity
1	Basic application	None	85-305VAC	-40℃ to +85℃	CLASS A	LEVEL 3
2	Indoor civil environment	Smart home/Home appliances (2Y)		-25℃ to +55℃	CLASS B	LEVEL 3
	Indoor general environment	Intelligent building/Intelligent agriculture				
3	Indoor industrial environment	Manufacturing workshop		-25℃ to +55℃	CLASS B	LEVEL 4
4	Outdoor general environment	ITS/Video monitoring/Charging point/Communication/Security and protection		-40℃ to +85℃	CLASS A	LEVEL 4

Electromagnetic Compatibility Solution--Recommended Circuit

1. Recommended circuit 1——Basic application

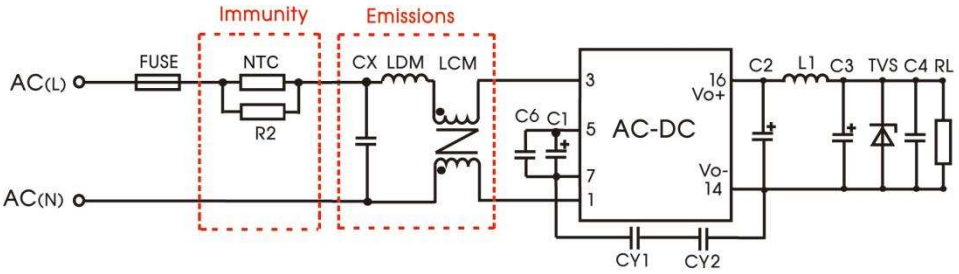


recommended circuit 1

Application environmental	Ambient temperature range	Immunity LEVEL	Emissions CLASS
Basic application	-40℃ to +85℃	LEVEL 3	CLASS A

Component	Recommended value
NTC	8D-15
R2	24Ω/3W (wire-wound resistor)
C6	103K/1206/630V
LDM	1.2mH (MIN: 0.4A, MAX: 4Ω)
CX	0.1μF/310VAC
FUSE(required)	1A/300V, slow-blow

2. Recommended circuit 2——Indoor civil/Universal system recommended circuits for general environment

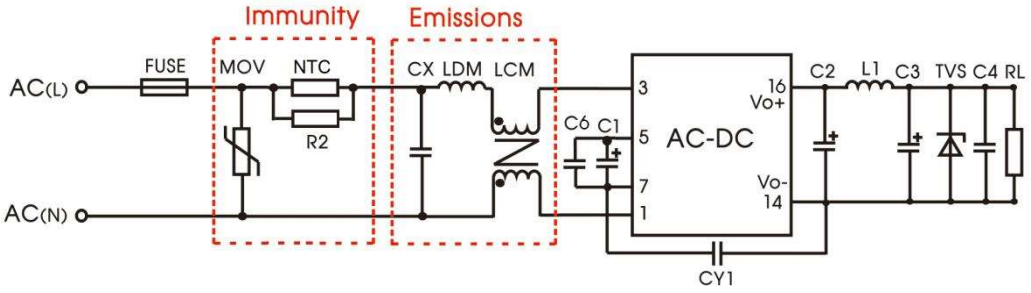


Recommended circuit 2

Application environmental	Ambient temperature range	Immunity LEVEL	Emissions CLASS
Indoor civil /general	-25℃ to +55℃	LEVEL 3	CLASS B

Component	Recommended value
NTC	8D-15
R2	24Ω/3W (wire-wound resistor)
C6	103K/1206/630V
CY1/CY2	2.2nF/400VAC
LCM	20mH
LDM	0.33mH (MIN: 0.4A, MAX: 1Ω)
CX	0.22μF/310VAC
FUSE(required)	1A/300V, slow-blow
Note: In the home appliance application environment, the two Y capacitors of the primary and secondary need to be externally connected (CY1/CY2, value at 2.2nF/400VAC), which can meet the EN60335 certification. In other industries, only one Y capacitor is needed.	

3. Recommended circuit 3——Universal system recommended circuits for indoor industrial environment

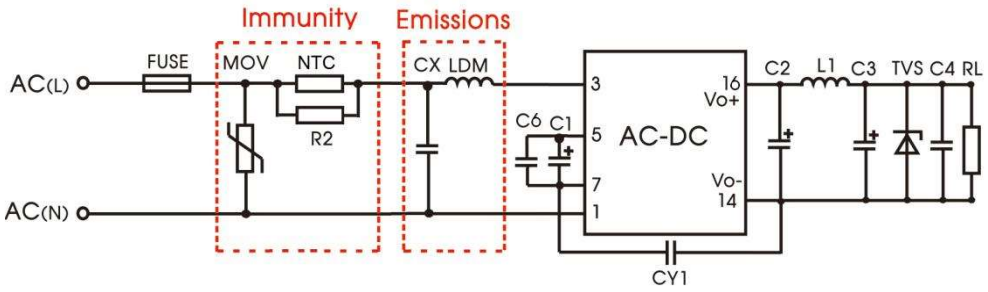


Recommended circuit 3

Application environmental	Ambient temperature range	Immunity LEVEL	Emissions CLASS
Indoor industrial	-25℃ to +55℃	LEVEL 4	CLASS B

Component	Recommended value
MOV	S14K350
CY1	2.2nF/400VAC
CX	0.22μF/310VAC
LCM	20mH
LDM	0.33mH (MIN: 0.4A, MAX: 1Ω)
NTC	8D-15
R2	24Ω/3W (wire-wound resistor)
C6	103K/1206/630V
FUSE(required)	2A/300V, slow-blow

4. Recommended circuit 4——Universal system recommended circuits for outdoor general environment



Recommended circuit 4

Application environmental	Ambient temperature range	Immunity LEVEL	Emissions CLASS
Outdoor general environment	-40℃ to +85℃	LEVEL 4	CLASS A

Component	Recommended value
MOV	S14K350
LDM	1.2mH (MIN: 0.4A, MAX: 4Ω)
CX	0.1μF/310VAC
NTC	8D-15
R2	24Ω/3W (wire-wound resistor)
C6	103K/1206/630V
FUSE(required)	2A/300V, slow-blow

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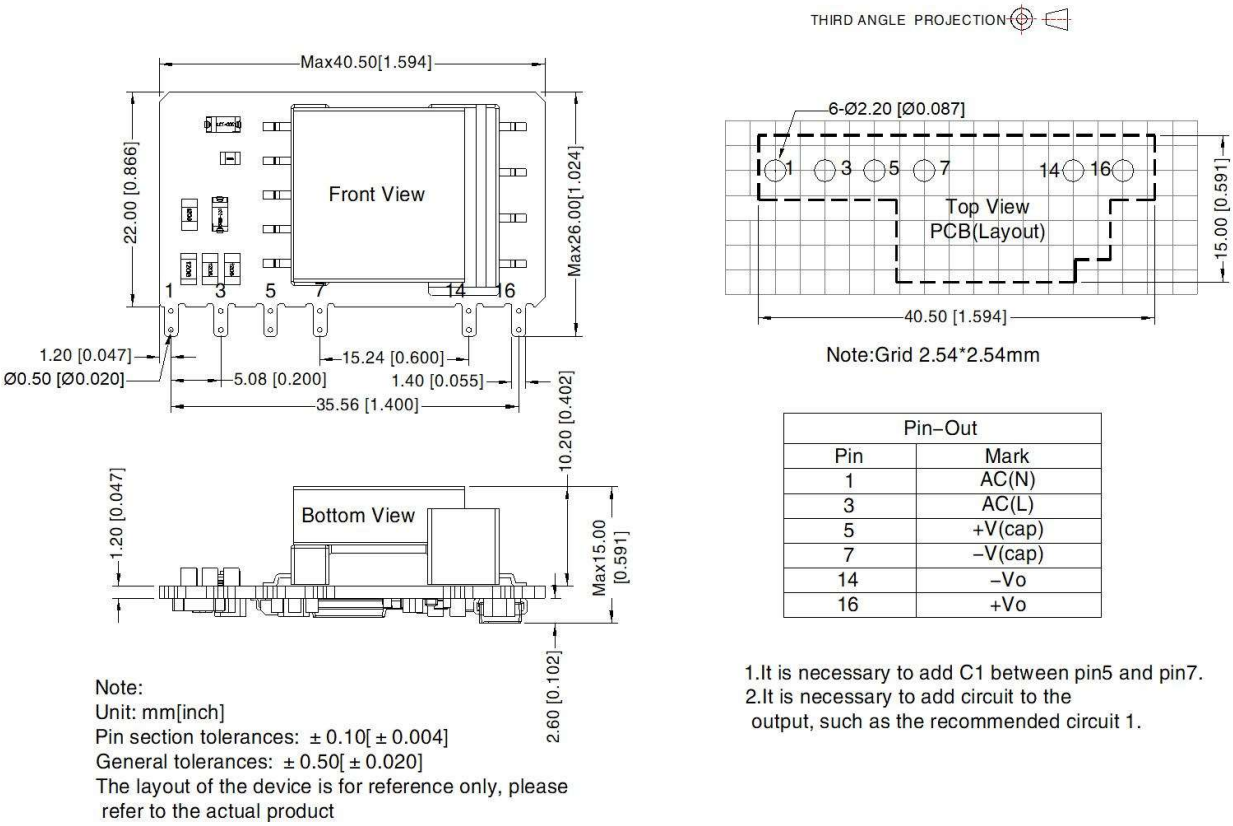
Dimensions and Recommended



Note:Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	AC(N)
3	AC(L)
5	+V(cap)
7	–V(cap)
14	–Vo
16	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
The layout of the device is for reference only, please refer to the actual product

1.It is necessary to add C1 between pin5 and pin7.
2.It is necessary to add circuit to the output, such as the recommended circuit 1.

1. External electrolytic capacitors are required to modules, more details refer to typical applications;
2. This part is open frame, at least 6.4mm safety distance between the primary and secondary external components of the module is needed to meet the safety requirement;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%, nominal input voltage (115V and 230V) and rated output load;
4. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
9. Packaging bag number: 58220480V