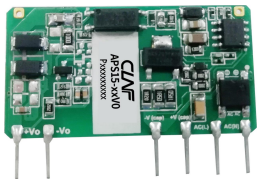
DESCRIPTIONS

15W, AC-DC Converter





RoHS

CE Report UKCA Report

EN62368-1 BS EN62368-1

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℃
- Small size, high power density
- Low power consumption, green power
- Output short circuit, over-current, over-voltage protection
- Regulated output, low ripple & noise

APPLICATIONS

- Industrial control
- Electric power
- Instrumentation
- Smart home

Selection Guide

Certification	Part No*	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN/BS EN	APS15-09V0	15W	9V/1670mA	82	5000
EN/BS EN	APS15-15V0	15W	15V/1000mA	84	2000
--	APS15-15V0-F	15W	15V/1000mA	84	2000
EN/BS EN	APS15-24V0	15W	24V/625mA	85	1000

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

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	--	
	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		--	±2	--	%
	Line Regulation	Full load	--	±0.5	--	
	Load Regulation	0%-100% load	--	±1	--	
	Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	80	150	mV
	Stand-by Power Consumption	230VAC input	--	0.10	0.25	W
	Temperature Coefficient		--	±0.02	--	%/°C
	Short Circuit Protection		Hiccup, continuous, self-recover			
	Over-current Protection		≥110%Io, self-recover			
	Over-voltage Protection	9VDC output	≤12VDC (Output voltage hiccup or clamp)			
		15VDC output	≤20VDC (Output voltage hiccup or clamp)			
		24VDC output	≤30VDC (Output voltage hiccup or clamp)			
	Minimum Load		0	--	--	%
	Hold-up Time	115VAC input	--	10	--	ms
		230VAC input	--	40	--	
General Specifications	Isolation Input-Output	Electric Strength Test for 1min., leakage current < 5mA	3000	--	--	VAC
	Operating Temperature		-40	--	+85	°C
	Storage Temperature		-40	--	+105	
	Storage Humidity		--	--	95	%RH
	Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
		Manual-welding	360 ± 10°C; time: 3 - 5s			
	Switching Frequency		--	65	--	kHz

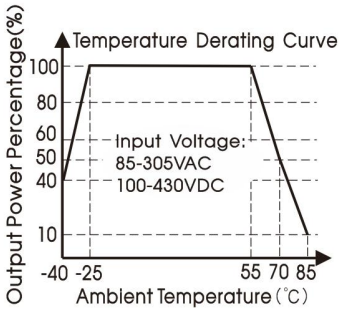
	Power Derating	-40℃ to -25℃	4	--	--	%/℃
		+55℃ to +70℃	3.34	--	--	
		+70℃ to +85℃	2.67	--	--	
		85VAC - 100VAC	1.67	--	--	%/VAC
		277VAC - 305VAC	0.72	--	--	
	Safety Class		CLASS II			
	MTBF	MIL-HDBK-217F@25℃	>1000,000 h			
Mechanical Specifications	Dimension	44.50 x 24.00 x 15.00 mm				
	Weight	11g (Typ.)				
	Cooling method	Free air convection				

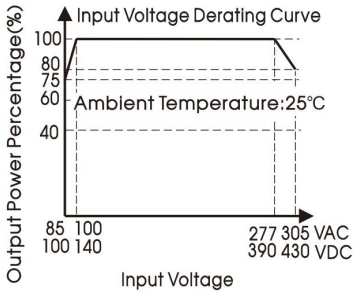
Note: 1. * The "parallel cable" method is used for ripple and noise test.
2. The product is able to work with 0% - 10% load and with stable output.

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions	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)	
	Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV	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 dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

Characteristic Curve

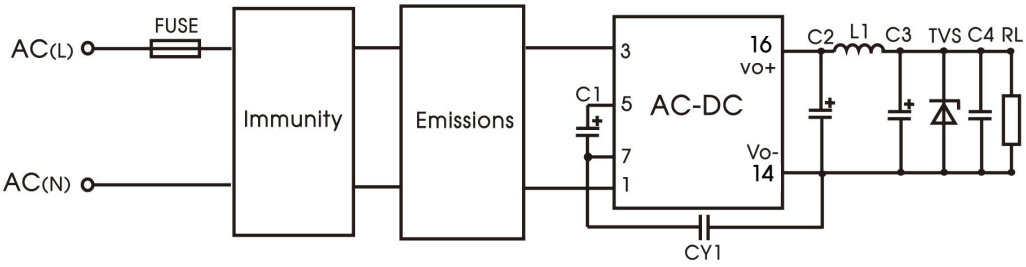




Note: 1. With an AC input between 85-100V/277-305VAC and a DC input between 100-140V/390-430VDC, the output power must be derated as per temperature derating curves;

2. This product is suitable for applications using natural air cooling.

Additional Circuits Design Reference



APS(-F) series additional circuits design reference

APS15(-F) series additional components selection guide								
Part No.	FUSE(required)	C1 (required)	C2 (required)	L1 (required)	C3 (required)	C4	CY1 (required)	TVS
APS15-09V0	1A/300V	33μF/450V	470μF/ 16V (solid-state capacitor)	2.2μH (Max 22mΩ)	220μF/16V	0.1μF/ 50V	2.2nF/ 400VAC	SMBJ12A
APS15-15V0(-F)			680μF/25V		220μF/35V			SMBJ20A
APS15-24V0			470μF/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.

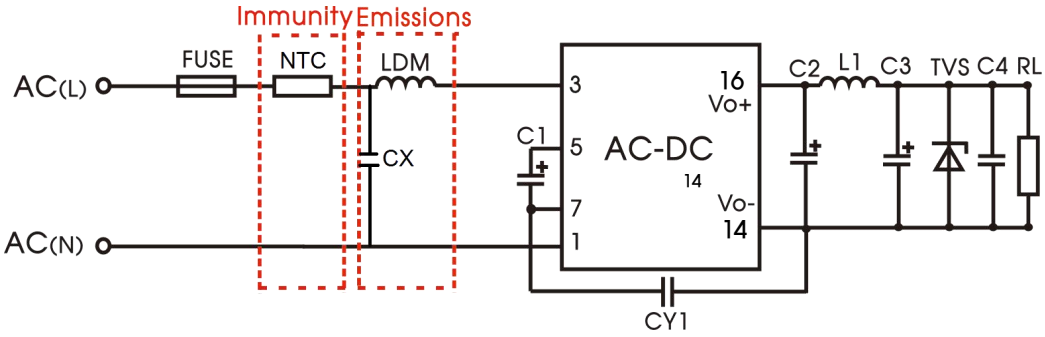
3. The distance of the original secondary side isolation belt is greater than 6.4mm to meet the safety requirements. In the layout of the periphery, it is also necessary to pay attention to the creepage distance greater than 6.4mm, and the electrical clearance greater than 4.0mm can meet the certification together with the periphery.

Environmental Application EMC Solution

APS 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	CLASS III
2	Indoor civil environment	Smart home/Home appliances (2Y)		-25℃ to +55℃	CLASS B	CLASS III
	Indoor general environment	Intelligent building/Intelligent agriculture				
3	Indoor industrial environment	Manufacturing workshop		-25℃ to +55℃	CLASS B	CLASS IV
4	Outdoor general environment	ITS/Video monitoring/Charging point/Communication/Security and protection		-40℃ to +85℃	CLASS A	CLASS IV

Electromagnetic Compatibility Solution--Recommended Circuit

1. Recommended circuit 1——Basic application

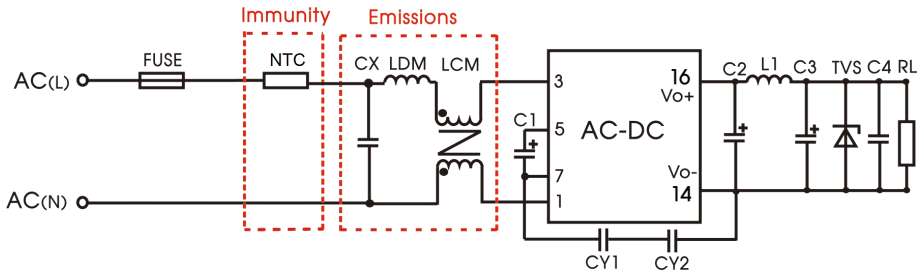


recommended circuit 1

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

Component	Recommended value
NTC	10D-10
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

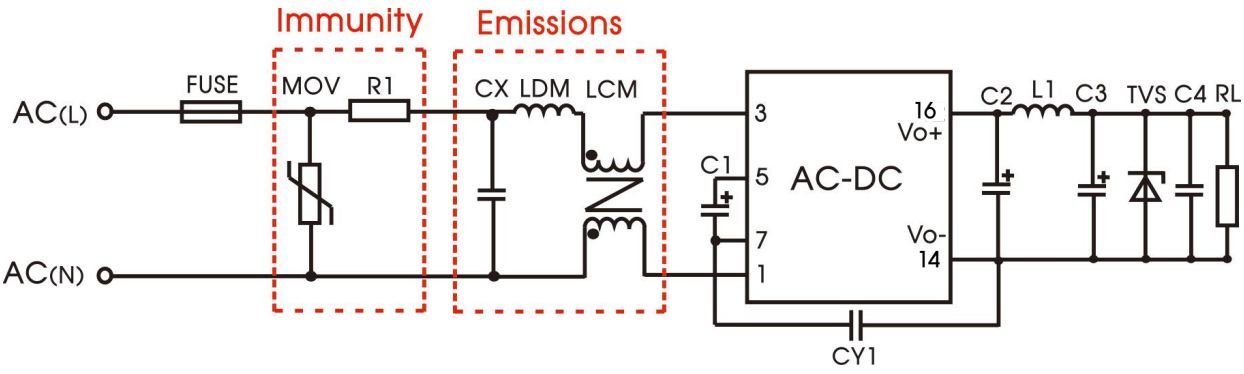


Recommended circuit 2

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

Component	Recommended value
NTC	10D-10
CY1(CY2)	2.2nF/400VAC
LCM	10mH (MIN: 0.4A, MAX: 600mΩ)
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



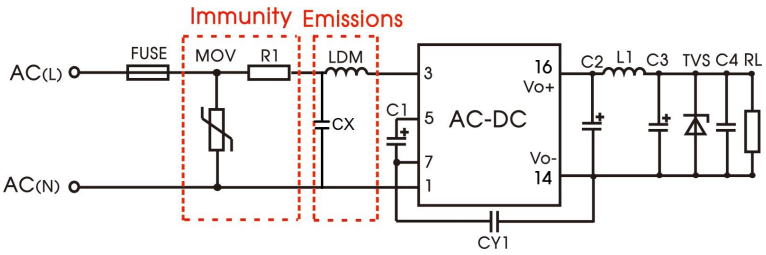
Recommended circuit 3

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

Component	Recommended value
MOV	S14K350
CY1	2.2nF/400VAC

CX	0.22μF/310VAC
LCM	10mH (MIN: 0.4A, MAX: 600mΩ)
LDM	0.33mH (MIN: 0.4A, MAX: 1Ω)
R1	12Ω/3W
FUSE (required)	2A/300V, slow-blow

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

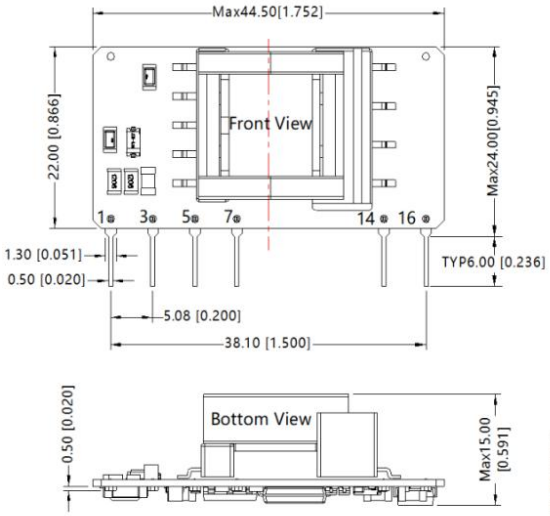


Recommended circuit 4

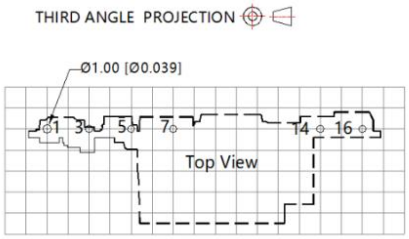
Application environmental	Ambient temperature range	Immunity CLASS	Emissions CLASS
Outdoor general environment	-40℃ to +85℃	CLASS IV	CLASS A

Component	Recommended value
MOV	S14K350
LDM	1.2mH (MIN: 0.4A, MAX: 4Ω)
CX	0.1μF/310VAC
R1	12Ω/3W
FUSE(required)	2A/300V, slow-blow

APS15-xxV0 Dimensions and Recommended Layout



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

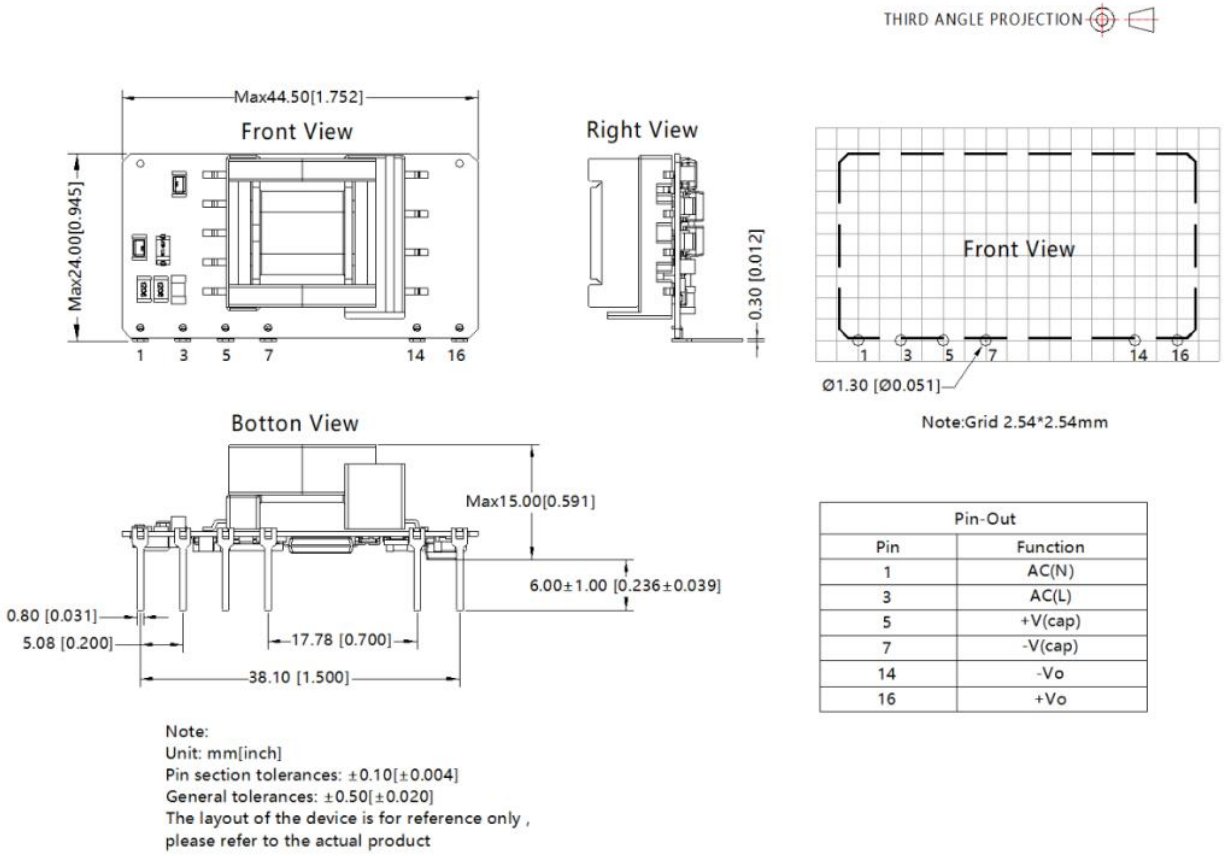


Note:Grid 2.54*2.54mm

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

1.It is necessary to add C1 between pin5 and pin7.
2.It is necessary to add Pi circuits to the output, such as the recommended circuit 1.
3.The distance of the primary and secondary isolation area >6.4mm to meet the safety requirements. The whole layout including additional circuits meet safety requirements with conditions of the creepage distance >6.4mm and the electrical clearance>4mm.

APS15-xxV0-F Dimensions and Recommended Layout



Pin-Out	
Pin	Function
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

Note:

1. External electrolytic capacitors are required to modules, more details refer to typical applications;
2. This part is open frame, at least 6.4mm creepage distance between the primary and secondary external components of the module is needed to meet the safety requirement, refer to the recommended welding hole design in the external dimension drawing;
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 lmprove the efficlency atllght load. there will be audlble ndse generated. But lt 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. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.