DESCRIPTIONS 20W, AC/DC Converter





RoHS

Report Report

UL62368-1 EN61558-1 EN60335-1 EN62368-1 BS EN62368-1 IEC61558-1 IEC62368-1

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- Up to 87% efficiency
- No-load power consumption 0.1W
- 5000m altitude application
- OVC III (meet EN61558-1)
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32/EN55032 CLASS B, EN55014

APPLICATIONS

- Industrial
- Power
- Medical treatment
- Home appliances
- Instrumentation
- Communication
- Civil applications

Selection Guide

Certification	Part No.	Output Power (W)	nominal Output Voltage and Current(vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN/BS EN/ IEC	APD20-03	14.85	3.3V/4500mA	81	8000
EN/BS EN/ IEC	APD20-05	20	5V/4000mA	85	8000
EN/BS EN/ IEC	APD20-09		9V/2200mA	84	5400
UL/EN/ BS EN/ IEC	APD20-12		12V/1670mA	86	4000
EN/BS EN/ IEC	APD20-15		15V/1330mA	87	3000
EN/BS EN/ IEC	APD20-24		24V/830mA	87	1000

Note: 1.Use suffix " E2S" for chassis and suffix " D4S" for DIN-Rail mounting;
2.The product picture is for reference only. For details, please refer to the actual product.

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	--	440	Hz
	Input Current		115VAC		--	--	0.5	A
			230VAC		--	--	0.3	
	Inrush Current		115VAC		--	20	--	
			230VAC		--	45	--	
	Leakage Current		277VAC/50Hz		0.1mA RMS Max.			
	Built In Fuse				3.15A/300V, slow-blow			
	Hot Plug				Unavailable			
Output Specifications	Output Voltage Accuracy				--	±1.5	--	%
	Line Regulation		Full load		--	±0.5	--	
	Load Regulation		0%-100% load		--	±1	--	
	Ripple & Noise*		20MHz bandwidth (peak-to-peak value)		--	100	150	mV
	Temperature Coefficient				--	±0.02	--	%/℃
	Minimum Load				0	--	--	%
	Stand-by Power Consumption		230VAC	3.3/5/9/12/15V	--	0.10	--	W
				24V	--	0.12	--	
	Hold-up Time		115VAC input		--	8	--	ms
			230VAC input		--	50	--	
	Short Circuit Protection				Hiccup, continuous, self-recovery			
	Over-current Protection				≥110%Io, self-recovery			
	Over-voltage Protection		3.3/5V output		≤7.5VDC (Output voltage clamp or hiccup)			
			9V output		≤16VDC (Output voltage clamp or hiccup)			
			12/15V output		≤20VDC (Output voltage clamp or hiccup)			
			24V output		≤30VDC (Output voltage clamp or hiccup)			
General Specifications	Isolation	Input-output	Electric Strength Test for 1min., leakage current <5 mA		4200	--	--	VAC
	Insulation Resistance	Input - output	At 500VDC		100	--	--	MΩ
	Operating Temperature				-40	--	+85	℃
	Storage Temperature				-40	--	+85	
	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
General Specifications	Power Derating	-40℃ to -25℃	85VAC-165VAC	2.0	--	--	%/℃
		+50℃to +70℃	3.3/5/9V	2.5	--	--	
		+55℃ to +70℃	12/15/24V	3.33	--	--	
		+70℃ to +85℃		1.33	--	--	
		85VAC - 100VAC		2.0	--	--	%/VAC
		277VAC - 305VAC		0.71	--	--	
		2000m - 5000m		6.7	--	--	%/Km
	Safety Class			CLASS I I			
	MTBF	MIL-HDBK-217F@25℃		≥1,500,000 h			
	Designed life	230VAC	Ta: 25℃ 100% load	>130x10^3 h			
			Ta: 55℃ 100% load	>16x10^3 h			
			Ta: 55℃ 80% load	>27x10^3 h			
Mechanical Specifications	Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)					
	Dimension	DIP package		52.40 x 27.20 x 24.00 mm			
		E2S chassis mounting		76.00 x 31.50 x 32.80 mm			
		D4S Din-Rail mounting		76.00 x 31.50 x 37.40 mm			
	Weight	DIP package		55g (Typ.)			
		E2S chassis mounting		75g (Typ.)			
		D4S Din-Rail mounting		95g (Typ.)			
	Cooling method	Free air convection					

Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor,

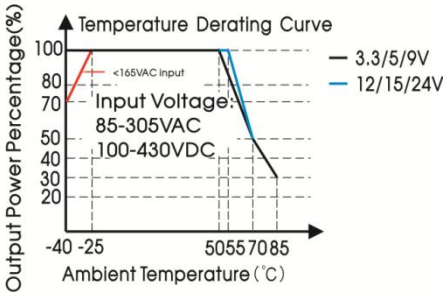
Electromagnetic Compatibility (EMC)

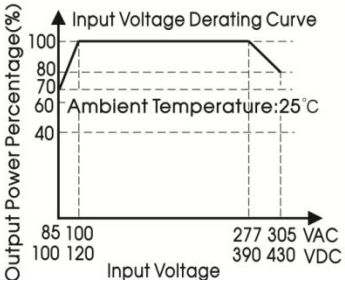
Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	CISPR32/EN55032 CLASS B	
			CISPR11/EN55011 CLASS B	
			EN55014-1	
		RE	CISPR32/EN55032 CLASS B	
			CISPR11/EN55011 CLASS B	
			EN55014-1	
	Immunity (EMS)	Flicker	IEC/EN6100-3-3	
			EN55014-1	
		ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria A
			IEC/EN61000-4-4 ±4KV (See Fig. 2, Fig. 3 for recommended circuit)	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		Surge	IEC/EN61000-4-5 line to line ±1KV	perf. Criteria A
			IEC/EN61000-4-5 line to line ±2KV (See Fig. 2 for recommended circuit)	perf. Criteria A
			IEC/EN61000-4-5 line to line ±2KV/line to PE ±4KV (See Fig. 3 for recommended circuit)	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		PFMF	IEC/EN6100-4-8 10A/m	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B
			IEC/EN55014-2	perf. Criteria B

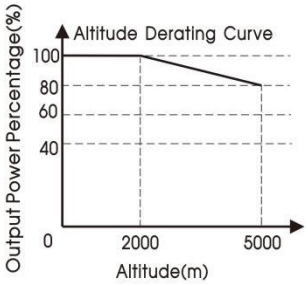
Note : 1.When the output terminal of the product needs to be connected PE through a Y capacitor, or close to metal frame, please refer to the Fig.3 for recommended circuit.

2.Unless otherwise specified, EMC performance indicators are tested according to typical application circuits (Fig.1) .

Characteristic Curve

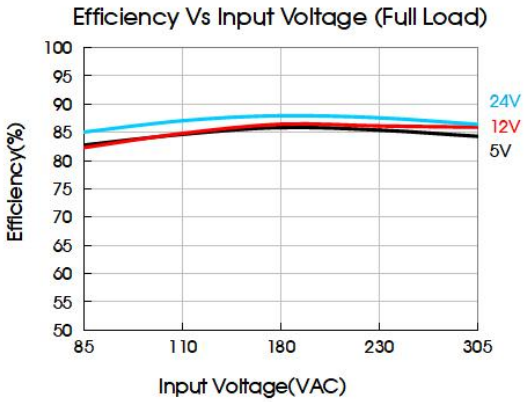


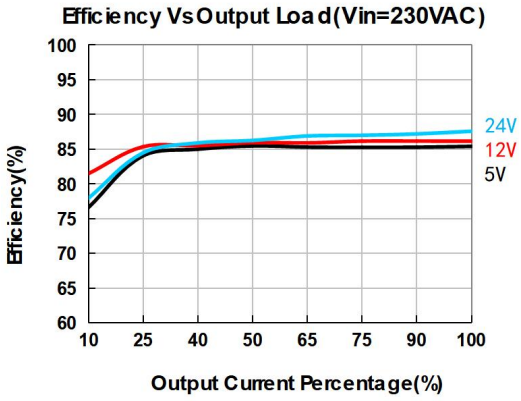




Note: ① With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;

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





Design Reference

1. Typical application

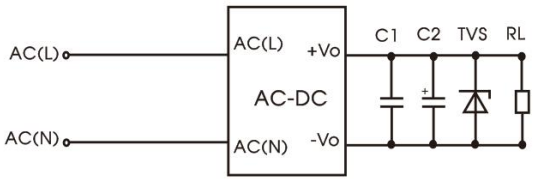


Fig. 1: Typical circuit diagram

Part No.	C1	C2	TVS
APD20-03	1uF/50V	10uF/16V	SMBJ7.0A
APD20-05		10uF/16V	SMBJ7.0A
APD20-09		10uF/25V	SMBJ12A
APD20-12		10uF/25V	SMBJ20A
APD20-15		10uF/25V	SMBJ20A
APD20-24		10uF/35V	SMBJ30A

Output Filter Components:

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.

2. EMC compliance recommended circuit

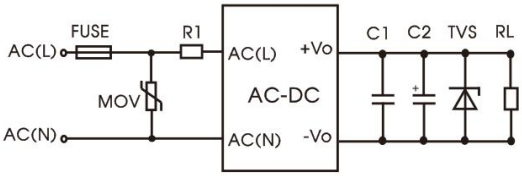


Fig. 2: EMC application circuit with higher requirements

Component	Recommended value
FUSE	3.15A/300V, slow-blow, required
MOV	S14K350
R1	3Ω/3W (wire-wound resistor)
CX	334K/305VAC

Note:

1. The function of CX is to filter out harmonic currents. It must be connected when applied in the power industry.
2. Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ /150VDC.
3. The external circuit component parameters are the same as those of the above typical circuit diagram.

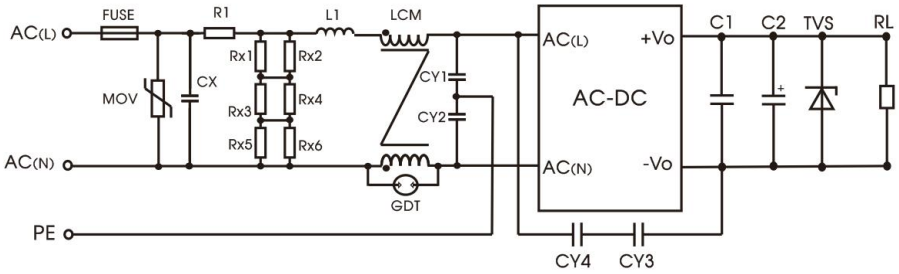


Fig. 3: Recommended circuit for class I equipment

(Recommended when the output terminal of the product needs to be connected to PE or connected to PE through a Y capacitor)

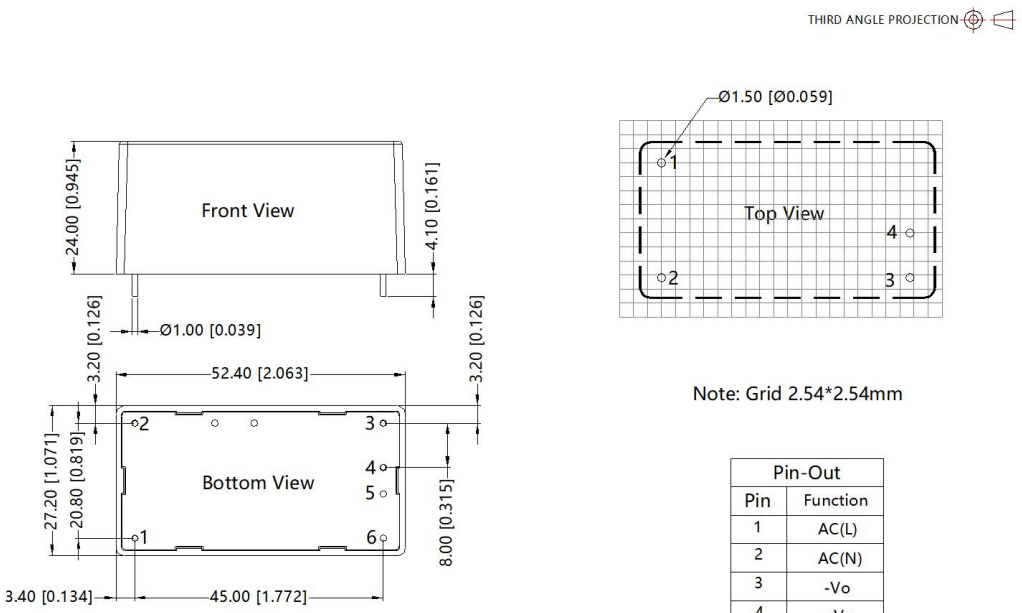
Component	Recommended value
FUSE	3.15A/300V, slow-blow, required
MOV	S14K350
CX	334K/305VAC
R1	6.8Ω/5W (wire-wound resistor)
L1	1.2mH/0.5A
CY1/CY2	2.2nF/400VAC
CY3/CY4	1nF/400VAC
GDT	300V/1KA
LCM	20 mH

Note:

1.Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150VDC.

2. The external circuit component parameters are the same as those of the above typical circuit diagram.

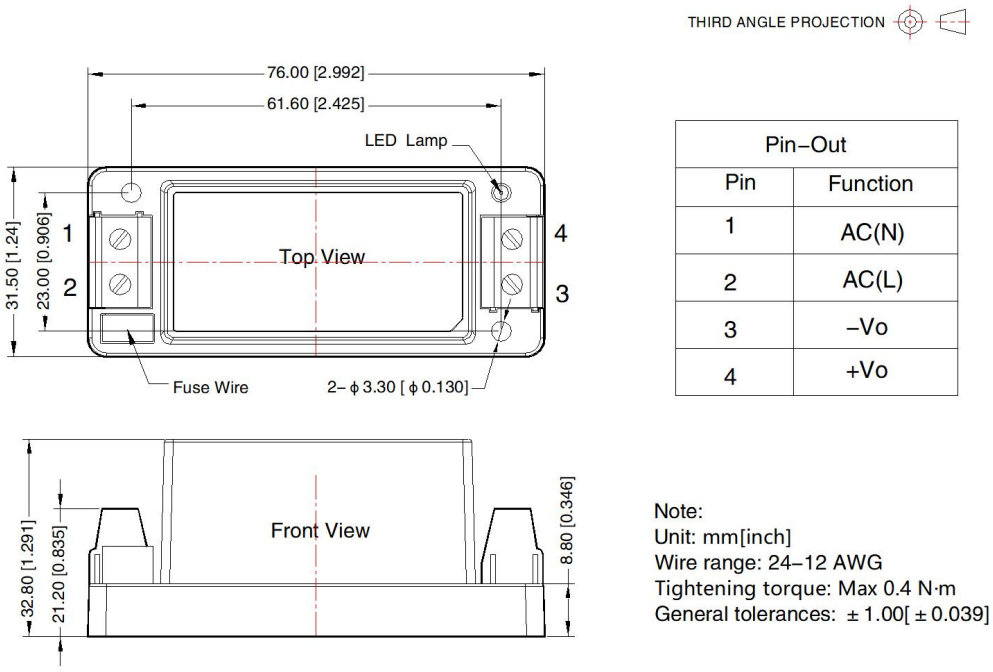
Dimensions and Recommended



Pin-Out	
Pin	Function
1	AC(L)
2	AC(N)
3	-Vo
4	+Vo
5	No Pin
6	No Pin

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

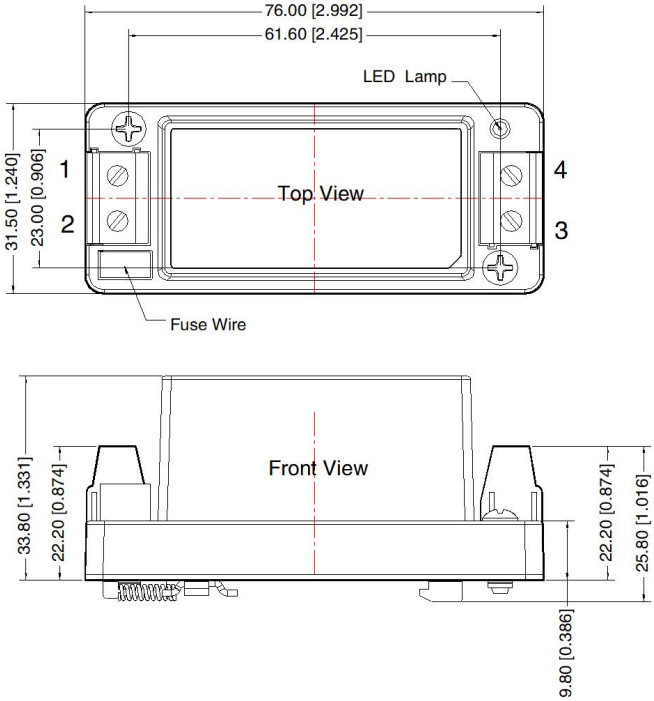
E2S Dimension



Pin–Out	
Pin	Function
1	AC(N)
2	AC(L)
3	–Vo
4	+Vo

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 1.00[± 0.039]

D4S Dimension



THIRD ANGLE PROJECTION

Pin–Out	
Pin	Function
1	AC(N)
2	AC(L)
3	–Vo
4	+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: ± 1.00[± 0.039]

Note:

1. 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;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
7. 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.