APD15-xx Series

DESCRIPTIONS

15W，AC-DC Converter



RoHS

Report Report

UL62368-1 EN62368-1 EN61225-1 EN60335-1 BS EN62368-1 IEC61558-1

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- Up to 86% efficiency
- No-load power consumption < 0.1W
- 5000m altitude application
- OVC III (meet EN61558-1)
- EMI performance meets CISPR32/EN55032 CLASS B, EN55014

APPLICATIONS

- Industrial
- Electric power
- Medical treatment
- Home appliances
- Instrumentation
- Communication
- Civil applications

Selection Guide

Certification	Part No.	Output Power	nominal Output Voltage and Current(vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
UL/EN/BS EN/ IEC	APD15-03	13.2W	3.3V/4000mA	82	6600
UL/EN/BS EN/ IEC	APD15-05	15W	5V/3000mA	85	5000
UL/EN/BS EN/ IEC	APD15-09		9V/1670mA	84	3000
UL/EN/BS EN/ IEC	APD15-12		12V/1250mA	85	2000
UL/EN/BS EN/IEC	APD15-15		15V/1000mA	85	1500
UL/EN/BS EN/IEC	APD15-24		24V/625mA	86	680

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	--	63	Hz
	Input Current	115VAC		--	--	0.45	A
		230VAC		--	--	0.30	
	Inrush Current	115VAC		--	30	--	
		230VAC		--	60	--	
	Leakage Current	277VAC/50Hz		0.1mA RMS Max.			
	Built In Fuse			2A/300V, slow-blow			
	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)		--	70	120	mV
	Stand-by Power Consumption	230VAC	3.3/5/9/12/15V	--	--	0.10	W
			24V	--	--	0.12	
	Temperature Coefficient			--	±0.02	--	%/℃
	Short Circuit Protection			Hiccup, continuous, self-recover			
	Over-current Protection			≥110%Io, self-recover			
	Over-voltage Protection	3.3/5V		≤7.5VDC (Output voltage clamp or hiccup)			
		9 V		≤15VDC (Output voltage clamp or hiccup)			
		12/15V		≤20VDC (Output voltage clamp or hiccup)			
		24V		≤30VDC (Output voltage clamp or hiccup)			
	Minimum Load			0	--	--	%
	Hold-up Time	115VAC		--	10	--	ms
		230VAC		--	55	--	
General Specifications	Isolation	Input- output	Electric Strength Test for 1min., leakage current <5mA	4200	--	--	VAC
	Insulation Resistance	Input- output	At 500VDC	100	--	--	MΩ
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-40	--	+85	
	Storage Humidity			--	--	95	%RH
	Soldering Temperature	Wave-soldering		260 ± 5℃; time: 5 - 10s			
		Manual-welding		360 ± 10℃; time: 3 - 5s			
	Switching Frequency			--	65	--	kHz

	Power Derating	+50℃ to +70℃	3.3/5V	3.00	--	--	%/℃
		+55℃ to +70℃	9/12/15/24V	2.67	--	--	
		+70℃ to +85℃		0.66	--	--	
		85VAC - 100VAC		1.33	--	--	%/VAC
		277VAC - 305VAC		0.71	--	--	
		2000 - 5000m		6.7	--	--	%/Km
	Safety Class			CLASS I I			
	MTBF	MIL-HDBK-217F@25℃		≥3,200,000 h			
	Designed Life	230VAC	Ta: 25℃ 100% load	>130x10^3 h			
			Ta: 55℃ 100% load	>27x10^3 h			
Mechanical Specifications	Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)					
	Dimension	Horizontal package		47.60 x 26.80 x 23.50 mm			
		A2S chassis mounting		76.00 x 31.50 x 32.30 mm			
		A4S Din-Rail mounting		76.00 x 31.50 x 36.90 mm			
	Weight	Horizontal package		48g (Typ.)			
		A2S chassis mounting		68g (Typ.)			
		A4S Din-Rail mounting		88g (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)

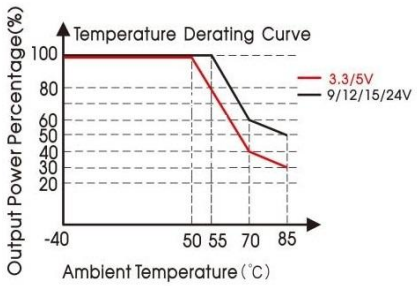
Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	CISPR32/EN55032 CLASS B	
			CISPR11/EN55011 CLASS B	
			EN55014-1	
		RE	CISPR32/EN55032 CLASS B	
			CISPR11/EN55011 CLASS B	
			EN55014-1	
	Immunity (EMS)	ESD	IEC/EN 61000-4-2 Contact ±8KV	perf. Criteria B
			IEC/EN55014-2	perf. Criteria B
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
			IEC/EN55014-2	perf. Criteria A
		EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria B
			IEC/EN61000-4-4 ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
			IEC/EN61000-4-4 ±4KV (See Fig. 3 for recommended circuit)	perf. Criteria A
			IEC/EN55014-2	perf. Criteria B
		Surge	IEC/EN61000-4-5 line to line ±1KV	perf. Criteria B
			IEC/EN61000-4-5 line to line ±2KV (See Fig. 2 for recommended circuit)	perf. Criteria B
			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 B
		CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A

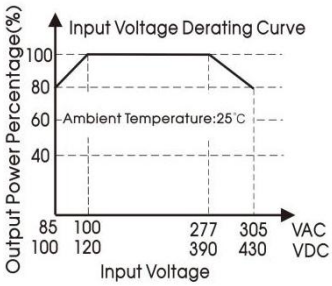
			IEC/EN55014-2	perf. Criteria A
		Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B
			IEC/EN55014-2	perf. Criteria B

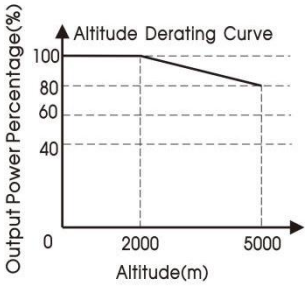
Note: ①When the output terminal of the product needs to be connected to PE through a Y capacitor, or close to the metal frame, please refer to the Fig. 3 for recommended circuit;

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

Characteristic Curve

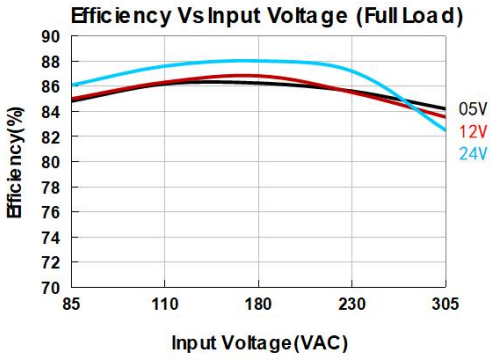


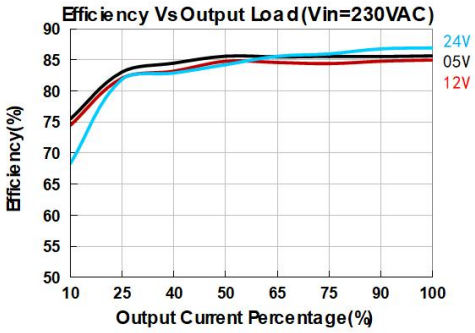




Note: ① With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;

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





Design Reference

1.Typical application

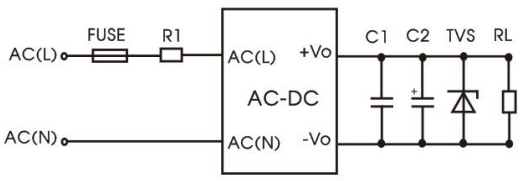


Fig. 1: Typical circuit diagram

Part No.	FUSE	R1	C1	C2	TVS
APD15-03	3.15A/300V, slow-blow , required	6.8Ω/3W (wire-wound resistor, required)	1uF/50V	220uF/16V	SMBJ7.0A
APD15-05				220uF/16V	SMBJ7.0A
APD15-09				100uF/25V	SMBJ12A
APD15-12				100uF/25V	SMBJ20A

APD15-15				100uF/25V	SMBJ20A
APD15-24				100uF/35V	SMBJ30A

Output Filter Components:

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.

2.EMC compliance recommended circuit

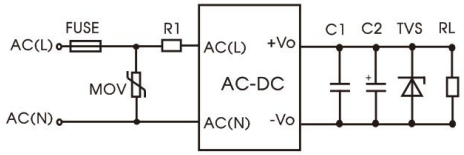


Fig. 2: EMC application circuit with higher requirements

Component	Recommended value
MOV	S14K350
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.	

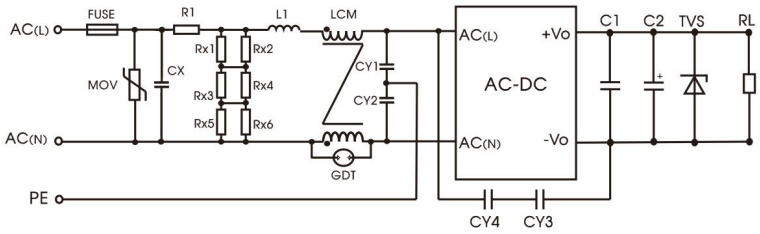


Fig. 3: Recommended circuit for class I equipment

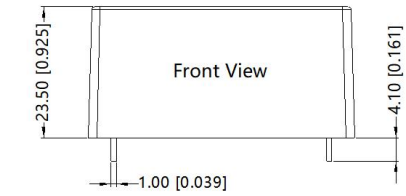
(Recommended when the output terminal of the product needs to be connected to PE or connected to PE through a Y capacitor)

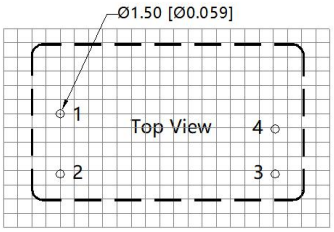
Component	Recommended value
FUSE	3.15A/300V, slow-blow, required
MOV	S14K350
CX	334K/305VAC
R1	12Ω/5W (wire-wound resistor, required)
L1	1.2mH/0.5A
CY1/CY2	2.2nF/400VAC
CY3/CY4	1nF/400VAC
GDT	300V/1KA
LCM	20 mH
Note:	

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.

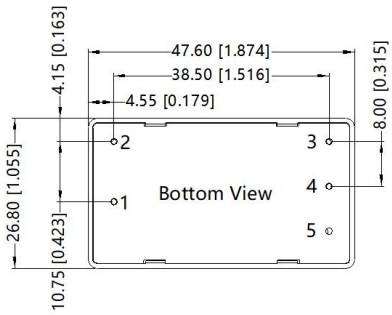
Dimensions and Recommended

THIRD ANGLE PROJECTION





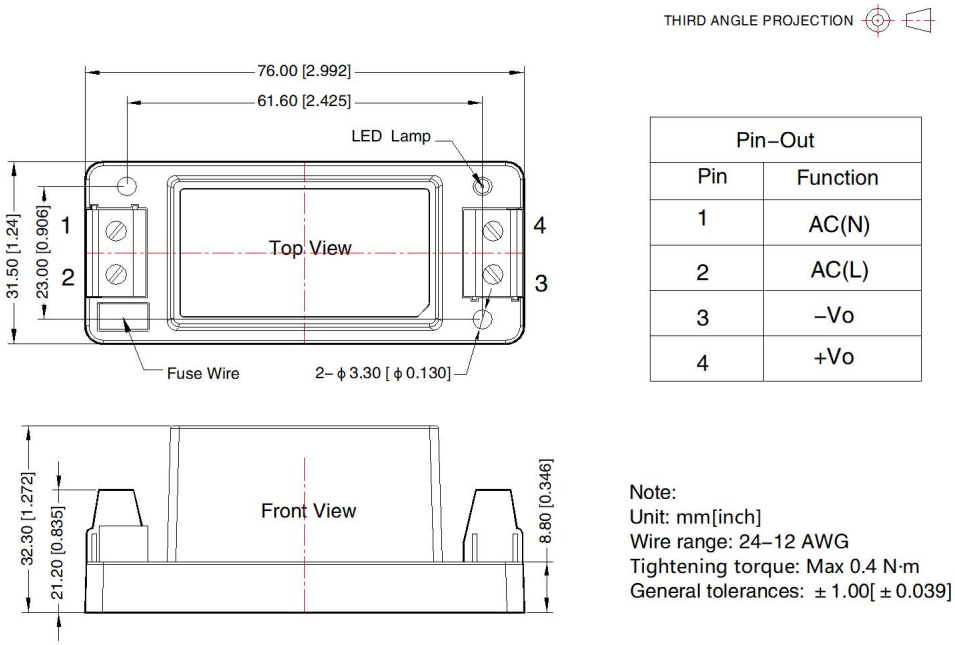
Note: Grid 2.54*2.54mm



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

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

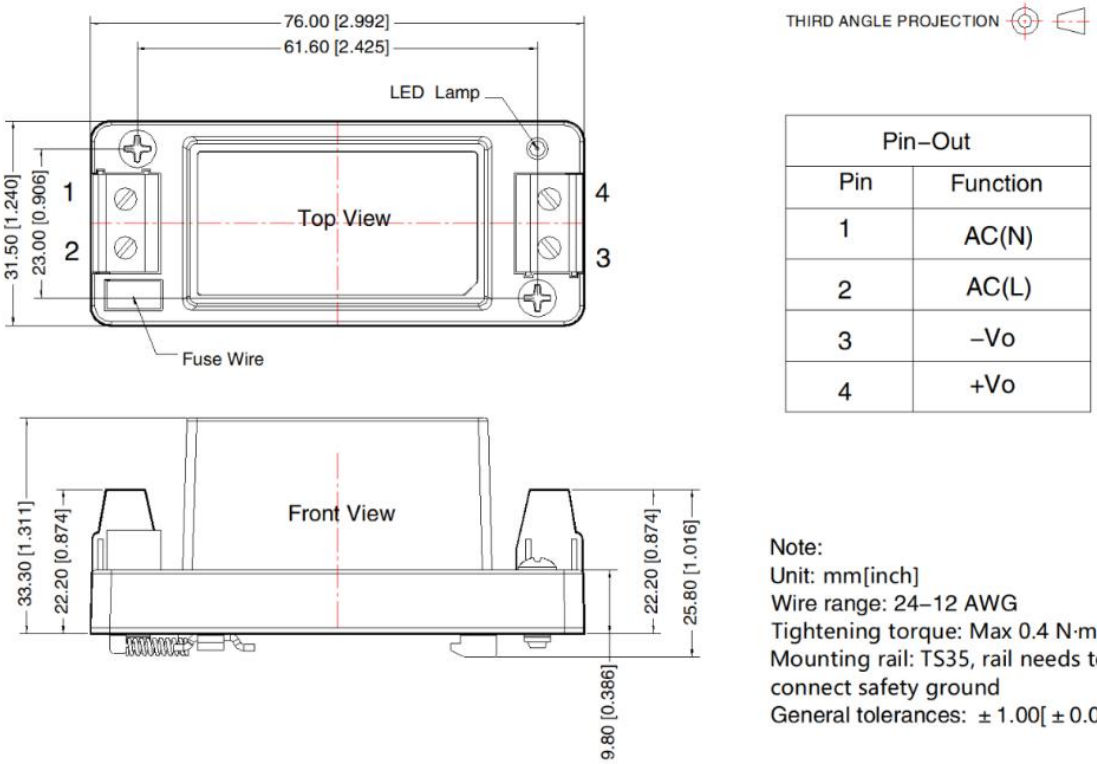
E2S Dimension



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



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.