DESCRIPTIONS

5W, AC-DC Converter







RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

cULus UL62368-1

FEATURES

- Wide 85 - 305VAC or 100 - 430VDC Input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4000VAC
- Low power consumption, High efficiency, High reliability
- Output short circuit, over-current, over-voltage protection
- 5000m altitude application
- Plastic case meets UL94V-0 flammability
- OVC III (meet IEC62477-1, 2000m altitude)
- Meets Emissions CLASS B and surge ±2KV/±4KVwithout additional circuits

APPLICATIONS

- Industrial
- Electric power
- 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	APH05-03	4.12	3.3V/1250mA	72	8100
EN/BS EN	APH05-05	5	5V/1000mA	77	6800
EN/BS EN	APH05-09	4.95	9V/550mA	78	1200
EN/BS EN/UL	APH05-12	5.04	12V/420mA	79	1000
EN/BS EN	APH05-15	4.95	15V/330mA	79	680
EN/BS EN	APH05-24	5.52	24V/230mA	82	270

Note: 1.*Use suffix " E2" for chassis and suffix " D4" 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	--	--	0.125	A
			230VAC	--	--	0.08	
	Inrush Current		115VAC	--	15	--	
			230VAC	--	30	--	
	Leakage Current		277VAC/50Hz	--	--	0.25	mA
	Recommended External Input Fuse			2A/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)	--	--	100	mV
	Stand-by Power Consumption		230VAC	--	--	0.3	W
	Temperature Coefficient			--	±0.02	--	%/℃
	Short Circuit Protection			Hiccup, continuous, self-recover			
	Over-current Protection			≥150%, self-recover			
	Over-voltage Protection		3.3/5V output	≤7.5VDC (Output voltage clamp)			
			9V output	≤15VDC (Output voltage clamp)			
			12/15V output	≤20VDC (Output voltage clamp)			
			24V output	≤30VDC (Output voltage clamp)			
	Minimum Load			0	--	--	%
	Hold-up Time		115VAC input	--	15	--	ms
			230VAC input	--	80	--	
General Specifications	Isolation	Input - PE	Electric Strength Test for 1min., leakage current <5mA	2500	--	--	VAC
		Input - output		4000	--	--	
		Output - PE		1250	--	--	
	Impulse Withstand Voltage	Input - PE	1.2/50us impulse waveform, three positive/ negative pulses, interval ≥5s. There is no breakdown discharge during the test.	6000	--	--	VDC
		Input - output		6000	--	--	
		Output - PE		6000	--	--	
	Insulation	Input - PE	Testing voltage at 500VDC	100	--	--	MΩ

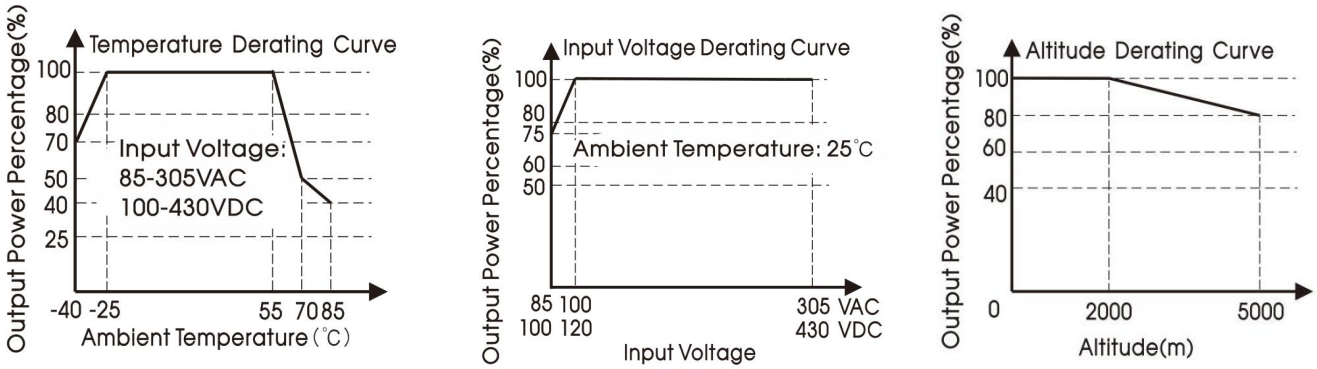
	Resistance	Input - output		100	--	--	
		Output - PE		100	--	--	
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-40	--	+85	
	Storage Humidity			--	--	95	%RH
	Soldering Temperature		Wave-soldering	260 ± 5℃; time: 5 - 10s			
			Manual-welding	360 ± 10℃; time: 3 - 5s			
	Power Derating		-40℃ to -25℃	2	--	--	%/℃
			+55℃ to +70℃	3.33	--	--	
			+70℃ to +85℃	0.67	--	--	
			85VAC - 100VAC	1.66	--	--	%/VAC
	Safety Class			CLASS I			
	MTBF		MIL-HDBK-217F@25℃	>1000,000 h			
Mechanical Specifications	Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)				
	Dimension		Horizontal package	48.50 x 36.00 x 20.50 mm			
			E2 chassis mounting	96.10 x 54.00 x 29.00mm			
			D4 Din-Rail mounting	96.10 x 54.00 x 33.60mm			
	Weight		Horizontal package	55g (Typ.)			
			E2 chassis mounting	100g (Typ.)			
			D4 Din-Rail mounting	140g (Typ.)			
	Cooling Method		Free air convection				

Note: *The "parallel cable" method is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 0.1uF ceramic capacitor,

Electromagnetic Compatibility (EMC)

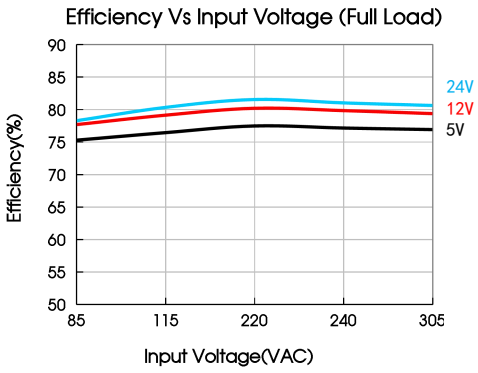
Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	CISPR32/EN55032 CLASS B	
		RE	CISPR32/EN55032 CLASS B	
	Immunity (EMS)	ESD	IEC/EN61000-4-2 Contact ±8KV/Air ±15KV	perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN61000-4-4 ±4KV	perf. Criteria A
		Surge	IEC/EN61000-4-5 line to line ±2KV/line to PE ±4KV	perf. Criteria A
			IEC/EN61000-4-5 line to line ±4KV/line to PE ±6KV (See Fig. 2 for recommended circuit)	perf. Criteria A
		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

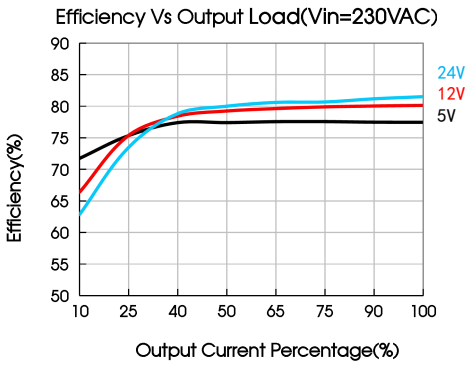
Characteristic Curve



Note: ① With an AC input between 85-100VAC and a DC input between 100-120VDC, 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

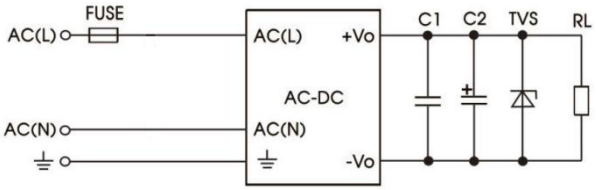


Fig. 1: Typical circuit diagram

型号	C1	C2	FUSE	TVS
APH05-03	1uF/50V	10uF/16V	2A/300V, slow-blow, required	SMBJ7.0A
APH05-05		10uF/16V		SMBJ7.0A
APH05-09		10uF/35V		SMBJ12A
APH05-12		10uF/35V		SMBJ20A
APH05-15		10uF/35V		SMBJ20A
APH05-24		10uF/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

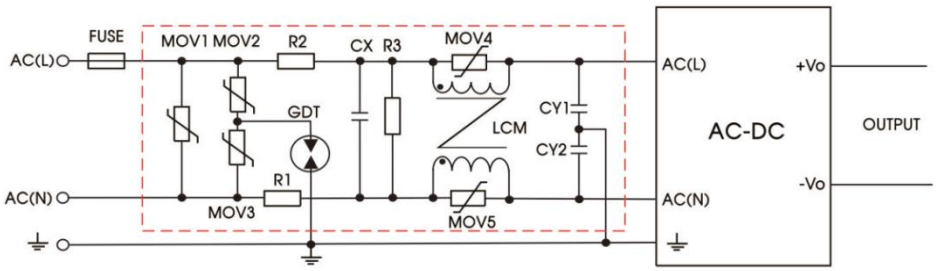
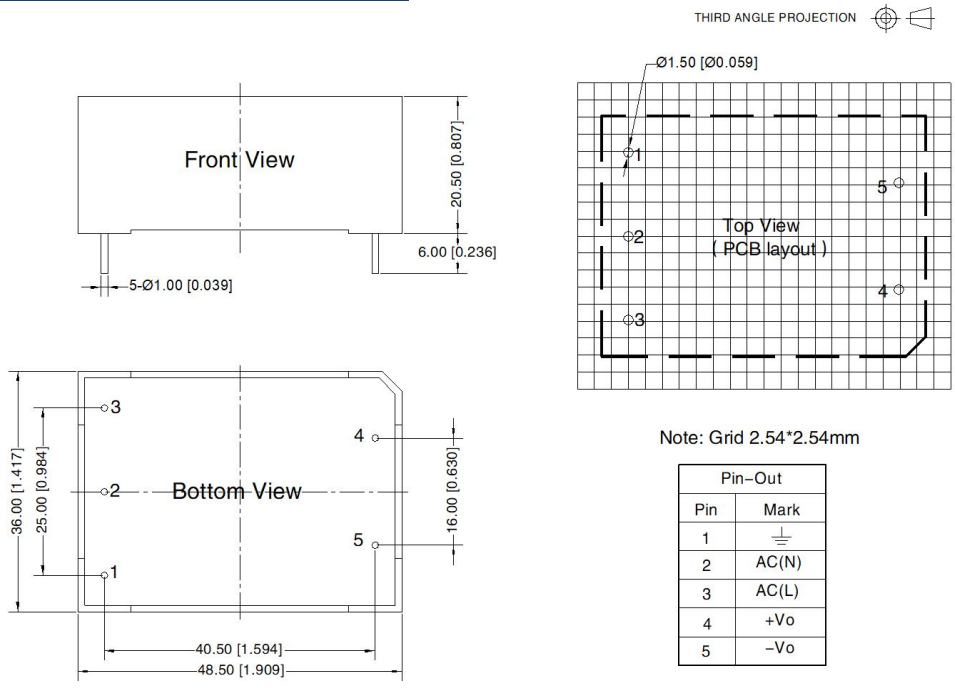


Fig. 2: EMC circuit for harsh requirements

Component	Recommended value	Component	Recommended value
MOV1	S20K350	CY1/CY2	2200pF/400VAC
MOV2/MOV3	S14K350	GDT	B 5G3600
MOV4/MOV5	S07K350	R3	1MΩ/2W (wire-wound resistor)
CX	0.15uF/310VAC	FUSE	3.15A/300V, slow-blow, required
R1/R2	2Ω/3W (wire-wound resistor)		
LCM	10mH		
Note: R3 can also be replaced by 4 pieces of 1MΩ/1206 SMD resistors in series and parallel.			

Dimensions and Recommended

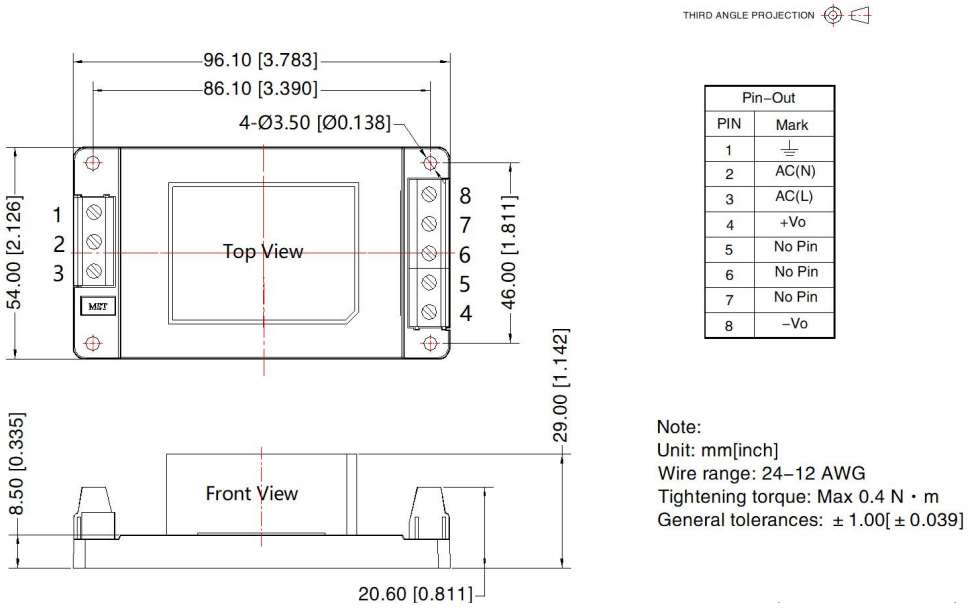


Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	-Vo

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

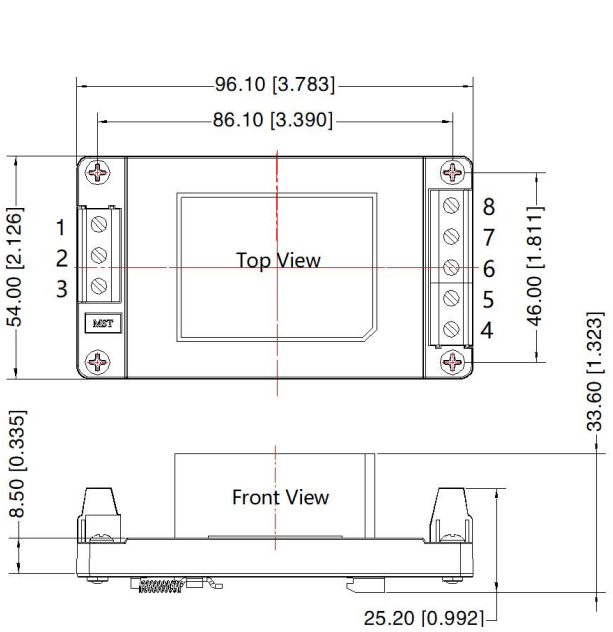
E2 Dimension



Pin-Out	
PIN	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo

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

D4 Dimension



Pin-Out	
PIN	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo

Note:
Unit: mm[inch]
Mounting rail: TS35, rail needs to connect safety ground
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N・m
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.