



## 20ACE1W\_4 series

20W - Single output AC-DC converter

### AC-DC Converter

20 Watt

- ⊕ Wide input voltage range: 85-305VAC/120-430VDC
- ⊕ No load power consumption  $\leq 0.15W$
- ⊕ Transfer efficiency 86% (typ.)
- ⊕ Switching frequency: 65KHz
- ⊕ Protections: short circuit, over current and over voltage
- ⊕ Isolation voltage: 4000VAC
- ⊕ IEC62368/UL62368/EN62368 approved
- ⊕ RoHS compliant
- ⊕ Plastic case, UL94 V-0 class
- ⊕ 5000m altitude application

Introducing our latest 20ACE1W\_4 series: featuring a wide input voltage range of 85-305VAC/120-430VDC, this converter ensures flexibility and reliability. With no-load power consumption  $\leq 0.15W$  and a typical transfer efficiency of 86%, it provides efficient performance. Operating at a switching frequency of 65KHz, it includes protections against short circuit, over current, and over voltage.

The converter offers robust isolation with a voltage of 4000VAC and meets the IEC62368/UL62368/EN62368 test standards. It comes with CB, CE, and RoHS certificates, ensuring compliance with international safety and environmental regulations. Housed in a durable plastic case with UL94 V-0 class rating, it guarantees enhanced safety and reliability.



Common specifications	
Short circuit protection	Full input voltage range - Continuous, self-recovery Hiccup
Over current protection	Input 100-265VAC - $\geq 130\%$ Io self-recovery - Hiccup
Over voltage protection	Input 5.0VDC $\leq 10$ VDC Input 12VDC/12.5VDC $\leq 18$ VDC Input 15VDC $\leq 20$ VDC Input 24VDC $\leq 30$ VDC
Switching frequency	65 KHz (typ.)
Operating temperature	-40°C +75°C (Base on temperature derating curve, see Product Characteristic Curve at back.)
Storage temperature	-40°C +85°C
Soldering temperature	Wave soldering 260 $\pm$ 4°C, time 5-10S Manual soldering 360 $\pm$ 8°C, time 4-7S
Relative humidity	10-90% RH
Hot plug	Unavailable
Remote control terminal	Unavailable
Safety standard	EN62368, IEC62368
Vibration	10-55Hz,10G,30Min,alongX,Y,Z
Safety standard	CLASS II
Class of case material	Black flame-retardant and heat-resistant plastic (UL94V-0)
MTBF (MIL-HDBK-217F@25°C)	>300,000 Hours
Dimension	54.0 x 29.3 x 23.7mm (Horizontal package)
Weight	50g (typ.) (Horizontal package)
Cooling Method	Free air convection

Input specifications					
Item	Operating condition	Min	Typ	Max	Units
Input voltage range	AC input	85	220	305	VAC
	DC input	120	310	430	VDC
Input frequency range		47	50	440	Hz
Input current	100VAC			0.55	A
	220VAC			0.35	A
Surge current	100VAC			10	A
	220VAC			20	A
No Load Power Consumption	Input 115VAC Input 230VAC		0.1	0.15	W
Leakage current	0.5mA TYP/230VAC/50Hz				
Recommended external Input fuse	3.15A-5A/250VAC slow fusing				

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	Full input voltage range, any load		$\pm 1.0$	$\pm 2.0$	%
Line regulation	Nominal load			$\pm 0.5$	%
Load regulation	Nominal input voltage, 20%-100% load			$\pm 2.0$	%
Minimum load	Single Output	0			%
Start up delay time	Input 115VAC(full load)		500		mS
	Input 220VAC(full load)				
Power-off holding time	Input 115VAC(full load)		14		mS
	Input 220VAC(full load)		70		mS
Dynamic response	Overshoot range 25%-50%-25%	-5.0		+5.0	%
	Recovery time 50%-75%-50%	-5.0		+5.0	mS
Output overshoot	Full input voltage range		$\leq 10\%V_o$		%
Temperature drift			$\pm 0.03\%$		%/°C
Ripple & noise*	Full input voltage range		80	100	mV

Note: \*Twisted Pair Method, for details please check "Ripple & Noise Test" at back.

Isolation specifications					
Item	Operating Conditions	Min	Typ	Max	Units
Isolation voltage	I/P-O/P - Test 1min, leakage current $\leq 5mA$	4000			VAC
Insulation resistance	I/P-O/P @ DC500V	100			MΩ

**Example:**  
**20ACE1W\_05S4**  
 20 = 20Watt; AC = AC-DC; E1 = Pinning; W = Wide input;  
 05 = 5Vout; S = Single output; 4 = 4 kVAC isolation

- The product should be used under the specification range, otherwise it will cause permanent damage to it.
- Product's input terminal should connect to fuse;
- If the product operated below the minimum load request, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- If the product worked beyond the load range, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- Unless otherwise specified, data in this datasheet are tested under conditions of  $T_a = 25^\circ C$ , humidity <75% when inputting nominal voltage and outputting rated load(pure resistance load);
- All index testing methods in this datasheet are based on our company's corporate standards.
- The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, please directly contact our technician for specific information;
- We can provide customized product service;
- The product specification may be changed at any time without prior notice.

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EMC specifications					
EMC	EMI	CE	CISPR22/EN55032	CLASS B	
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EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf.Criteria B (see recommended circuit Photo 2)
EMC	EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria B (see recommended circuit Photo 2)
EMC	EMS	ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV	Perf.Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5	±1KV ±2KV	Perf.Criteria B (bare board) Perf.Criteria B (see recommended circuit Photo 2)
EMC	EMS	EFT	IEC/EN61000-4-4	±2KV	Perf.Criteria B (see recommended circuit Photo 2)
EMC	EMS	Voltage dips and interruptions	IEC/EN61000-4-11	0%~70%	Perf.Criteria B

## Product Selection Guide

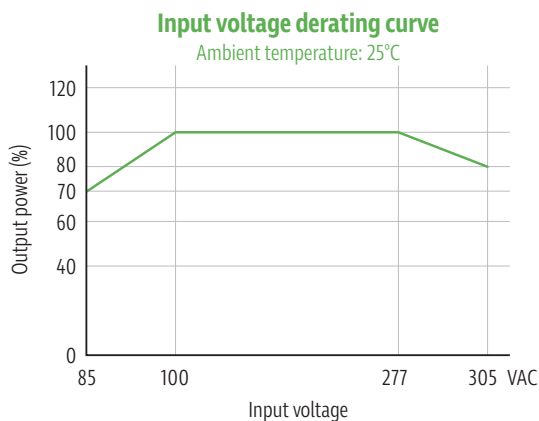
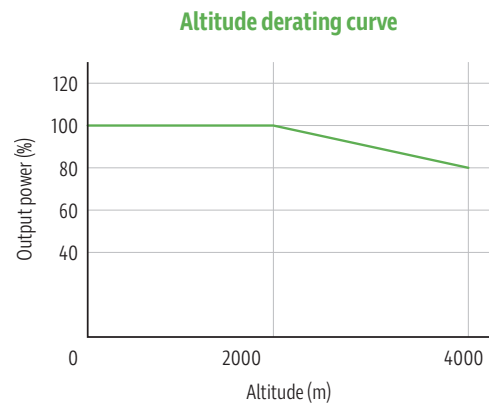
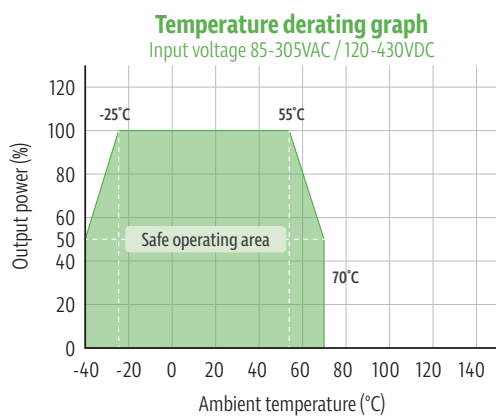
Approval	Model	Output Power (W)	Output Voltage Vo(V)	Output Current Io(mA)	Max. Capacitive Load (uF)	Ripple & Noise 20MHz - Max. (mVp-p)	Efficiency Full Load, 220VAC Typ. (%)
UL	20ACE1W_05S4	20	5	4000	8000	80	84%
UL	20ACE1W_09S4	20	9	2222	7000	80	84%
UL	20ACE1W_12S4	20	12	1666	5000	80	86%
UL	20ACE1W_12.5S4	20	12.5	1600	4000	80	86%
UL	20ACE1W_15S4	20	15	1333	4700	80	86%
UL	20ACE1W_24S4	20	24	833	2000	100	88%

Note:

1: The typical value of output efficiency is based on module is full loaded and burned-in after half an hour.

2: The fluctuation range of full load efficiency (%typ) in table is ±2%, full load efficiency = output power/module's input power.

## Product characteristic curve



Note

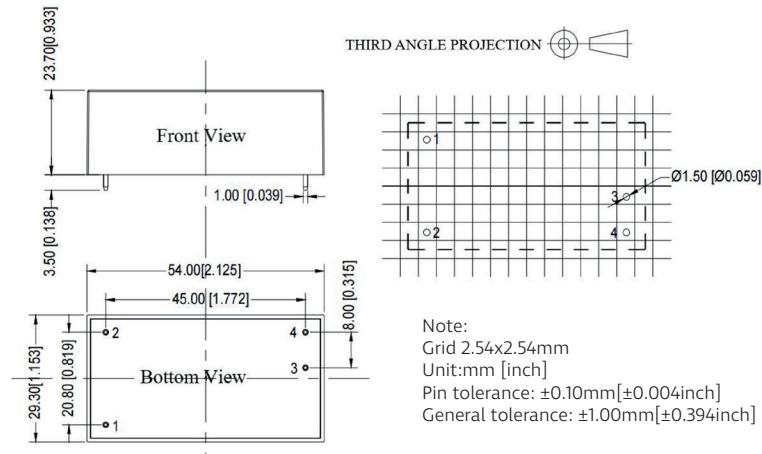
1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 85-100VAC/240-305VAC/120-140VDC/ 340-430VDC.

2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

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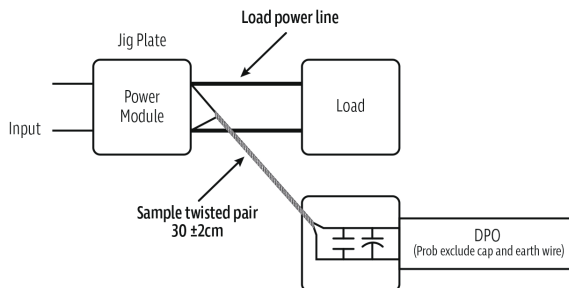
## Dimensions and recommended layout



Pin	1	2	3	4
Single	AC(L)	AC (N)	+Vo	-Vo

## Ripple & noise test: (twisted pair method 20mHz bandwidth)

### Twisted pair method (20MHz bandwidth)



### Test Method:

1. Connect the twisted pair, set the oscilloscope bandwidth to 20MHz, use a 100M bandwidth probe, and terminate with a 0.1uF polypropylene capacitor and a 10uF high-frequency low-resistance electrolytic capacitor in parallel. Configure the oscilloscope to sample mode.
2. Connect the input terminal to the power supply and the output terminal to the electronic load using a jig plate. Use a 30cm ( $\pm 2$  cm) sampling line, and select the power line from appropriately insulated wires of the corresponding diameter according to the output current flow.

## Typical application circuit

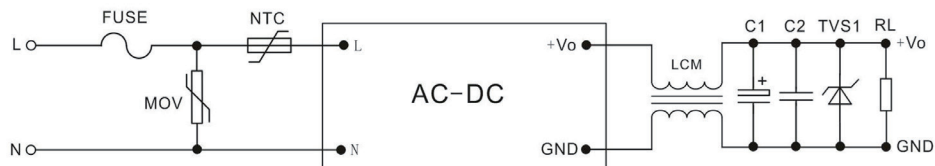


Photo 1

FUSE	Recommend 2A,250VAC (necessary)	C2	0.1uF/50V	TVS1	15V: SMBJ20.0A
MOV	14D561K	TVS1	5V: SMBJ7.0A	TVS1	24V: SMBJ30.0A
NTC	5D-9	TVS1	9V: SMBJ12.0A	TVS1	48V: SMBJ64.0A
C1	electrolytic capacitor 220uF	TVS1	12V,12.5V: SMBJ20.0A	LCM	Common mode inductor 180uH

### Note:

1. C1 is the output high-frequency low-impedance filter electrolytic capacitor, which can reduce the output ripple. It can be increased according to the customer's use conditions. The capacitance withstand voltage is more than 1.2 times the output voltage.

2. TVS1 is a transient voltage absorber, which protects the subsequent circuit when the output voltage of the module is abnormal. Choose the appropriate original model according to above table.

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### EMC recommended circuit (for higher EMC request)

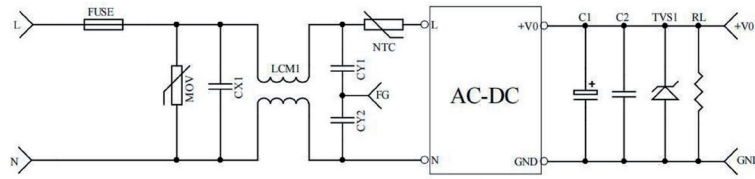


Photo 2

FUSE	Recommend 2A,250VAC (necessary)	CY1, CY2	1nF/400VAC
MOV	14D561K	LCM1	15-25mH
NTC	5D-9	-	-
CX1	0.22uF/275VAC	-	-