20ACE1W_4R series

20W - Single Output AC-DC Converter



AC-DC Converter 20 Watt

- Input voltage range: 85-305VAC / 100-430VDC
- DIP package type
- Operating temperature range: -40°C to +85°C
- 4000VAC isolation voltage
- Up to 87% efficiency
- OVC III (meets EN61558-1)
- Short circuit protection (SCP)
- Over current protection
- Design meets safety standards: IEC/EN61558, IEC/EN60335
- MTBF: 1,500,000 hours

Introducing our latest 20ACE1W_4R series: designed with a wide input voltage range of 85-305VAC/120-430VDC, this converter ensures flexibility and versatility in various applications. With no-load power consumption ≤0.3W and a typical transfer efficiency of 87%, it delivers efficient performance. The converter includes comprehensive protection features such as short circuit, over current, and over voltage protection. It provides reliable and stable performance. It features a robust isolation voltage of 4000VAC and meets stringent safety standards and classified as OVC III for safety.

UL62368 - E347551
Pending

Common specifications

Short circuit protection	Continuous, self recovery
Over current protection	110 (typ.) %Io
Over temperature protection	Shut down output voltage; recovers automatically after temperature decreases.
Power derating	-40°C - -25°C (input voltage) 85-165VAC 2.0 %/°C +50°C - +85°C (output voltage) 3.3/5/9V 2.8 %/°C +55°C - +85°C (output voltage) 12/15/18/24V 2.33 85VAC - 100VAC 2.0 %/VAC 277VAC - 305VAC 0.7 %/VAC
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-40°C - +85°C
Storage humidity	95% RH
Soldering profile	Wave soldering 260°C ± (5°C); time: 5 - 10s Manual welding 360°C ± (10°C); time: 3 - 5s
Safety standard	IEC/EN/BS EN62368-1, EN61558-1, EN60335-1; UL62368-1
Safety class	CLASS II
MTBF	>1,500,000 h (MIL-HDBK-217F@25°C)
Hot plug	Unavailable
Case material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Package dimensions	52.40 x 27.20 x 24.00mm
Weight	50.5g (typ.)
Cooling method	Free air convection

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage	AC Input DC Input	85 100		305 430	VAC VDC
Input current	115VAC 230VAC			0.5 0.3	A
Inrush current	115VAC 230VAC		30 60		A
Input frequency		47		63	HZ
Fuse	3.15A/300V,Slow-blow, Required				
Leakage current	230VAC/50Hz	0.1mA RMS max.			

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy			±2		%
Linear regulation	Vin = min. to max. @full load		±0.5		%
Load regulation	0% - 100% load		±1.0		%
Ripple & noise	20MHz bandwidth, 5%-100% load		100	150	mV
Temperature drift coefficient			±0.02		%/°C
Stand-by power consumption	230VAC		0.1		W
Minimum load		0			%
Over current protection		110			%Io
Hold up time	230VAC		50		ms

Note: The test method for ripple and noise adopts the proximity test method, with a 10uF electrolytic capacitor and a 1uF ceramic capacitor

Isolation specifications

Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 5mA	4000			VAC
Isolation resistance	Input-output, isolated voltage 500VDC	100			MΩ

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this datasheet are based on our company's corporate standards;
6. For specific requirements please contact our technical team directly;
7. Product specifications are subject to change without prior notice.

Example:
20ACE1W_09S4R
20 = 20Watt; AC = AC-DC; E1 = Cost effective; W = Wide input;
09 = 9Vout; S = Single output; 4 = 4kVAC isolation; R = Revised version

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EMC specifications			
EMI	CE	CISPR32/EN55032 CLASS B CISPR11/EN55011 CLASS B EN55014-1	
EMI	RE	CISPR32/EN55032 CLASS B CISPR11/EN55011 CLASS B EN55014-1	
EMS	RS	IEC/EN61000-4-3 10V/m EN55014-2	perf. criteria A perf. criteria A
EMS	EFT	IEC/EN61000-4-4 ±2kV (see fig. 2-1 for recommended circuit) IEC/EN61000-4-4 ±4kV (see fig. 2-2 for recommended circuit) EN55014-2	perf. criteria B perf. criteria A perf. criteria B
EMS	Surge	IEC/EN61000-4-5 line to line ±1kV IEC/EN61000-4-5 line to line ±2kV (see fig. 2-2 for recommended circuit) IEC/EN61000-4-5 line to line ±2kV/line to PE ±4kV/ (see fig. 2-2 for recommended circuit) EN55014-2	perf. criteria B perf. criteria B perf. criteria A perf. criteria B
EMS	CS	IEC/EN61000-4-6 10Vr.m.s EN55014-2	perf. criteria A perf. criteria A
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV / Air ±8kV	perf. criteria A

Product Selection Guide - Single output

Approval	Part number	Input Voltage (VAC)	Out Power (W)	Out Voltage (VDC)	Out Current (mA) max.	Full Load Efficiency % (typ.)	Capacitive Load (µF) max.
	20ACE1W_03S4R	85-305	14.9	3.3	4500	81	8000
	20ACE1W_05S4R	85-305	20	5	4000	85	8000
	20ACE1W_09S4R	85-305	19.8	9	2200	84	5400
	20ACE1W_12S4R	85-305	20	12	1670	85	4000
	20ACE1W_15S4R	85-305	20	15	1330	86	3000
	20ACE1W_18S4R	85-305	20	18	1112	86	3000
	20ACE1W_24S4R	85-305	19.9	24	830	87	1000

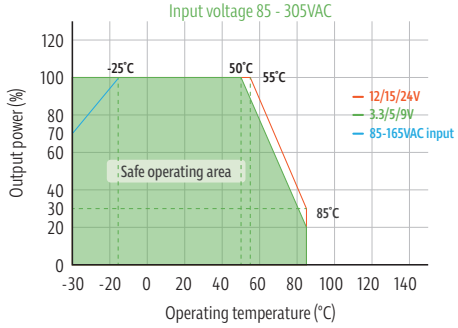
Note:

1. All the above data were tested within the parameter range of typical application circuits;
2. Please use suffix „/CM" is for chassis mounting (20ACE1W_15S4R/CM); Please use suffix „/DR" is for DIN-rail mounting (20ACE1W_24S4R/DR).
3. The product images are for reference only. Please refer to the actual product for details.

Typical characteristics

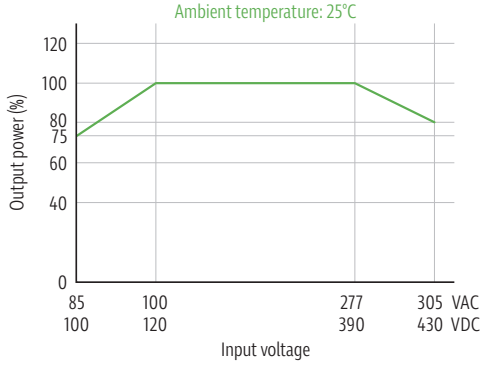
Temperature derating graph

Input voltage 85 - 305VAC



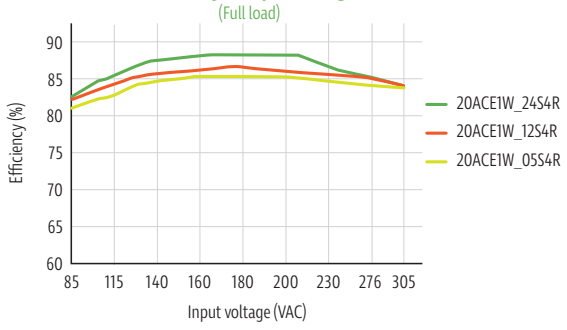
Input voltage derating curve

Ambient temperature: 25°C



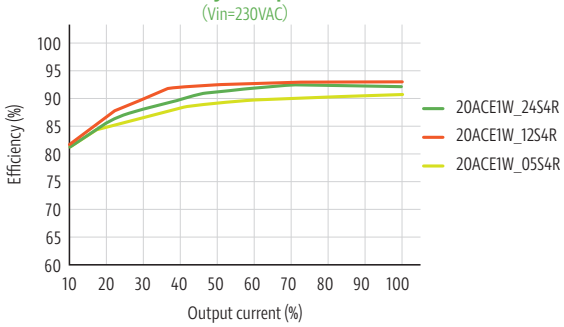
Efficiency vs input voltage

(Full load)



Efficiency vs output load

(Vin=230VAC)



Notes: 1. For input voltages of 85-100VAC/277-305VAC, voltage derating should be carried out on the basis of temperature derating.
2.This product is suitable for use in a natural wind-cooled environment.

Application circuit

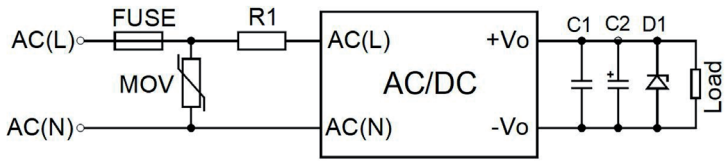


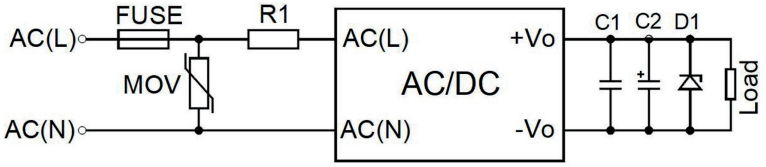
Figure 1

Reference Table for Selection of Peripheral Devices

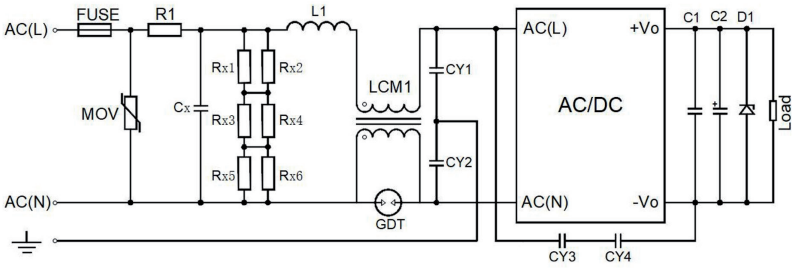
Out Voltage	FUSE	MOV	R1	C1	C2	D1
3.3/5VDC	3.15A/300VAC slow-blow, required	14D561K	3Ω/3W wire-wound resistor, required	1uF/16V	330uF/16V	See Note2
9/12/15VDC				1uF/25V	220uF/25V	
18/24VDC				1uF/50V	100uF/35V	

Note:
1. FUSE and Mov Can be selected based on actual needs.
2. D1 is a TVS transistor that can protect the downstream circuit in case of module abnormalities. It is recommended to choose a model that is 1.2 times the output voltage.

EMC Solutions - Recommended circuits



EMC Recommended Circuit (2-1)

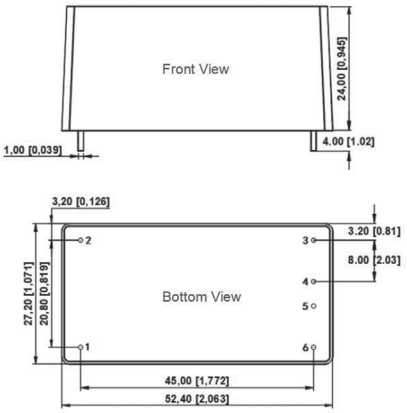


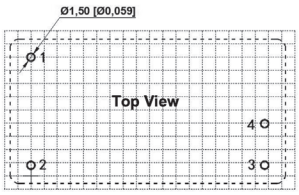
EMC Recommended Circuit (2-2)
(When the output of the product needs to be connected to PE or connected to PE through Y capacitor, recommended)

Recommended parameter values for EMC solution circuits

Model	Recommended value
FUSE	3.15A/300VAC, Slow-blow, Required
MOV	14D561K
R1	6.8Ω/5W Wire-wound resistor, Required
Cx	0.33uF/305VAC
L1	1.2mH/0.5A
CY1, CY2, CY3, CY4	2.2nF/400VAC
GDT	300V/1KA
LCM1	20mH, common mode inductance
Rx1, Rx2, Rx3, Rx4, Rx5, Rx6	1.5MΩ/1206
C1, C2, D1	Refer to typical circuit design and application

Mechanical dimensions and recommended layout





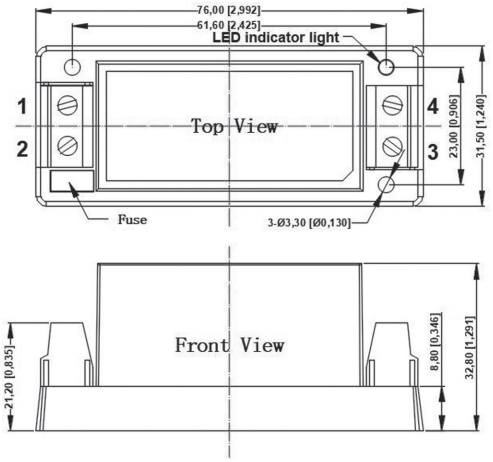
Grid size: 2.54*2.54mm

Pin Function Table

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

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

Mechanical dimensions and recommended layout (chassis mounting)

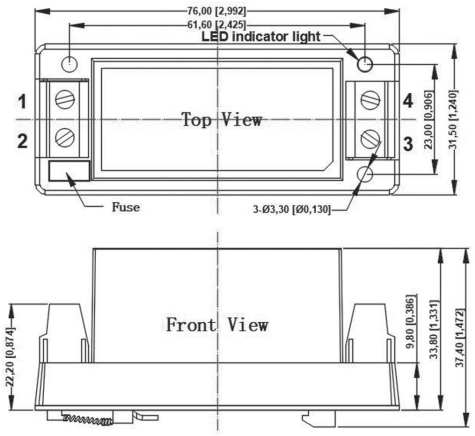


Pin Function Table

Pin	Function
1	AC (L)
2	AC (N)
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]

Mechanical dimensions and recommended layout (DIN rail)



Pin Function Table

Pin	Function
1	AC (L)
2	AC (N)
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]