20ACE_4 series

20W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

AC-DC Converter 20 Watt

- Universal input: 85~264VAC/100~370VDC
- Operating temperature range: -40°C to +70°C
- High efficiency
- High reliability
- Isolation up to 4kVAC
- Output over voltage protection
- Short circuit protection (SCP)
- Over current protection
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- Meets IEC62368, UL62368, EN62368 standards (pending)

The 20ACE_4 Series is a compact size power converter series offered by Gaptec. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, and is UL & CE certified, and widely used in industrial, electricity, instruments, telecommunication and civil applications.

UL-62368-1 (E347551)

Approval (pending)	Model	Power [W]	Output Voltage [V]	Output current [mA, max]	Efficiency [230VAC; %, typ]	Capacitive load [µF, max]
UL/CE/CB	20ACE_03S4	11.88	3.3	3600	74	10000
UL/CE/CB	20ACE_05S4	18	5.1	3600	78	6600
UL/CE/CB	20ACE_09S4	20	9	2200	79	4400
UL/CE/CB	20ACE_12S4	20	12	1660	82	3000
UL/CE/CB	20ACE_15S4	20	15	1330	83	2000
UL/CE/CB	20ACE_24S4	20	24	833	83	800

Note: Add suffix CM for Chassis mounting (f.ex. 20ACE_15S4CM), suffix DR for DIN rail mounting (f.ex. 20ACE_15S4DR)

Input specifications		
Input voltage range	85~264VAC, 100~370VDC	
Input frequency	47~63Hz	
Input current	115VAC • 0.37A (typ) • 0.44A (max)	230VAC • 0.24A (typ) • 0.26A (max)
Inrush current	115VAC • 12A (typ)	230VAC • 36A (typ)
Recommended external input fuse	3.15A/250V, slow fusing, necessary	
Hot plug	unavailable	

Example:
20ACE_05S4
20 = 20Watt; AC = AC-DC; E = case style; 5Vout; S = Single Output; 4 = 4kVAC isolation

Output specifications	
Voltage accuracy	• 3.3V output: ±3% • Others: ±2%
Minimum load	0%
Line regulation (full load)	±0.5% (typ)
Load regulation (0% to 100%)	±1% (typ)
Ripple & Noise (20MHz bandwidth, peak-peak value)	50mV (typ); 120mV (max)
Short circuit protection	Hiccup, indefinite, auto-recovery
Over current protection	≥110% Io, self-recovery
Over voltage protection	• 3.3V/5V output: 7.5V • 9V output: 15V • 12V/15V output: 20V • 24V output: 30V
Hold-up time	115VAC input: 5ms (min); 10ms (typ) 230VAC input: 44ms (min); 55ms (typ)

Note:

1. Ripple and Noise tested with "parallel cable" method.
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's 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.

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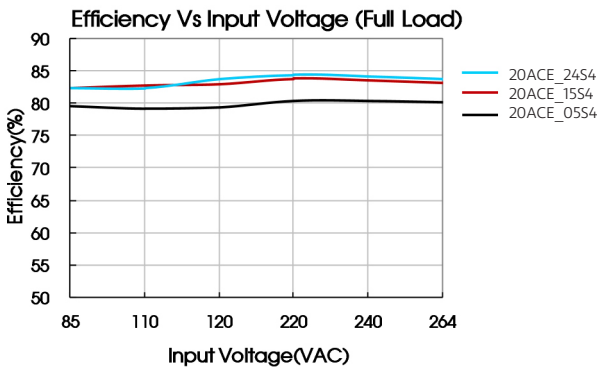
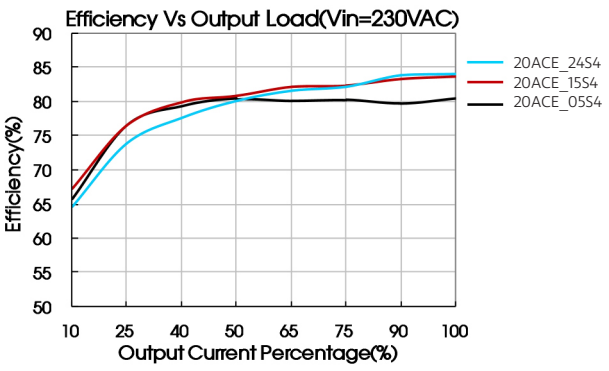
20ACE_4 series

20W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

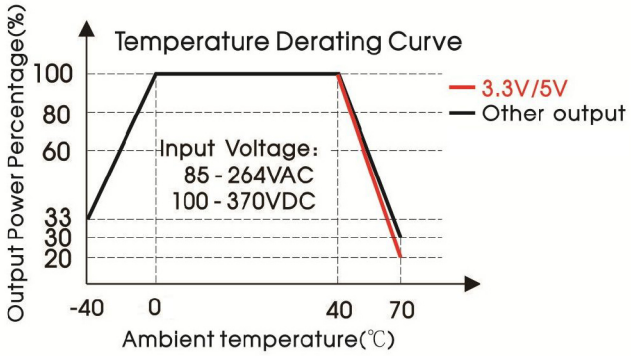
Common specifications			
Operating temperature range	-40°C ~ +70°C		
Storage temperature range	-40°C ~ +85°C		
Humidity	95% MAX		
Temperature coefficient	0.02%/°C		
Welding temperature	• Wave-soldering: 260 ± 5°C; time: 5 - 10s • Manual welding: 360 ± 10°C; time: 3 - 5s		
Switching frequency	100kHz TYP		
Power derating	-40°C to 0°C: 1.67%/°C +40°C to +70°C: 3.3V/5V: 2.66%/°C; others: 2.33%/°C		
Power derating	85-130VAC, 5V • -25°C to +70°C: 0.66%/VAC • -40°C to -25°C: 1.33%/VAC 85-100VAC, Others -25°C to +70°C: 2.0%/VAC -40°C to -25°C: 4.0%/VAC 240-264VAC: 0.83%/VAC		
I/O-isolation voltage	4000VAC/1Min		
EMC / EMI / CE	CISPR32/EN55032,	CLASS B	
EMC / EMI / RE	CISPR32/EN55032,	CLASS B	
EMC / EMS / ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	perf. Criteria B
EMC / EMS / RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
EMC / EMS / EFT	• IEC/EN 61000-4-4	± 4kV	perf. Criteria B
EMC / EMS / Surge	• IEC/EN 61000-4-5 • IEC/EN 61000-4-5	line to line ±2KV line to line ±4KV/line to ground ±6KV (see EMC solution recommended circuit)	perf. Criteria B perf. Criteria B
EMC / EMS / CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
EMC / EMS / Voltage dips, short and interruptions immunity	IEC/EN61000-4-11	0%-70%	perf. Criteria B
Safety standard	IEC62368/EN62368/UL62368		
Safety regulation certification	IEC62368/EN62368/UL62368 (Pending)		
Safety class	CLASS II		
Case material	UL94V-0		
Install	PCB, chassis, Din rail mounting		
MTBF	>300,000h @25°C (MIL-HDBK-217F)		
Cooling method	Free air convection		
Weight	60g / 80g (chassis mounting) / 100g (Din rail mounting)		
Dimensions	53.80*28.80*23.50 mm / 76.00*31.50*32.30 mm (chassis mounting) / 76.00*31.50*36.90 mm 100g (Din rail mounting)		

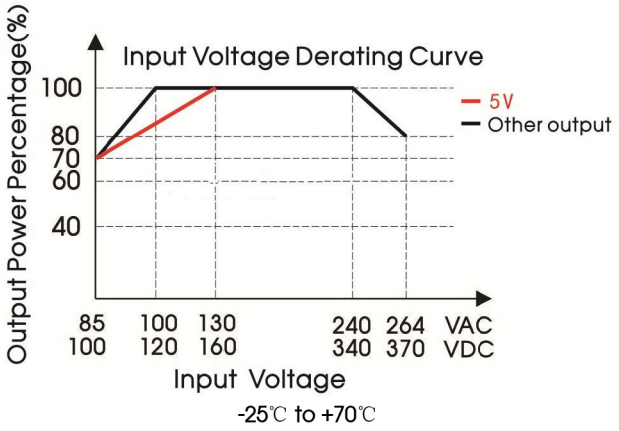
Efficiency

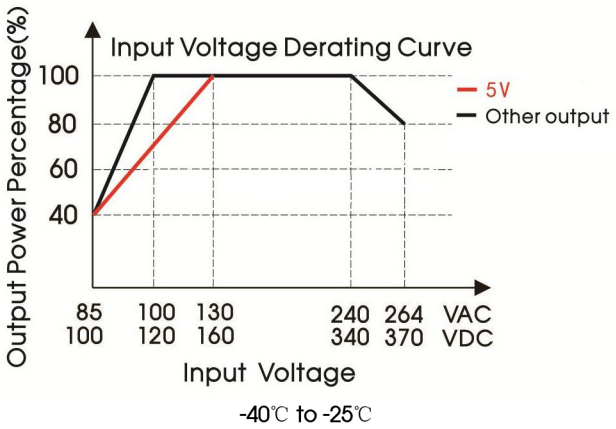




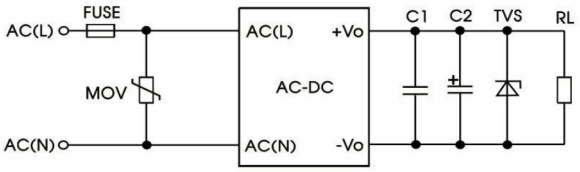
Typical characteristics







Typical application circuit



Model	FUSE	MOV	C1	C2	TVS
20ACE_03S4	3.15A/250V, slow fusing, necessary	S20K300	1μF/50V	220μF/16V	SMBJ7.0A
20ACE_05S4				220μF/16V	SMBJ7.0A
20ACE_09S4				120μF/25V	SMBJ12A
20ACE_12S4				120μF/25V	SMBJ20A
20ACE_15S4				120μF/25V	SMBJ20A
20ACE_24S4				68μF/35V	SMBJ30A

Table 1

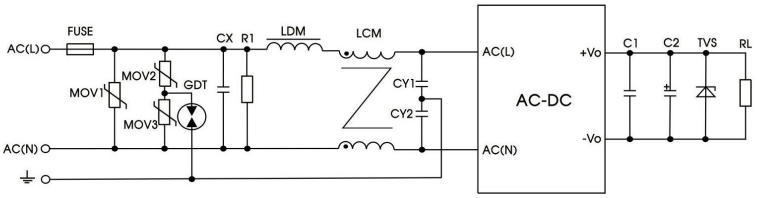
Model	FUSE
20ACE_03S4	470μF/16V (Solid capacitor)
20ACE_05S4	470μF/16V (Solid capacitor)
20ACE_09S4	470μF/16V (Solid capacitor)
20ACE_12S4	390μF/25V
20ACE_15S4	390μF/25V
20ACE_24S4	220μF/35V

Table 2

Note:

1. Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.
2. The product in the application must connect external electrolytic capacitors C2, to achieve lower ripple noise and better dynamic load performance.
3. When the product's output terminal is connected to high frequency switch type load, electrolytic capacitor C2's selection is as shown in table 2.

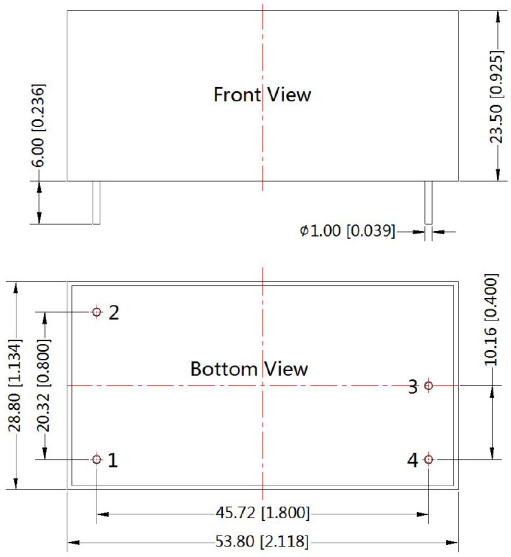
EMC solution-recommended circuit

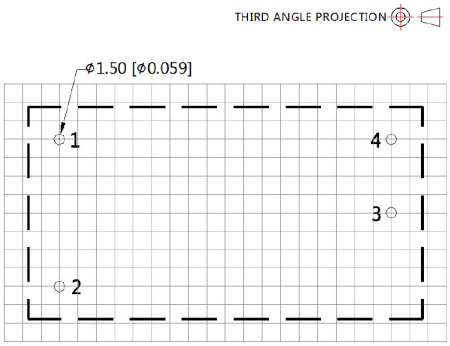


Note：Output external circuit refer to the typical application circuit.

Element model	Recommended value
MOV1	S20K300
MOV2	S10K300
MOV3	S10K300
CX	0.22μF/275VAC
CY1, CY2	1nF/400VAC
R1	1MΩ/2W
LDM	4.7uH
LCM	2mH
GDT	EM3600XS
FUSE	6.3A/250V, slow fusing, necessary

Mechanical dimensions





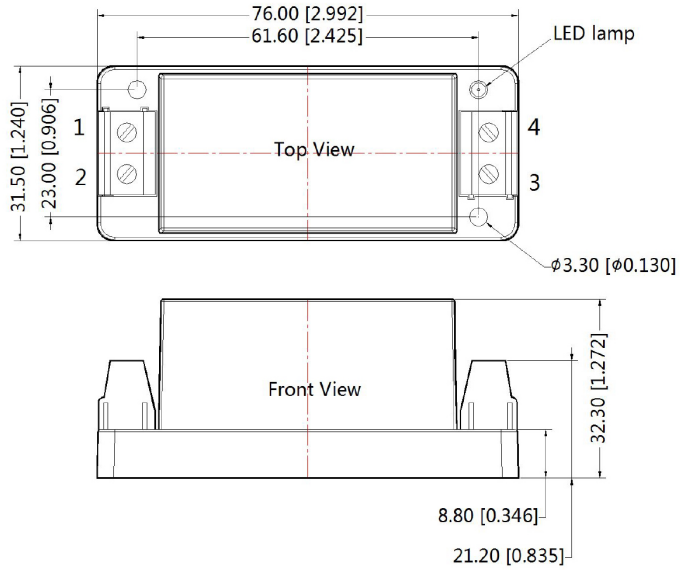
Note:Grid 2.54*2.54mm

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

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

Chassis mounting

THIRD ANGLE PROJECTION

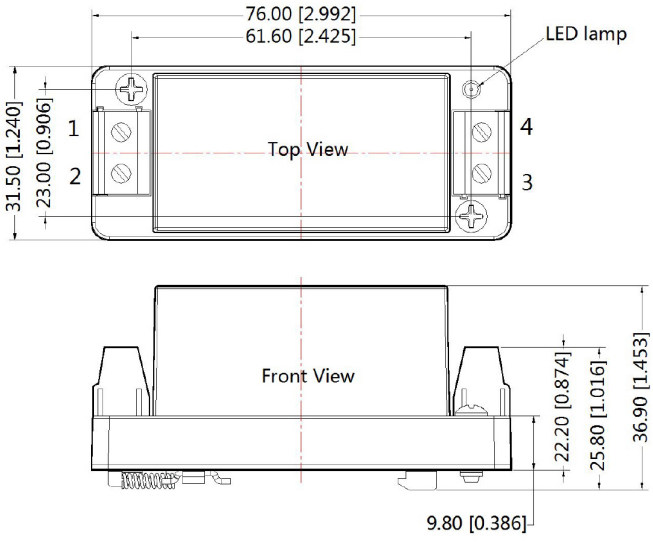


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

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

Din rail mounting

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]