



## 15ACE\_S4 Series

15W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

### AC-DC Converter 15 Watt

- ⊕ Universal Input:  
85 - 264VAC/100 - 370VDC
- ⊕ Operating temperature range:  
-40°C to +70°C
- ⊕ Isolation voltage up to 4kVAC
- ⊕ Regulated output,  
low ripple & noise
- ⊕ Short circuit protection (SCP)
- ⊕ Output over voltage protection
- ⊕ Over current protection
- ⊕ High efficiency, high reliability
- ⊕ Plastic case meets UL94V-0
- ⊕ EMC performance meets  
CISPR32/EN55032 CLASS B
- ⊕ Meets IEC62368, UL62368,  
EN62368 standards

The 15ACE\_S4 series is a compact size power converter series offered by Gaptec with ultra-slim volume. It features universal input voltage, taking both DC and AC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, 4000VAC safer isolation. It offers good EMC performance, meet IEC/EN61000-4, CISPR32/EN55032, UL62368 and EN62368 standards, and widely used in industrial, electricity, instruments, telecommunication and civil applications.

Note: Please refer to Design Reference when module being used in a bad EMC environment.



Approval	Model	Power [W]	Output voltage [V]	Output current [mA, max]	Efficiency [%, typ]	Capacitive load [μF, max]
UL/CE	15ACE_03S4	8.9	3.3	2700	72	10000
UL/CE	15ACE_05S4	13.5	5	2700	76	6600
UL/CE	15ACE_09S4	15	9	1660	77	4400
UL/CE	15ACE_12S4	15	12	1250	80	3000
UL/CE	15ACE_15S4	15	15	1000	81	2000
UL/CE	15ACE_24S4	15	24	625	81	800

#### Input specifications

Input voltage range	85~264VAC, 100~370VDC	
Input frequency	47~63Hz	
Input current	115VAC • 0.27A (typ) • 0.32A (max)	230VAC • 0.17A (typ) • 0.20A (max)
Inrush current	115VAC • 12A (typ)	230VAC • 36A (typ)
Hot plug	Unavailable	
Recommended external input fuse	3.15A/250V	slow fusing, necessary

#### Example:

**15ACE\_05S4**  
15 = 15Watt; AC= AC-DC; E = series ; 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	Continuous, self-recovery
Over current protection	130%Io self-recovery
Over voltage protection (Output voltage clamp or hiccup)	• 3.3VDC/5VDC: ≤7.5VDC • 9VDC: ≤15VDC • 12VDC/15VDC: ≤20VDC • 24VDC: ≤30VDC
Hold-up time	115VAC input: 5ms (min); 10ms (typ) 230VAC input: 44ms (min); 55ms (typ)

\* Ripple and noise are measured by "parallel cable" method.

#### Note:

- 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;
- All index testing methods in this datasheet are based on our Company's corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see „Features“ and „EMC“;
- 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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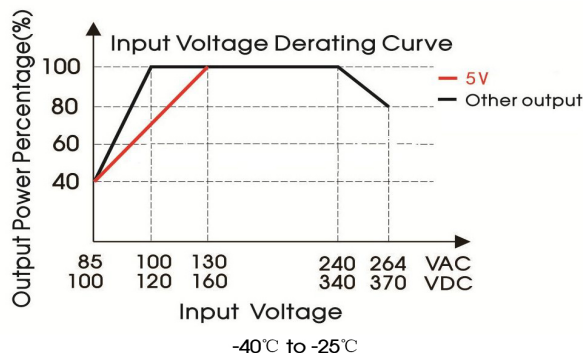
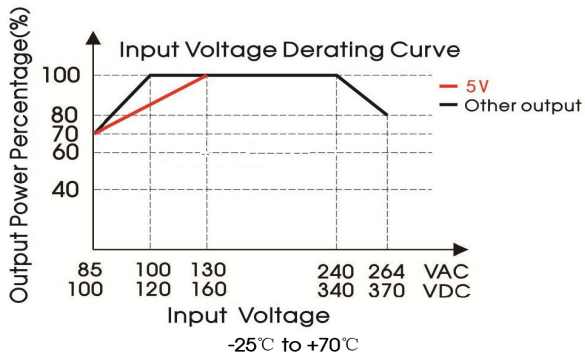
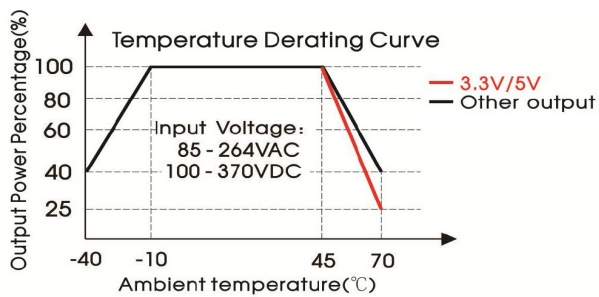
15W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

Common specifications			
Operating temperature range	-40°C ~ +70°C		
Storage temperature range	-40°C ~ +85°C		
Case temperature range	+95°C MAX		
Storage humidity	95%RH MAX		
Welding temperature	<ul style="list-style-type: none"> <li>• Wave-soldering: 260 ± 5°C; time: 5 - 10s</li> <li>• Manual-welding: 360 ± 10°C; time: 3 - 5s</li> </ul>		
Temperature coefficient	0.02%/°C		
Switching frequency	100kHz TYP		
Power derating	<p><u>-40 to -10°C</u>      2.0%/°C</p> <p><u>+45°C to +70°C</u></p> <ul style="list-style-type: none"> <li>• 3.3/5V      3.0%/°C</li> <li>• Others      2.4%/°C</li> </ul> <p><u>85 - 130VAC / 5V</u></p> <ul style="list-style-type: none"> <li>• -25°C to +70°C: 0.66%/VAC</li> <li>• -40°C to -25°C: 1.33%/VAC</li> </ul> <p><u>85 - 100VAC / Others</u></p> <ul style="list-style-type: none"> <li>• -25°C to +70°C: 2.0%/VAC</li> <li>• -40°C to -25°C: 4.0%/VAC</li> </ul> <p><u>240 - 264VAC</u>      0.83%/VAC</p>		
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 standards	UL62368/EN62368/IEC62368		
Safety certification	368/EN62368/IEC62368 (Pending)		
Safety class	CLASS II		
Case material	UL94V-0		
Install	PCB mounting, Chassis mounting, Din rail mounting		
MTBF	>300,000h @25°C (MIL-HDBK-217F)		
Cooling method	Free air convection		
Weight	<ul style="list-style-type: none"> <li>• PCB mounting: 60g</li> <li>• Chassis mounting: 80g</li> <li>• Din rail mounting: 100g</li> </ul>		
Dimensions	<ul style="list-style-type: none"> <li>• PCB mounting: 53.80*28.80*23.50 mm</li> <li>• Chassis mounting: 76.00*31.50*32.30 mm</li> <li>• Din rail mounting: 76.00*31.50*36.90 mm</li> </ul>		

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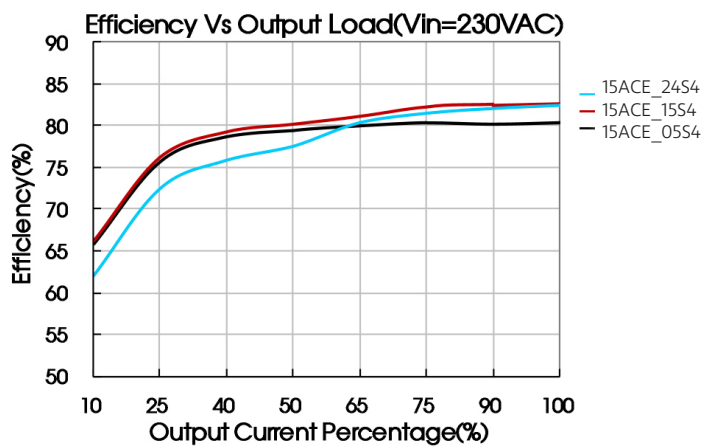
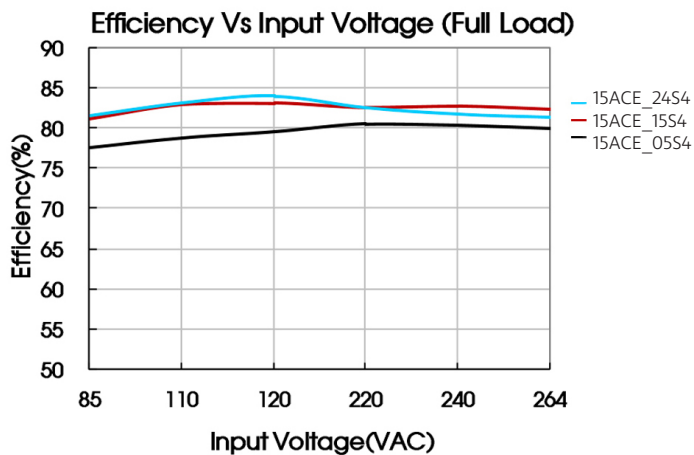
## Typical characteristics



**Note:**

1. Input voltage should be derated based on temperature derating when it is 85-100VAC/240-264VAC/100-140VDC/340-370VDC (15ACE\_05S4: 85-130VAC/240-264VAC/100-160VDC/340-370VDC);
2. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

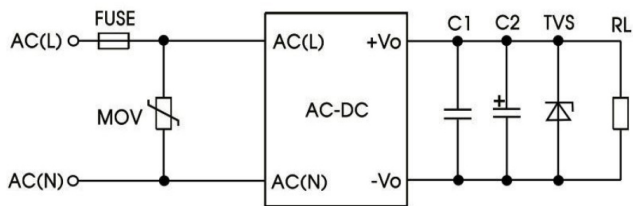
## Efficiency



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### Typical application circuit



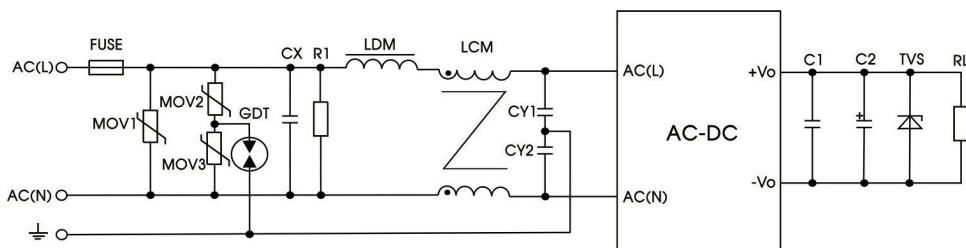
Model	FUSE	MOV	C1 ( $\mu\text{F}$ )	C2 ( $\mu\text{F}$ )	TVS
15ACE_03S4	3.15A/250V, slow fusing, necessary	S20K300	1 $\mu\text{F}$ /50V	220 $\mu\text{F}$ /16V	SMBJ7.0A
15ACE_05S4				220 $\mu\text{F}$ /16V	SMBJ7.0A
15ACE_09S4				120 $\mu\text{F}$ /25V	SMBJ12A
15ACE_12S4				120 $\mu\text{F}$ /25V	SMBJ20A
15ACE_15S4				120 $\mu\text{F}$ /25V	SMBJ20A
15ACE_24S4				68 $\mu\text{F}$ /35V	SMBJ30A

#### Note:

- 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 manufacturer'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.
- The product in the application must connect external electrolytic capacitors C2, to achieve lower ripple noise and better dynamic load performance.
- When the product's output terminal is connected to high frequency switch type load, electrolytic capacitor C2's selection is as seen on the right:

Model	FUSE
15ACE_03S4	470 $\mu\text{F}$ /16V (Solid capacitor)
15ACE_05S4	470 $\mu\text{F}$ /16V (Solid capacitor)
15ACE_09S4	470 $\mu\text{F}$ /16V (Solid capacitor)
15ACE_12S4	390 $\mu\text{F}$ /25V
15ACE_15S4	390 $\mu\text{F}$ /25V
15ACE_24S4	220 $\mu\text{F}$ /35V

### EMC solution recommended circuit

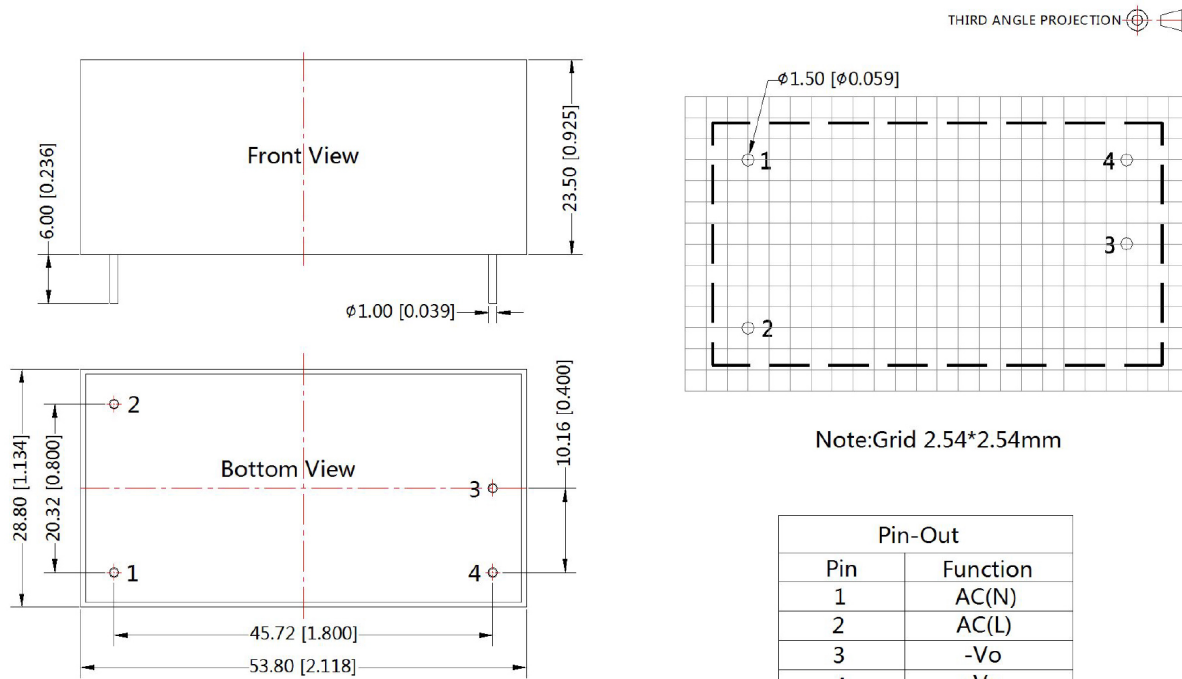


Element model	Recommended value
MOV1	S20K300
MOV2	S10K300
MOV3	S10K300
CX	0.22 $\mu\text{F}$ /275VAC
CY1, CY2	1nF/400VAC
R1	1M $\Omega$ /2W
LDM	4.7 $\mu\text{H}$
LCM	2mH
GDT	EM3600XS
FUSE	6.3A/250V, slow fusing, necessary

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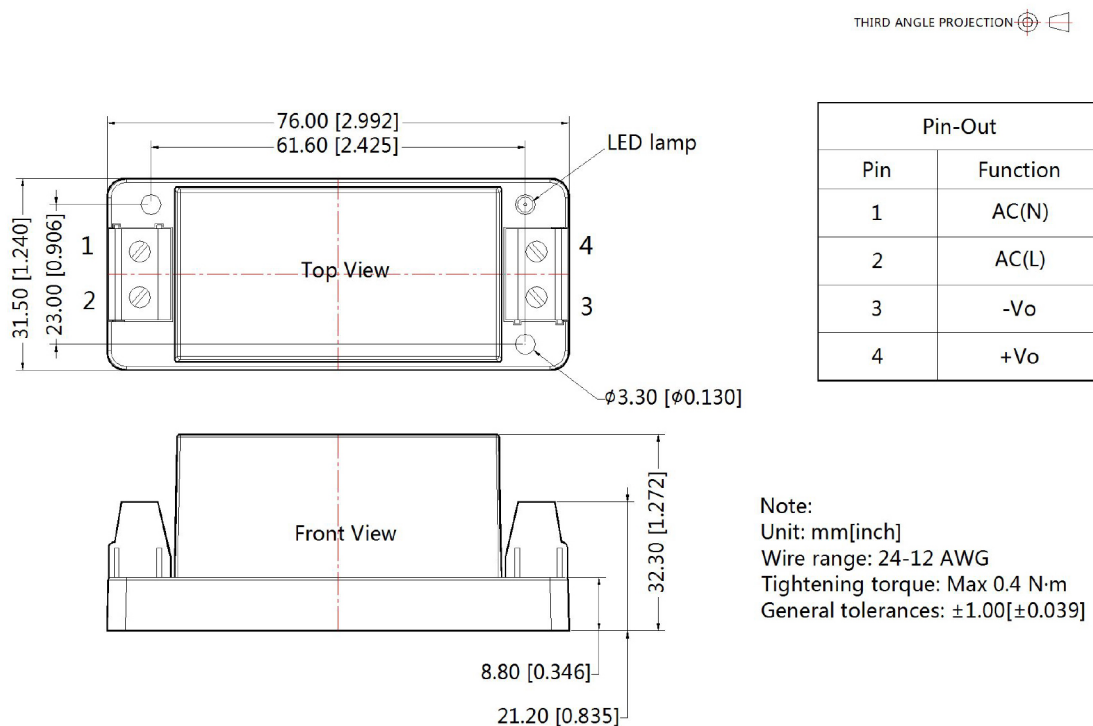
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### Mechanical dimensions



Note:  
Unit :mm[inch]  
Pin diameter tolerances : $\pm 0.10$ [ $\pm 0.004$ ]  
General tolerances: $\pm 0.50$ [ $\pm 0.020$ ]

### Chassis mounting

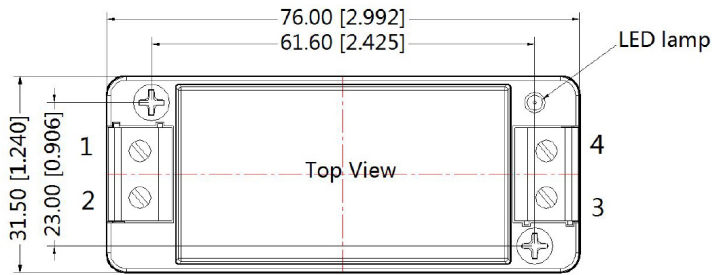


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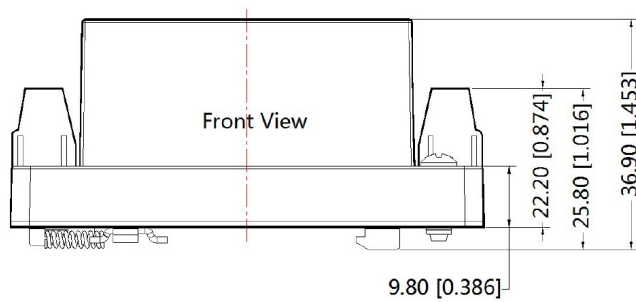
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## Din rail

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]