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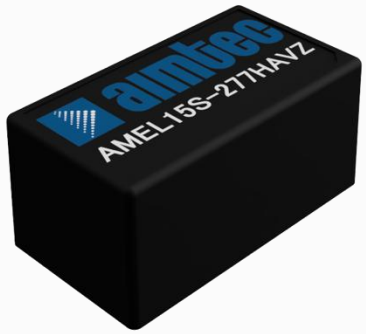
# AMEL15S-277HAVZ




Encapsulated

The AMEL15S-277HAVZ series is an efficient 15W AC-DC power supply module. Offering a commercial input voltage range of 85-305VAC, output voltage ranges from 3.3-24V, low power consumption, high efficiency and high reliability.

This new series offers great operating temperatures, from -40°C to 85°C with full power from -25°C to 50°C and features an isolation of 4000VAC for improved reliability and system safety. Furthermore, a high MTBF of 1,500,000h, output short circuit protection (OSCP), output over-current protection (OCP) and an output over-voltage protection (OVP) come standard with the series.

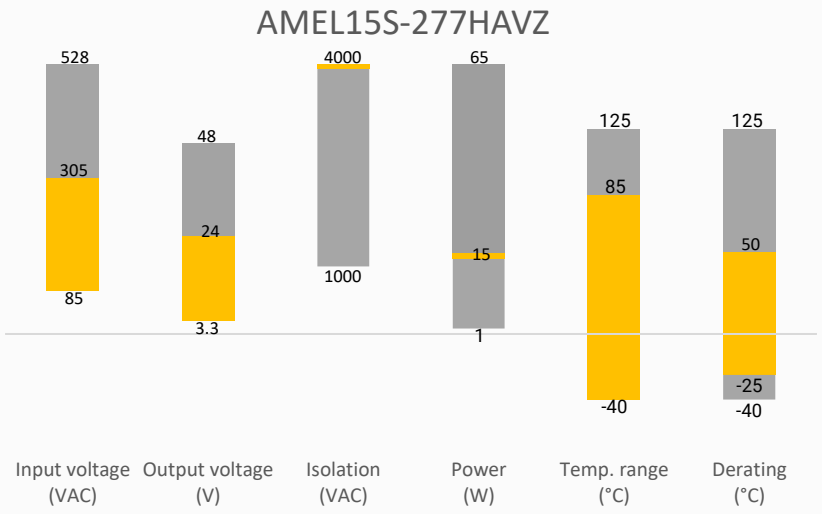
The AMEL15S-277HAVZ is suitable for grid power, instrumentation, industrial controls, communication, and civil applications.

## Features

- Universal Input: 85 - 305VAC/100 - 430VDC
- Operating Temp: -40 °C to +85 °C
- High isolation voltage: 4000VAC
- Low ripple & noise, 150mV(p-p), max.
- Output short circuit, over-current, over-voltage protection
- Regulated Output
- Efficiency up to 87%
- Designed to meet: UL/EN/IEC 62368-1, EN60335-1, EN61558-1

RoHS 3yr Warranty CE

## Summary




## Training

Product Training Video (click to open)

Press Release

Coming Soon!

Application Notes

## Applications

Power Grid | Industrial | Telecom | Instrumentation

# Models & Specifications

| Single Output | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | Input Voltage (VAC/Hz) | Input Voltage (VDC) | Max Output wattage (W) | Output Voltage (V) | Output Current max (A) | Maximum capacitive load (µF) | Efficiency @ 230VAC Typ. (%) |
| AMEL15S-3S277HAVZ | 85-305/47-63 | 100-430 | 13.2 | 3.3 | 4.0 | 6600 | 81 |
| AMEL15S-5S277HAVZ | 85-305/47-63 | 100-430 | 15 | 5 | 3.0 | 5000 | 83 |
| AMEL15S-9S277HAVZ | 85-305/47-63 | 100-430 | 15 | 9 | 1.67 | 3000 | 84 |
| AMEL15S-12S277HAVZ | 85-305/47-63 | 100-430 | 15 | 12 | 1.25 | 2000 | 86 |
| AMEL15S-15S277HAVZ | 85-305/47-63 | 100-430 | 15 | 15 | 1.0 | 1000 | 86 |
| AMEL15S-24S277HAVZ | 85-305/47-63 | 100-430 | 15 | 24 | 0.625 | 680 | 87 |

| Input Specifications | | | | |
|---|---|---|---|---|
| Parameters | Conditions | Typical | Maximum | Units |
| Input current | 115VAC | | 450 | mA |
| | 230VAC | | 300 | mA |
| Inrush current | 115VAC | 30 | | A |
| | 230VAC | 60 | | A |
| Leakage | 277VAC, 50Hz | | 0.1 | mA RMS |
| Fuse | 2A/300V, Slow blow, *required* | | | |

| Output Specifications | | | | |
|---|---|---|---|---|
| Parameters | Conditions | Typical | Maximum | Units |
| Voltage accuracy | | ±3 | | % |
| Line regulation | Full load | ±0.5 | | % |
| Load regulation | 0-100% load | ±1 | | % |
| Ripple & Noise* | 20MHz bandwidth | 80 | 150 | mV p-p |
| Hold up time | 115VAC | 10 | | ms |
| | 230VAC | 55 | | ms |

* Ripple and Noise are measured at 20MHz bandwidth with a 47µF electrolytic capacitor and a 0.1µF ceramic capacitor. Please refer to the application note for specific details.

| Isolation Specification | | | | |
|---|---|---|---|---|
| Parameters | Conditions | Typical | Maximum | Units |
| Tested I/O voltage | 60 sec I/P to O/P | 4000 | | VAC |
| Resistance | 500VDC, 25°C, 70%RH I/P to O/P | >100 | | MΩ |

## General Specifications

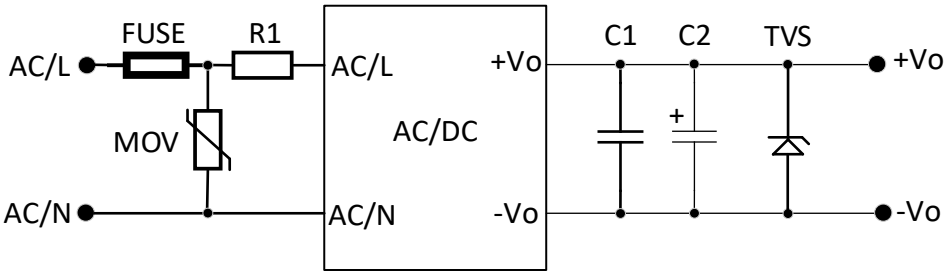
| Parameters | Conditions | Typical | Maximum | Units |
|---|---|---|---|---|
| Protection class | Class II | | | |
| Overvoltage category | OVC III | | | |
| Over current protection | Auto recovery | ≥ 110 | | % of Iout |
| Over voltage protection | 3.3, 5 Vout, voltage clamp, hiccup | | 7.5 | VDC |
| | 9 Vout, voltage clamp, hiccup | | 15 | VDC |
| | 12, 15 Vout, voltage clamp, hiccup | | 20 | VDC |
| | 24 Vout, voltage clamp, hiccup | | 30 | VDC |
| Short circuit protection | Hiccup, Continuous, Auto recovery | | | |
| Switching Frequency | | 65 | | KHz |
| Operating altitude | See derating graph | | 5000 | m |
| Operating temperature | See derating graph | -40 to +85 | | °C |
| Storage temperature | | -40 to +105 | | °C |
| Reflow soldering temperature | Duration 5s | 260 | | °C |
| Maximum case temperature | | | 95 | °C |
| No-load power consumption | 230VAC | 0.1 | | W |
| Power Derating | -40 °C to -25 °C | 2.33 | | %/°C |
| | 3.3, 5Vout +50 °C to +85 °C | 2.29 | | %/°C |
| | 9, 12, 15, 24Vout +55 °C to +85 °C | 2 | | %/°C |
| | 85VAC to 100VAC | 1.33 | | %/VAC |
| | 277VAC to 305VAC | 0.71 | | %/VAC |
| | 2000 - 5000m | 6.7 | | %/km |
| Temperature coefficient | | ±0.02 | | %/°C |
| Cooling | Free air convection | | | |
| Humidity | Non-condensing | | 95 | % RH |
| Vibration | 10Hz to 55Hz, 5G, 30 minutes along X, Y and Z axis | | | |
| Case material | Plastic (flammability to UL 94V-0) | | | |
| Weight | | 40 | | g |
| Dimensions (L x W x H) | | 1.80 x 1.00 x 0.85 inches (45.70 x 25.40 x 21.50 mm) | | |
| MTBF | > 1 500 000 hrs (MIL-HDBK -217F, t=+25°C) | | | |

**NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.**

## Safety Specifications

| Parameters | | |
|---|---|---|
| Standards | Designed to meet UL/EN/IEC 62368-1, UKCA, EN60335-1, EN61558-1 | |
| | EMC - Conducted and radiated emission | CISPR32 / EN55032, class B |
| | Electrostatic Discharge Immunity | IEC/EN61000-4-2 Contact ±6KV, Air ±8KV, Criteria B |
| | RF, Electromagnetic Field Immunity | IEC/EN61000-4-3 10V/m, Criteria A |
| | Electrical Fast Transient/Burst Immunity | IEC/EN61000-4-4 ±1KV, Criteria B (with the recommended application circuit)<br>±2KV, Criteria B (with the recommended EMC circuit) |
| | Surge Immunity | IEC/EN61000-4-5 L-L ±1KV, Criteria B (with the recommended application circuit)<br>L-L ±2KV, Criteria B (with the recommended EMC circuit) |
| | RF, Conducted Disturbance Immunity | IEC/EN61000-4-6 3Vr.m.s, Criteria A |
| | Voltage dips, Short Interruptions Immunity | IEC/EN61000-4-11 0%, 70%, Criteria B |

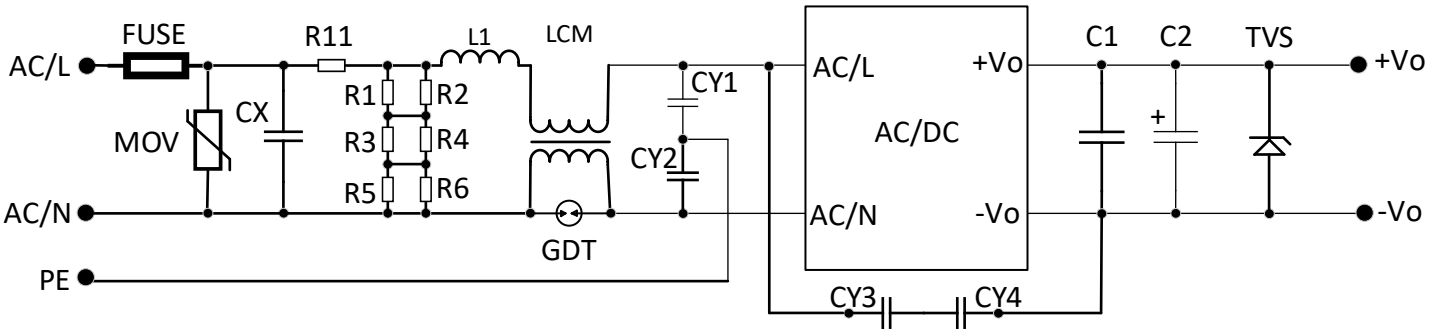
## Typical Application Circuit




| Model | FUSE | MOV | R1 | C1 | C2 | TVS |
|---|---|---|---|---|---|---|
| 3.3, 5Vout | 2A, 300V | 14D561K | 6.8 Ohm, 3W | 1μF, 50V | 220μF, 10V | SMBJ7.0A |
| 9, 12Vout | 2A, 300V | 14D561K | 6.8 Ohm, 3W | 1μF, 50V | 100μF, 25V | SMBJ15A |
| 15Vout | 2A, 300V | 14D561K | 6.8 Ohm, 3W | 1μF, 50V | 100μF, 25V | SMBJ20A |
| 24Vout | 2A, 300V | 14D561K | 6.8 Ohm, 3W | 1μF, 50V | 100μF, 35V | SMBJ30A |

Table 1

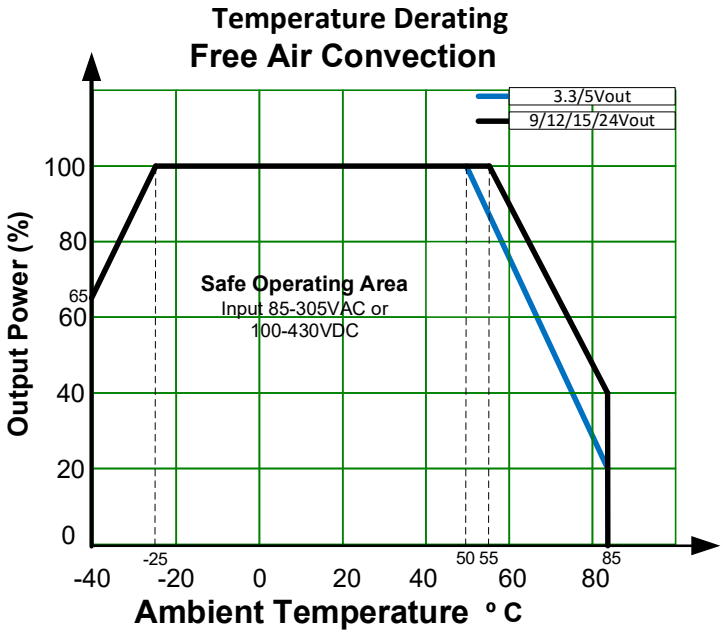
## Recommended EMC Circuit

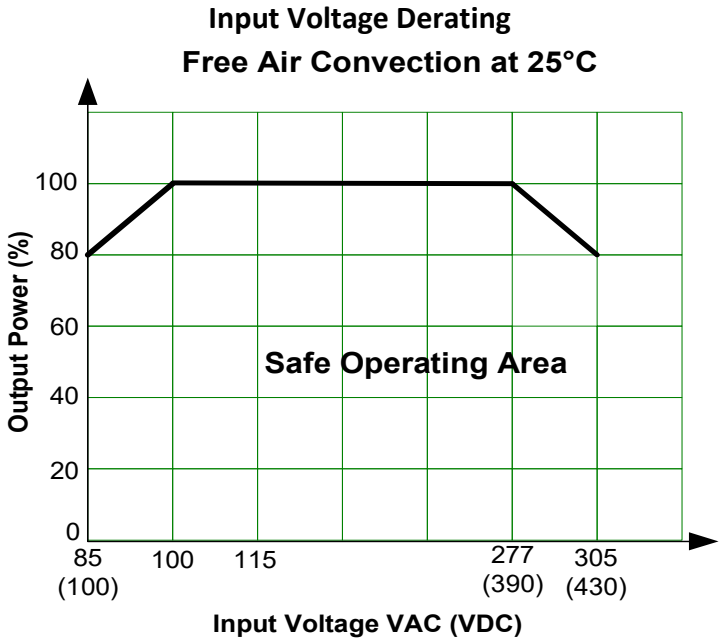


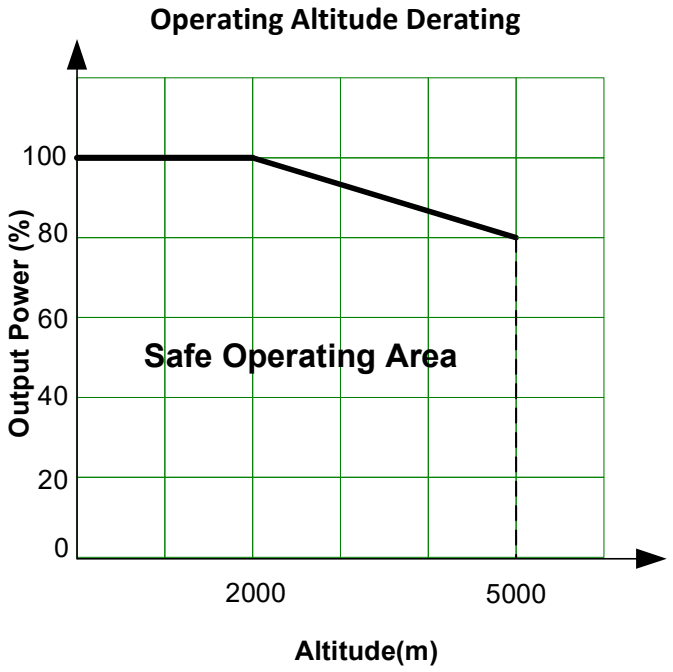

| MOV | CX | R11 | L1 | LCM | GDT | CY1, CY2 | CY3, CY4 |
|---|---|---|---|---|---|---|---|
| 14D561K | 0.1μF, 305VAC | 12 Ohm, 5W | 1.2mH, 0.5A | 20mH | 300V, 1KA | 2.2nF, 400VAC | 1nF, 400VAC |

*R11 is wire-wounded resistor, FUSE is required, *R1 … R6 is the bleeder resistance of CX – 1.5Mohm, 1206
*Other components see the same in Table 1

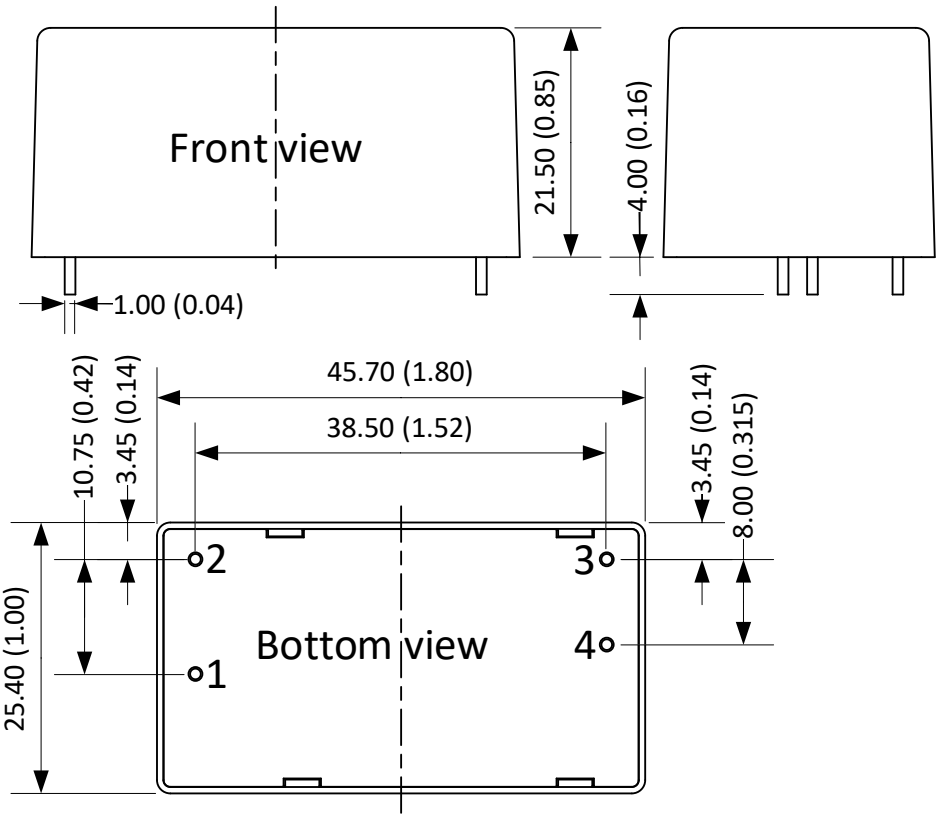
## Derating

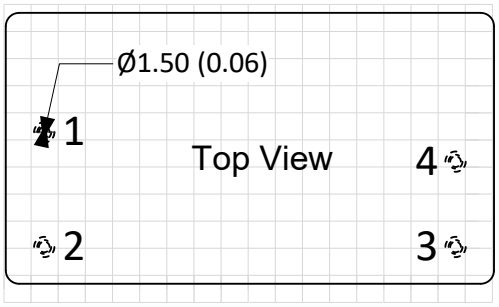

Temperature Derating
Free Air Convection
3.3/5Vout
9/12/15/24Vout
Output Power (%)
100
80
65
60
40
20
0
Safe Operating Area
Input 85-305VAC or
100-430VDC
-25
50 55
85
-40
-20
0
20
40
60
80
Ambient Temperature ° C


Input Voltage Derating
Free Air Convection at 25°C
Output Power (%)
100
80
60
40
20
0
Safe Operating Area
85
(100)
100
115
277
(390)
305
(430)
Input Voltage VAC (VDC)


Operating Altitude Derating
Output Power (%)
100
80
60
40
20
0
Safe Operating Area
2000
5000
Altitude(m)

## Dimensions




Grid size: 2.54*2.54mm

Note:
Unit: mm(inch)
General tolerance: ±1.0 (±0.04)
Pin diameter tolerance: ±0.15 (±0.006)

| Pin Output Specifications | |
|---|---|
| Pin | Function |
| 1 | AC Input (L) |
| 2 | AC Input (N) |
| 3 | -V Output |
| 4 | +V Output |