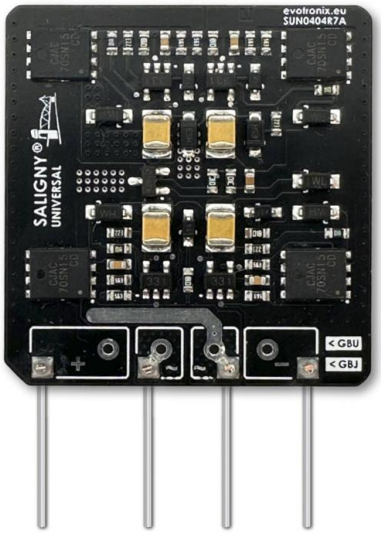
SALIGNY® Universal (V2)

Datasheet

January 2025 [revision D]



GENERAL DESCRIPTION

SALIGNY® represents an innovative series of active bridge rectifiers designed as an exceptional alternative to the traditional bridge rectifiers.

SALIGNY® Universal is a diode-less bridge rectifier that employs modern MOSFETs. The result is an active bridge that replaces the four diodes in a full-wave bridge rectifier with low - $R_{DS(ON)}$ MOSFETs, drastically reducing power dissipation, heat generation, voltage loss, and diode on/off switching noise. Unlike a diode, there is no P-N junction involved; instead, a low-milliohm conductive channel is inserted into the power path. This enables high current capability, improved power management, reduced power loss, minimal dynamic impedance variation with load current, and superior circuit performance compared to any other available rectifier solution.

While a typical diode has at least a 600mV voltage drop at 1A, a low - RDS(ON) MOSFET can have as little as 3mV, or even less, at the same current. This performance is 200 times better than that of a standard P-N junction diode and at least 100 times better than a Schottky diode.

APPLICATIONS

- Ultra-low noise power supply
- Top performance high-end audio
- Power-over-ethernet devices
- Polarity-agnostic input devices
- Diode bridge replacement

FEATURES

Reduce the cost of implementation
Smaller solution size – offer small footprint/watt
Maximizes power efficiency
Maximizes available voltage and current
Eliminates power thermal design problems
Operates efficiently without additional cooling components (heatsink)
Zero switching noise
No secondary ringing in the transformer (typical of P-N or Schottky diodes)
Fast turn-off during power source failure or short circuit

SPECIFICATIONS

Operates from 50Hz to 1000Hz
AC operating voltage: 6 Vac to 80 Vac
AC operating voltage for a center-tapped transformer: min. 2 × 4Vac to max. 2 × 40Vac
No DC operation
Iq = 8 mA
Continuous load current up to 22A
Over 200A pulsed current at Ta = 25 Celsius (Max Rθjc = 1.0C/W, pulse duration ≤100 µs, duty cycle ≤1%)
Peak 60A – 500ms
It may operate without an output capacitor, but this is not recommended
Support center-tapped transformers

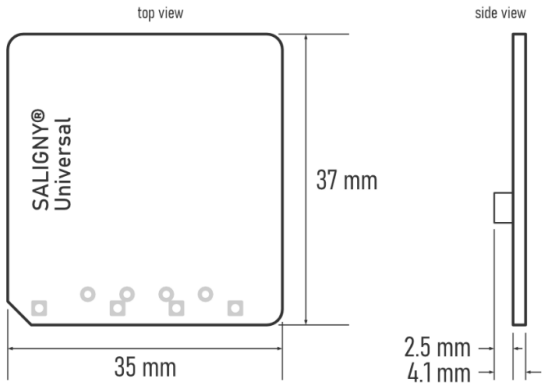
MECHANICAL INFORMATION

The following table provides mechanical characteristics.

Parameter	Conditions	Typ.	Unit
Size	-	37 x 35 x 4.1	mm
Mass	-	7	g

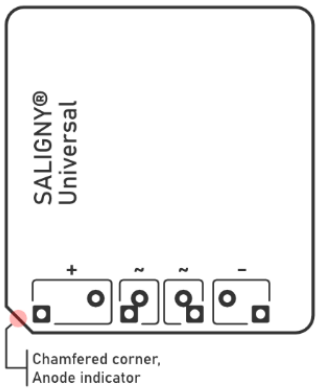
Also, refer to the drawing below to accurately identify the dimensions of the board.

Fig. 1 – Board dimensions



The following drawing shows the pin assignment. Pay attention to the chamfered corner of the board, as it indicates the '+' pin.

Fig. 2 – Pin assignment



SALIGNY® Universal has two pads assigned to each pin, designed to accommodate different packages. It is both pin- and mechanically compatible with GBU and GBJ packages, and the following drawings provide details on replacing a standard rectifier bridge.

Fig. 3 – GBU case style

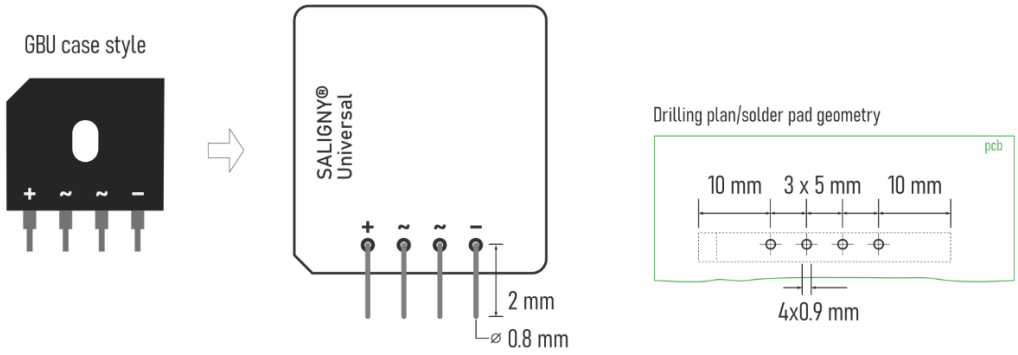
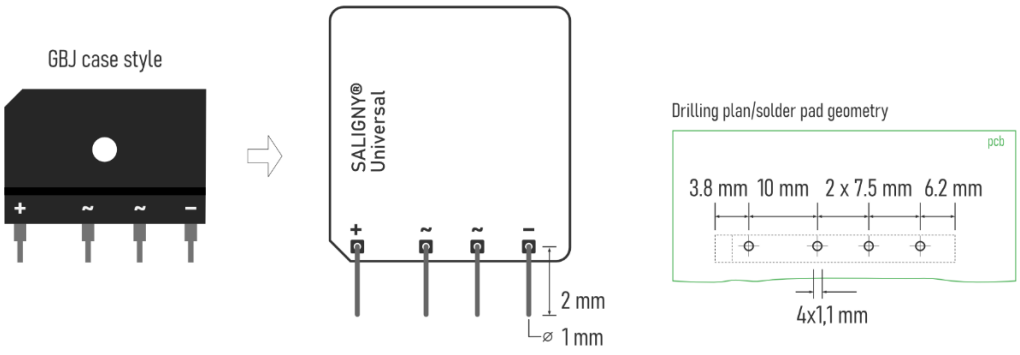


Fig. 4 – GBJ case style



Also, a 3D model (step file) of SALIGNY® Universal is available for download on our website.

CONNECTIONS

The following figure illustrates the general connection of SALIGNY® Universal in a typical circuit.

Fig. 5 – Typical circuit

The value of the output capacitor can be calculated using the following formula:

$$C \geq I_{AVG} / (V_{RIPPLE} \times 2 \times Freq)$$

Where: I_{AVG} represents the average output load current, V_{RIPPLE} denotes the maximum tolerable output ripple voltage, and $Freq$ refers to the frequency of the input AC source.

For example, in a 50Hz, 24VAC application where the load current is 1A and the tolerable ripple is 1V, choose C ≥ 1A / (1V × 2 × 50Hz) = 10,000µF.

IMPLEMENTATIONS

The following figures illustrate typical implementations of the SALIGNY® Universal in various circuit configurations. Also, please read the following section carefully to fully understand what SALIGNY® Universal offers and the factors that may affect its performance.

Fig. 6 - Full-wave rectification using a single secondary winding.

Fig. 7 - Full-wave rectification with dual identical secondary windings connected in parallel.

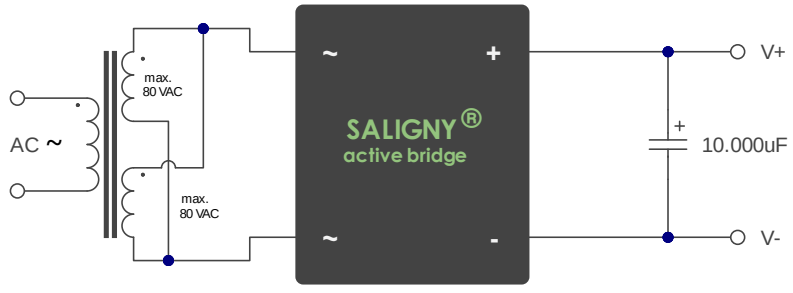
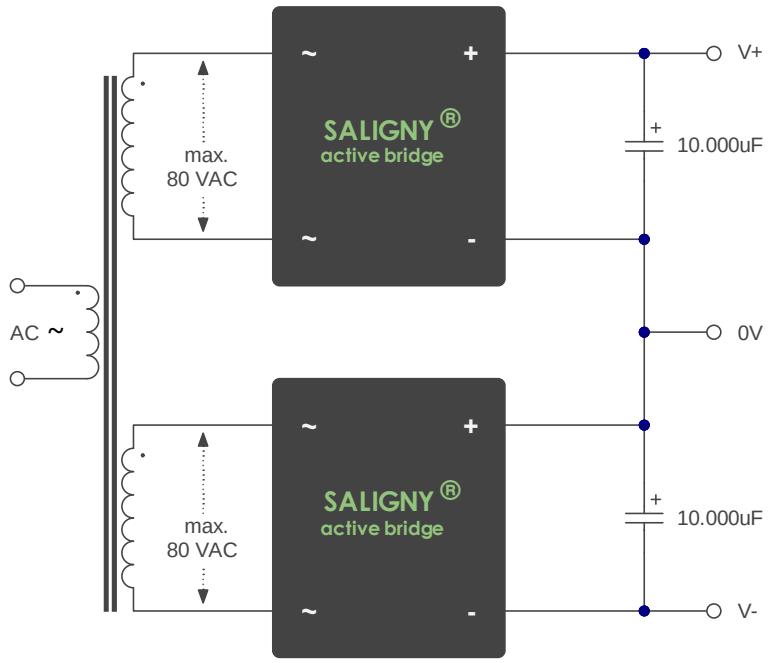


Fig. 8 - Full-wave rectification for a differential power supply using two secondary windings
a) The secondary windings are in phase



b) The secondary windings are in anti-phase

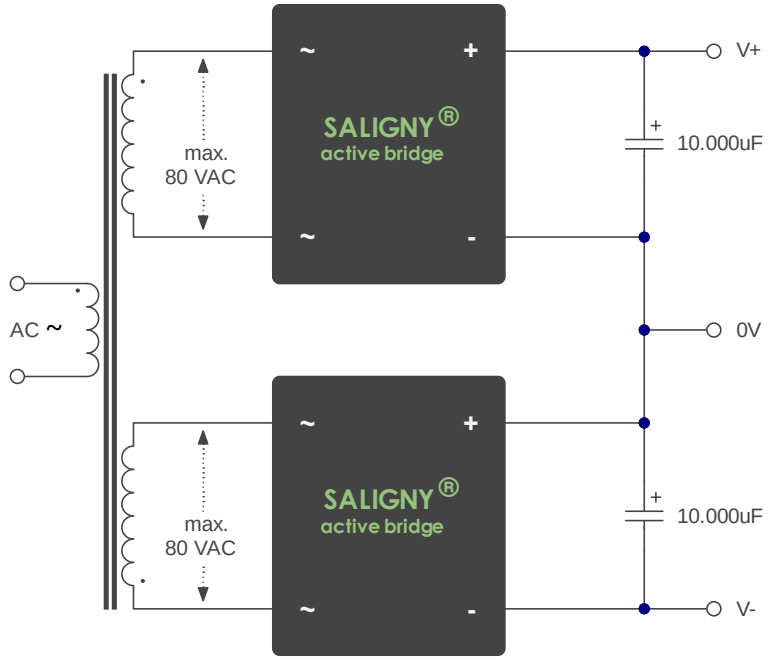


Fig. 9 - Symmetric power supply with four secondary windings designed for high-voltage differential applications.

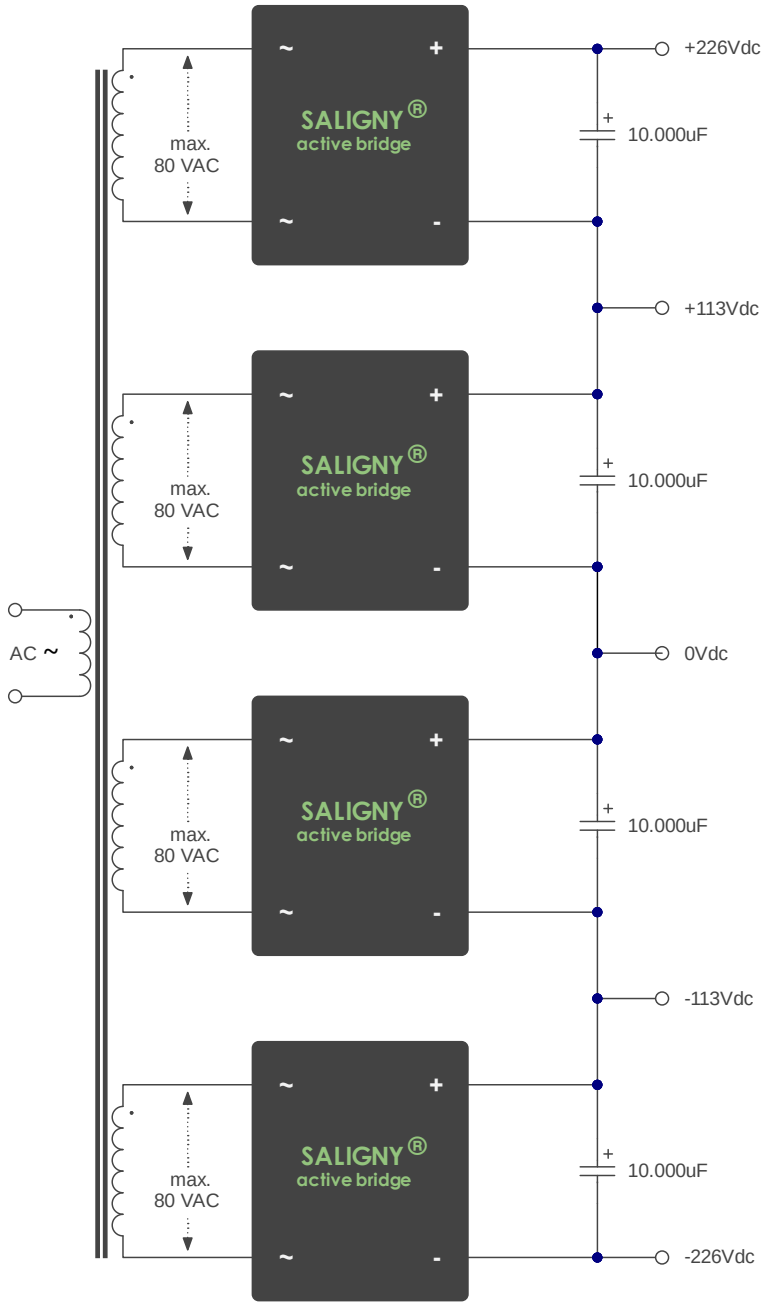
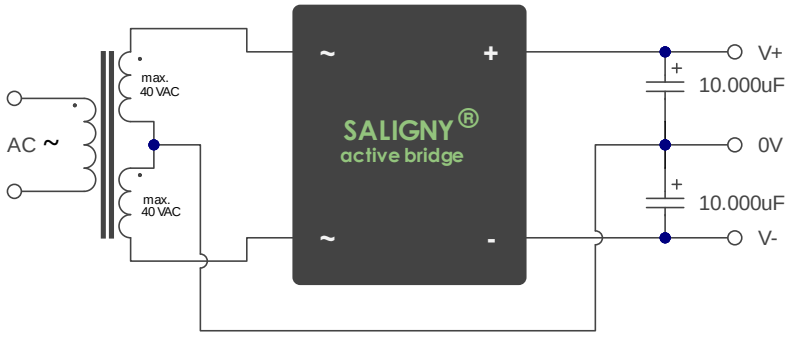
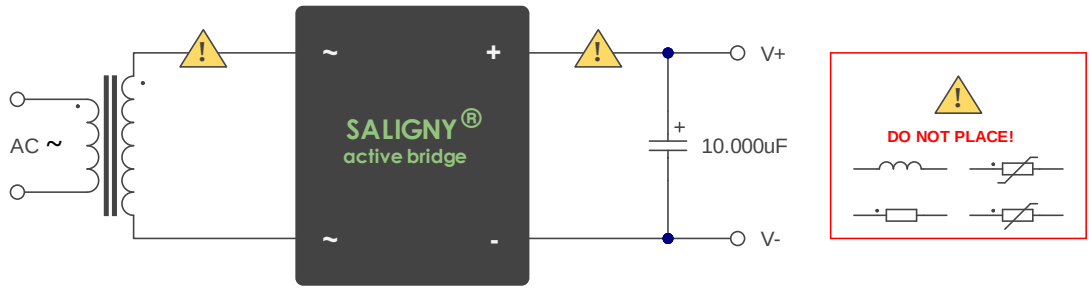


Fig.10 - Center-tapped full-wave rectification for a differential power supply



DO NOT!

1. DO NOT place any inductors, resistors, varistors, or thermistors before or after the SALIGNY® Universal, as this may affect its performance.



2. SALIGNY® Universal is NOT designed to be used as a DC blocker. Please look for other solutions or devices specifically designed for this purpose.

3. DO NOT drill or enlarge the holes on the board, as this may cause a short circuit and potentially damage the device.

REFERENCES

For further details, please visit the information available at https://evotronix.eu or explore additional resources such as the following:

- Active rectification on Wikipedia
- Synchronous rectification in high-power converter design by TI

SALES INFORMATION

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REVISION HISTORY

Revision	Date	Description
A	05/2023	Initial version
B	09/2023	Add notice in the Implementation section
C	05/2024	Updated to V2 of the board
D	01/2025	Added more detailed Mechanical Information and introduced a new section titled” DO NOT!”

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