

# Bridge Rectifier

## Student Group

First Name	Surname	Matrikel Nr.

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# Bridge Rectifier

In figure 1 the circuit of a bridge rectifier is shown. Enter the current arrows correctly. Draw the connection between the oscilloscope and the circuit in order to measure the output voltage  $u_{\text{R}}$  at the rectifier. Explain why one cannot measure the secondary voltage of the transformer and the output voltage of the bridge rectifier at the same time.

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Fig. 1

Build the circuit on the breadboard and connect the oscilloscope. Then sketch the voltage curve before and after the bridge rectifier, i.e. the voltages  $u_{\text{Sec}}$  and  $u_{\text{R}}$ . However, note that you connect the ground of the oscilloscope before or after the bridge rectifier for the respective measurement. Also give the oscilloscope settings used.



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Fig. 2

Channel 1:  $\frac{V}{\text{rm DIV}} = \$$

Channel 2:  $\frac{V}{\text{rm DIV}} = \$$

Time basis:  $\frac{T}{\text{rm DIV}} = \$$

Now connect a capacitor (electrolytic capacitor) with 100  $\mu\text{F}$  in parallel to the resistor  $R_{\text{L}}$  and sketch the voltage curve of  $u_{\text{Sec}}$  and  $u_{\text{R}}$  again in figure 2 with a different color.

**Warning: When using an electrolytic capacitor (Elko) the correct polarity must be**

**observed!**

Measure the following values with the help of the oscilloscope in the circuit and enter the results into [table 1](#) (100  $\mu\text{F}$ ):



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Tab. 1: Bridge-Rectifier measured values

Consider a measure by which the ripple voltage can be reduced. Draw the circuit with your found solution into [figure 3](#) and measure the voltage curves  $u_{\text{Sec}}$  and  $u_{\text{R}}$ . Enter these into the screen image [figure 2](#) with a third color.



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Fig. 3

Carry out the corresponding measurements - as above - again on the bridge rectifier. These were the secondary-side voltage of the transformer  $\hat{u}_{\text{Sec}}$ , the frequency of the secondary transformer voltage  $f_{\text{Sec}}$ , the peak-to-peak value of the ripple voltage  $u_{\text{PP-ripple}}$ , the ripple frequency  $f_{\text{Ripple}}$ , the average value of the rectified voltage  $|\bar{u}_{\text{R}}|$  and the peak value of the rectified voltage  $u_{\text{R,~max}}$ . Enter the results in the second free line of [table 1](#).

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Last update: **2026/04/03 01:31**

