

Bridge Rectifier

Student Group

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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_{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_{Sec} and u_{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.



Fig. 2

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

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

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

Now connect a capacitor (electrolytic capacitor) with 100 μF in parallel to the resistor R_{L} and sketch the voltage curve of u_{Sec} and u_{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 μF):



Start drawing by
clicking here

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_{Sec} and u_{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}_{Sec} , the frequency of the secondary transformer voltage f_{Sec} , the peak-to-peak value of the ripple voltage $u_{\text{PP-ripple}}$, the ripple frequency f_{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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