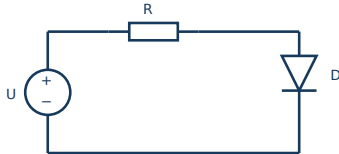


Diode, transistor and MOSFET

Worksheet · 20 tasks

Name: _____ Datum / Date: _____ Klasse / Class: _____

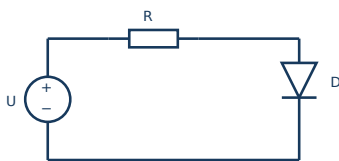
01 An ideal diode is in series with $1\text{ k}\Omega$ across 5 V , anode towards positive. Find current.



Concept diagram; values are in the task.

Method · units · working · check result

02 Reverse the ideal diode in task 1. What are current and resistor voltage?



Concept diagram; values are in the task.

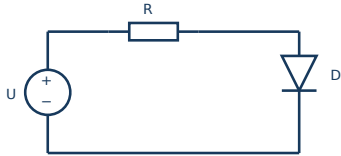
Method · units · working · check result

Diode, transistor and MOSFET

Worksheet · 20 tasks

Name: _____ Datum / Date: _____ Klasse / Class: _____

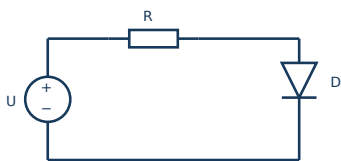
03 Repeat task 1 with a constant diode drop of 0.7 V.



Concept diagram; values are in the task.

Method · units · working · check result

04 LED with assumed 2 V forward drop: 5 V source, target 10 mA. Find series resistor.



Concept diagram; values are in the task.

Method · units · working · check result



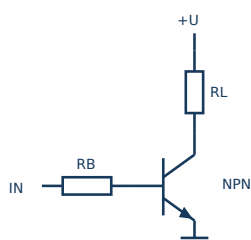
Worksheet · 20 tasks

Name: _____ Datum / Date: _____ Klasse / Class: _____

07 Why is 0.7 V not a universal hard diode turn-on threshold?

Method · units · working · check result

08 An NPN operates in its active region: $\beta = 100$, base current 0.1 mA. What collector current does the model predict?



Concept diagram; values are in the task.

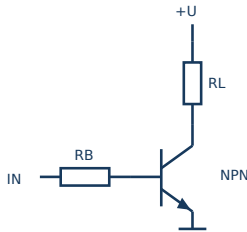
Method · units · working · check result

Diode, transistor and MOSFET

Worksheet · 20 tasks

Name: _____ Datum / Date: _____ Klasse / Class: _____

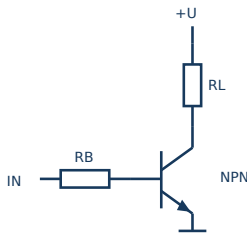
09 NPN switch: 100 Ω load on 5 V, saturated $V_{CE} = 0.2$ V. Find load current.



Concept diagram; values are in the task.

Method · units · working · check result

10 For task 9 choose forced current gain 10. What base current should be used?



Concept diagram; values are in the task.

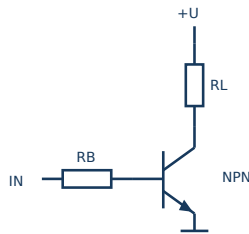
Method · units · working · check result

Diode, transistor and MOSFET

Worksheet · 20 tasks

Name: _____ Datum / Date: _____ Klasse / Class: _____

11 3.3 V drive, assumed $V_{BE} = 0.8 \text{ V}$ and base current 4.8 mA. Find base resistor.



Concept diagram; values are in the task.

Method · units · working · check result

12 Find collector-emitter dissipation of the on-state switch in task 9.

Method · units · working · check result

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Name: _____ Datum / Date: _____ Klasse / Class: _____

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Diode, transistor and MOSFET

Worksheet · 20 tasks

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19 10 nC gate charge must transfer in 100 ns. Estimate mean current during this edge.

Method · units · working · check result

20 A MOSFET turns a load on unintentionally while its microcontroller starts. What simple measure helps with a floating gate?

Method · units · working · check result