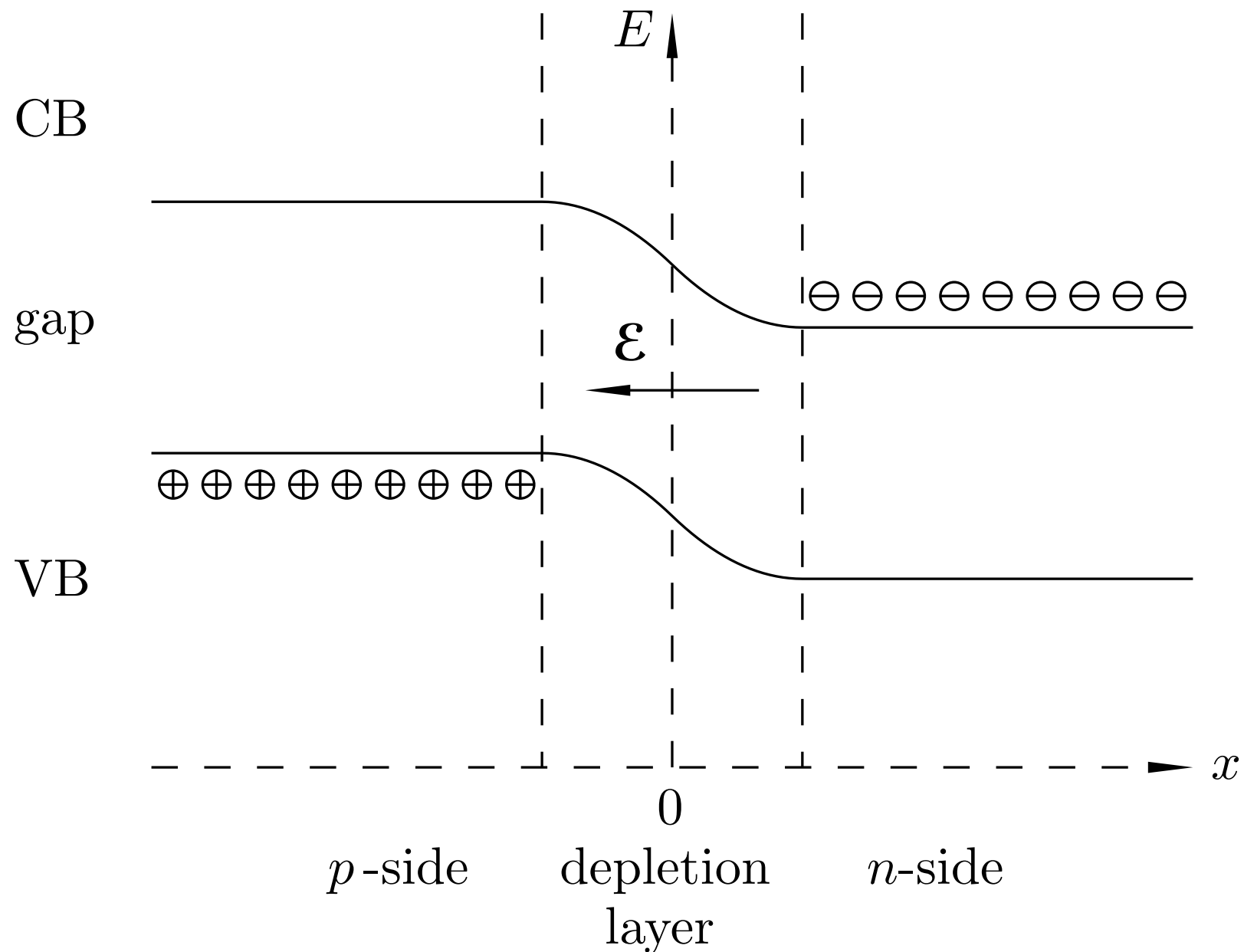


Discuss the following:

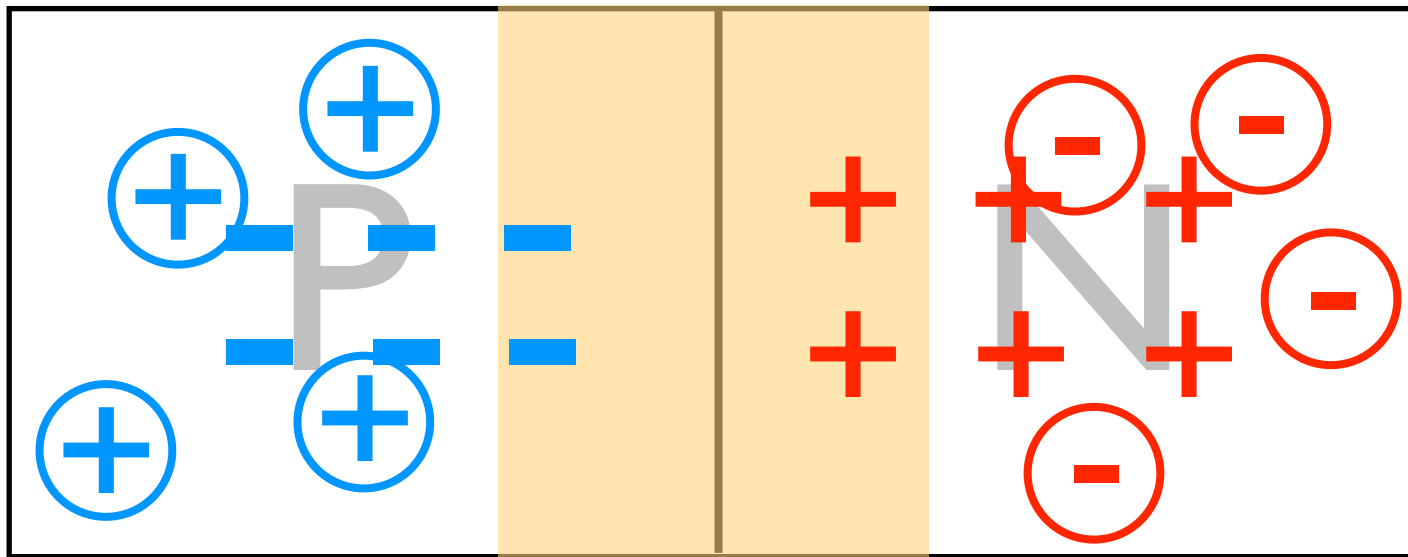
1- How does recombination and generation current work?

2 - What is biasing?

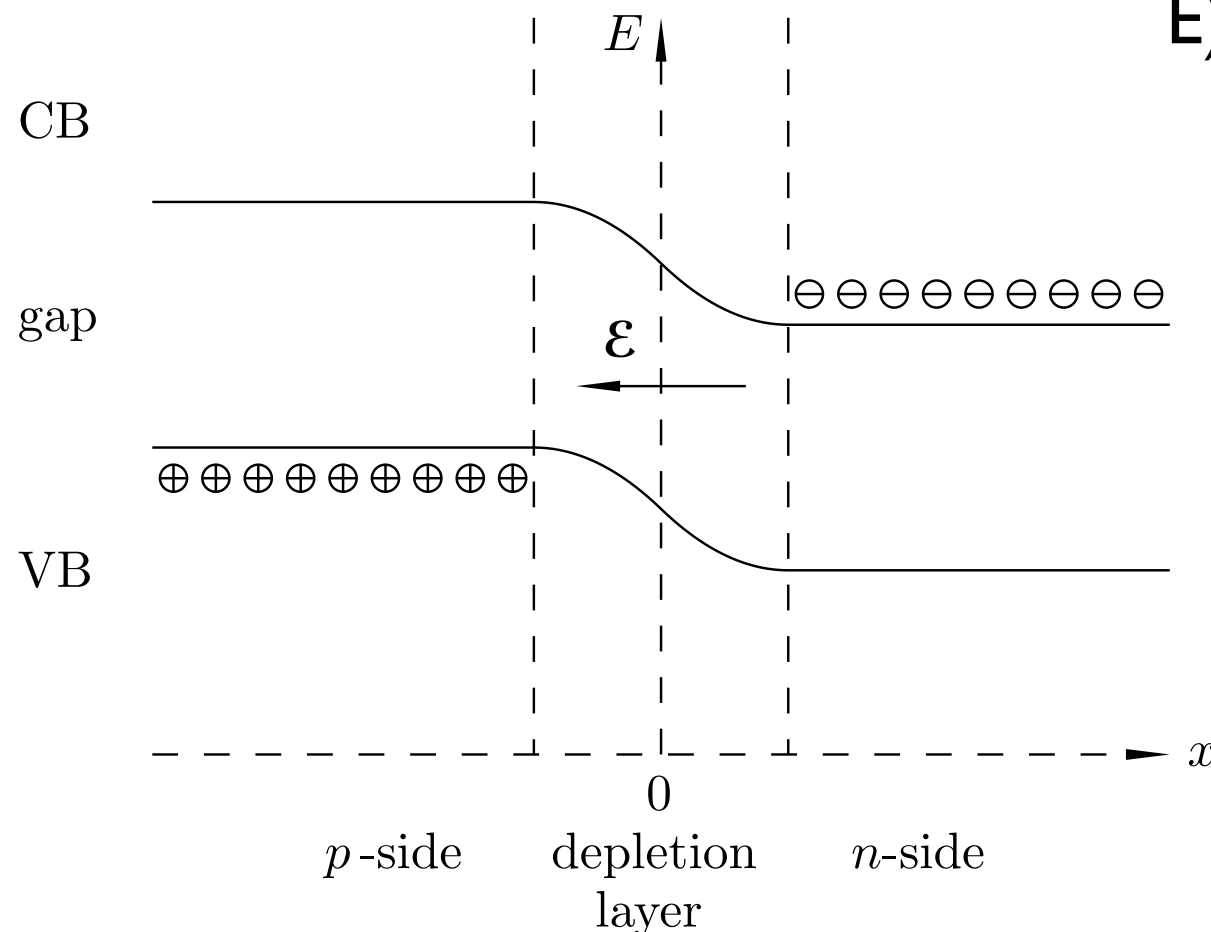
3 - What happens when you bias a p-n junction?



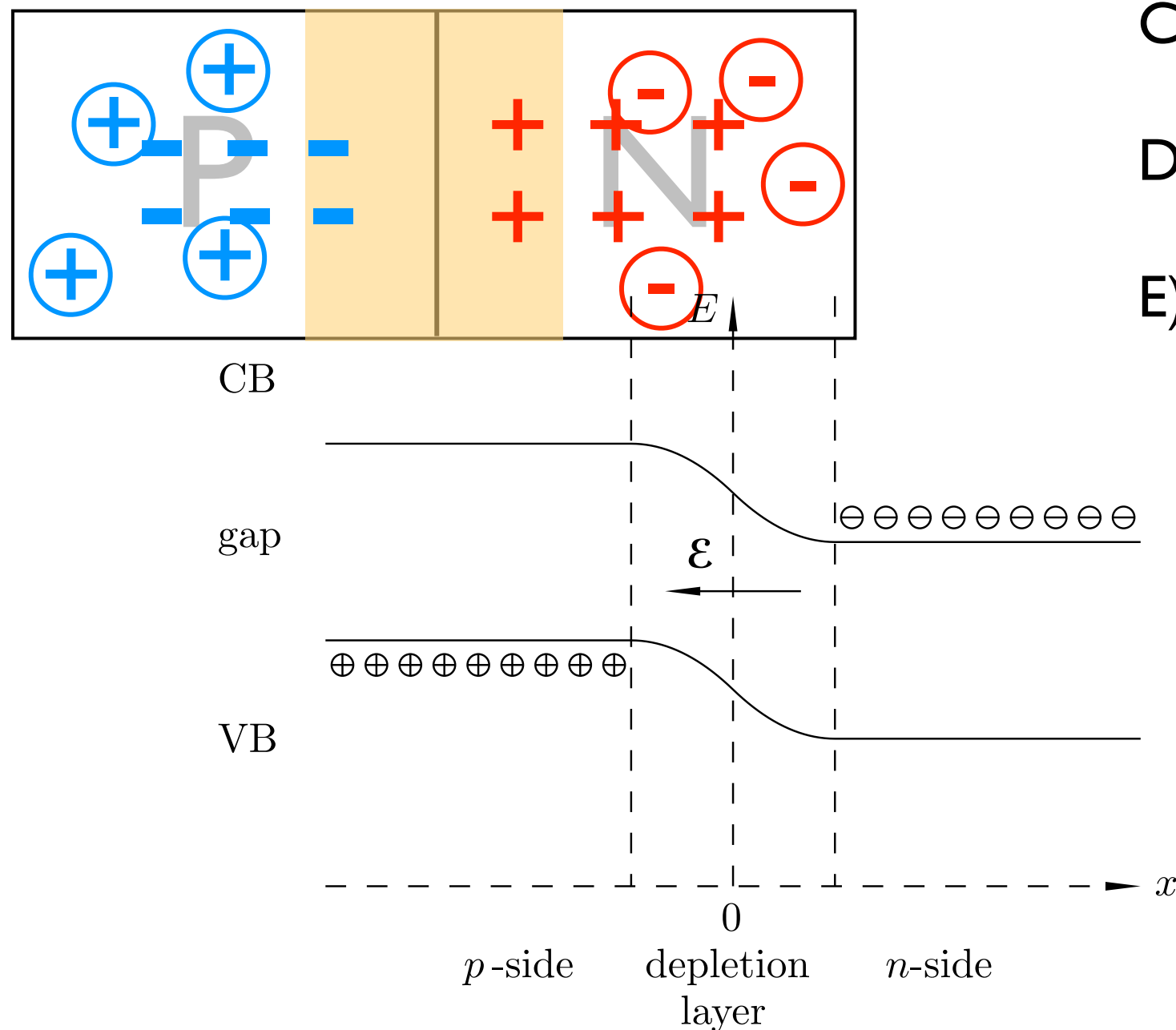
If a very large reverse bias is applied to this junction, what will happen?



- C) The current will become very small.
- D) The current will increase gradually..
- E) The current will increase suddenly and dramatically

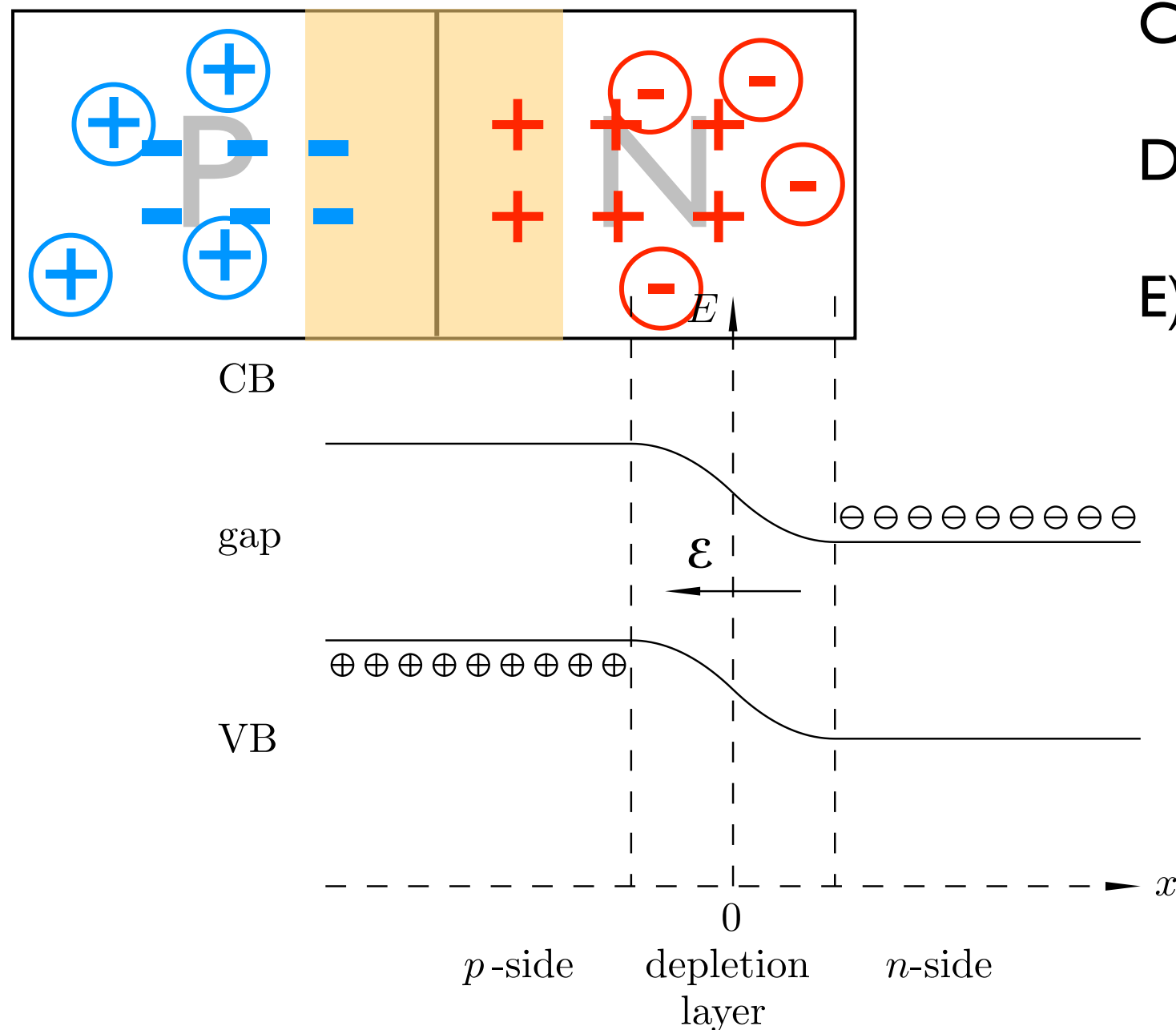


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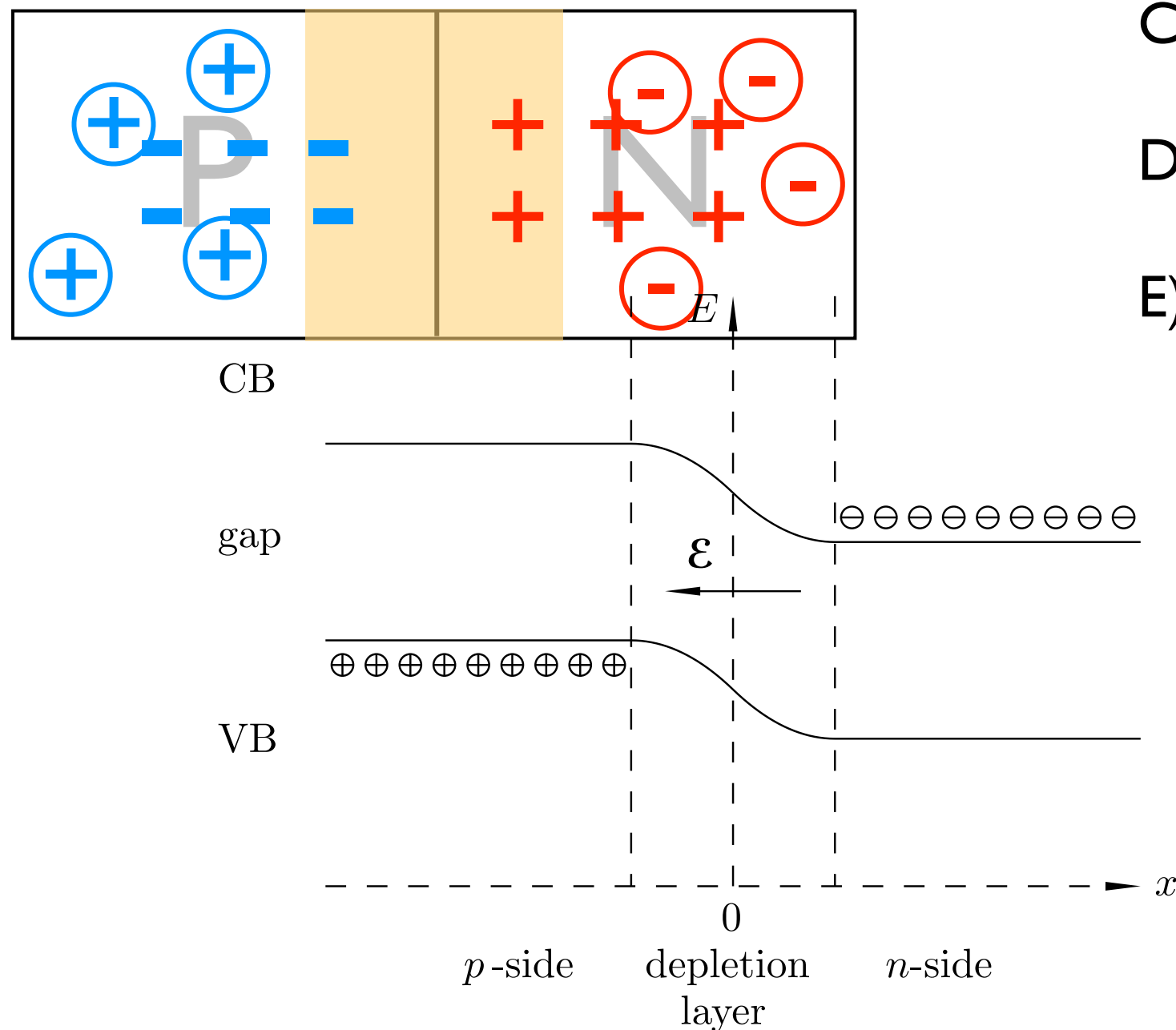
If a very large reverse bias is applied to this junction, what will happen?



- C) The current will become very small.
- D) The current will increase gradually..
- E) The current will increase suddenly and dramatically

Avalanche

If a very large reverse bias is applied to this junction, what will happen?

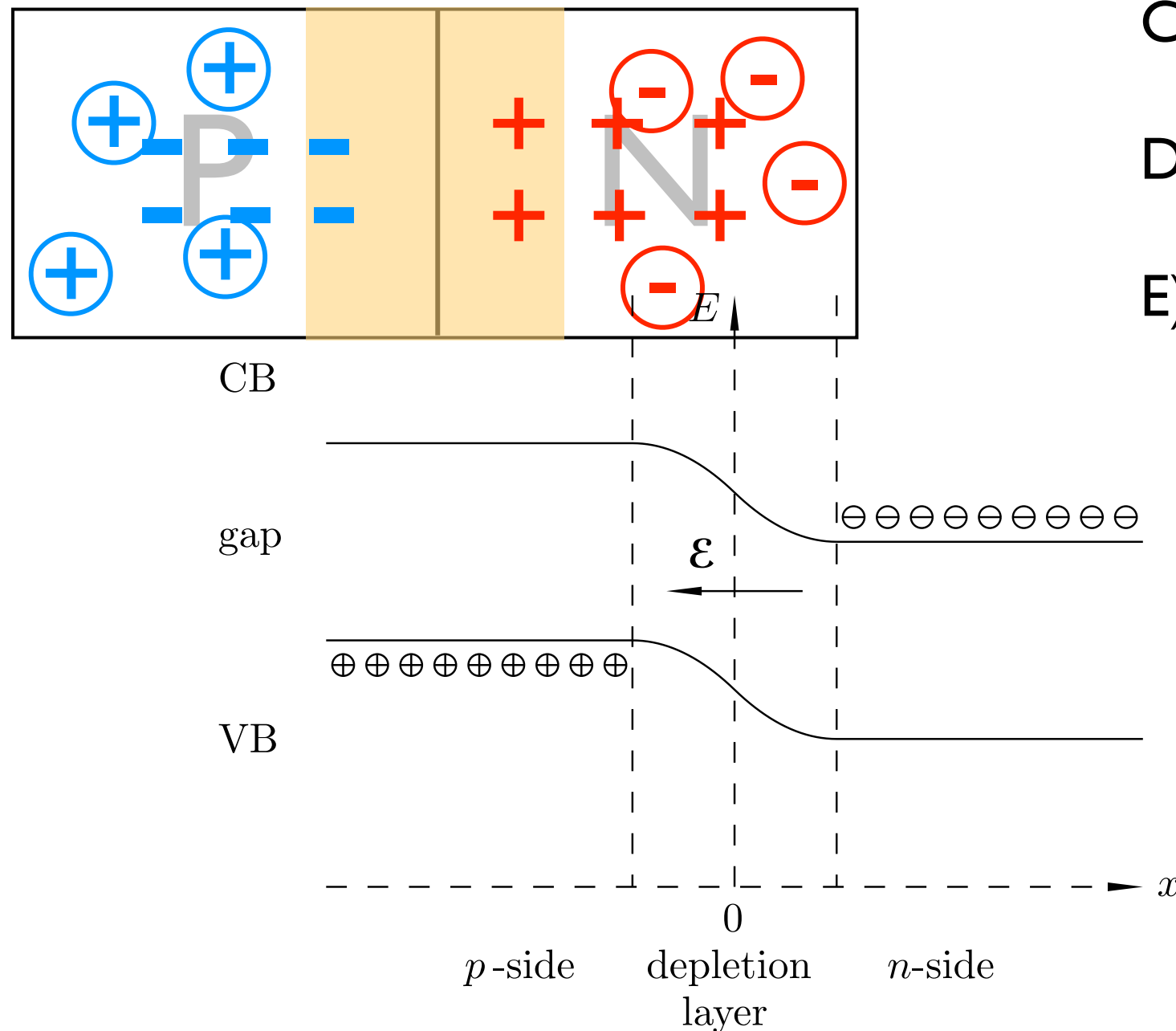


- C) The current will become very small.
- D) The current will increase gradually..
- E) The current will increase suddenly and dramatically

Avalanche

Zener

If a very large reverse bias is applied to this junction, what will happen?

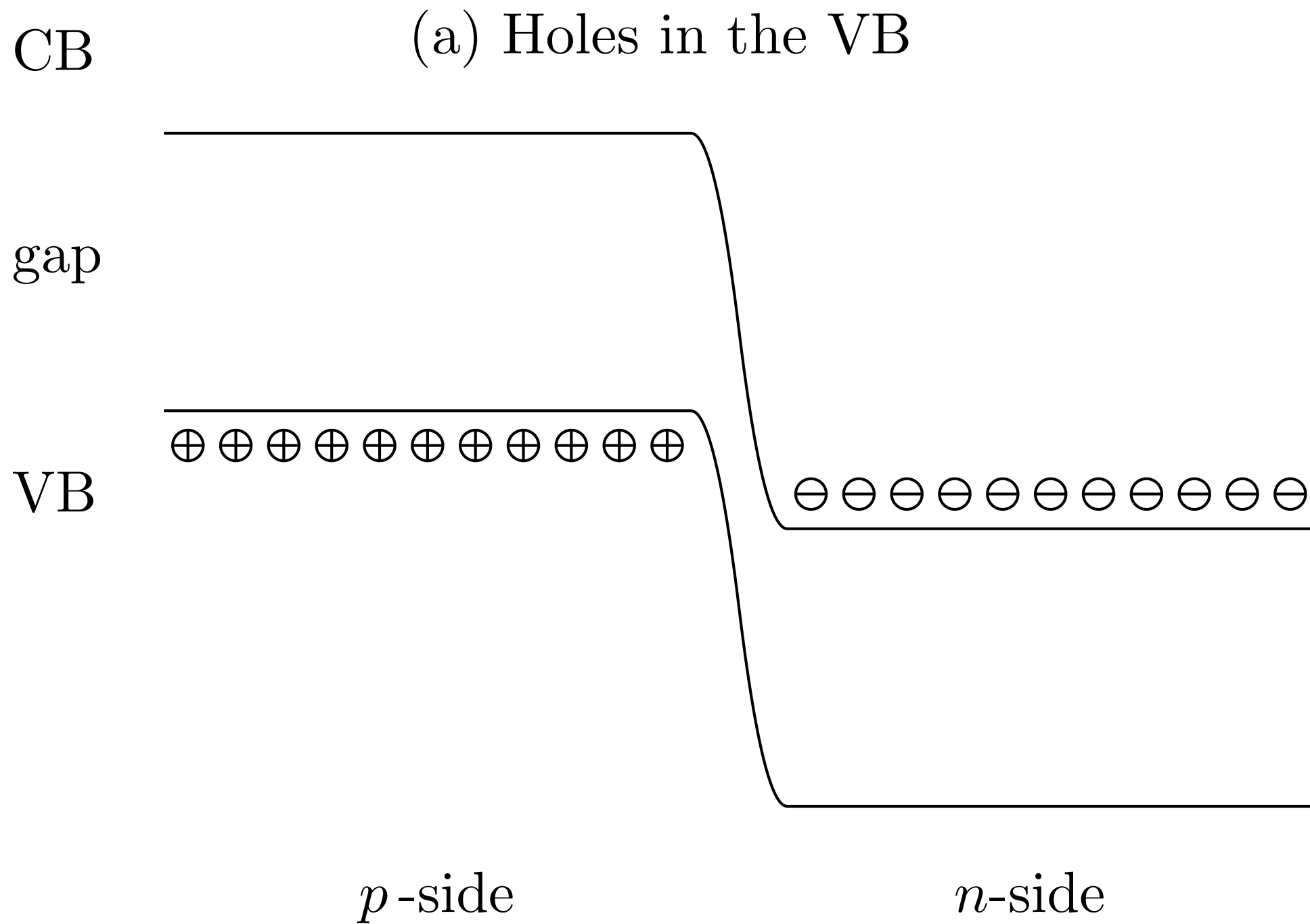


- C) The current will become very small.
- D) The current will increase gradually..
- E) The current will increase suddenly and dramatically

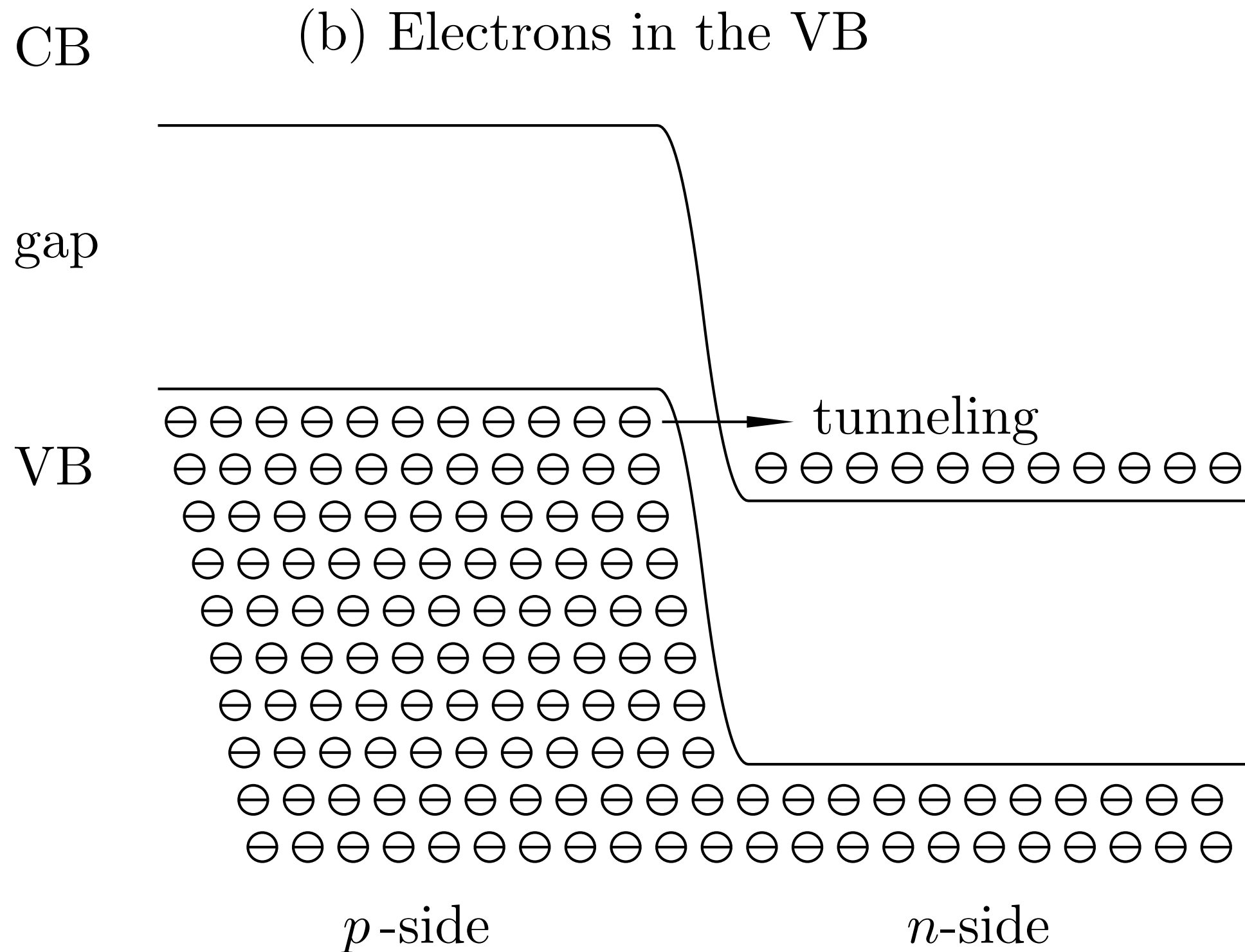
Avalanche

Zener

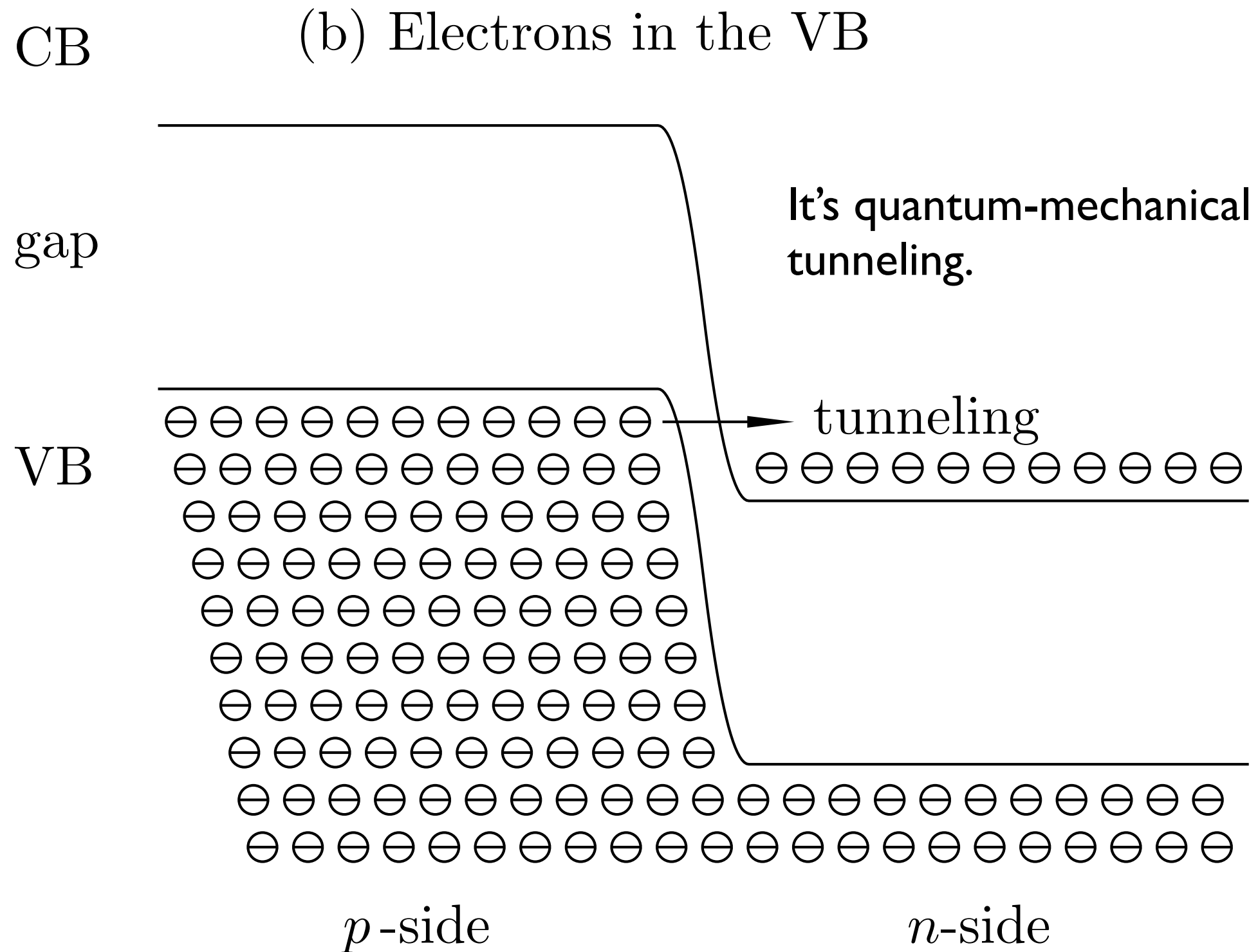
Zener breakdown



Zener breakdown



Zener breakdown

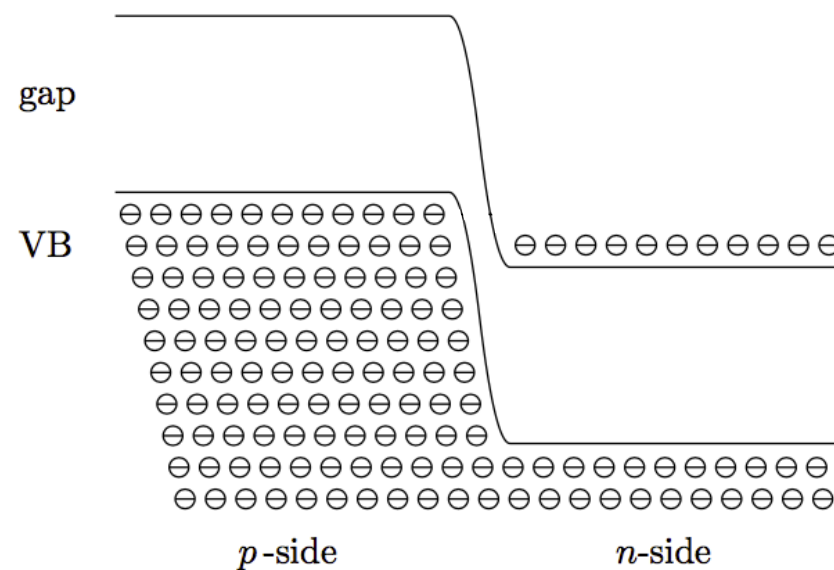


In a Zener diode, the level of doping must be:

- a) high
- b) low
- c) the same as a normal diode.

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- a) high
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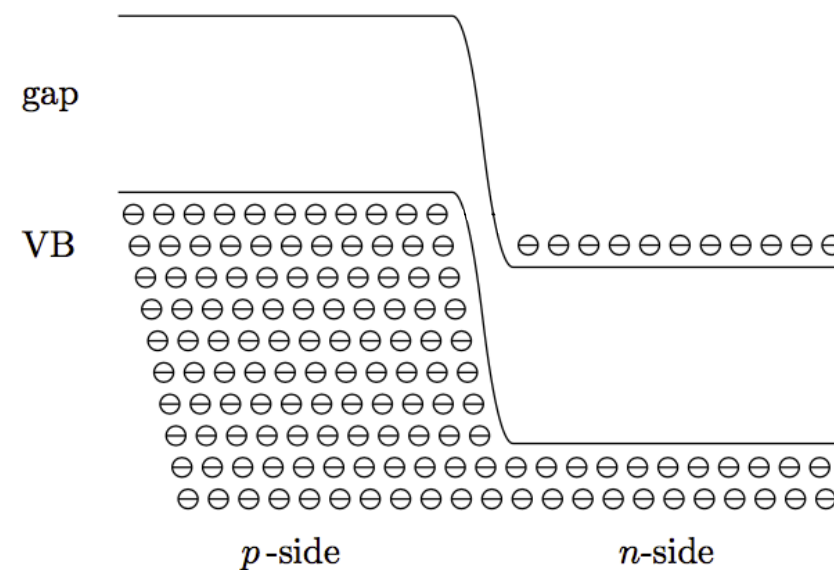


$$x_d = \sqrt{\frac{4\epsilon_r\epsilon_0\phi}{eN_d}}$$

Question #2

In a Zener diode, the level of doping must be:

- a) high
- b) low
- c) the same as a normal diode.



$$x_d = \sqrt{\frac{4\epsilon_r\epsilon_0\phi}{eN_d}}$$

Transistors

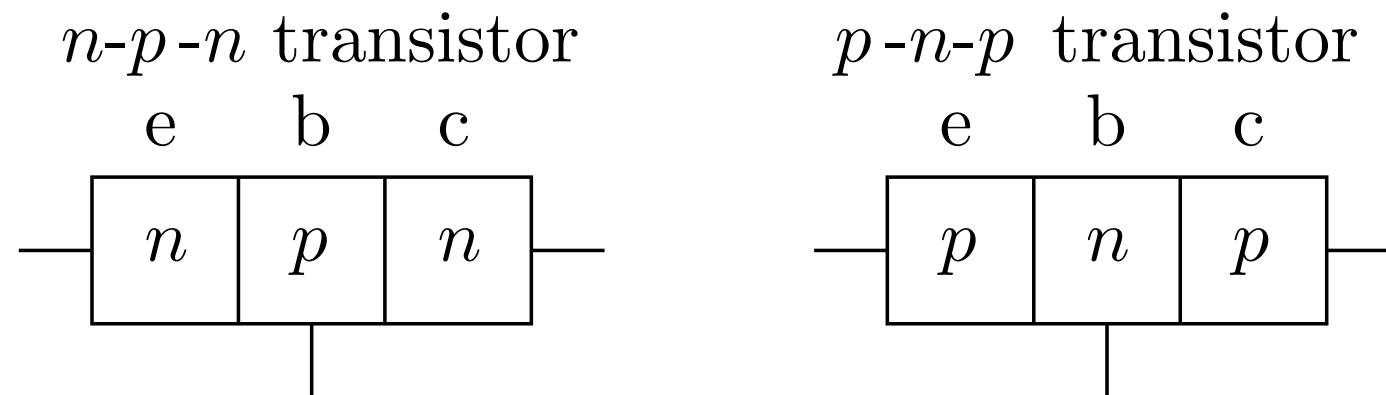


Fig. 12-4. Two kinds of bipolar junction transistors showing the emitter (e), base (b), and collector (c).

Transistors

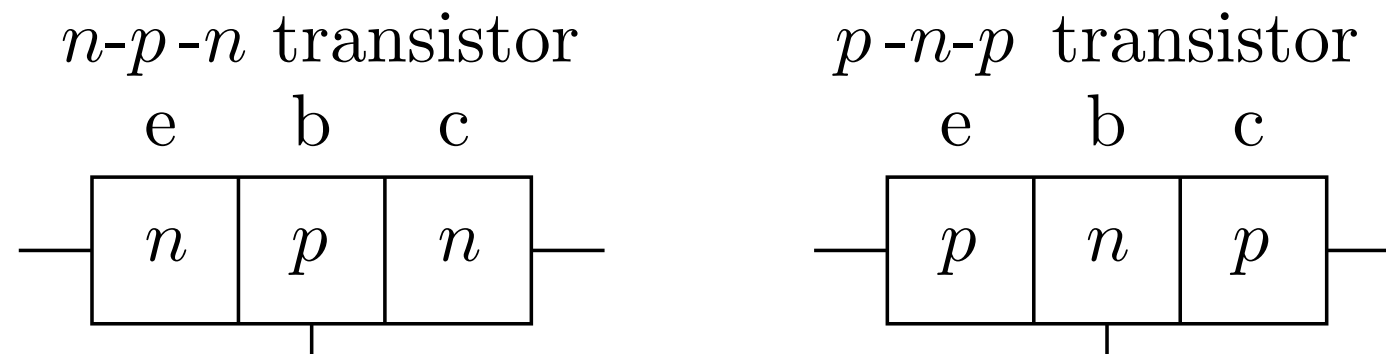
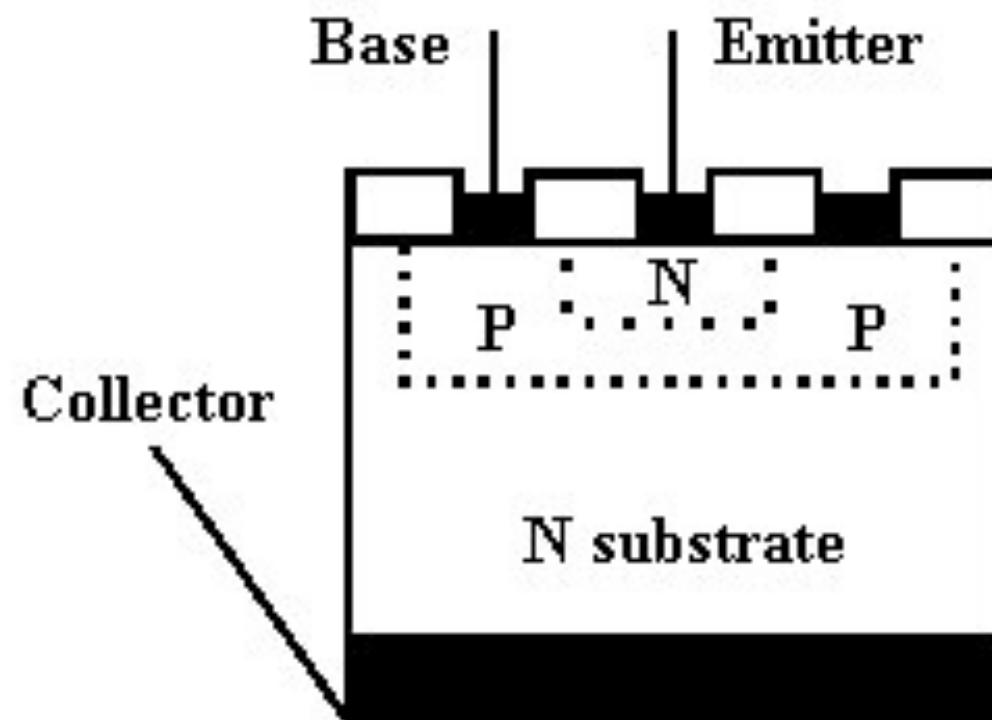


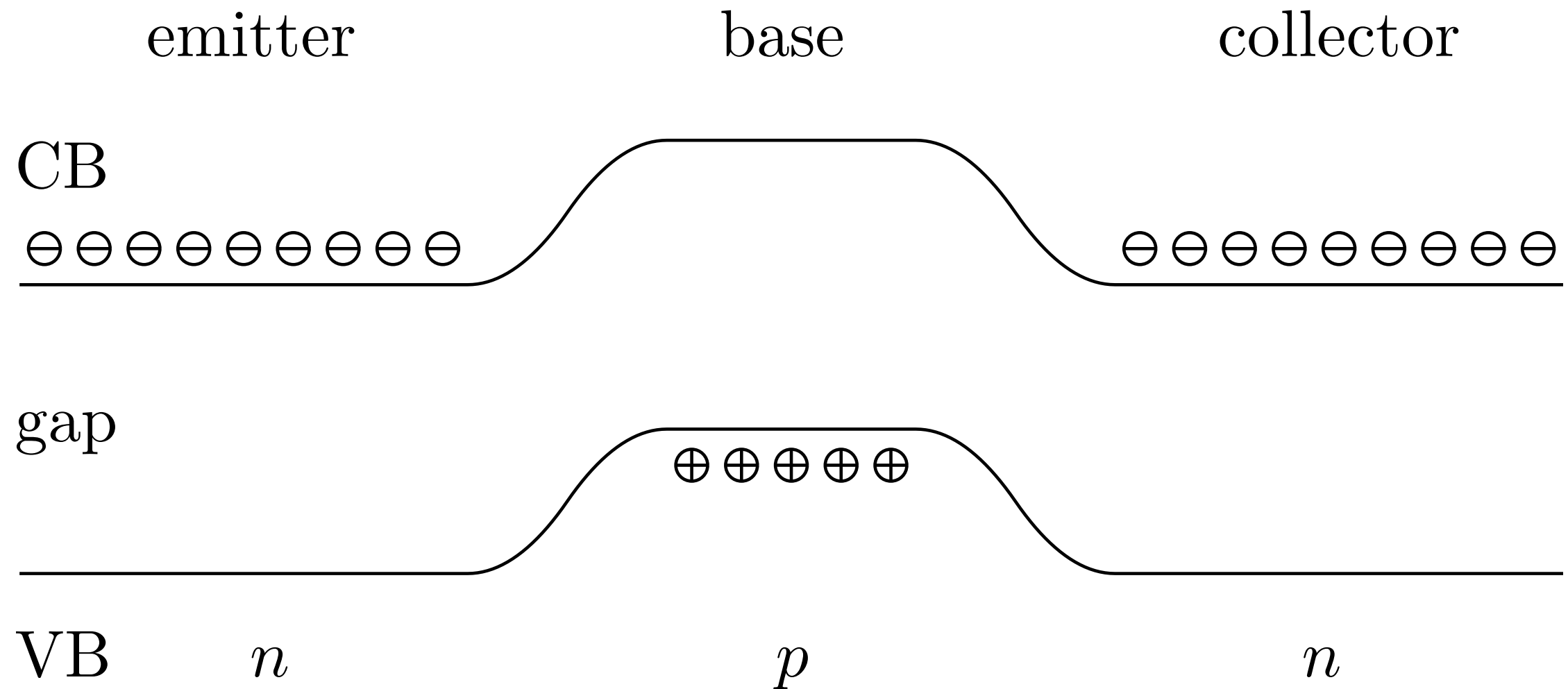
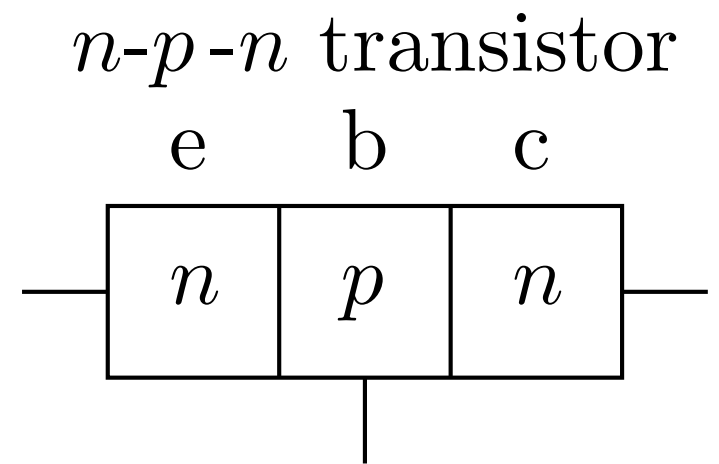
Fig. 1
showi

sistors
or (c).

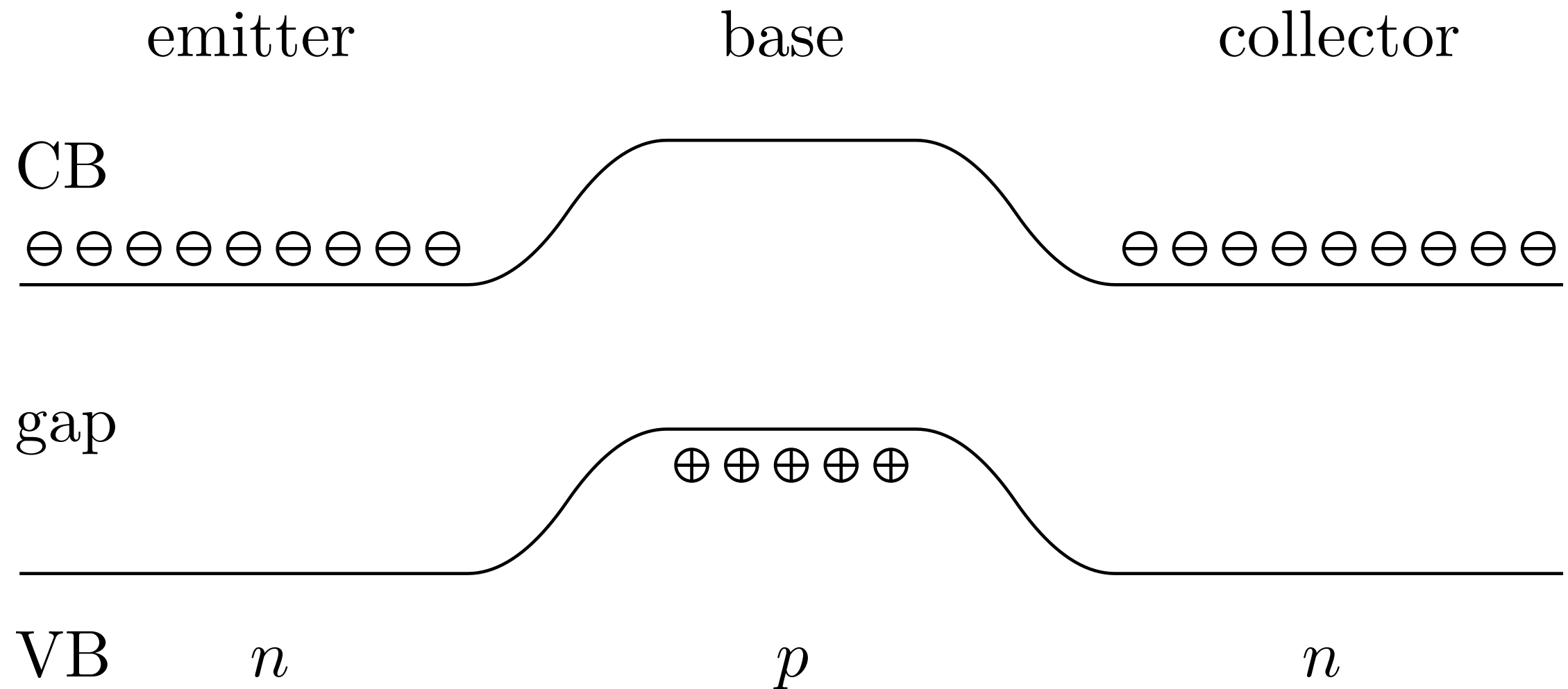
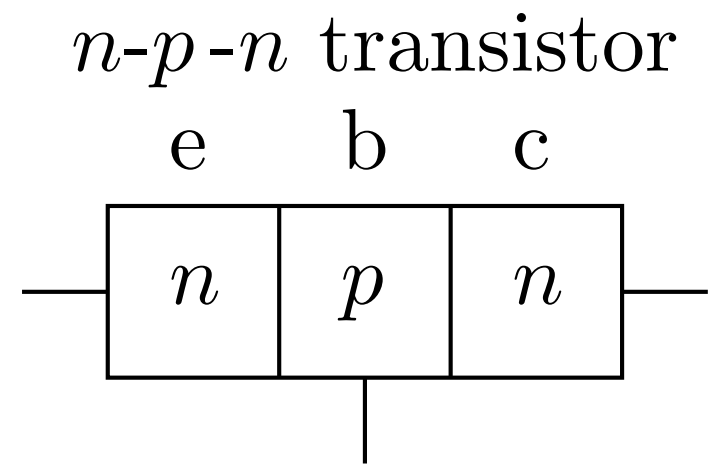


An NPN junction transistor

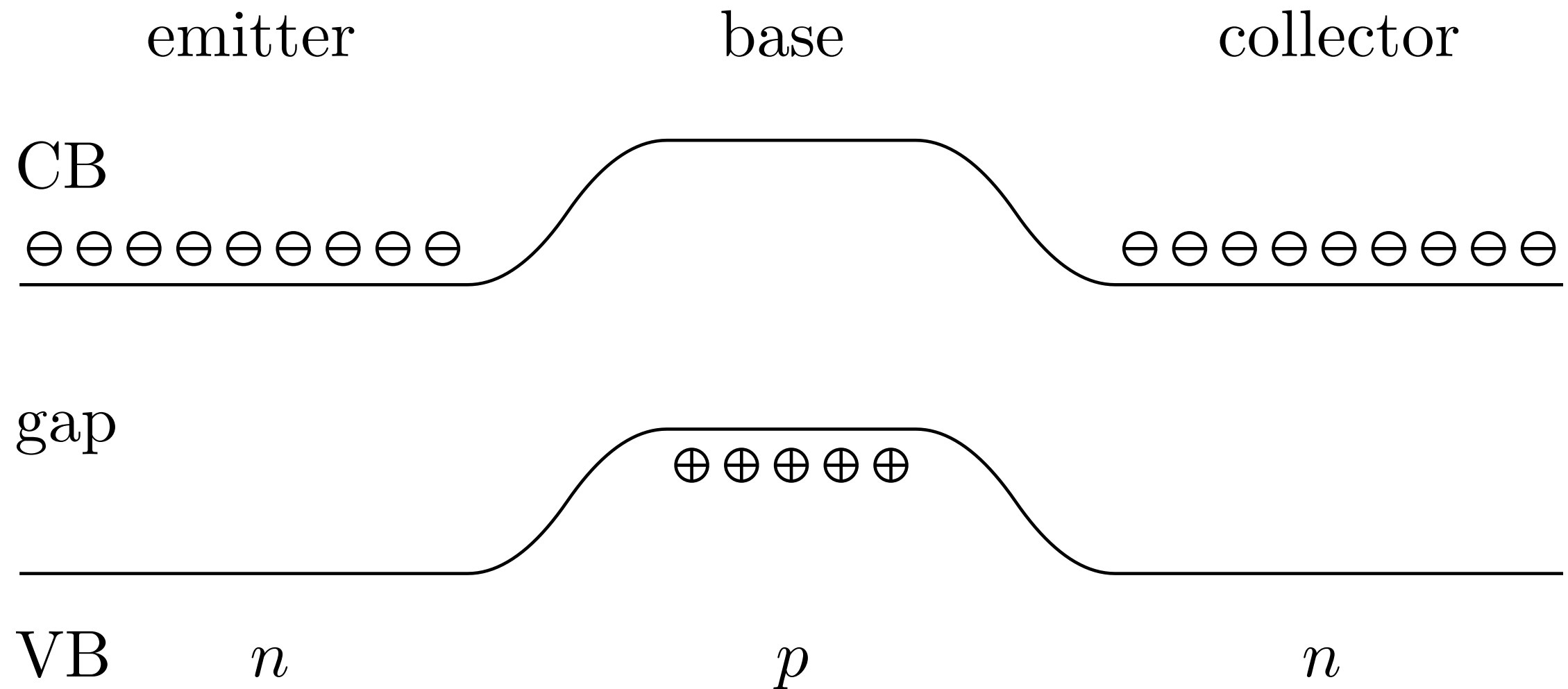
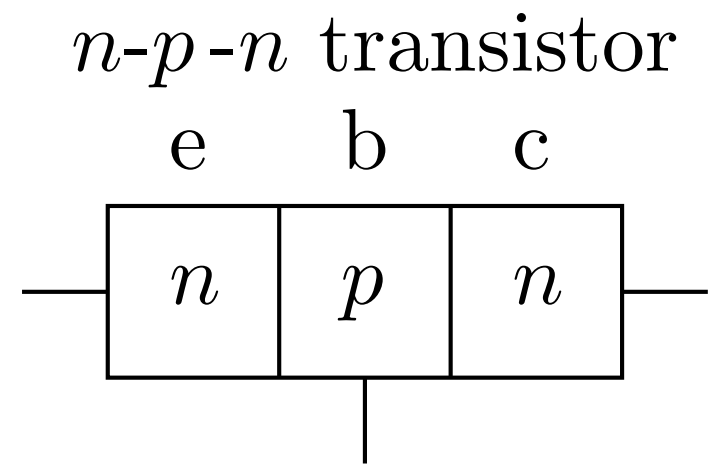
Transistors



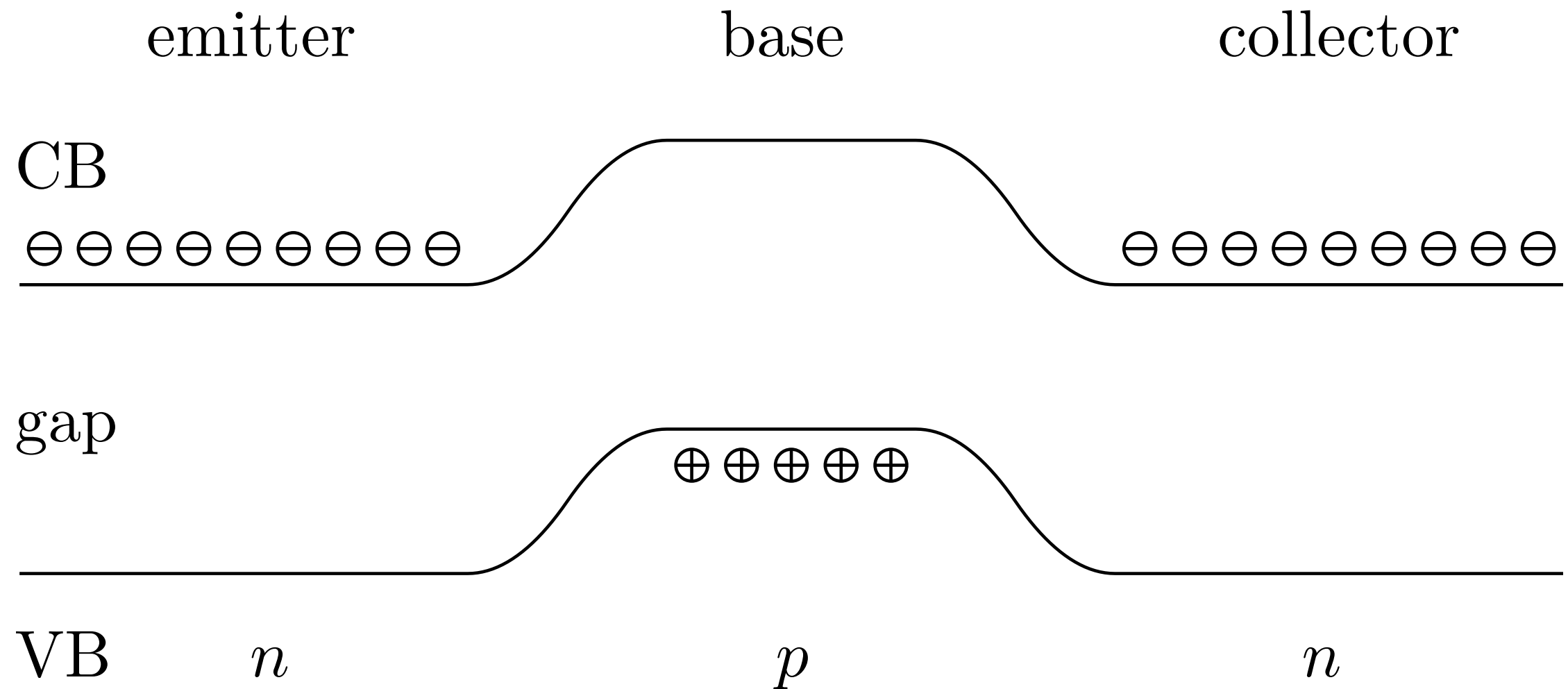
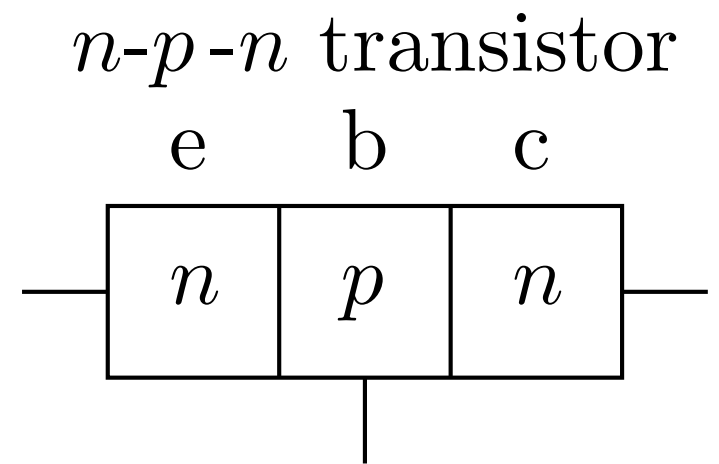
Transistors



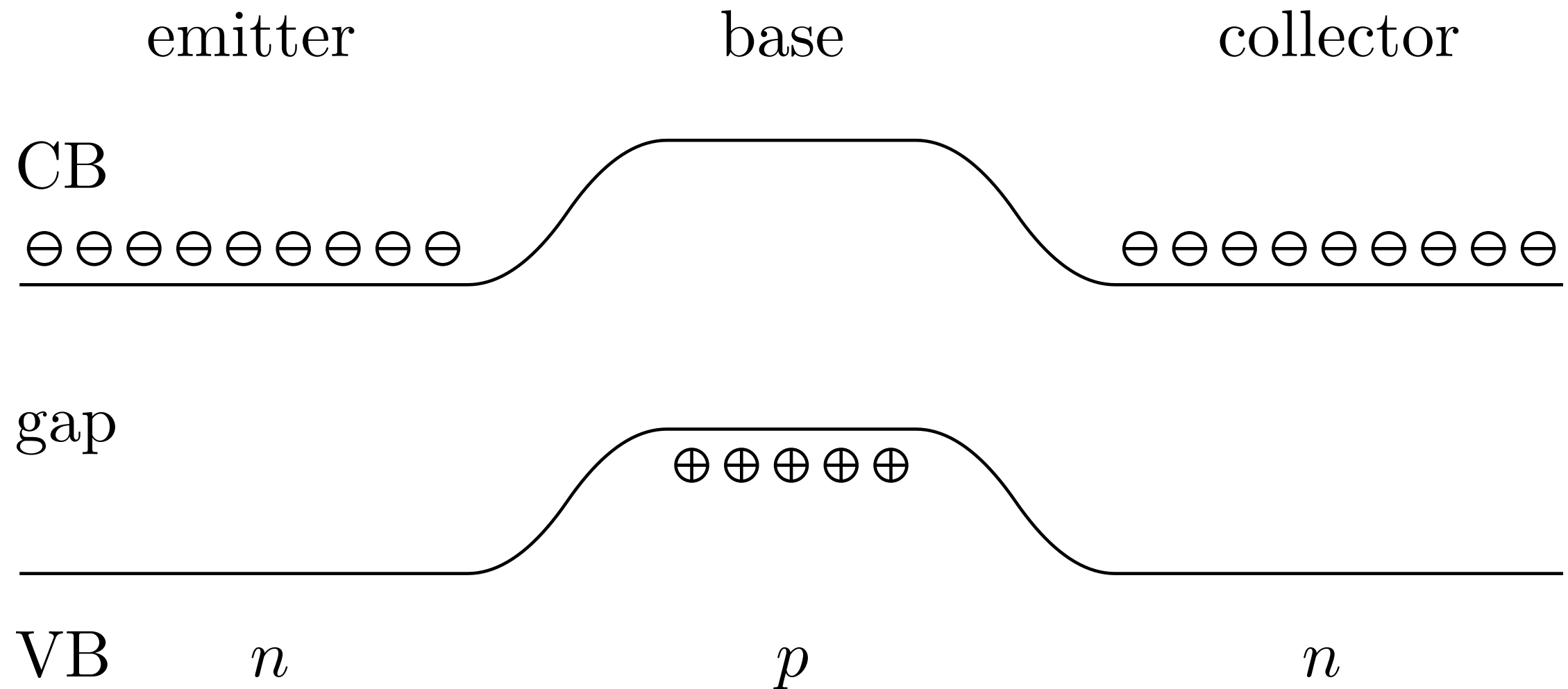
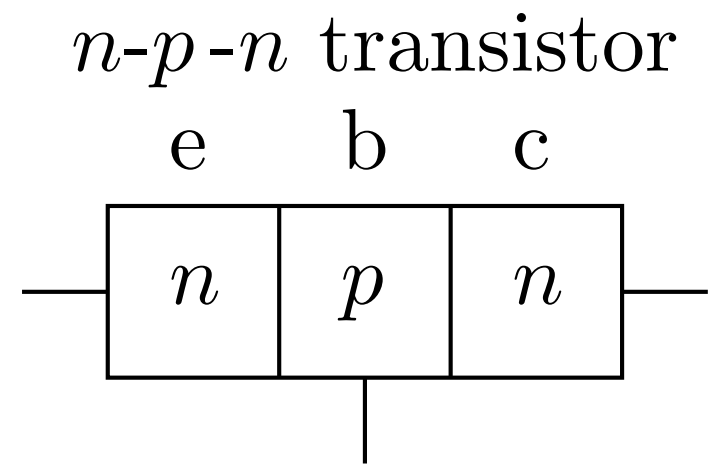
Transistors



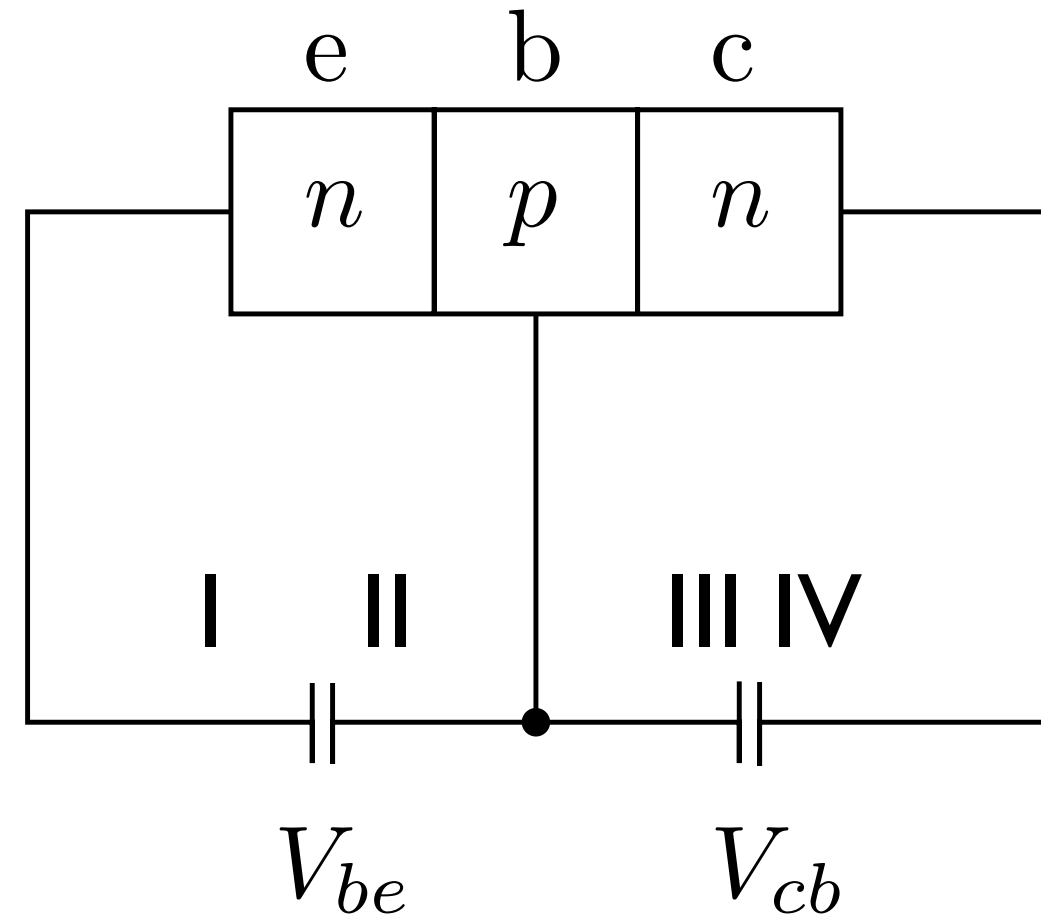
Transistors



Transistors



Transistors as amplifiers

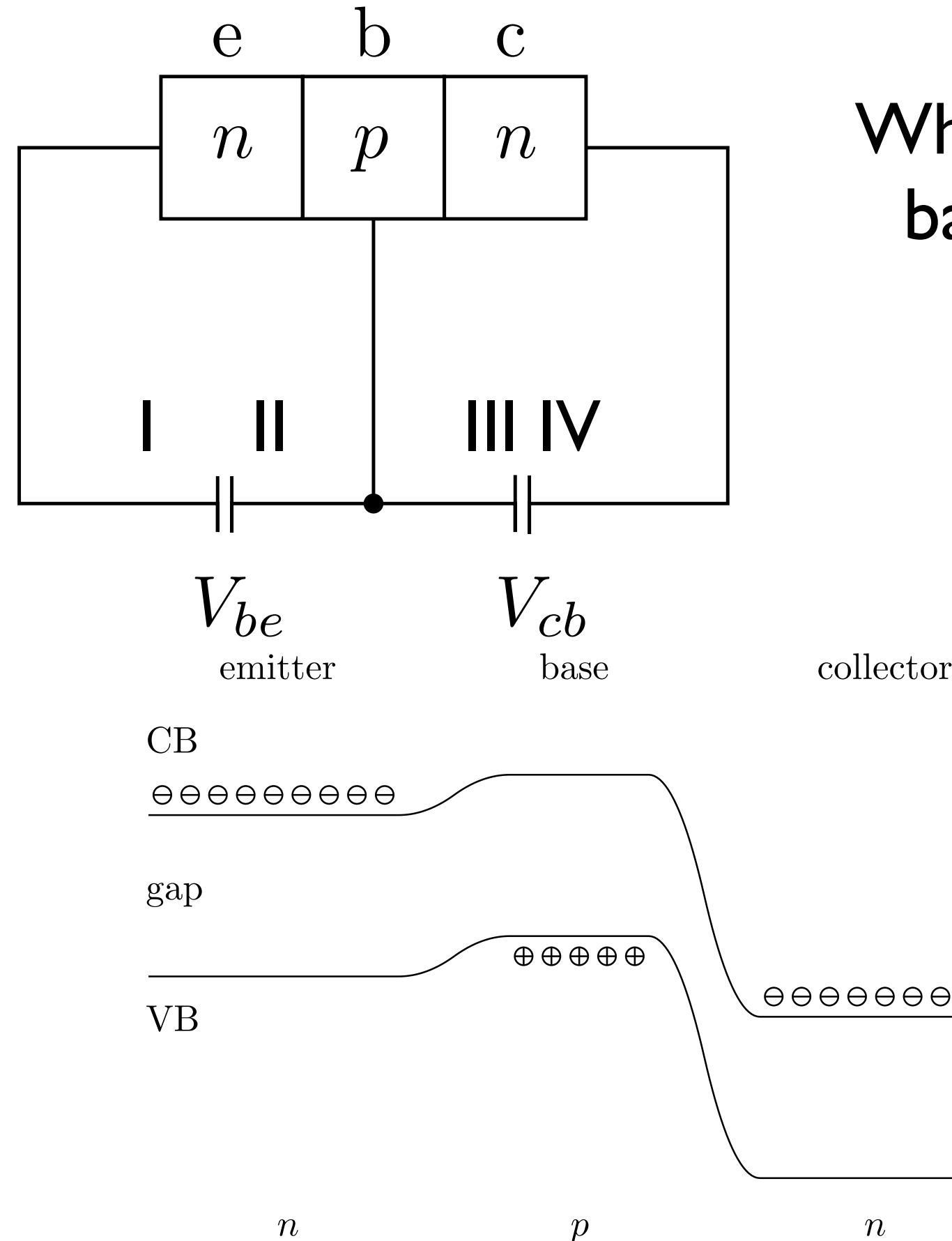


What must be the polarity of the batteries to create the energy diagram shown below.

- A) I and IV must be negative
- B) II and IV must be negative
- C) I and III must be negative
- D) II and III must be negative

Transistors as amplifiers

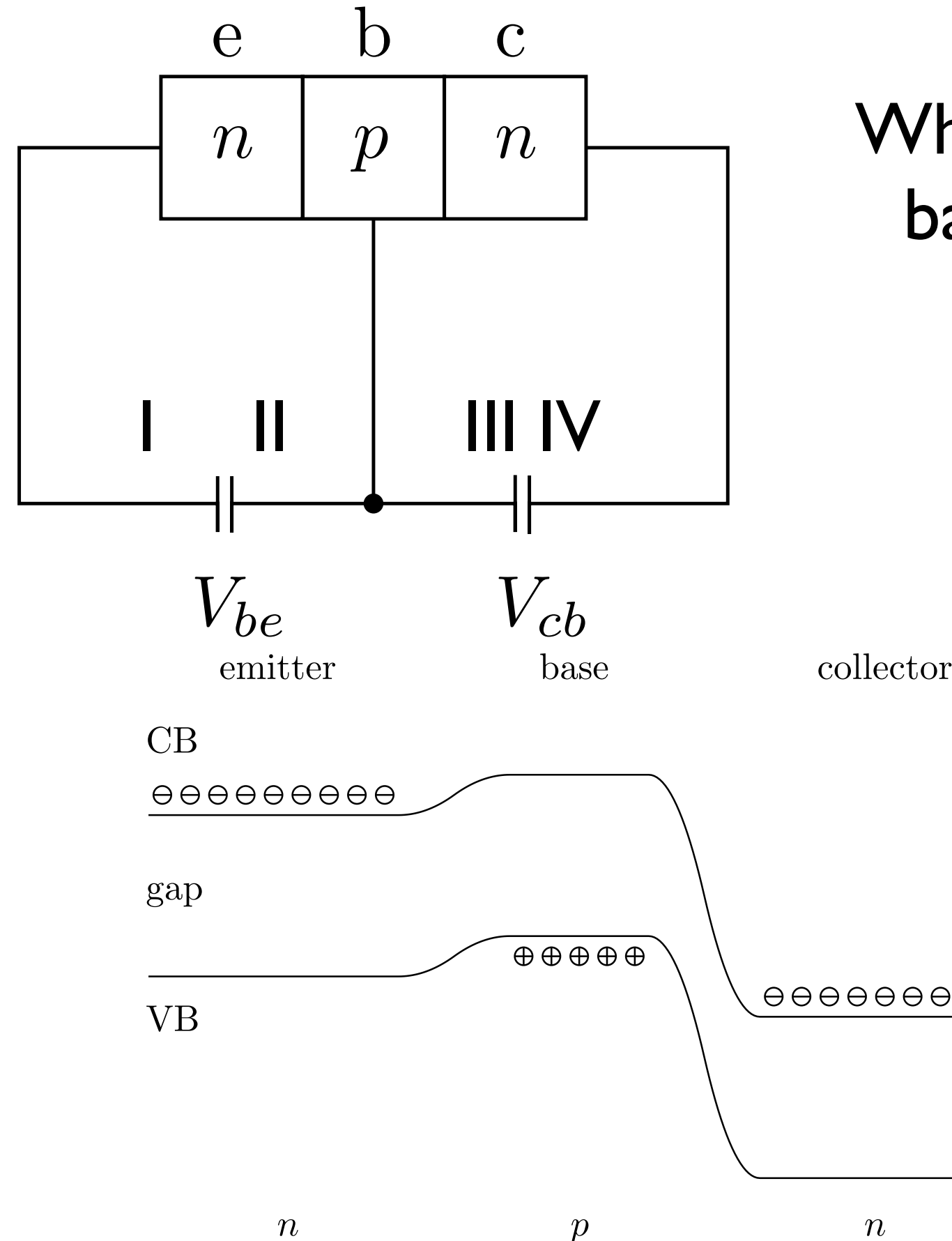
What must be the polarity of the batteries to create the energy diagram shown below.



- A) I and IV must be negative
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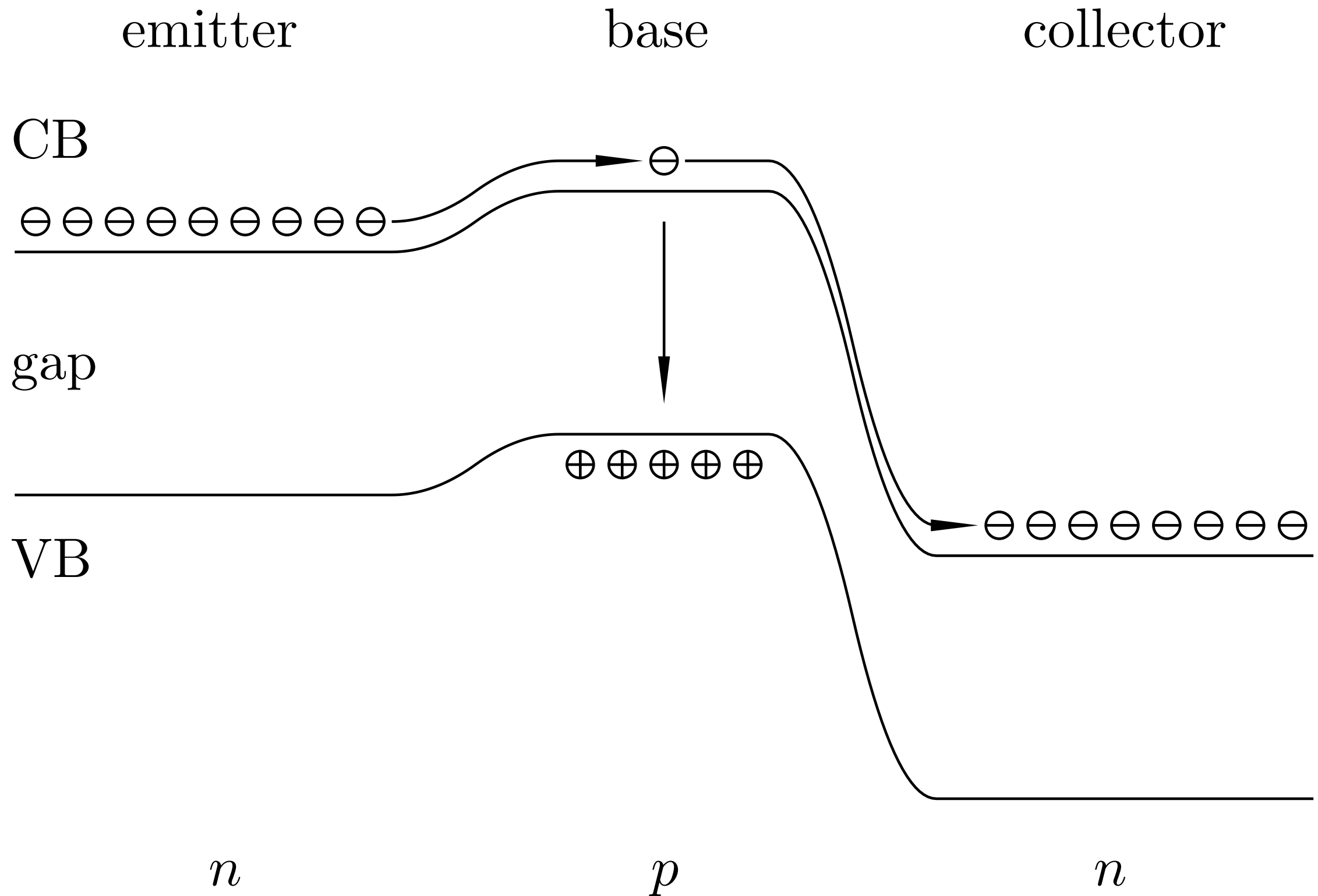
Transistors as amplifiers

What must be the polarity of the batteries to create the energy diagram shown below.

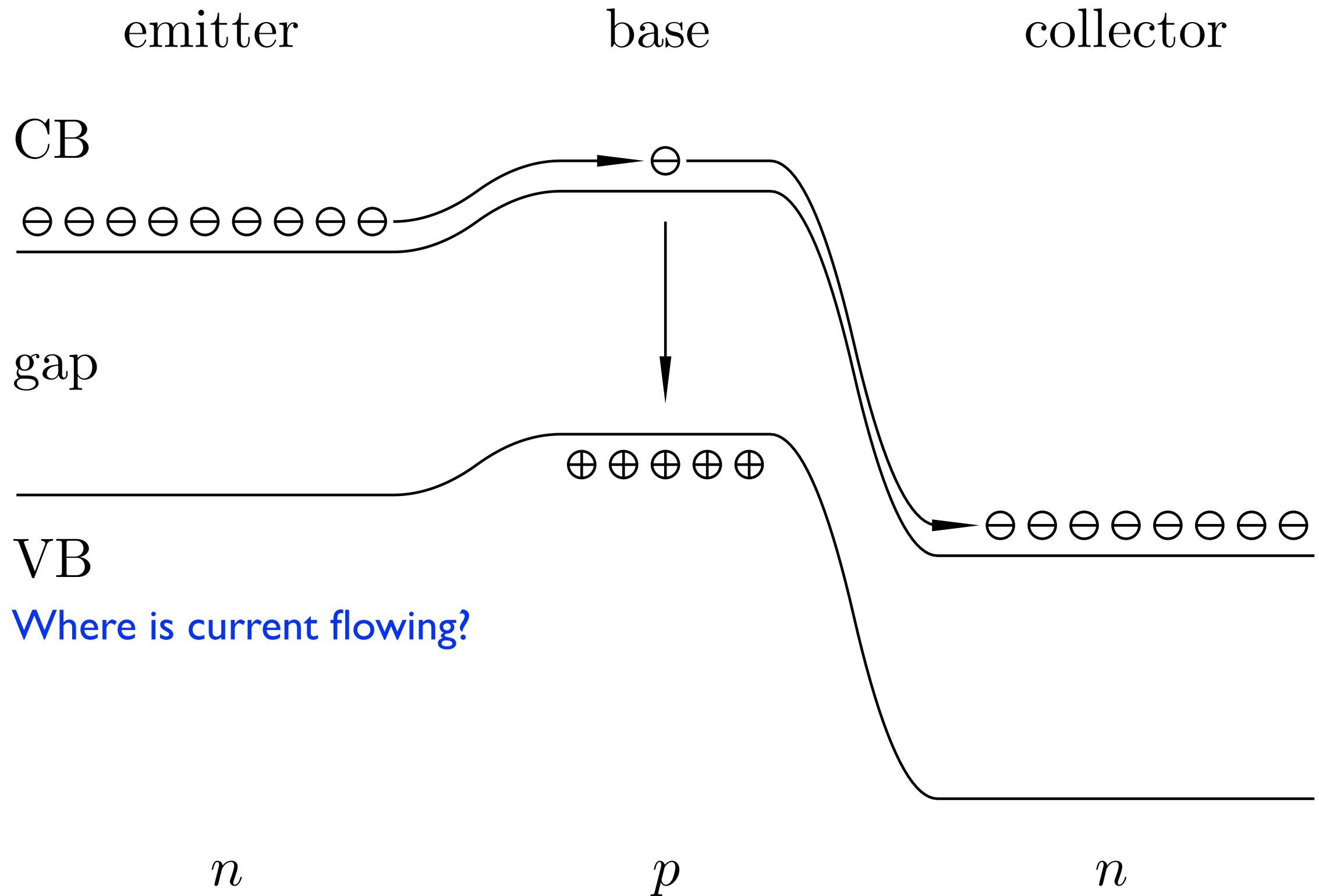


- A) I and IV must be negative
- B) II and IV must be negative
- C) I and III must be negative
- D) II and III must be negative

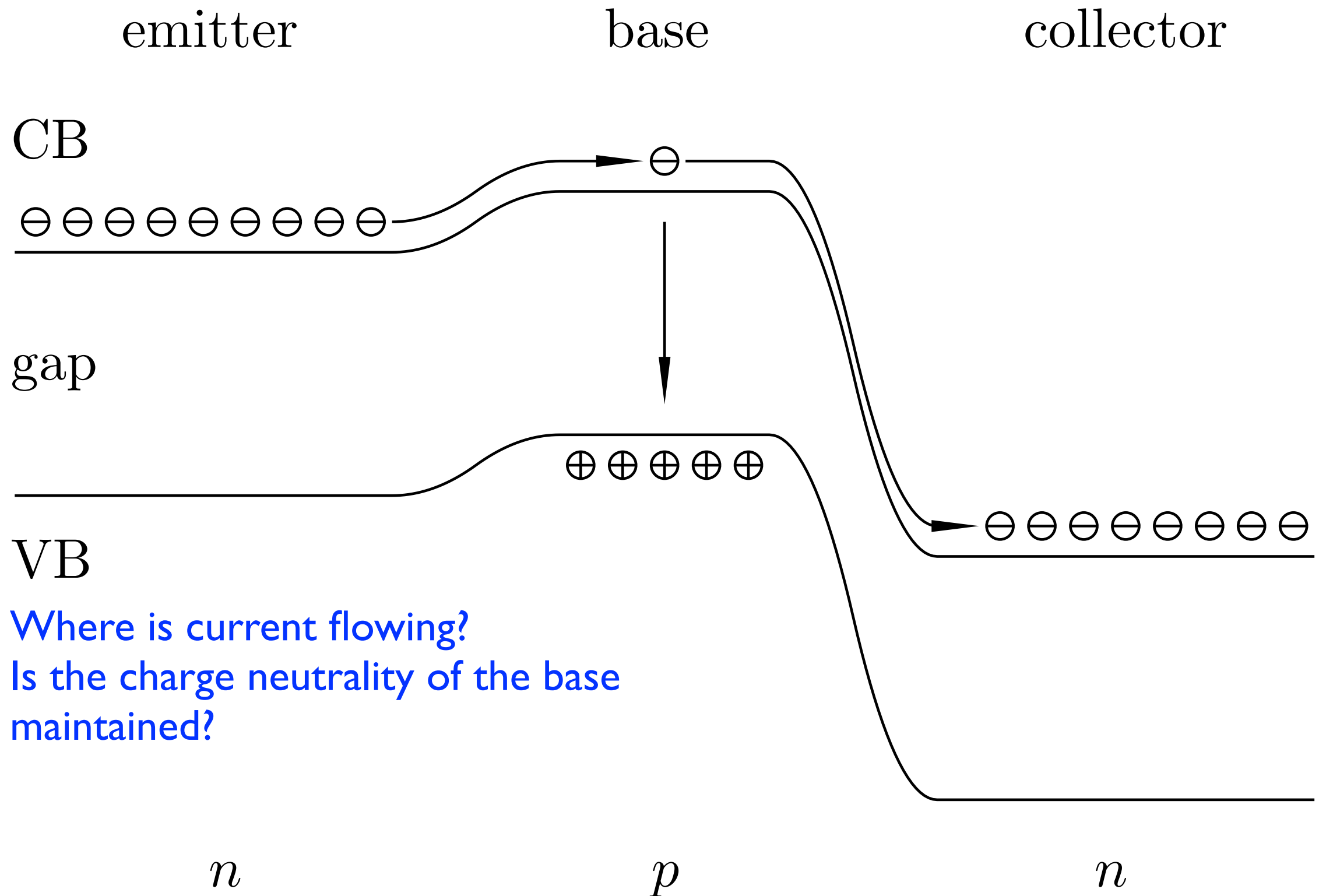
Transistors as amplifiers



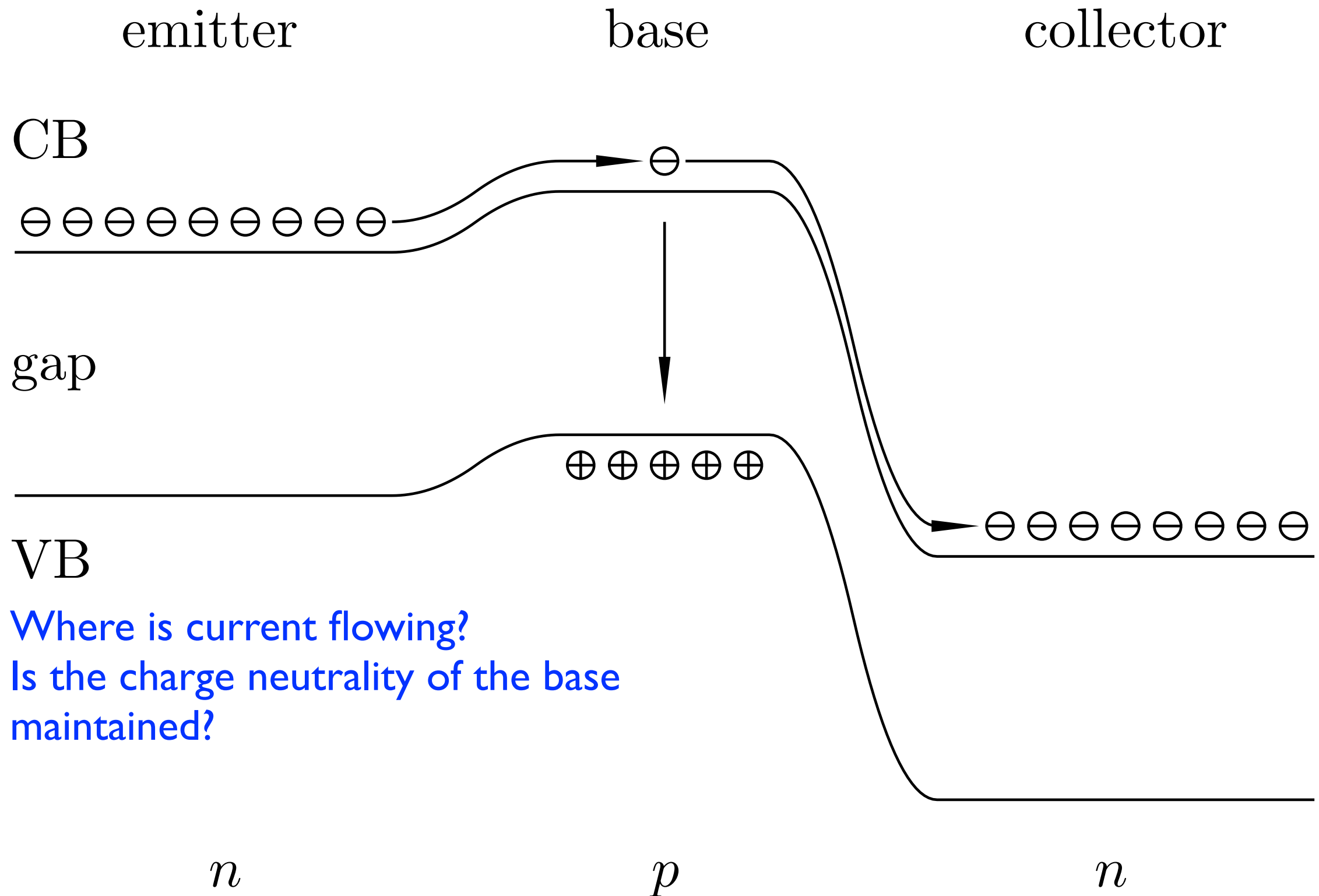
Transistors as amplifiers



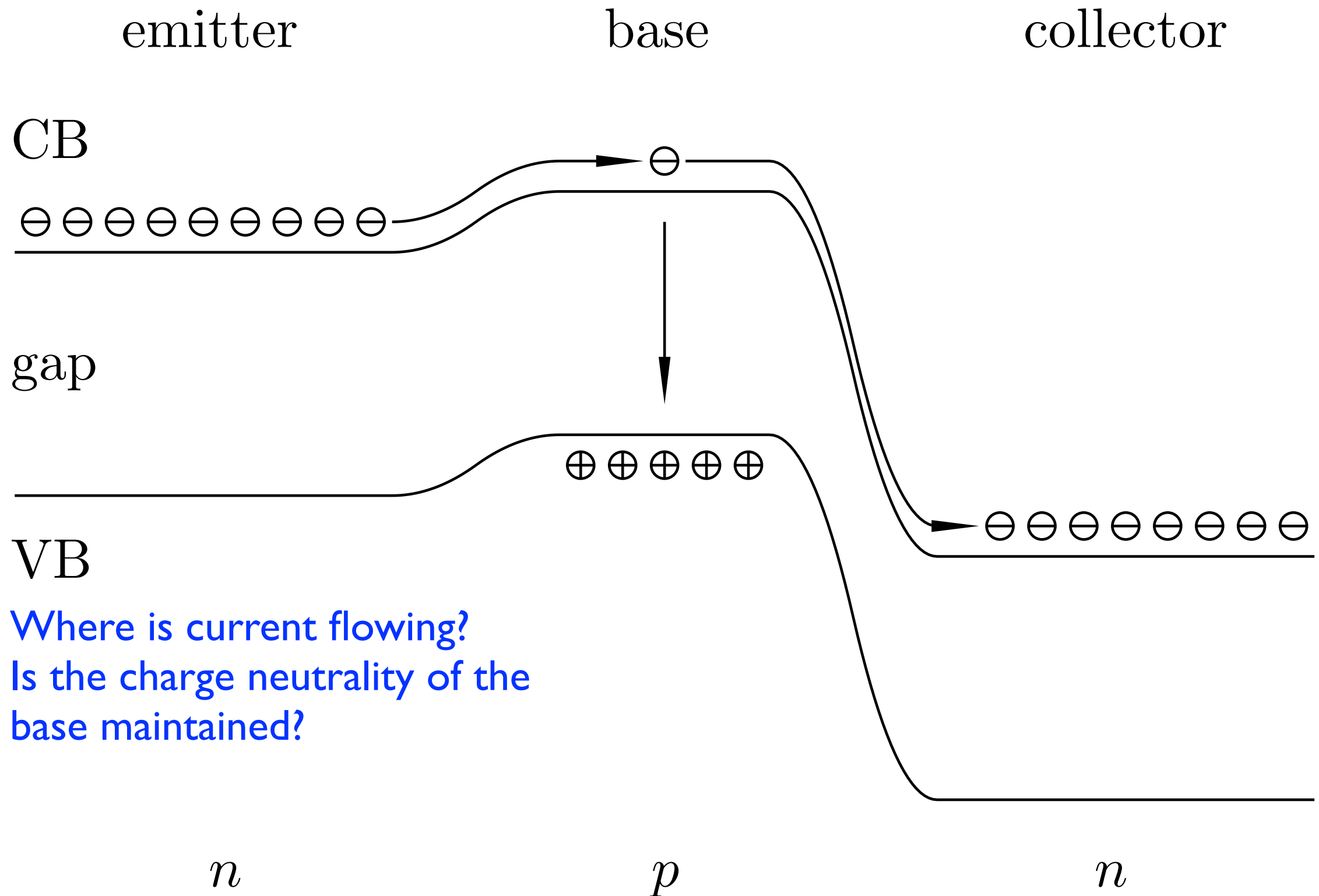
Transistors as amplifiers



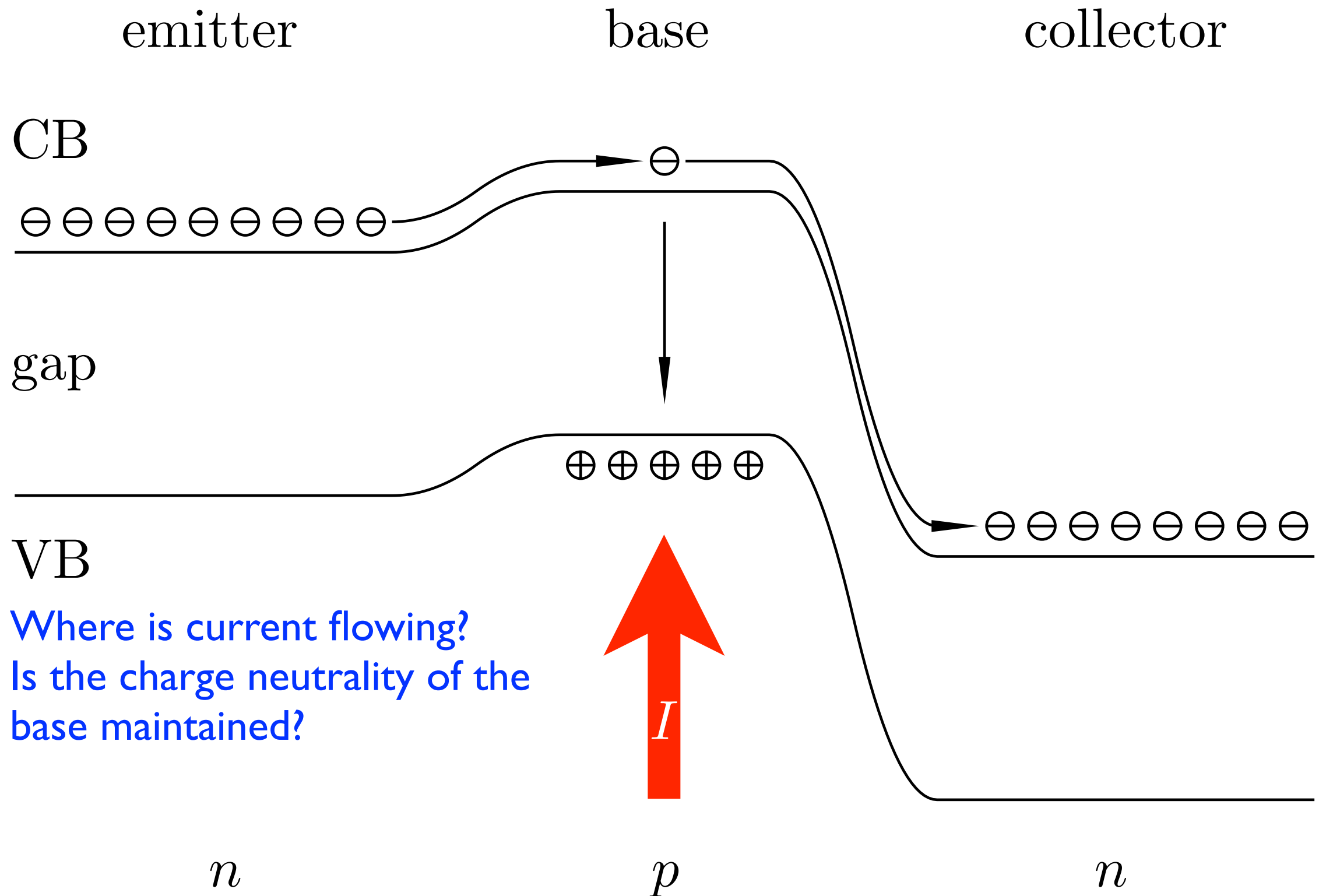
Transistors as amplifiers



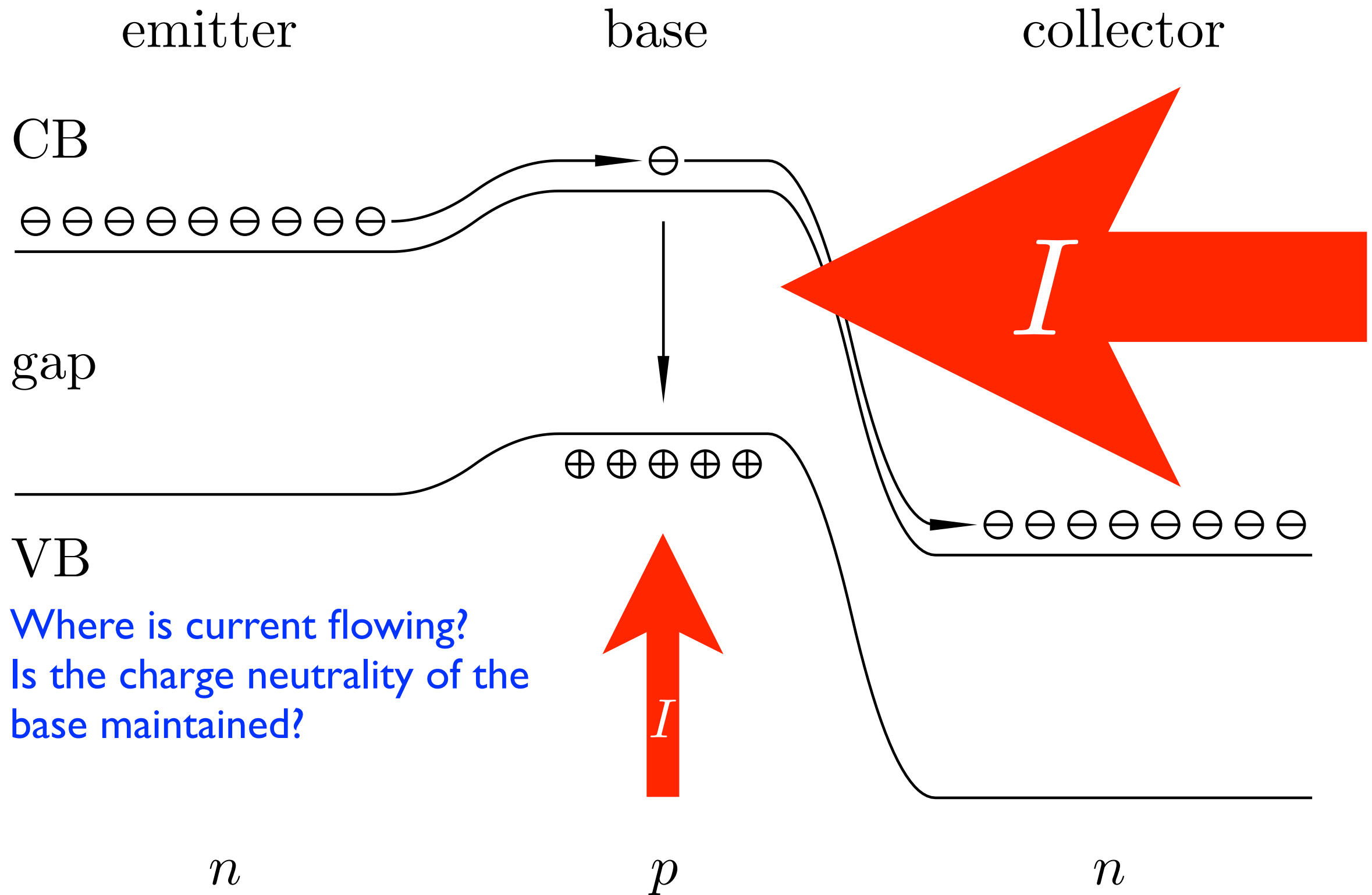
Transistors as amplifiers



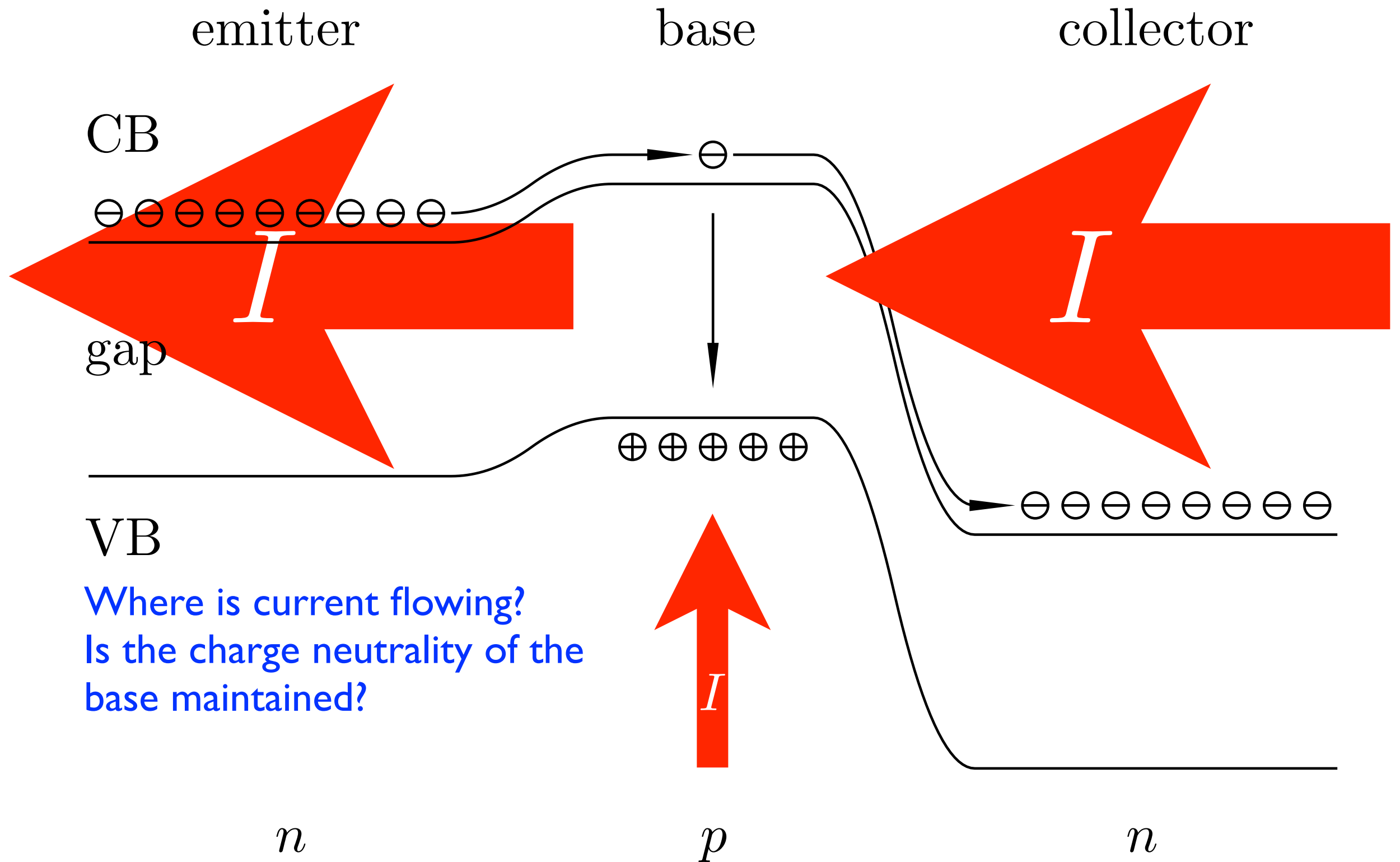
Transistors as amplifiers



Transistors as amplifiers



Transistors as amplifiers



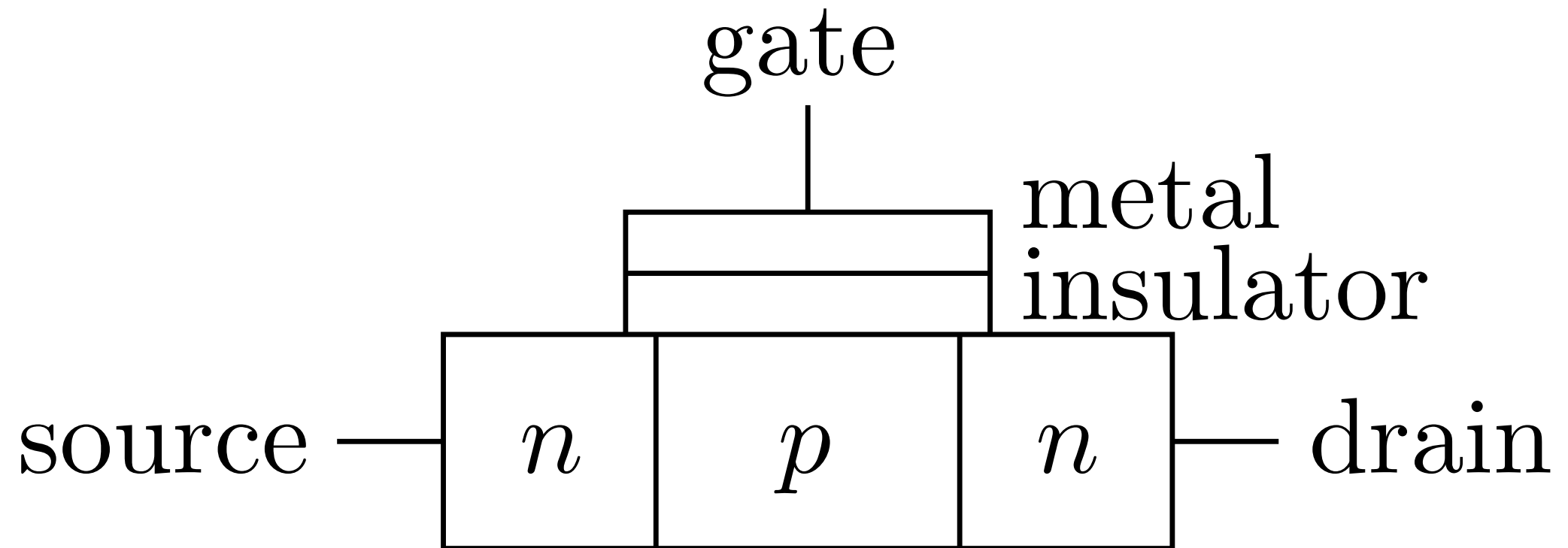
A good transistor (n-p-n) junction must..

- a) have a narrow base
- b) have a wide base
- c) have a base that is doped lighter than the emitter and collector.
- d) Both a and c.
- e) have a base that is doped heavier than the emitter and collector.

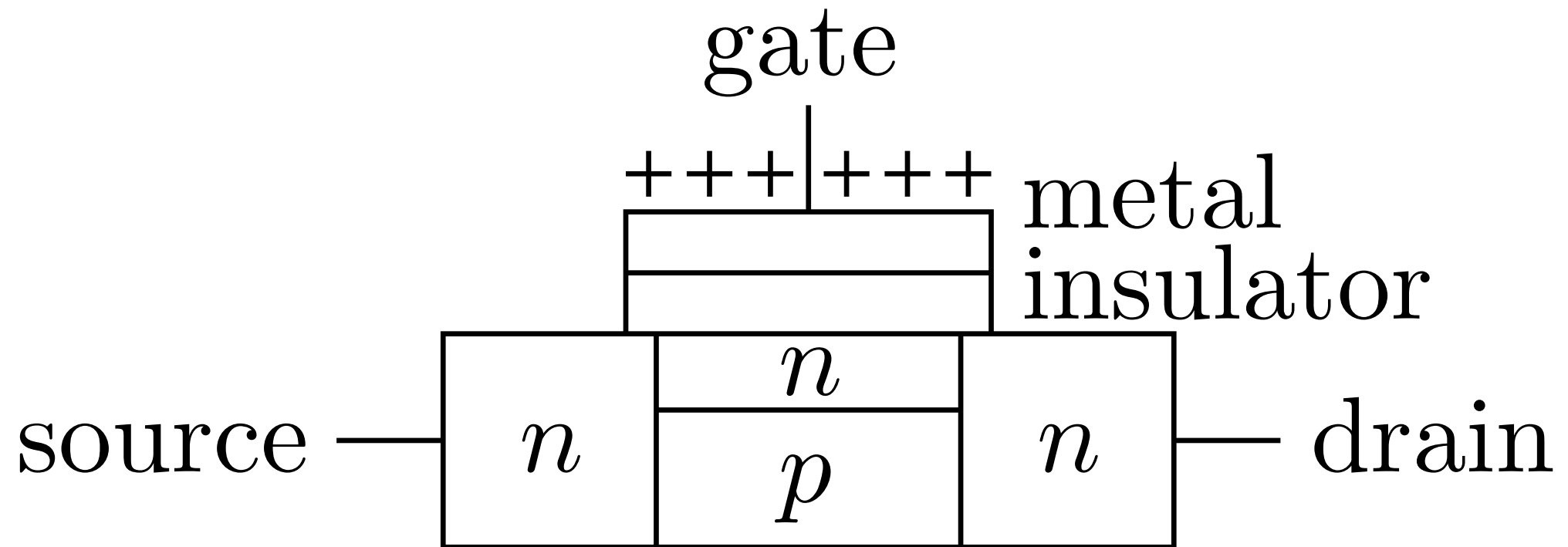
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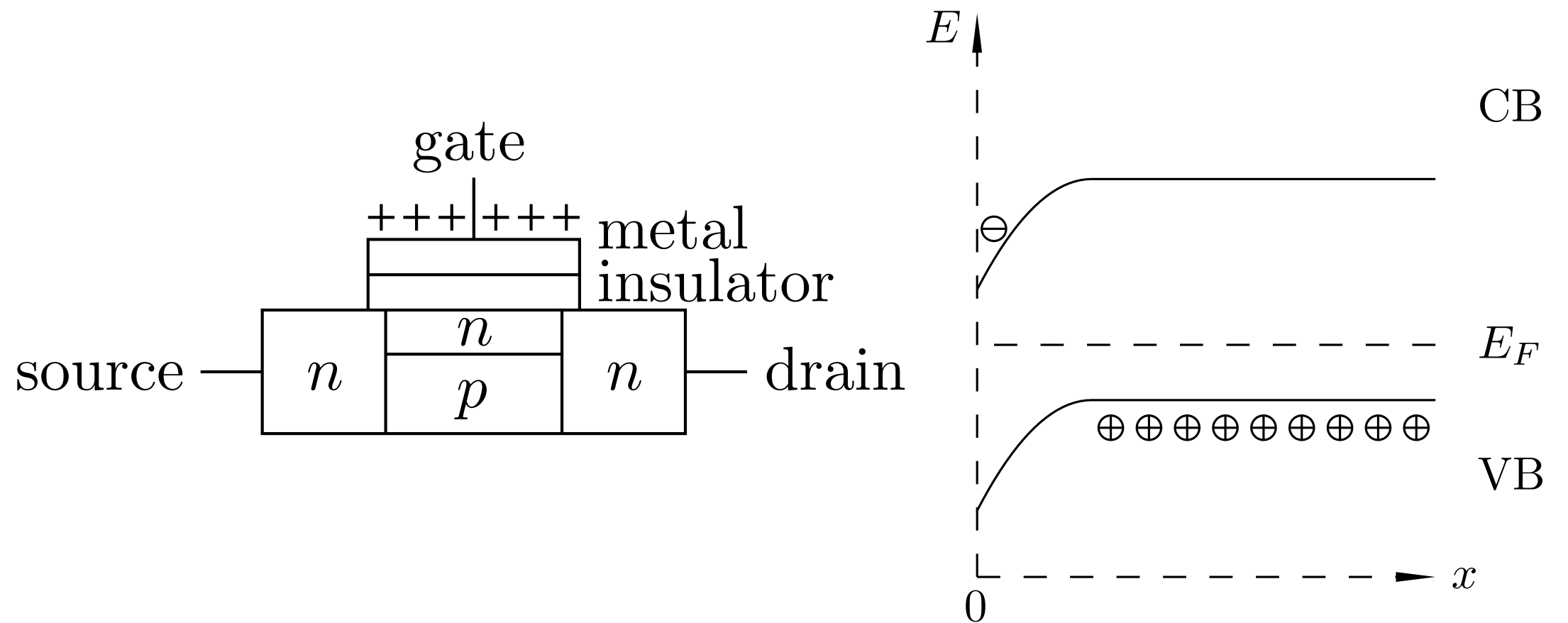
MOSFETs



MOSFETs

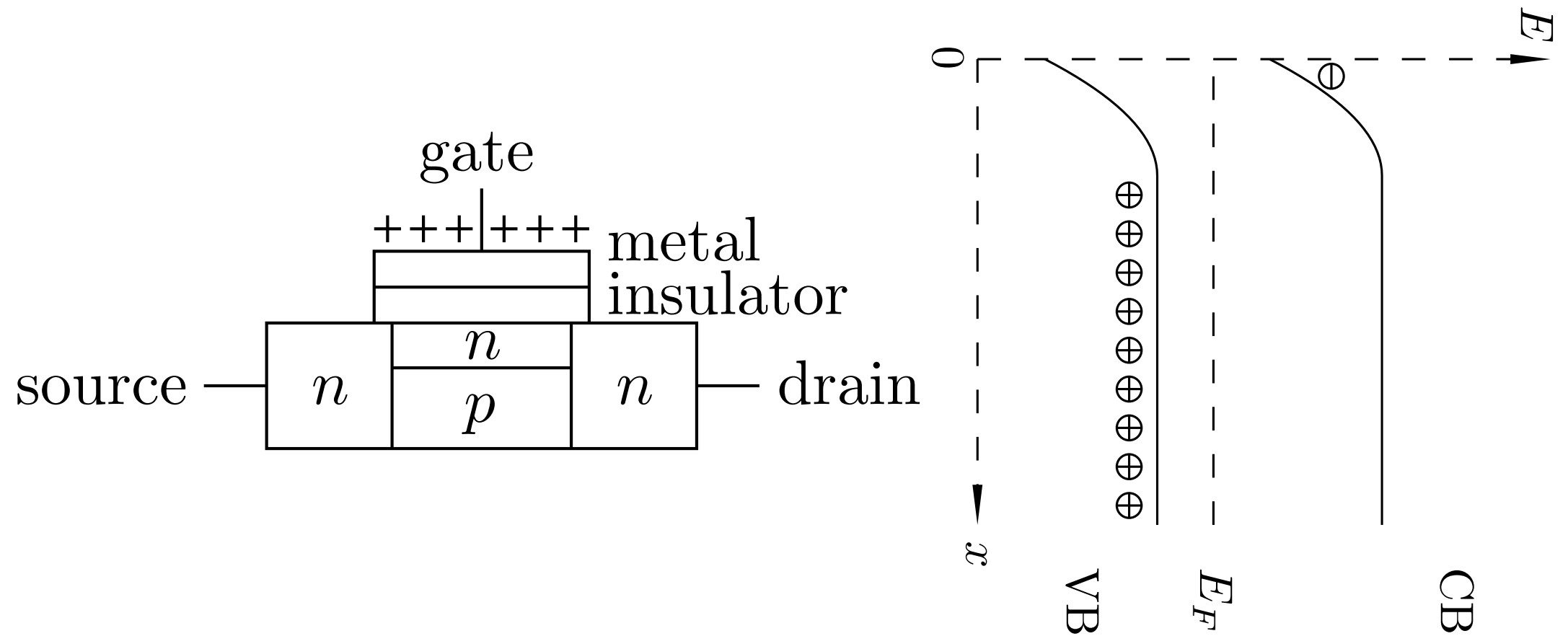


MOSFETs



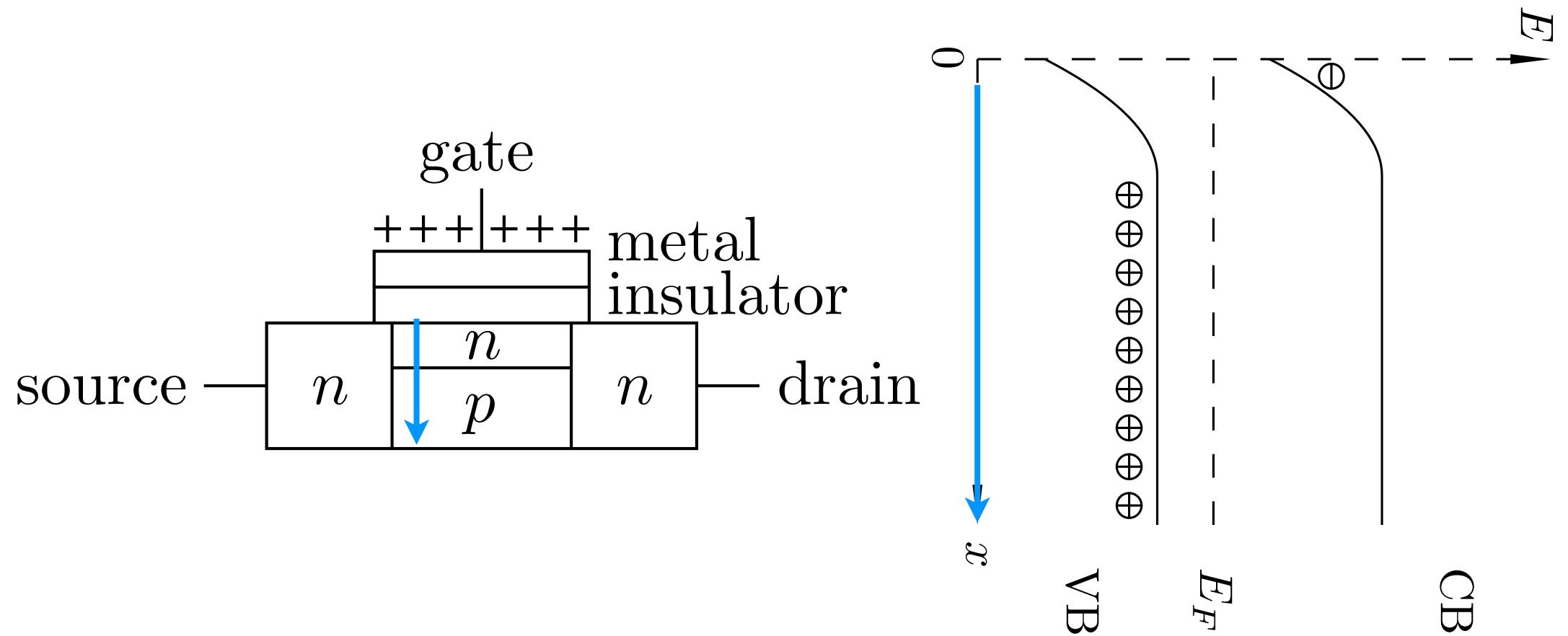
Energy as a function of
distance from the gate

MOSFETs



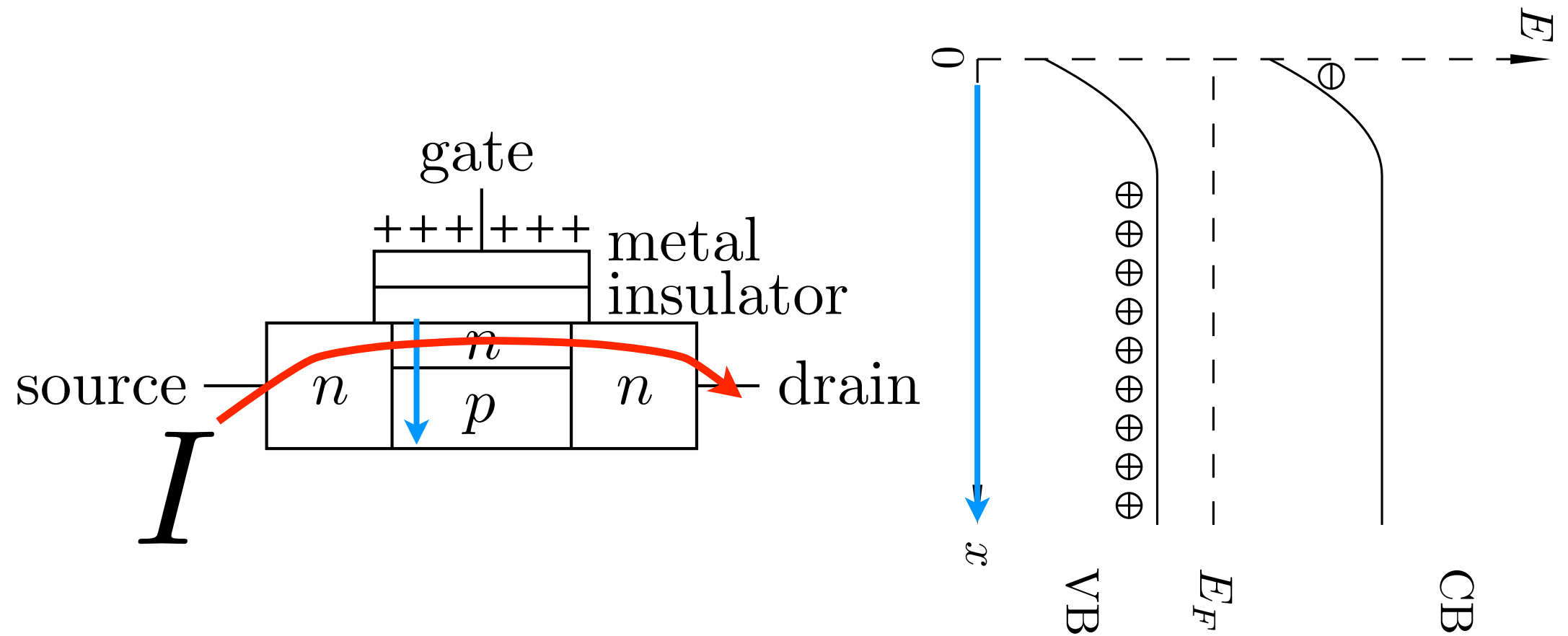
Energy as a function of
distance from the gate

MOSFETs



Energy as a function of
distance from the gate

MOSFETs



Energy as a function of
distance from the gate

Generation Current

1

Avalanche breakdown

2

Diode

8

4

transistor

5

Forward Bias

Zener breakdown

6

Reverse Bias

9

field-effect transistor (FET)

3

Recombination Current

7

