Basic Electrical Engineering

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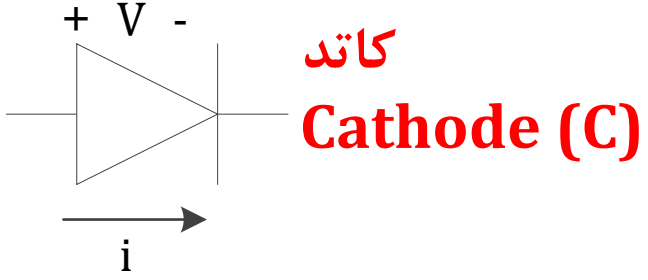
Faculty of Electrical and Computer Engineering
Department of Electrical & Electronics Engineering

Semiconductors

نیمه هادی ها

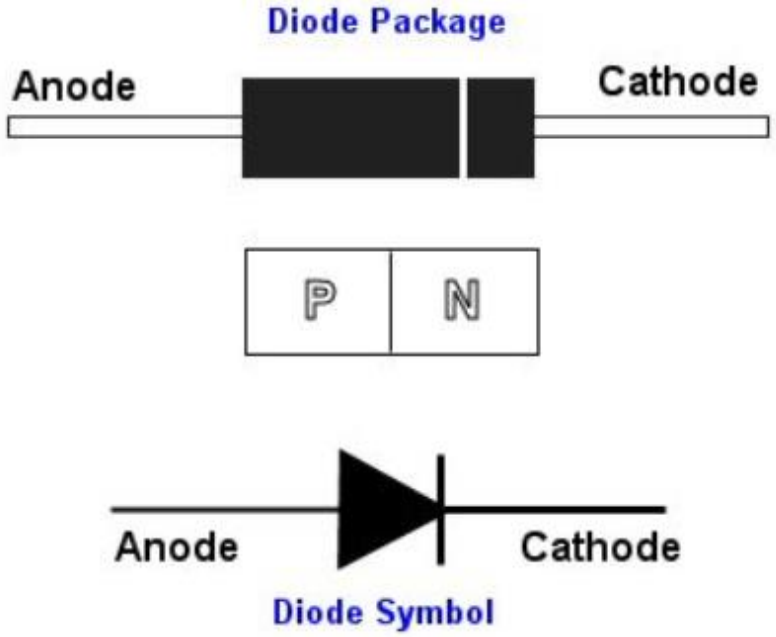
دیود

یک نیمه هادی است که جریان را فقط در یک جهت هدایت می کند.



$$i = I_S\left[\exp(\frac{V}{mV_T}) - 1\right]$$

$$V = mV_T Ln\left[\frac{i}{I_S} + 1\right]$$

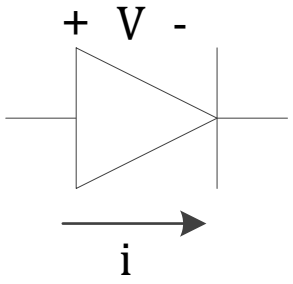


Semiconductors

نیمه هادی ها

دیود

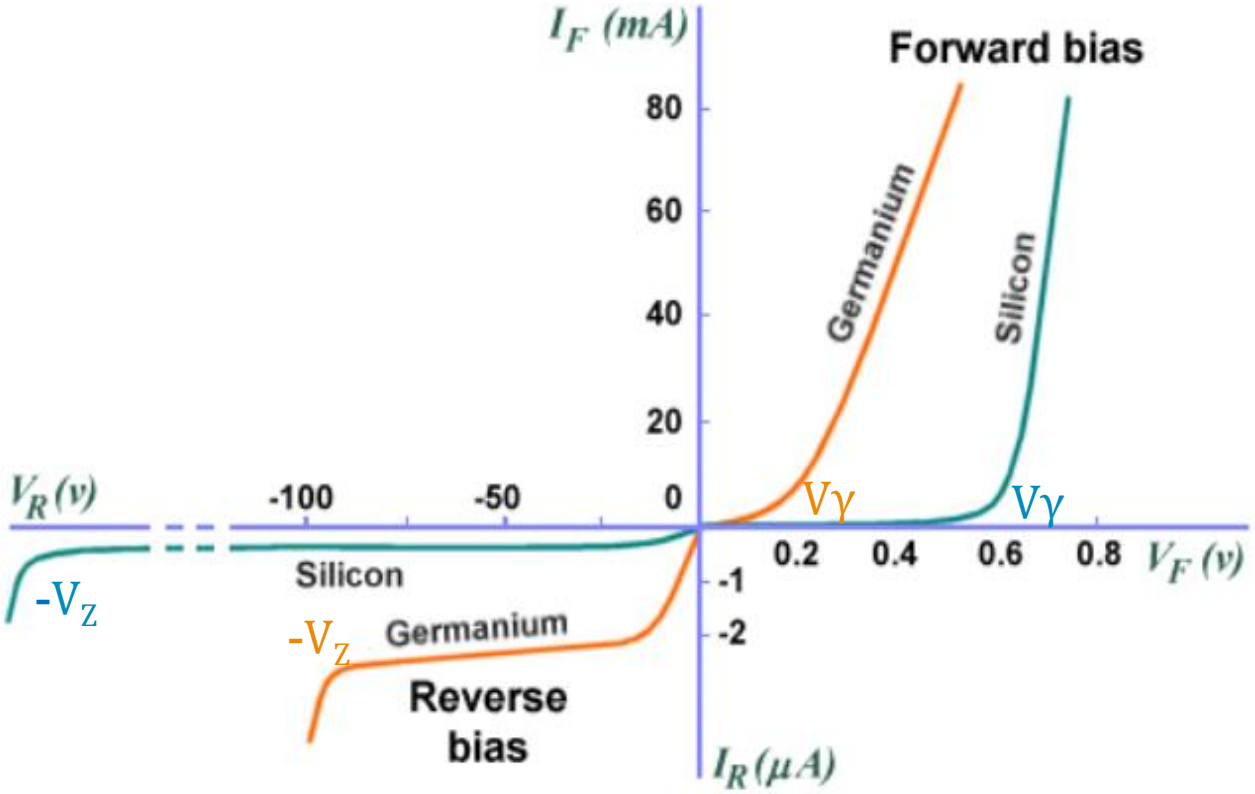
$$i = I_S\left[\exp(\frac{V}{mV_T}) - 1\right]$$



Vγ: ولتاژ آستانه

V_Z: ولتاژ شکست معکوس

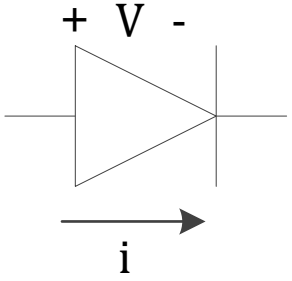
منحنی مشخصه دیود

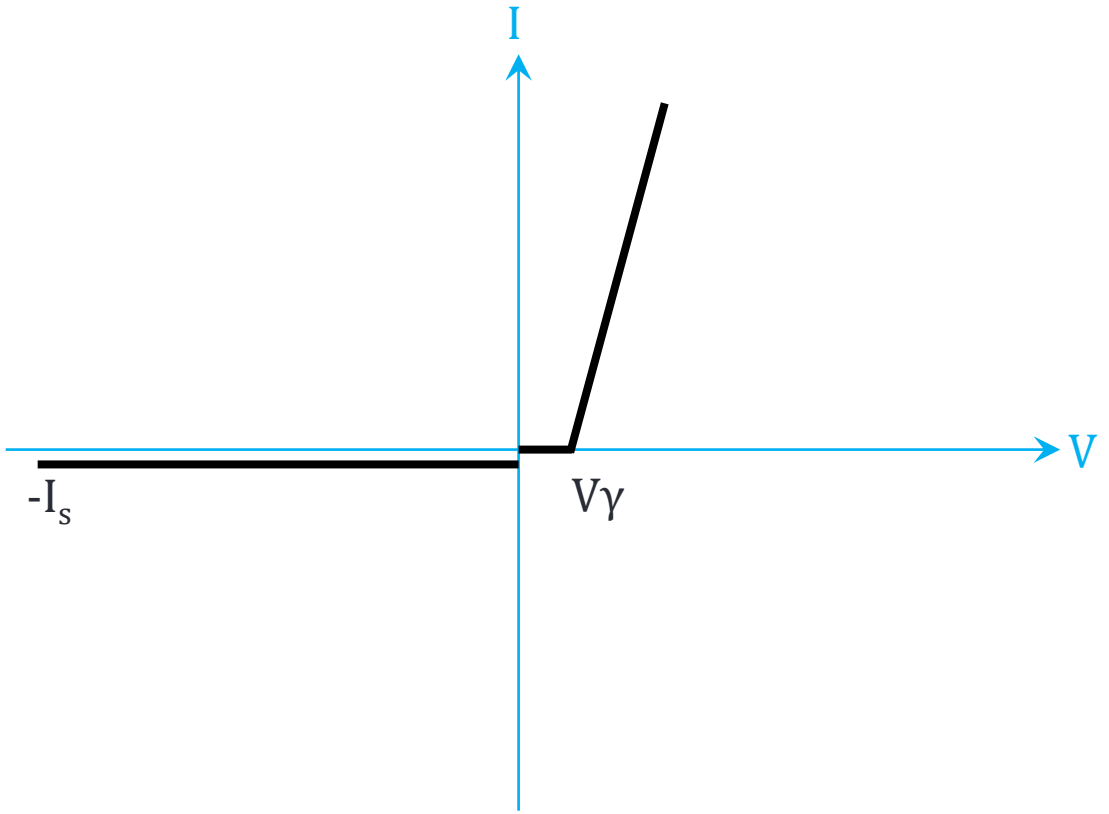


Semiconductors

نیمه هادی ها

مدل خطی تکه ای دیود

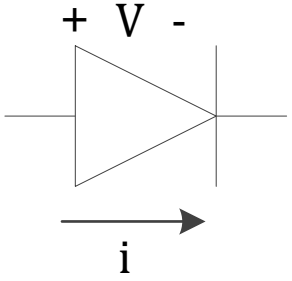


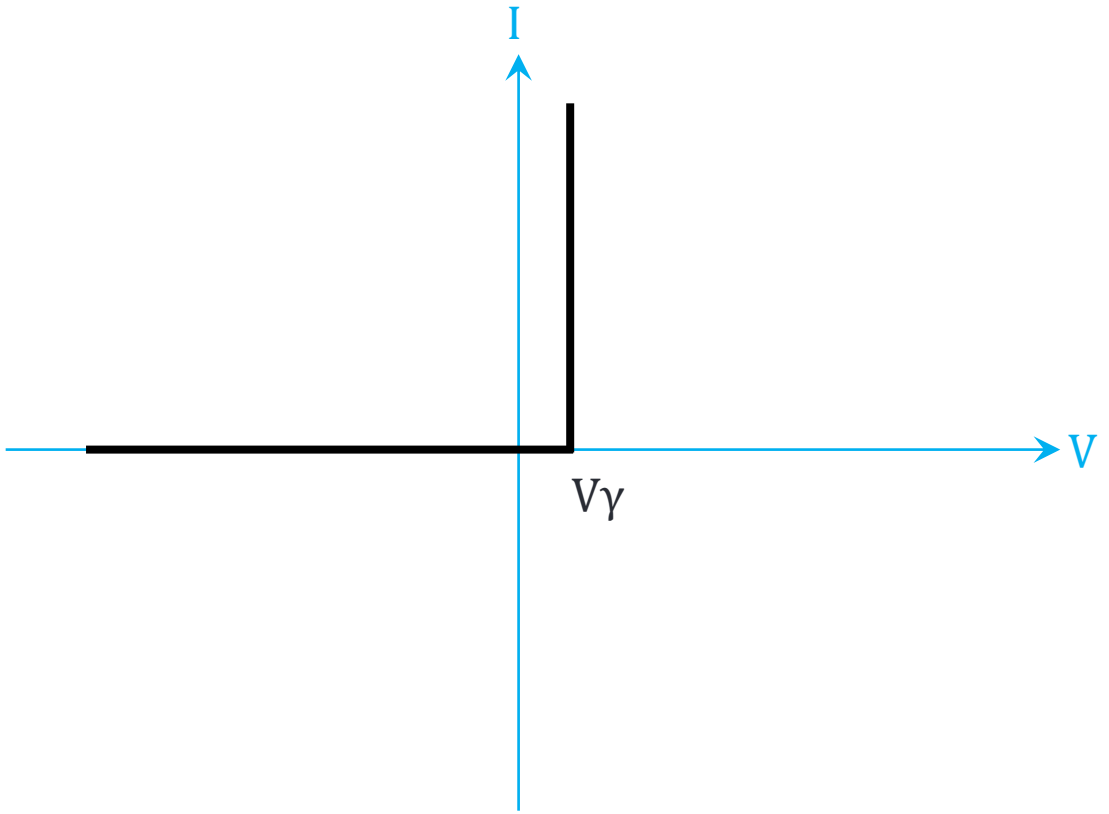


Semiconductors

نیمه هادی ها

مدل خطی دیود

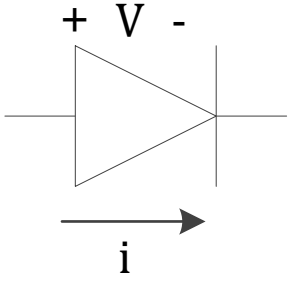


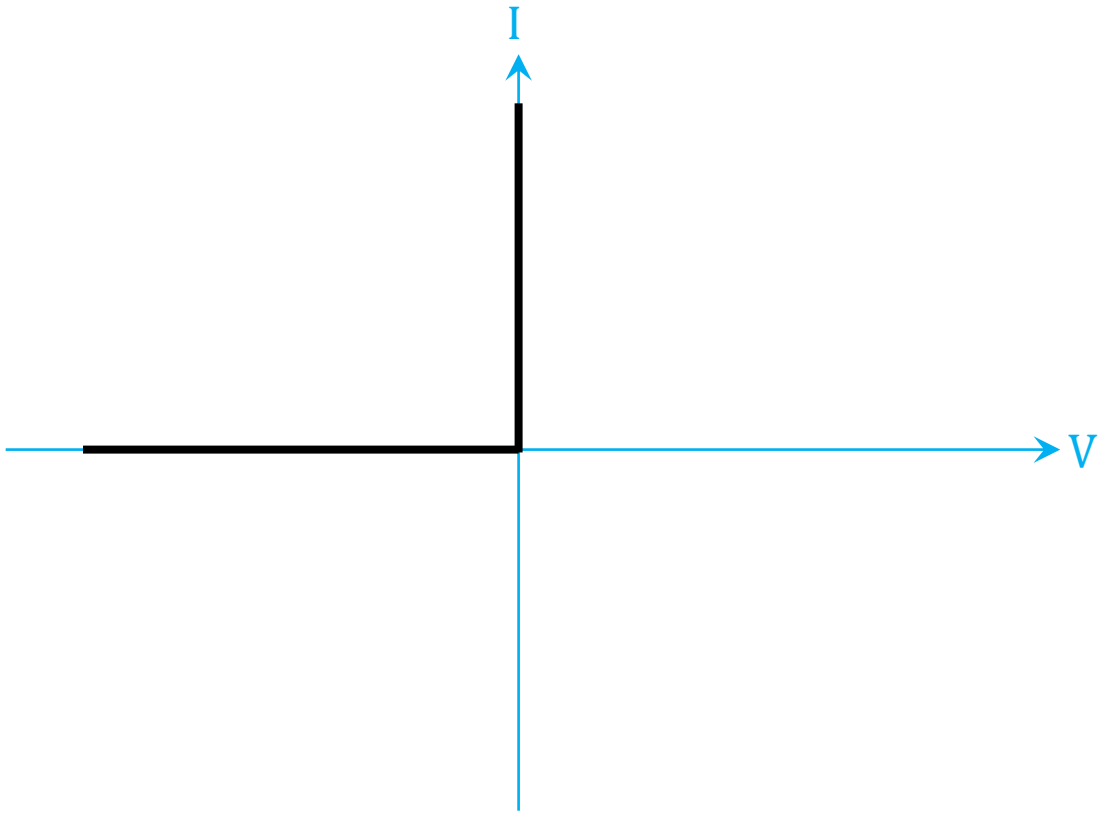


Semiconductors

نیمه هادی ها

مدل ایده آل دیود

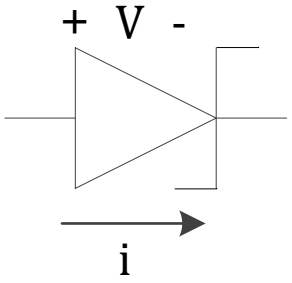


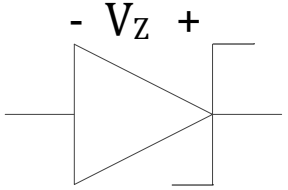


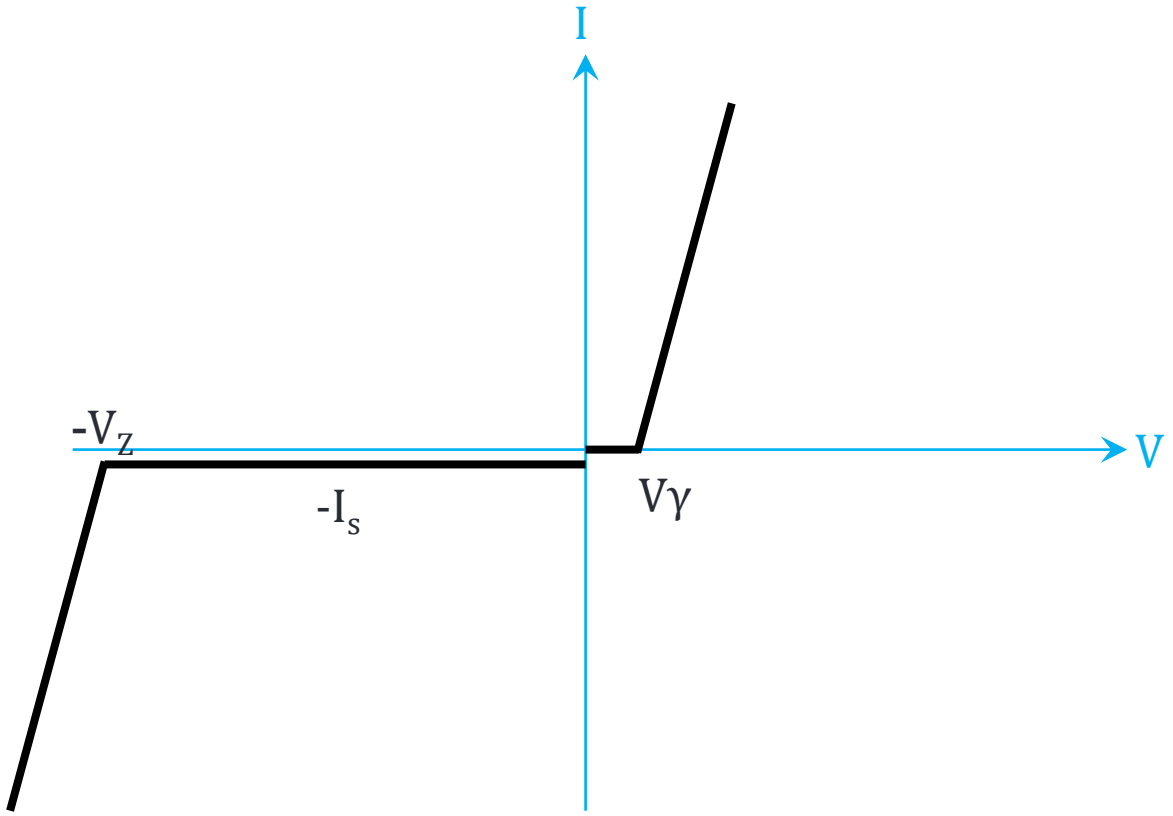
Semiconductors

نیمه هادی ها

مدل خطی تکه ای دیود زنر



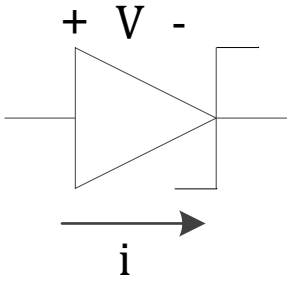


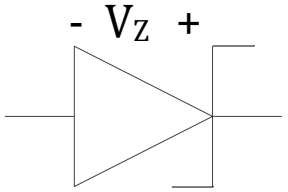


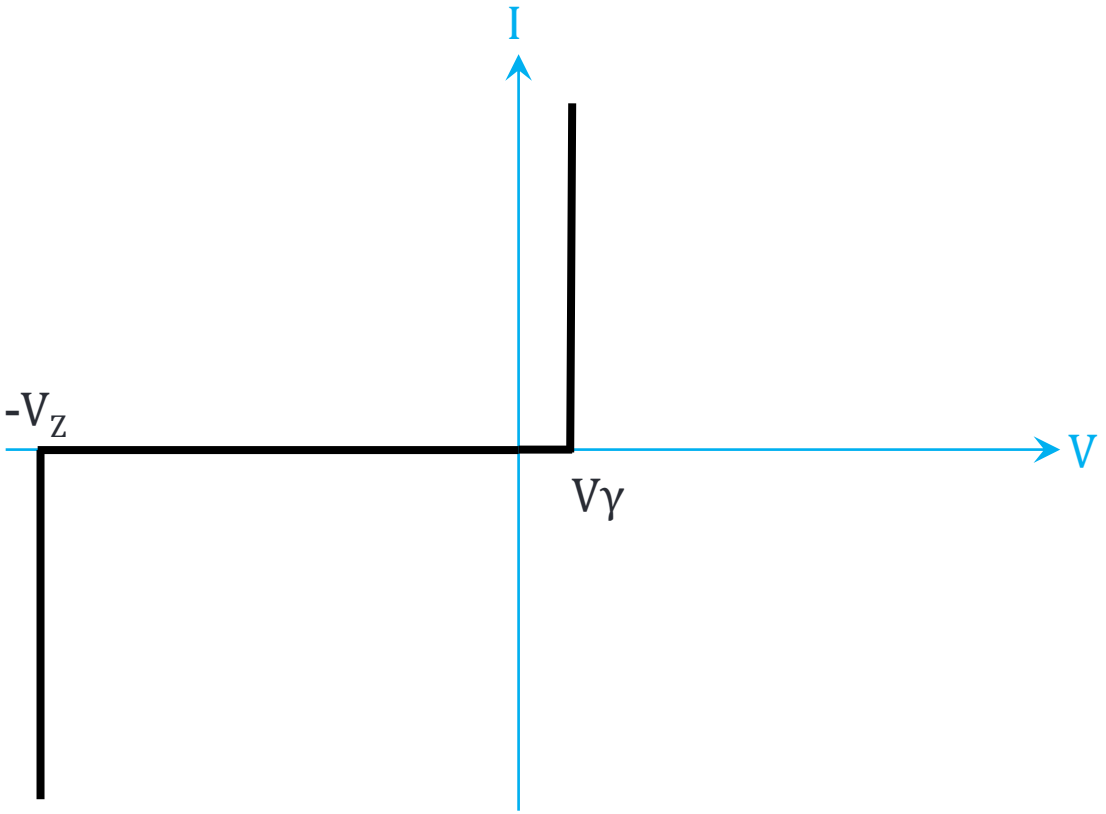
Semiconductors

نیمه هادی ها

مدل خطی دیود زنر







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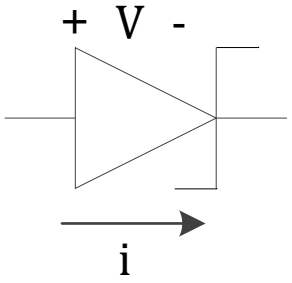
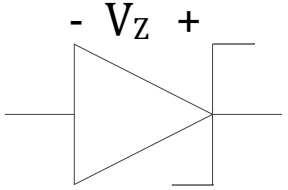
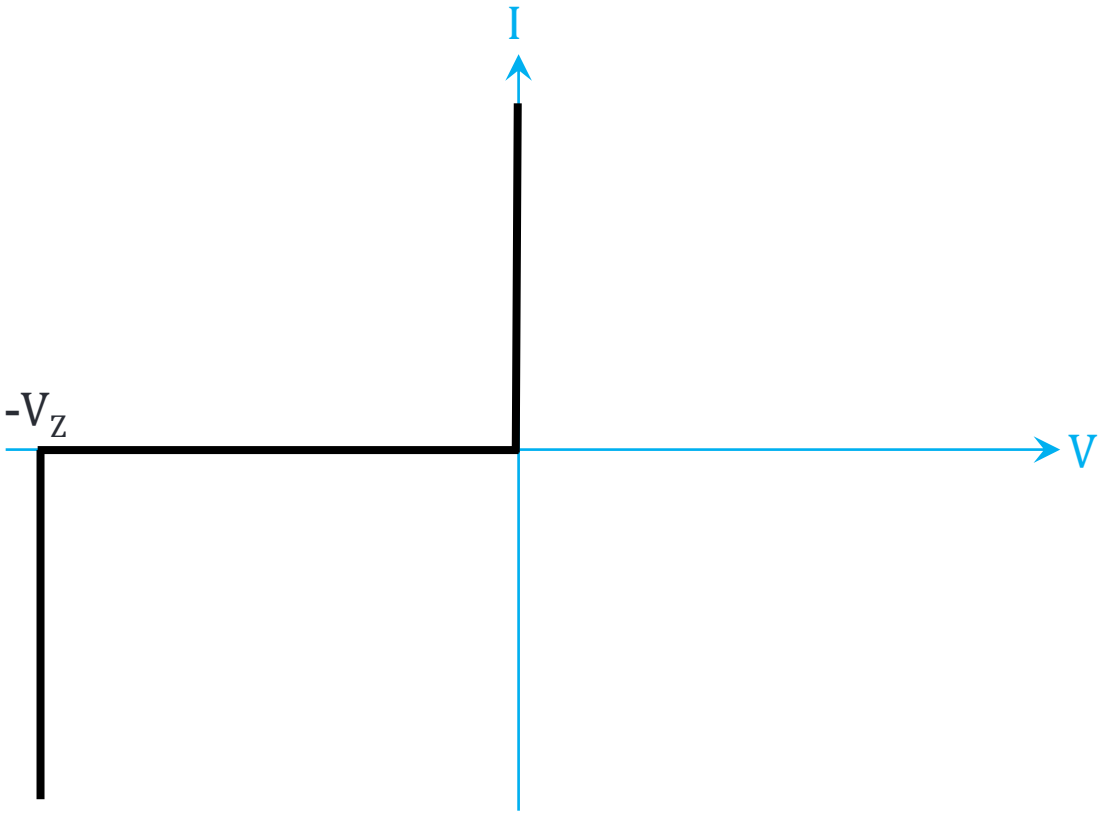
نیمه هادی ها

مدل ایده آل دیود زنر



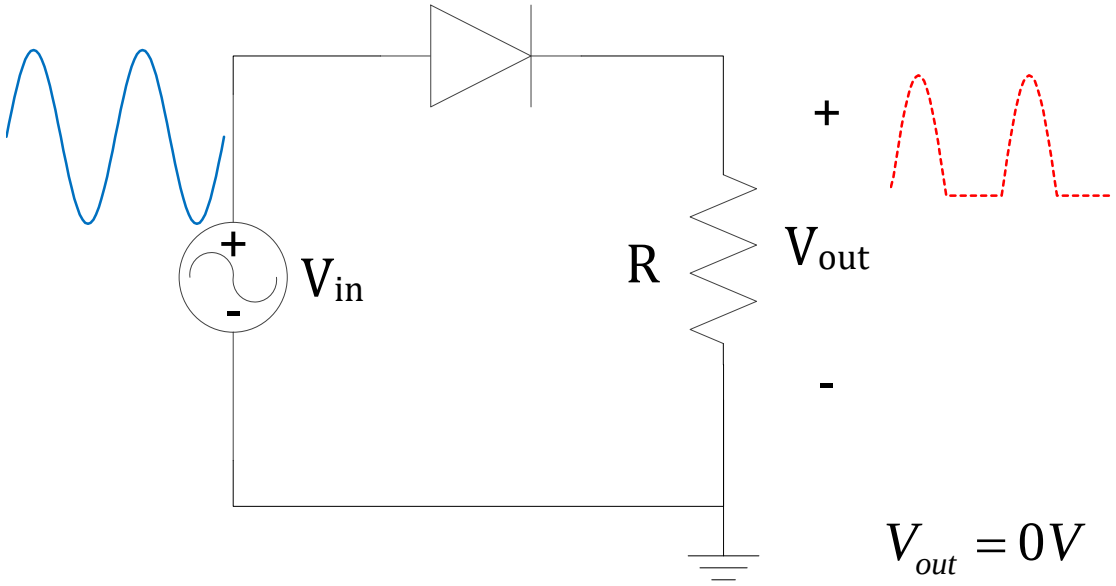




Semiconductors

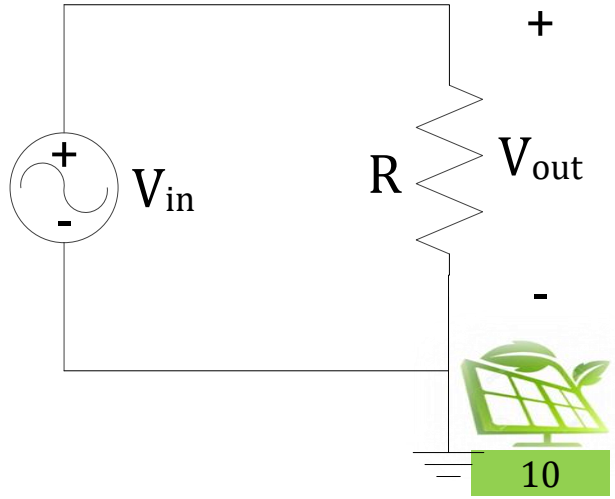
نیمه هادی ها

یکسوساز نیم موج



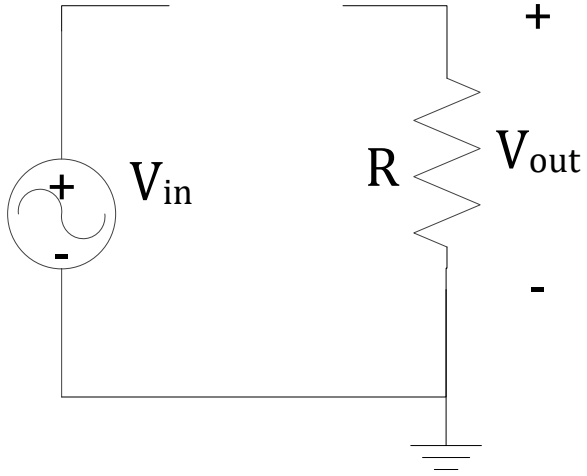
نیم سیکل مثبت ورودی:
D: On

$V_{out} = V_{in}$



نیم سیکل منفی ورودی:
D: Off

$V_{out} = 0V$



Semiconductors

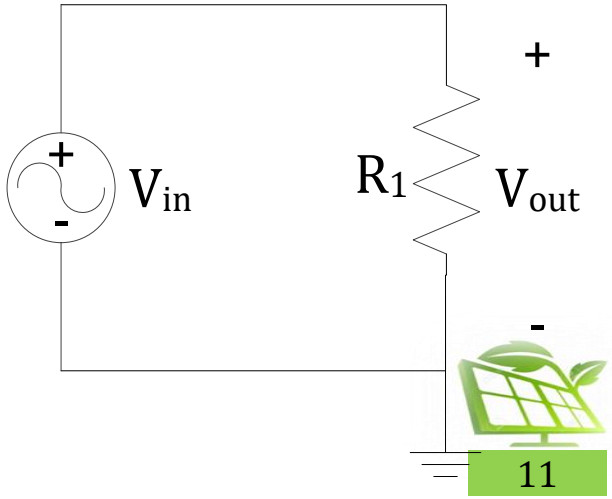
نیمه هادی ها

مدار تغییر شیب

نیم سیکل مثبت ورودی:

D: On

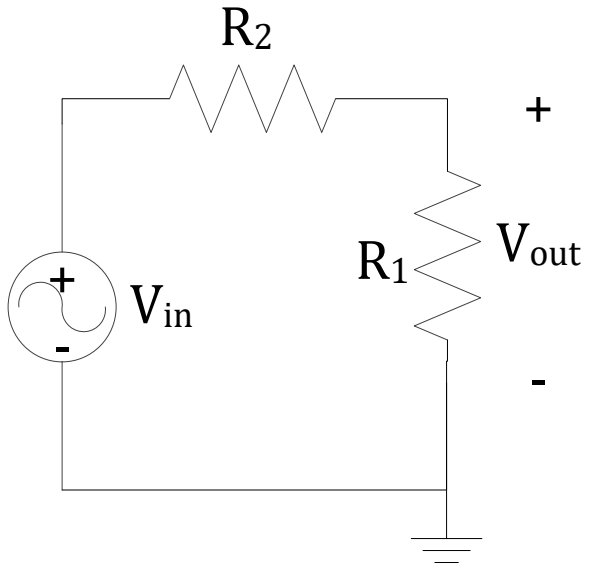
$$V_{out} = V_{in}$$

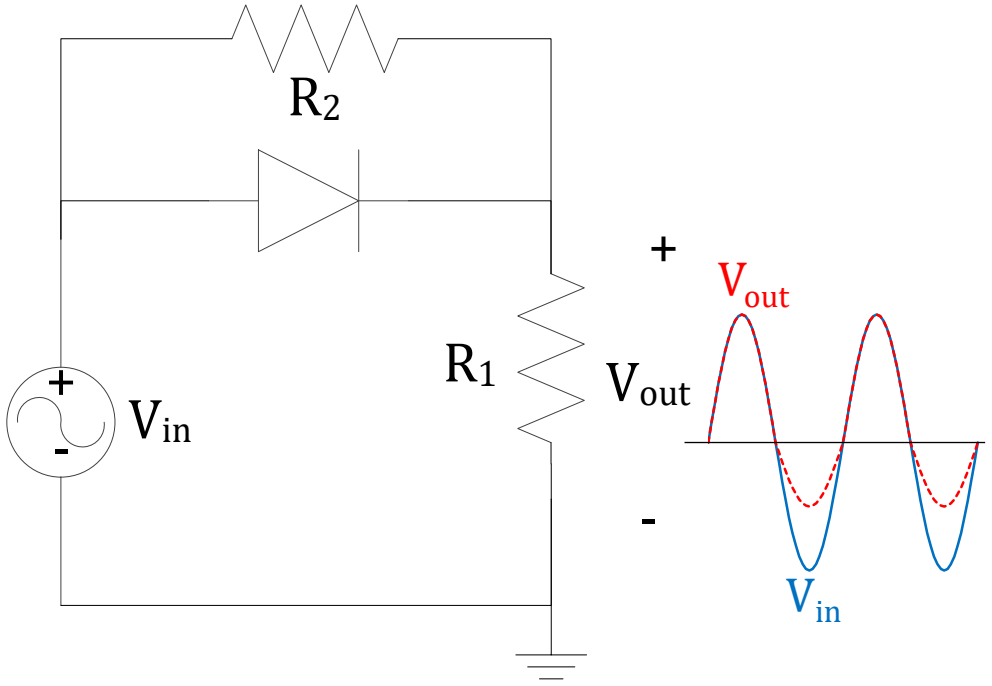


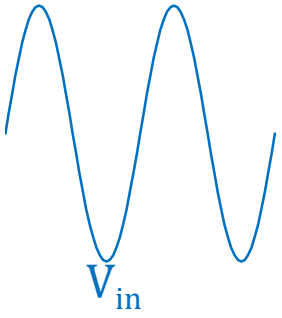
نیم سیکل منفی ورودی:

D: Off

$$V_{out} = \frac{R_1}{R_1 + R_2} V_{in}$$







Semiconductors

نیمه هادی ها

مدار تغییر شیب

نیم سیکل مثبت ورودی:

D: Off

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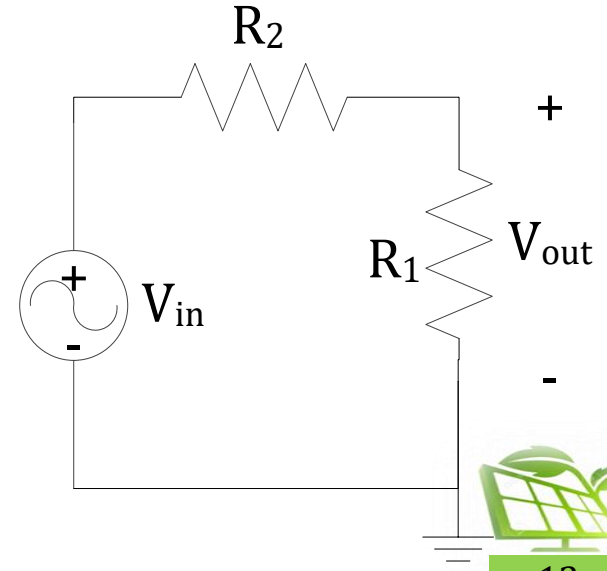
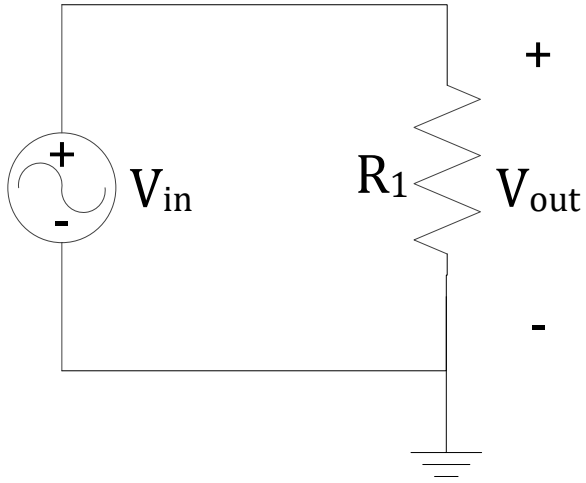
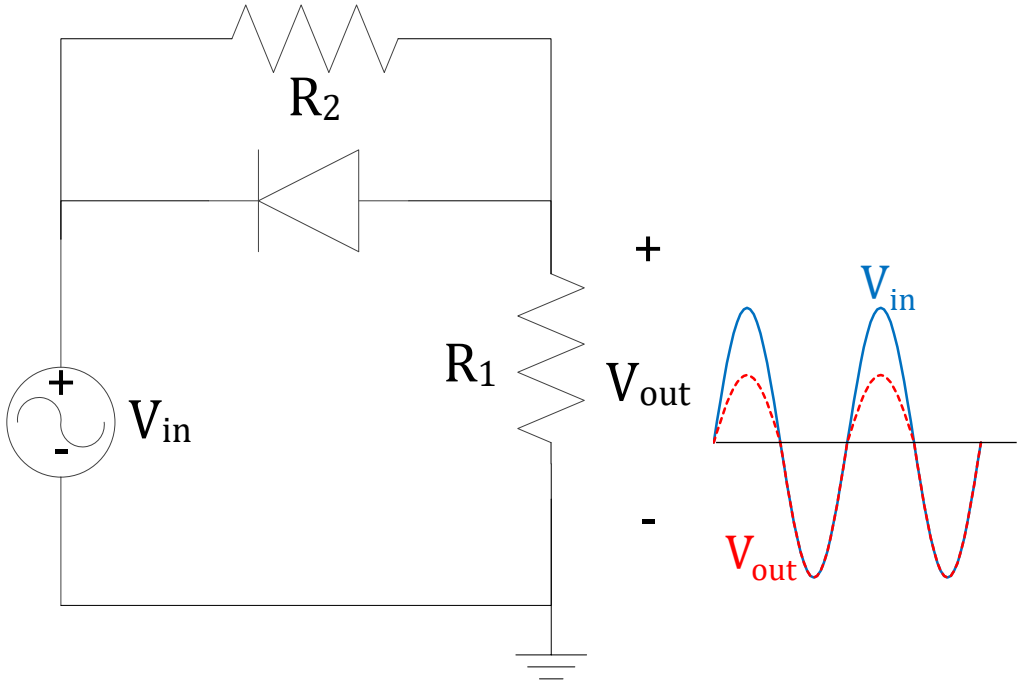


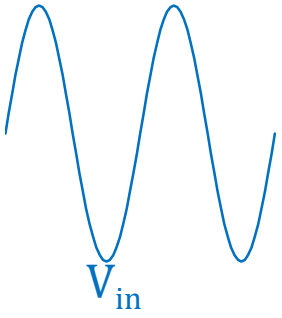
نیم سیکل منفی ورودی:

D: On

$$V_{out} = V_{in}$$

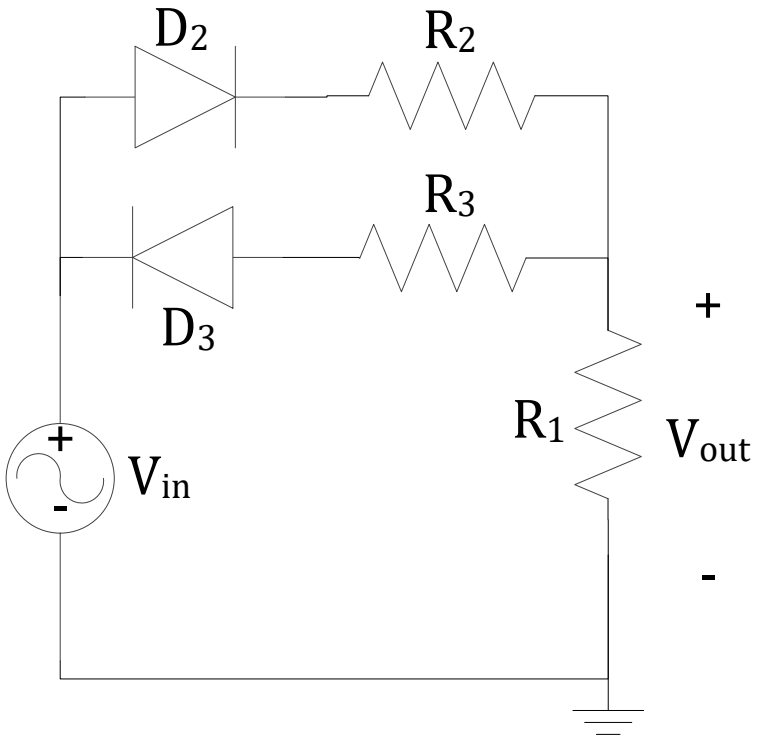






Semiconductors

نیمه هادی ها



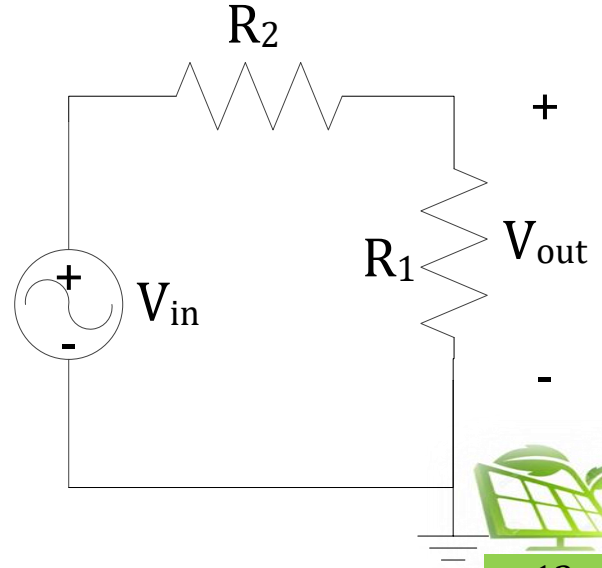
مدار تغییر شیب

نیم سیکل مثبت ورودی:

D_2: On

D_3:Off

$$V_{out} = \frac{R_1}{R_1 + R_2} V_{in}$$

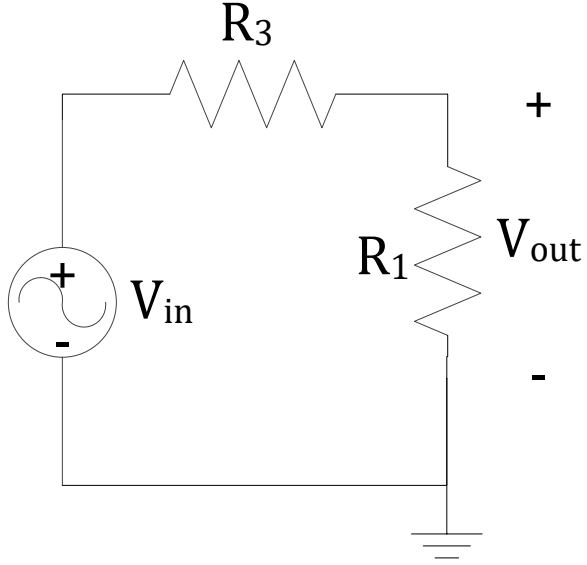


نیم سیکل منفی ورودی:

D_2: Off

D_3:On

$$V_{out} = \frac{R_1}{R_1 + R_3} V_{in}$$



Semiconductors

نیمه هادی ها

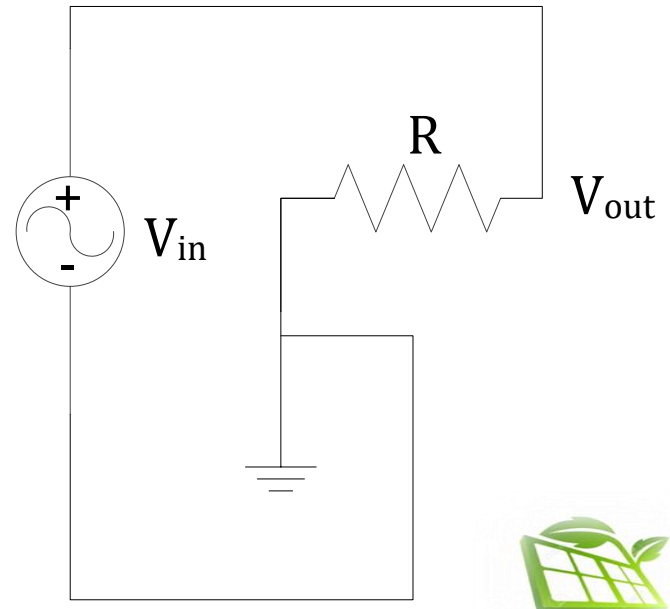
یکسوساز تمام موج (پل دیودی)

نیم سیکل مثبت ورودی:

D_2 & D_4: On

D_1 & D_3 :Off

$V_{out} = V_{in}$

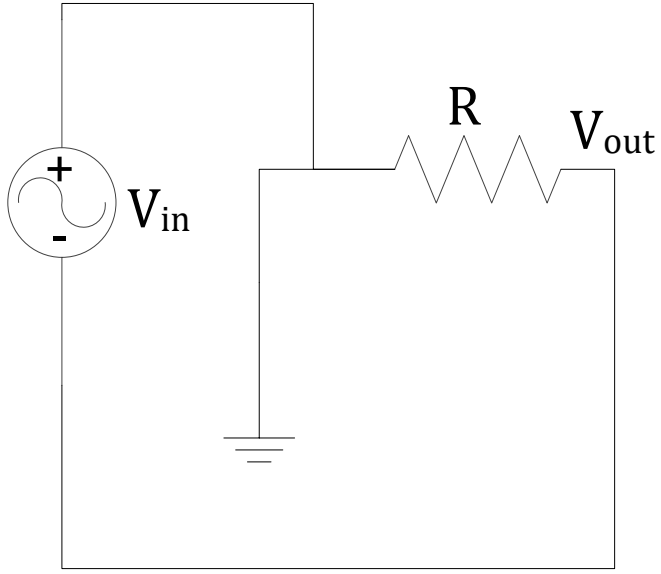


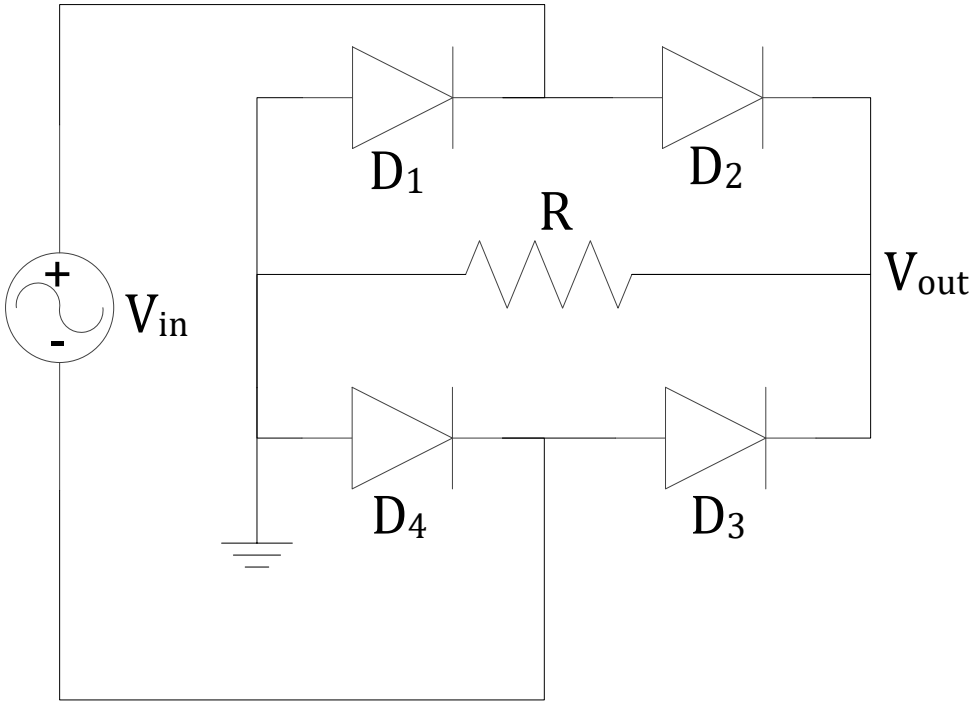
نیم سیکل منفی ورودی:

D_2 & D_4: Off

D_1 & D_3 :On

$V_{out} = -V_{in}$

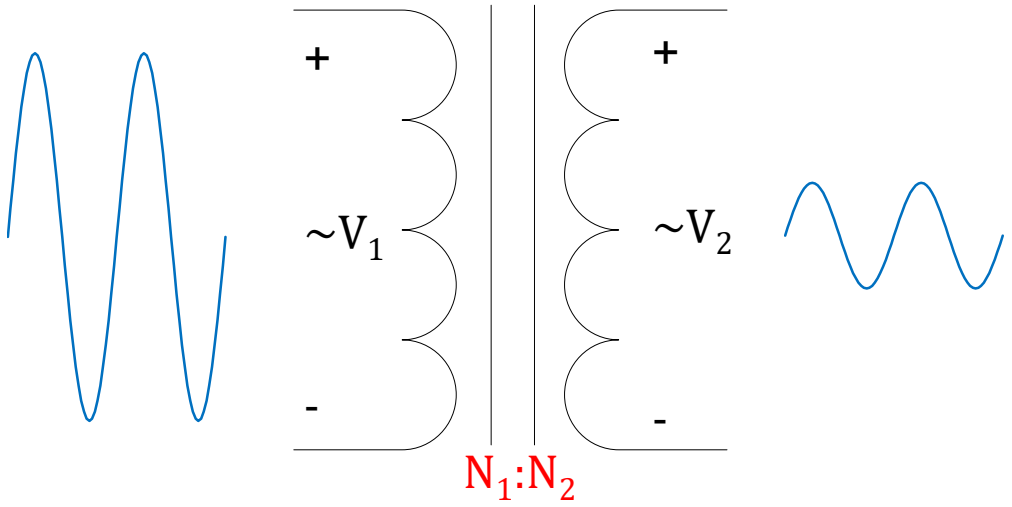




Semiconductors

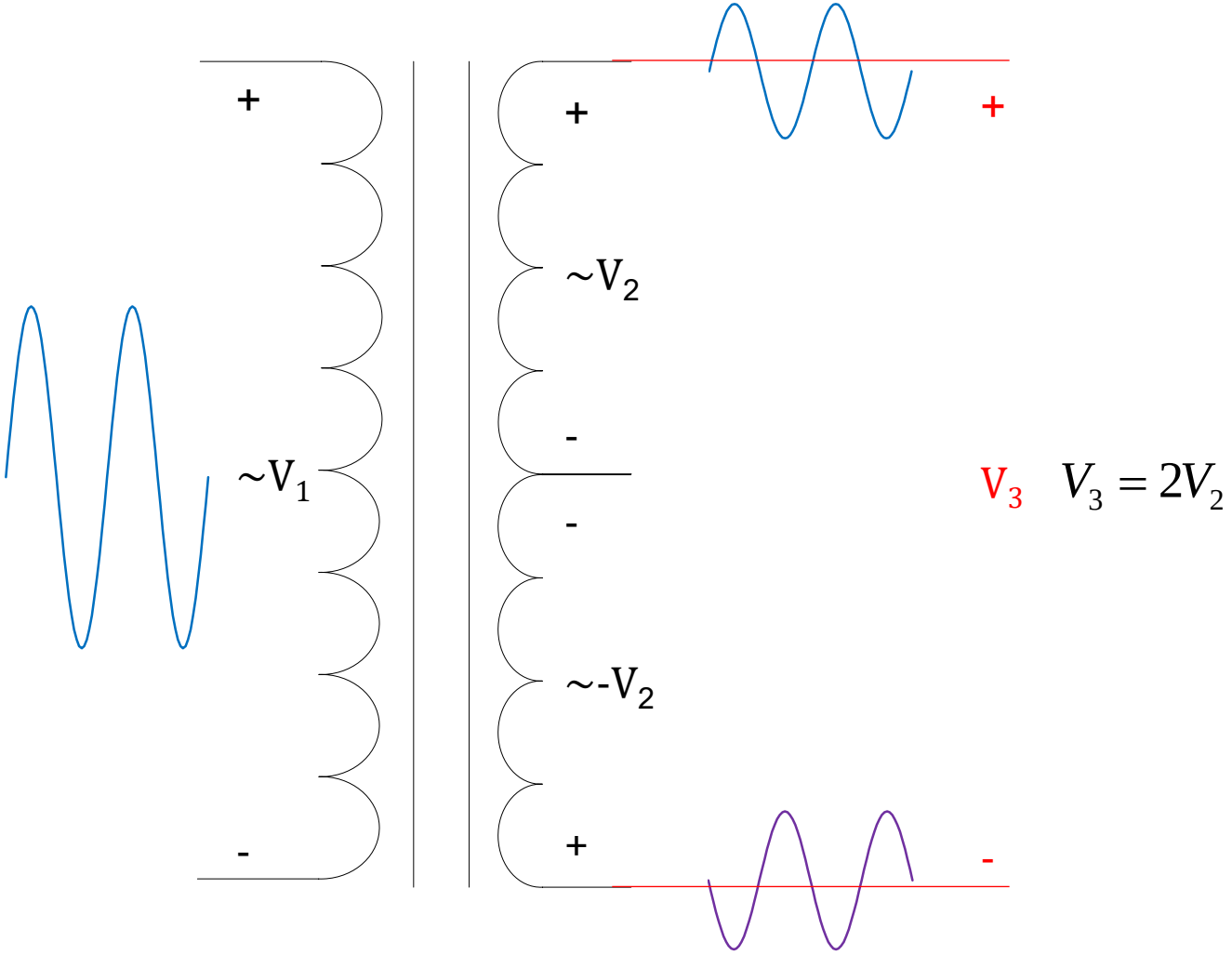
نیمه هادی ها

ترانسفورماتور (مبدل ولتاژ متناوب)



$$\frac{V_2}{V_1} = \frac{N_2}{N_1}$$

ترانسفورماتور با سر وسط

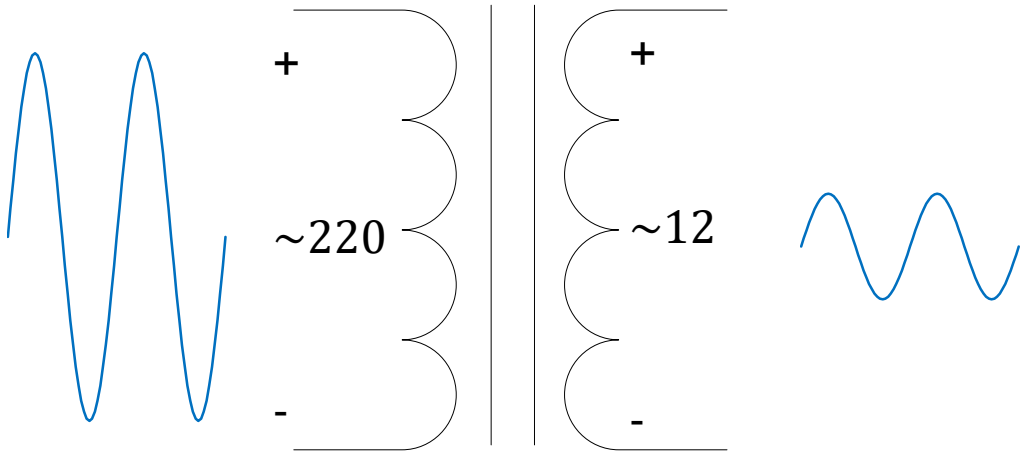


$$V_3 \quad V_3 = 2V_2$$

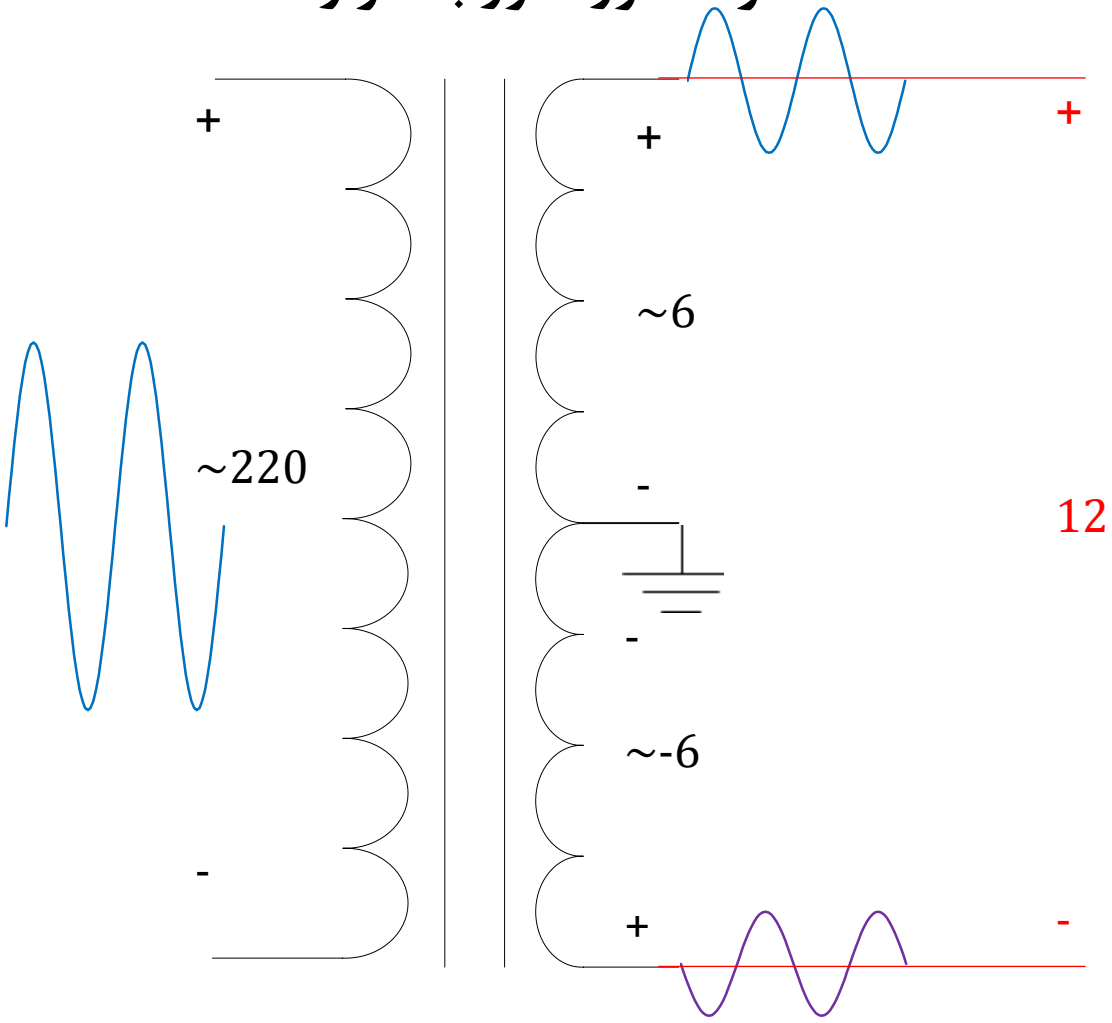
Semiconductors

نیمه هادی ها

ترانسفورماتور (مبدل ولتاژ)



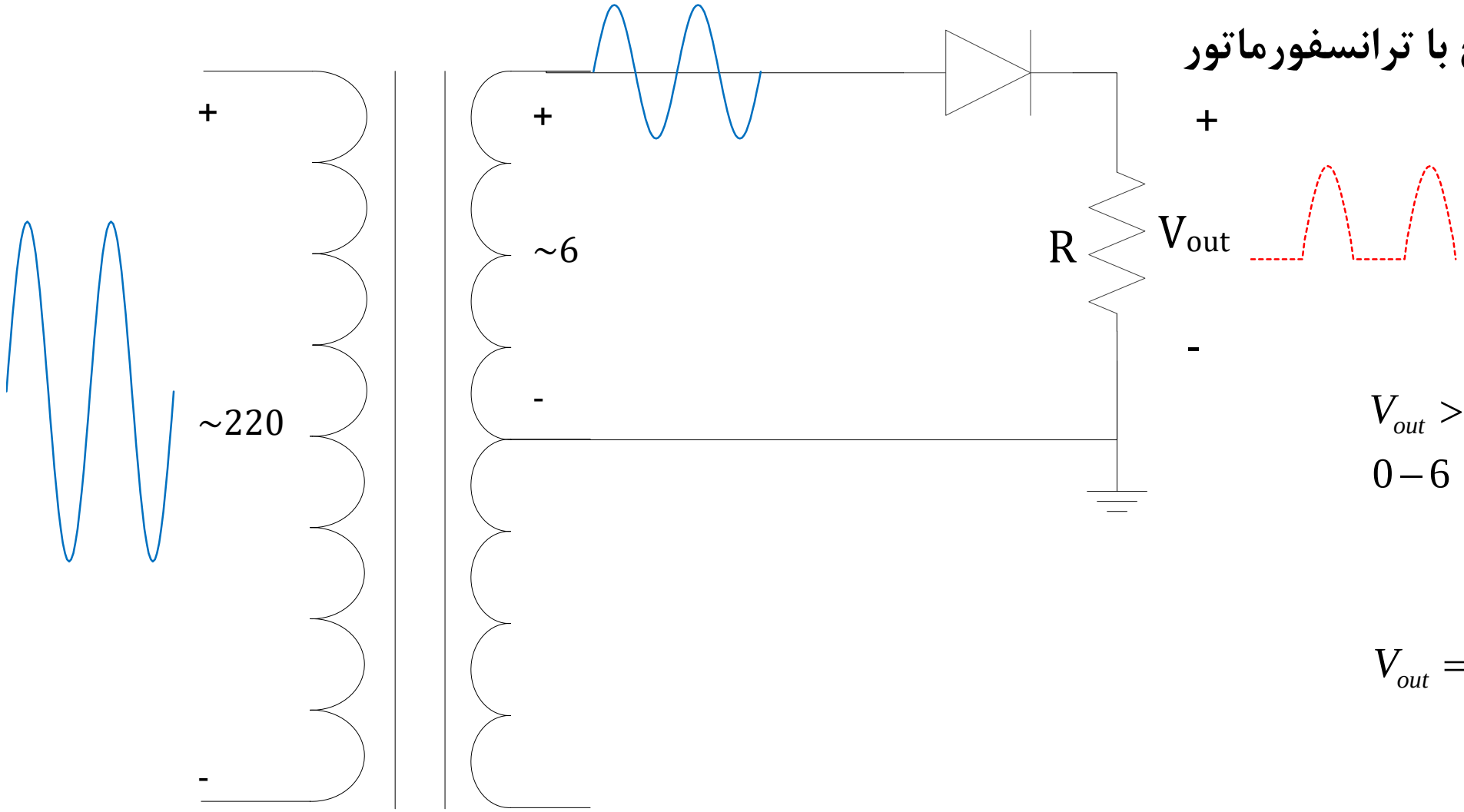
ترانسفورماتور با سر وسط



Semiconductors

نیمه هادی ها

یکسوساز نیم موج با ترانسفورماتور



نیم سیکل مثبت ورودی:

$V_{out} > 0$

$0-6$

D: On

نیم سیکل منفی ورودی:

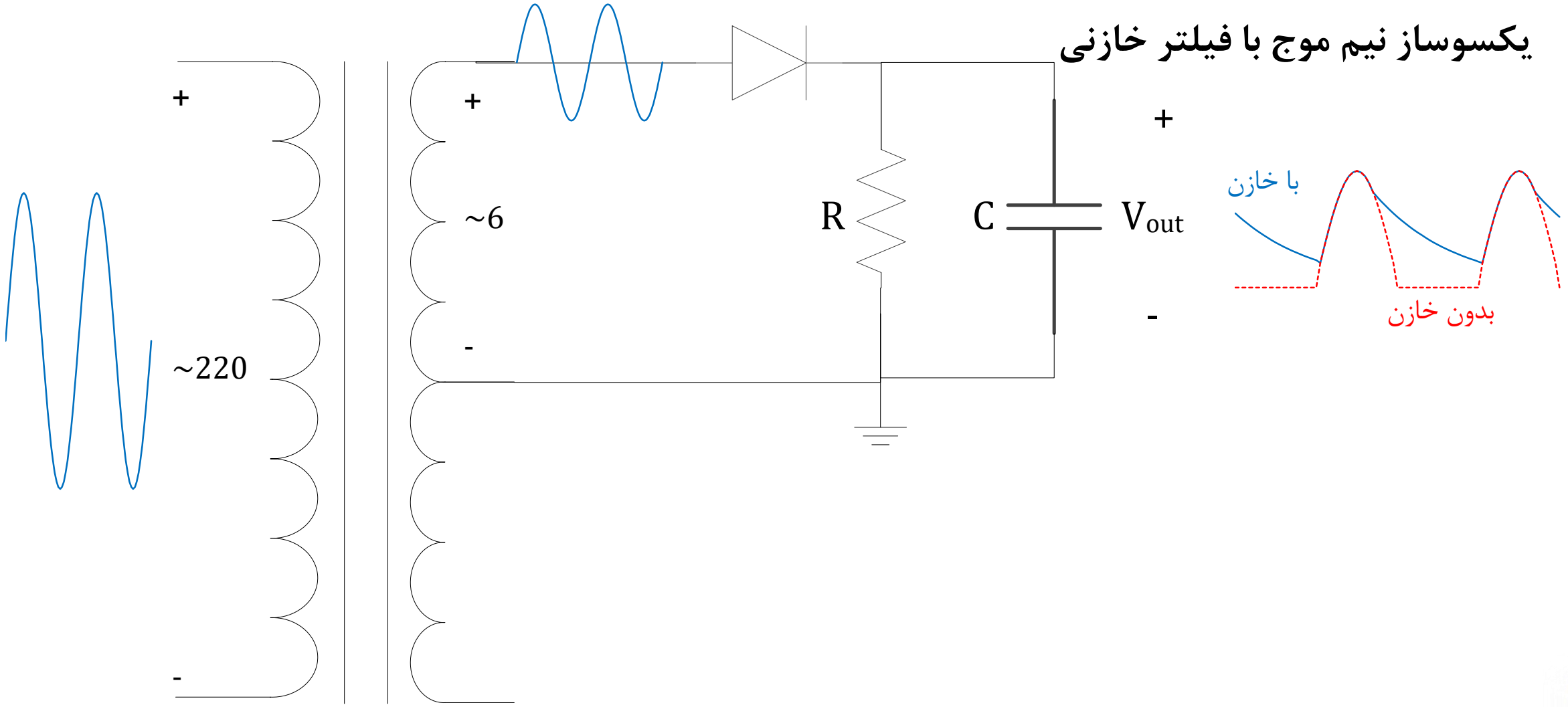
$V_{out} = 0V$

D: Off

Semiconductors

نیمه هادی ها

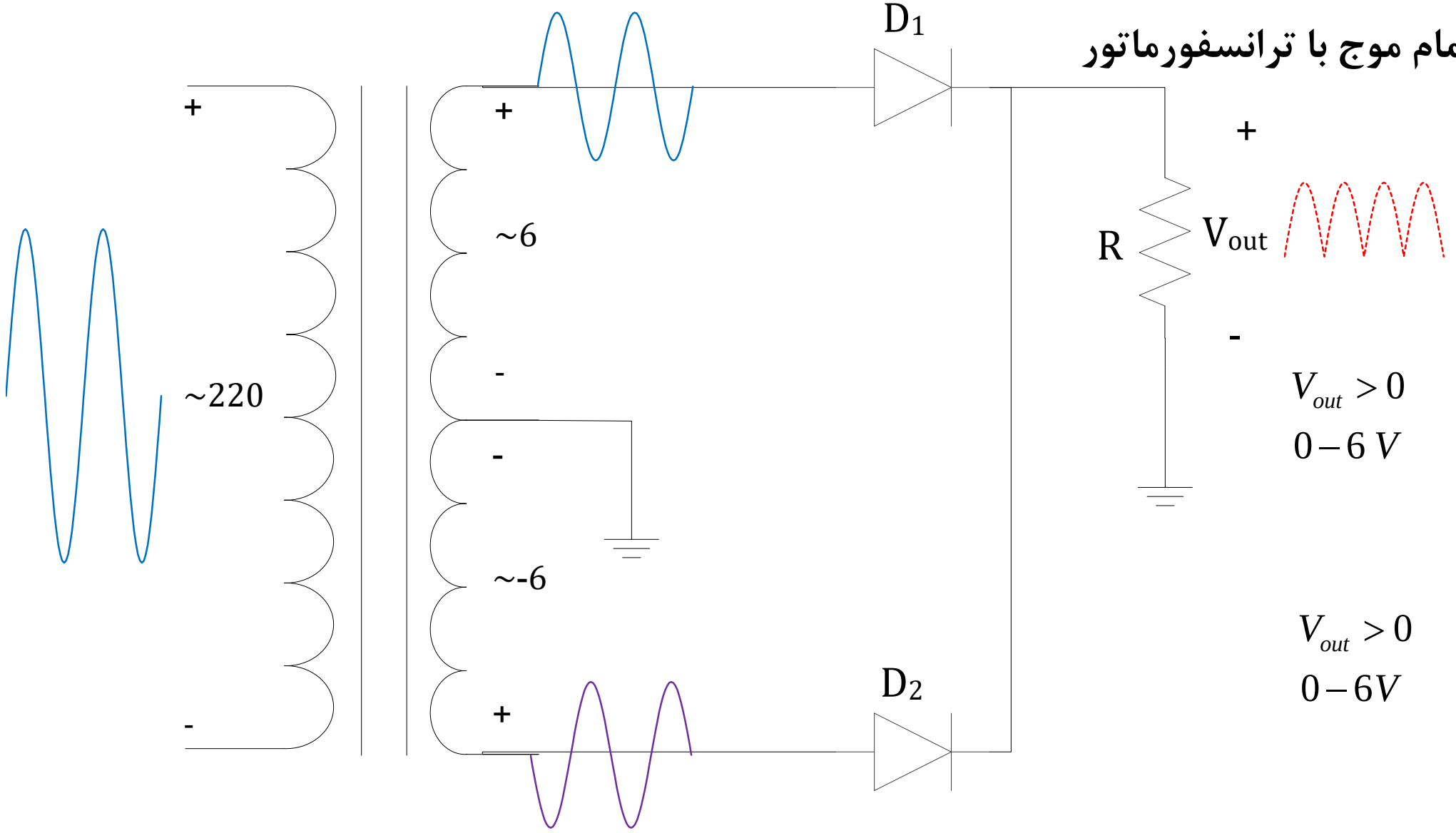
یکسوساز نیم موج با فیلتر خازنی



Semiconductors

نیمه هادی ها

یکسوساز تمام موج با ترانسفورماتور



نیم سیکل مثبت ورودی:

$V_{out} > 0$

$0-6\ V$

D_1: On

D_2: Off

نیم سیکل منفی ورودی:

$V_{out} > 0$

$0-6V$

D_1: Off

D_2: ON

Semiconductors

نیمه هادی ها

یکسوساز تمام موج با فیلتر خازنی