



**مدرس خصوصى
اونلاين**
يحصل الطالب على ...

- * مقاطع فيديو هات لشرح المقرربشكل وافي
- * ملخص للمادة للمراجعة النهائية
- * محاضرات مباشرة على برنامج Zoom
- * تواصل مستمر مع معلم المادة للمناقشة

للتواصل

 00201024041097
 00201096019763



CHAPTER 2

Diode applications



The primary goal of this chapter is

2.1 Load-Line Analysis

2.2 Diode Approximations

2.3 Series Diode Configuration with DC inputs

2.4 Parallel and series-parallel Configurations

2.5 AND/OR gates

2.6 Sinusoidal inputs; half-wave rectification

2.7 Full-wave rectification

2.8 Clippers

2.9 Clampers

2.10 Zener Diode

2.1 LOAD-LINE ANALYSIS

Consider the network of the following Fig. employing a diode having the shown characteristics.

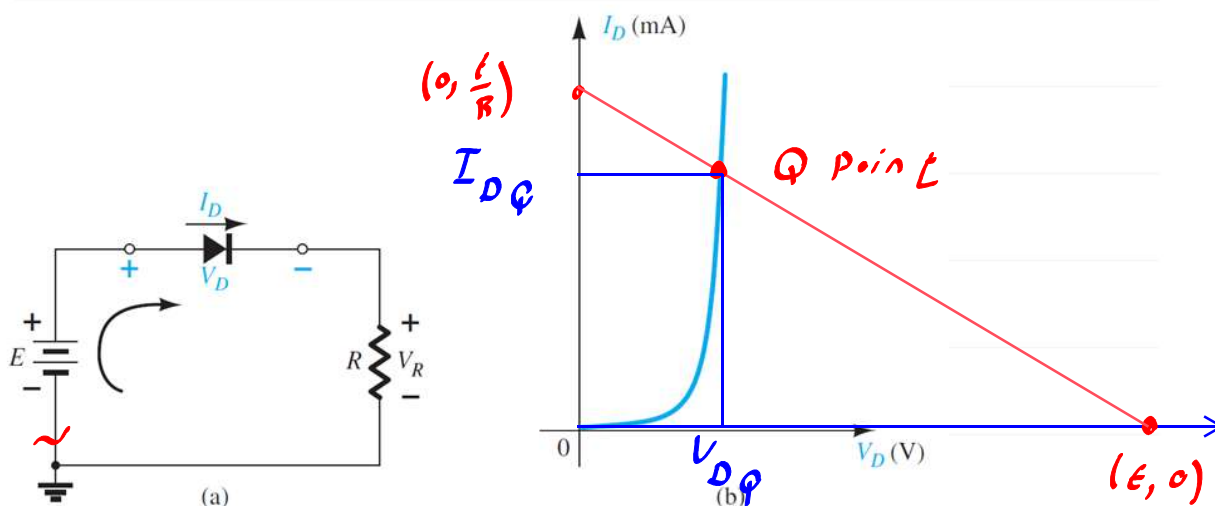


FIG. 2.1

Series diode configuration: (a) circuit; (b) characteristics.

apply K.V.L

$$-E + V_D + I_D R = 0 \Rightarrow E = V_D + I_D R$$

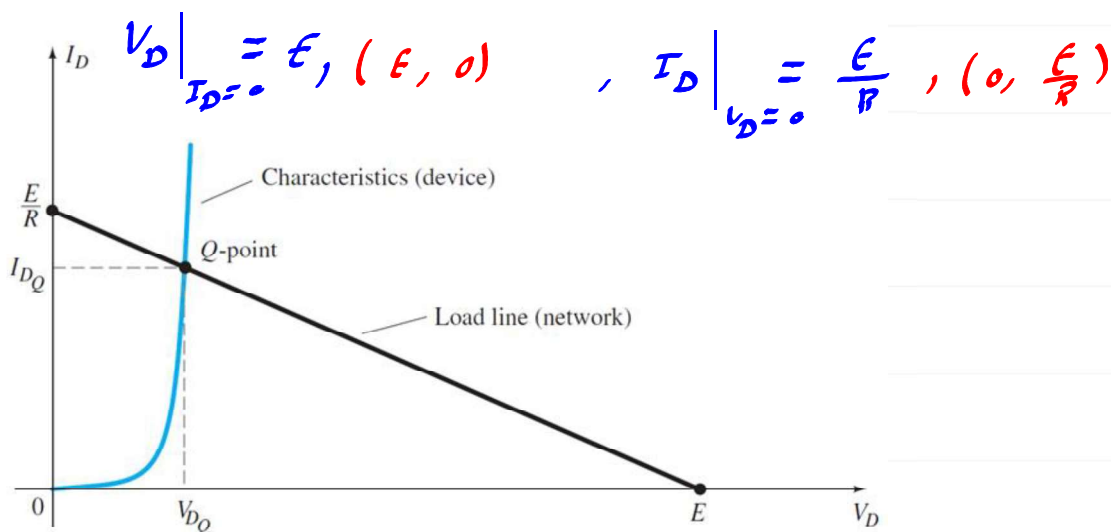


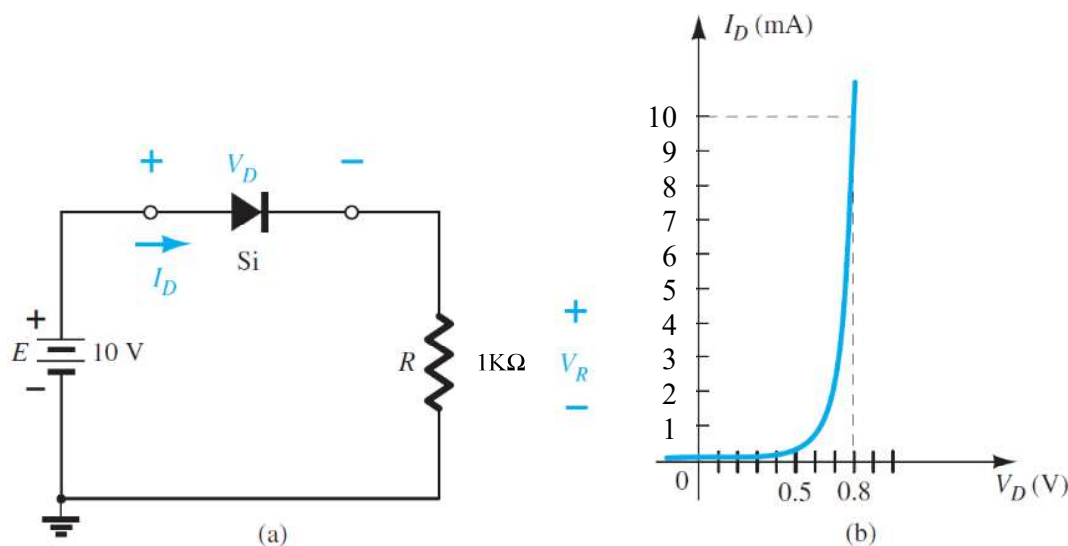
FIG. 2.2

Drawing the load line and finding the point of operation.

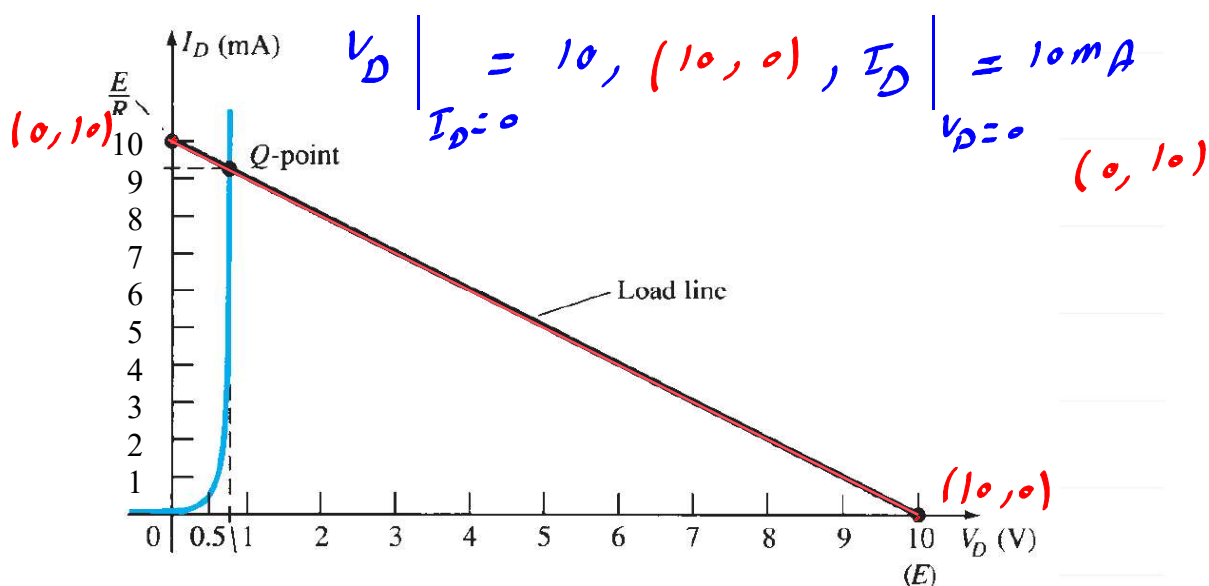
EXAMPLE 2.1

For the series diode configuration of the following Fig. employing the diode characteristics of given Fig. determine:

V_{DQ} and I_{DQ}



Solution $-10 + V_D + 1000 I_D = 0$



$$I_{DQ} = 9.25 \text{ mA}, V_{DQ} = 0.78 \text{ V}$$

EXAMPLE 2.2

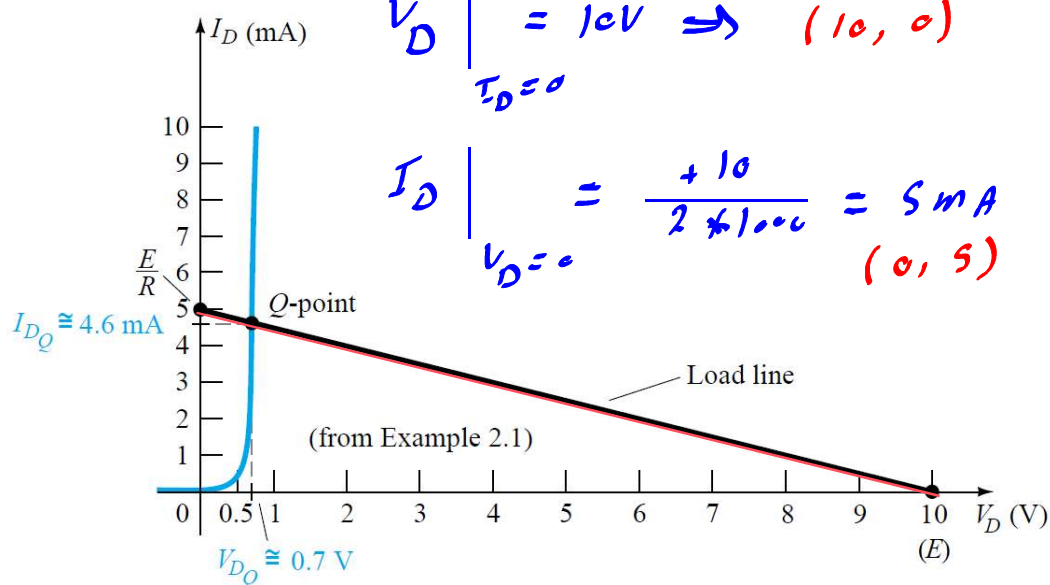
Repeat the analysis of Example 2.1 with $R = 2k\Omega$

Solution

$$-10 + V_D + 2000 I_D = 0$$

$$V_D \Big|_{I_D=0} = 10V \Rightarrow (10, 0)$$

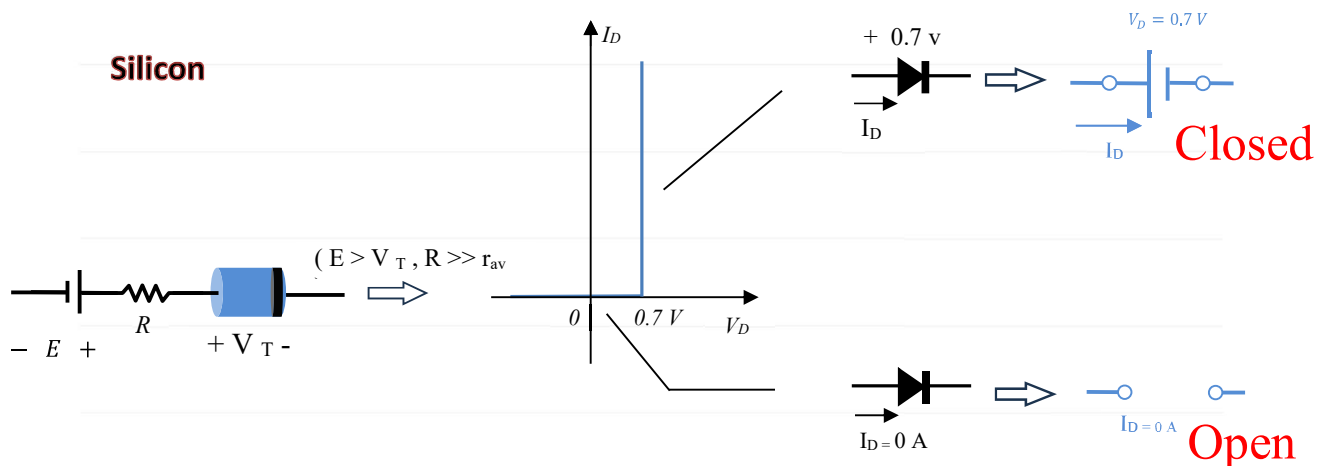
$$I_D \Big|_{V_D=0} = \frac{+10}{2 \times 1000} = 5mA \Rightarrow (0, 5)$$



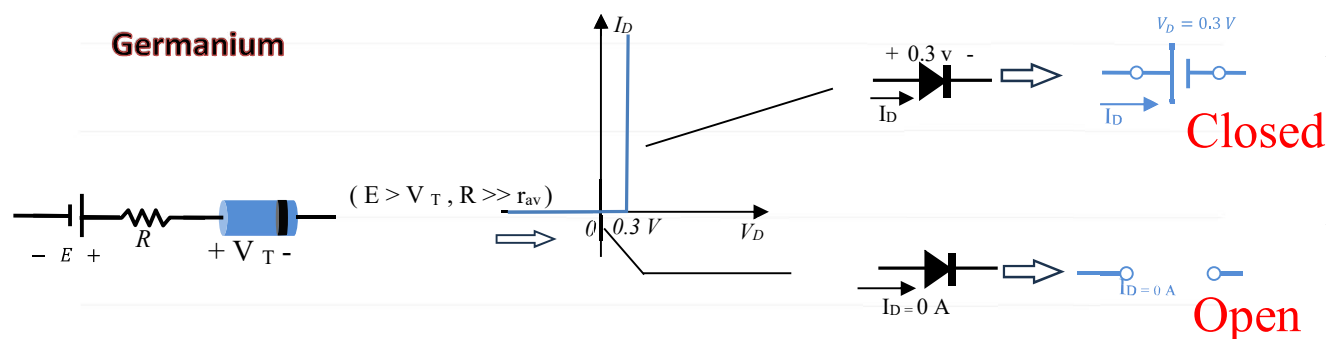
2.2 DIODE APPROXIMATIONS

Approximate and Ideal Semiconductor Diode Models

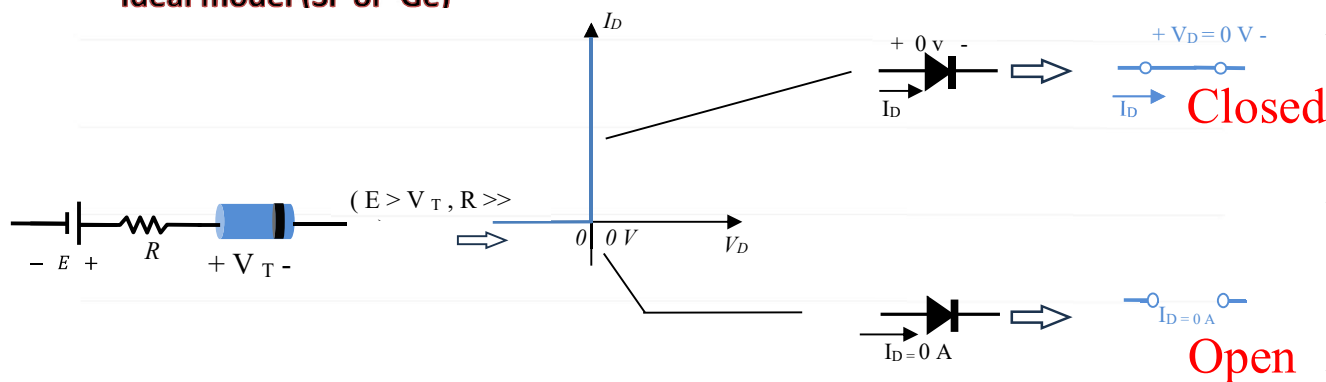
Silicon



Germanium

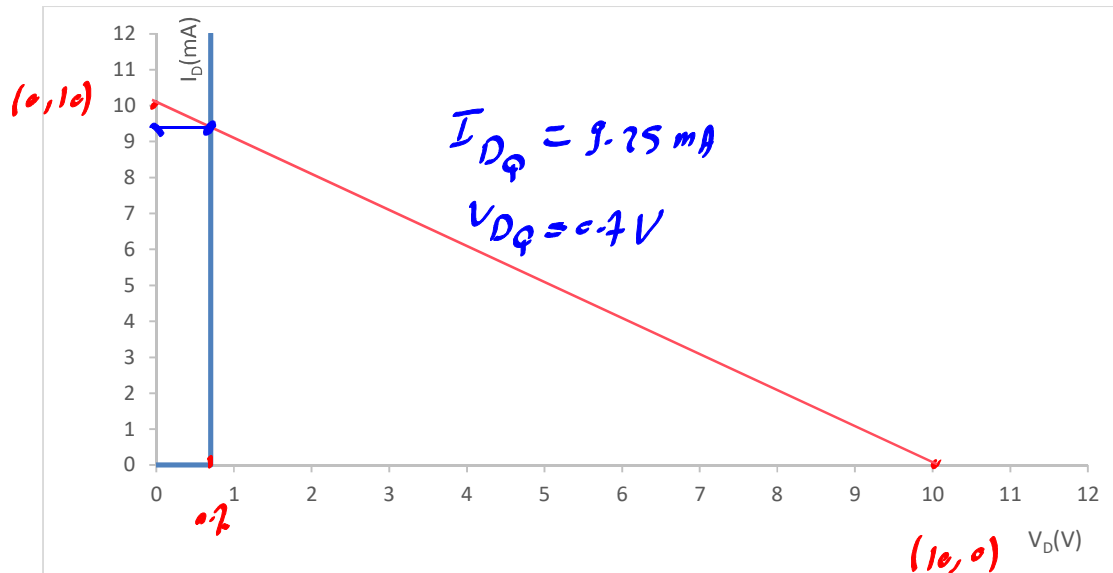


Ideal model (Si or Ge)



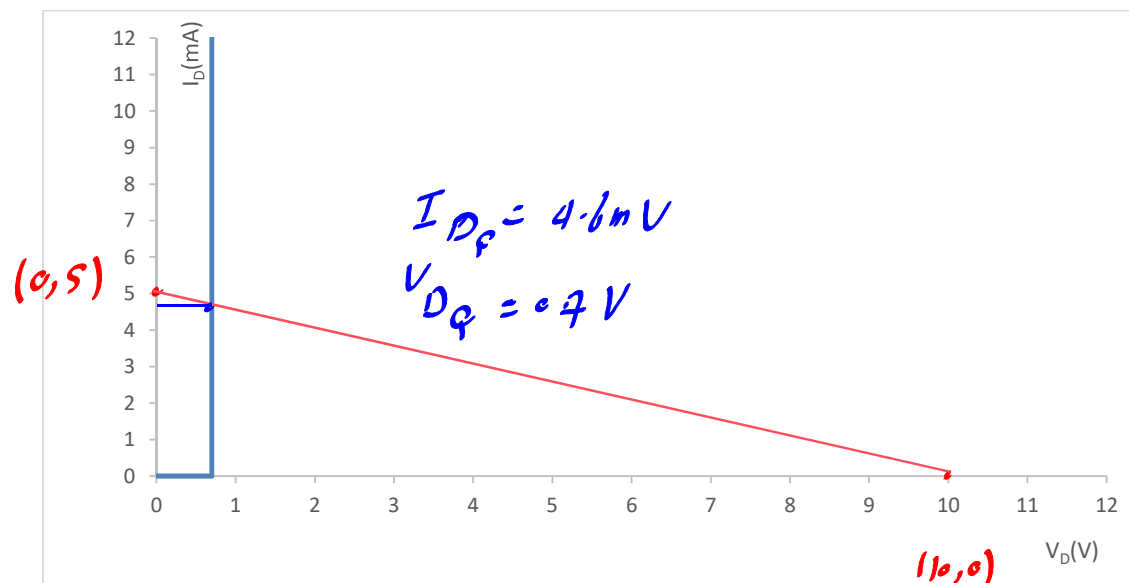
EXAMPLE 2.3

Repeat Example 2.1 using the approximate equivalent model for the silicon semiconductor diode.



EXAMPLE 2.4

Repeat Example 2.2 using the approximate equivalent model for the silicon semiconductor diode.



EXAMPLE 2.5

Repeat Example 2.1 using the ideal diode model.

