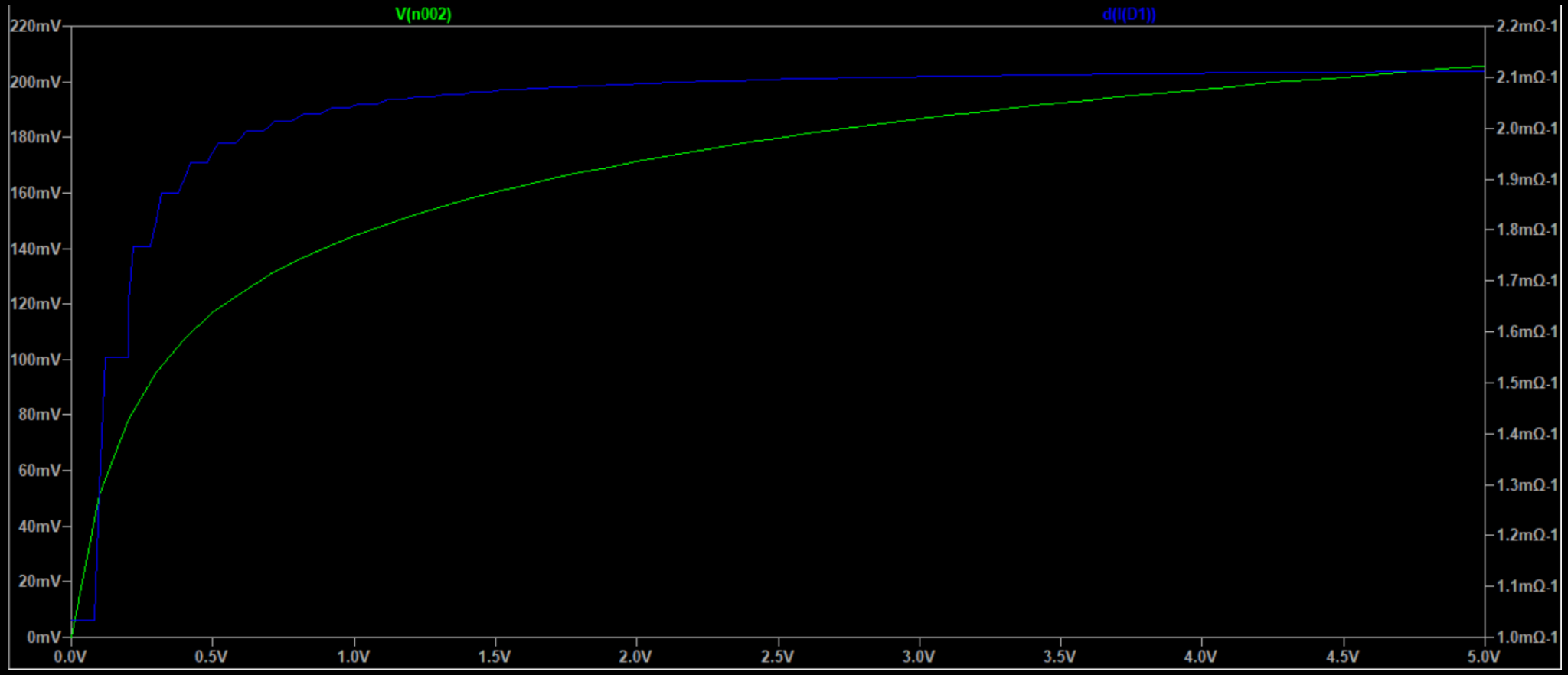
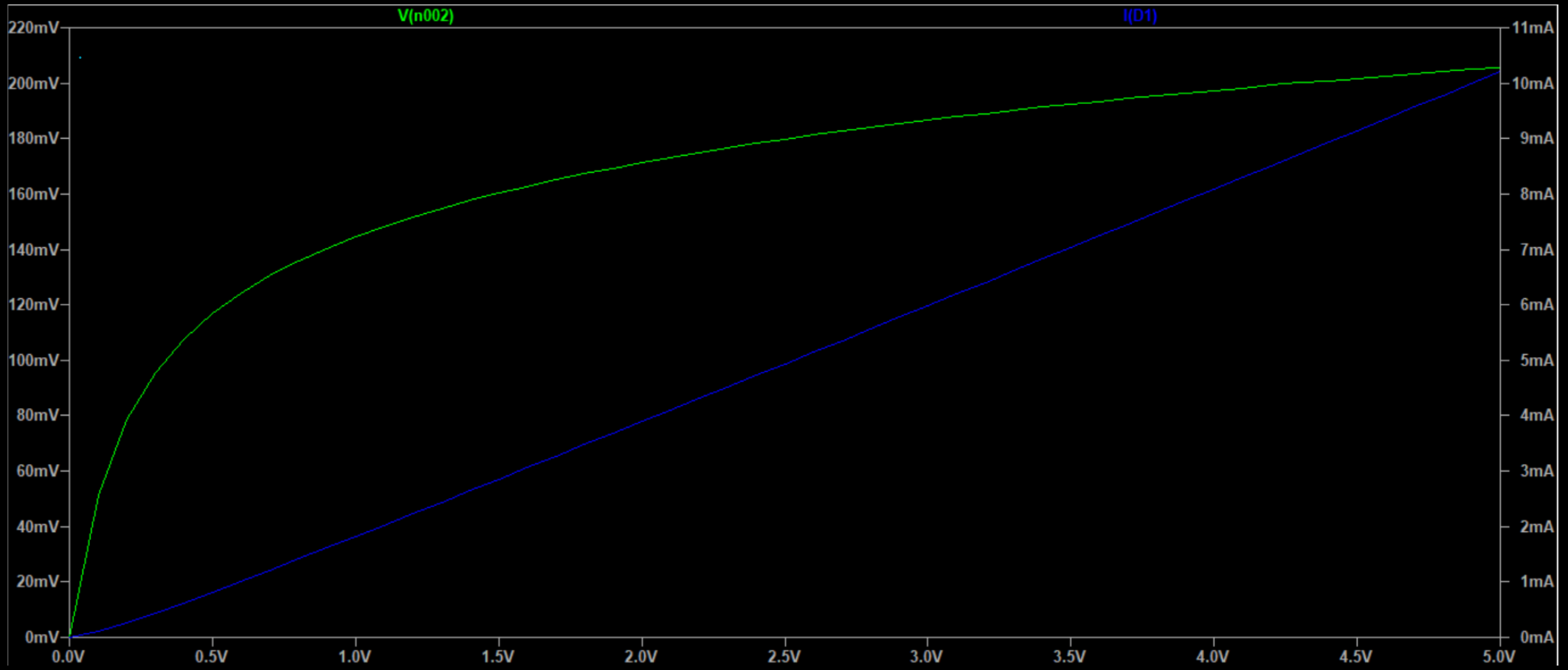
Exercise E4



For the 1N5817, the main difference lies in that it seems to have a way smaller forward voltage than 1N914.

Exercise E4


V(n002)
I(D1)
220mV
200mV
180mV
160mV
140mV
120mV
100mV
80mV
60mV
40mV
20mV
0mV
11mA
10mA
9mA
8mA
7mA
6mA
5mA
4mA
3mA
2mA
1mA
0mA
0.0V
0.5V
1.0V
1.5V
2.0V
2.5V
3.0V
3.5V
4.0V
4.5V
5.0V

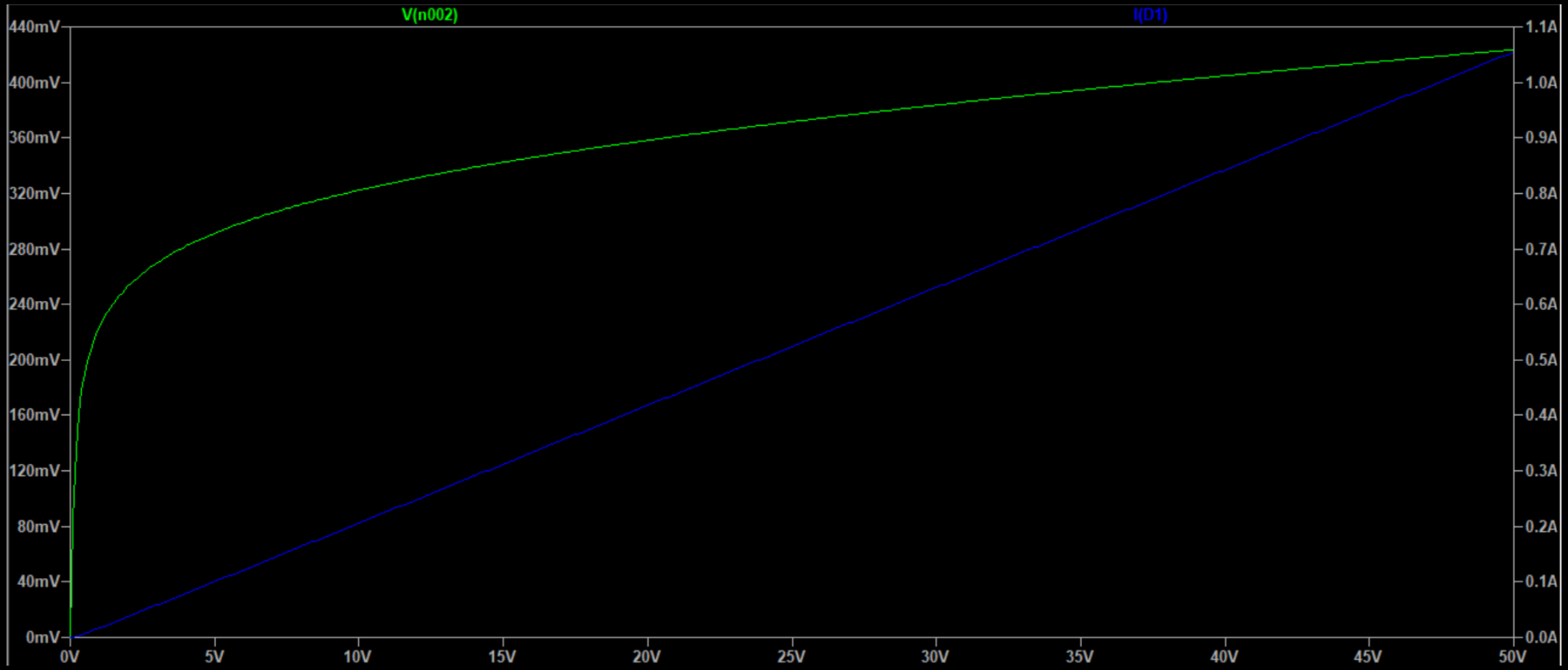
Exercise E4

- https://www.diodes.com/assets/Datasheets/1N5817-1N5819.pdf

Forward Voltage (Note 5)	@ I_F = 1.0A @ I_F = 3.0A	V_{FM}	0.450 0.750

- At 5V, with around 10mA max current, we cannot reproduce the results listed in the specification. However, given that the forward voltage seems to rise with the current, and that it's 0.450V at I=1.0A, our prediction that the forward voltage is very small is correct.
- However if the model is changed to having a 0-50V voltage swipe and a 47 Ohms resistor, we can indeed reach I=1.0A.

Exercise E4


V(n002)
I(D1)
440mV
400mV
360mV
320mV
280mV
240mV
200mV
160mV
120mV
80mV
40mV
0mV
1.1A
1.0A
0.9A
0.8A
0.7A
0.6A
0.5A
0.4A
0.3A
0.2A
0.1A
0.0A
0V
5V
10V
15V
20V
25V
30V
35V
40V
45V
50V

Exercise E4


V(n002)
d(I(D1))
440mV
400mV
360mV
320mV
280mV
240mV
200mV
160mV
120mV
80mV
40mV
0mV
22mΩ-1
20mΩ-1
18mΩ-1
16mΩ-1
14mΩ-1
12mΩ-1
10mΩ-1
8mΩ-1
6mΩ-1
4mΩ-1
2mΩ-1
0V
5V
10V
15V
20V
25V
30V
35V
40V
45V
50V

Exercise E4

- $\frac{1}{R} = 21.237m\Omega$, $R = 47.09\Omega$
- When $I = 0.999A$, $V = 47.36V$
- Thus $V_f = V - IR = 270mV$
- It's quite far from the published values (450mV). I am not sure about the cause of the issue.