# Lucrarea 3

## Circuite logice în diode. Poarta SI

### Scopul lucrării

$V_{AA} = 15V$ $\quad V_S = 5V$

$R_A = 10 k\Omega$ $\quad T = 20 \mu s \Rightarrow f = 50 kHz$

$V_i = 0V$ $\quad t_i = 10 \mu s$

a) $C = 100 pF$

$t_r = R \cdot C \ln 2 = 10 \cdot 10^3 \cdot 100 \cdot 10^{-12} \cdot 0,7 = 0,7 \cdot 10^{-6} =$

$= 700 ns$

$t_r$ măsurat = 825,7 ns

b) $C = 220 pF$

$t_r = RC \ln 2 = 10 \cdot 10^3 \cdot 220 \cdot 10^{-12} \cdot 0,7 =$

$= 0,7 \cdot 220 \cdot 10^{-8} = 1,54 \mu s$

$t_r$ măsurat = 1,664 $\mu s$

c) $C = 470 pF$

$t_r = RC \ln 2 = 10 \cdot 10^3 \cdot 470 \cdot 10^{-12} \cdot 0,7 = 3,29 \mu s$

$t_r$ măsurat = 3,34 $\mu s$

d) $C = 1 nF$

$t_r = RC \ln 2 = 10 \cdot 10^3 \cdot 10^{-9} \cdot 0,7 = 0,7 \cdot 10^{-5} = 7 \mu s$

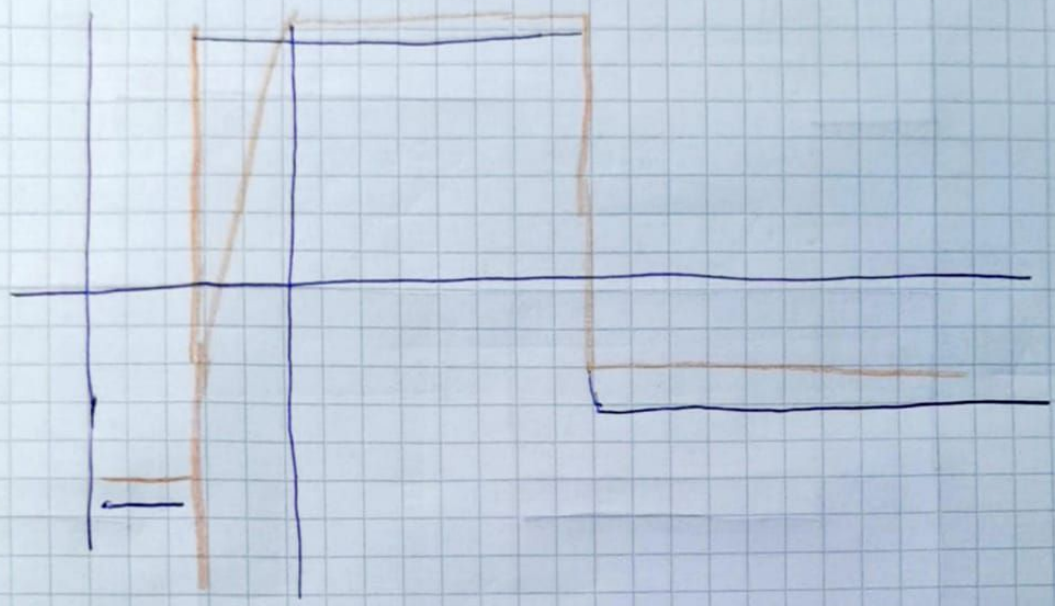
$t_r$ măsurat = 6,6 $\mu s$

e) $C = 1,5 nF$

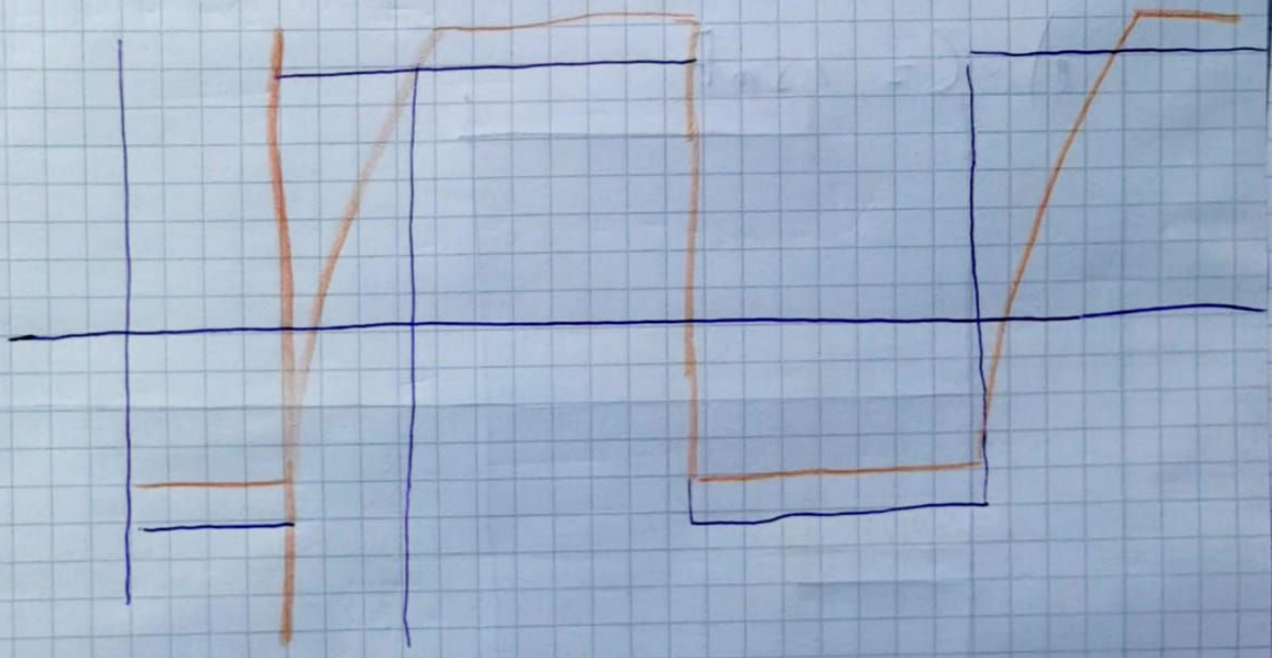
$t_r = RC \ln 2 = 10 \cdot 10^3 \cdot 1,5 \cdot 10^{-9} \cdot 0,7 = 10,5 \mu s$

$t_r$ măsurat = 10,0002 $\mu s$

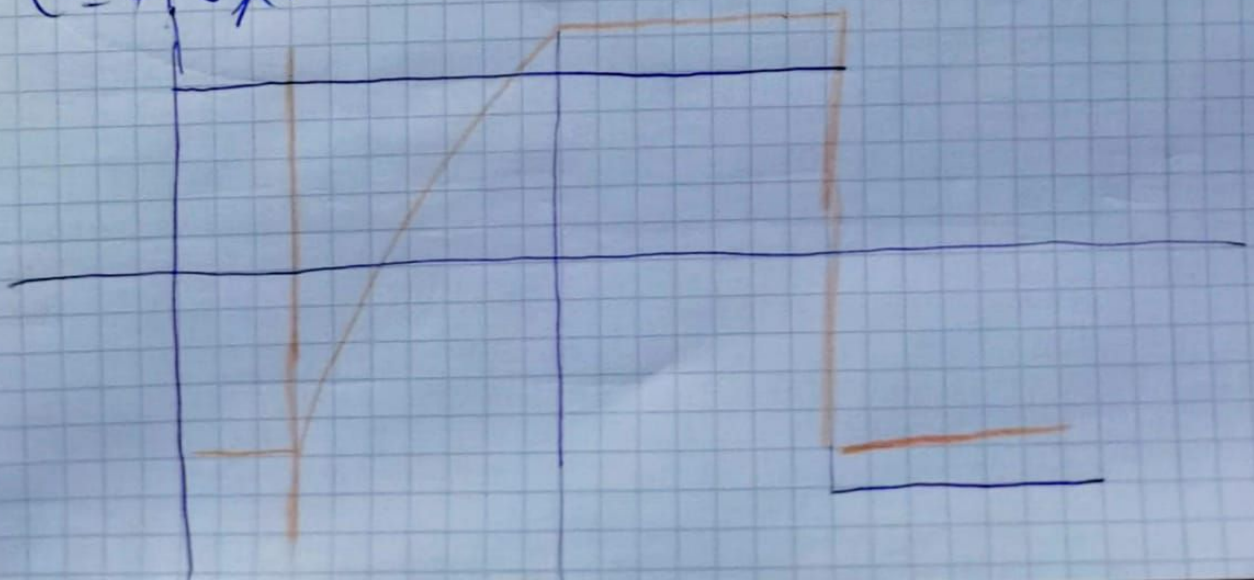
a) $C = 100\,\mu F$



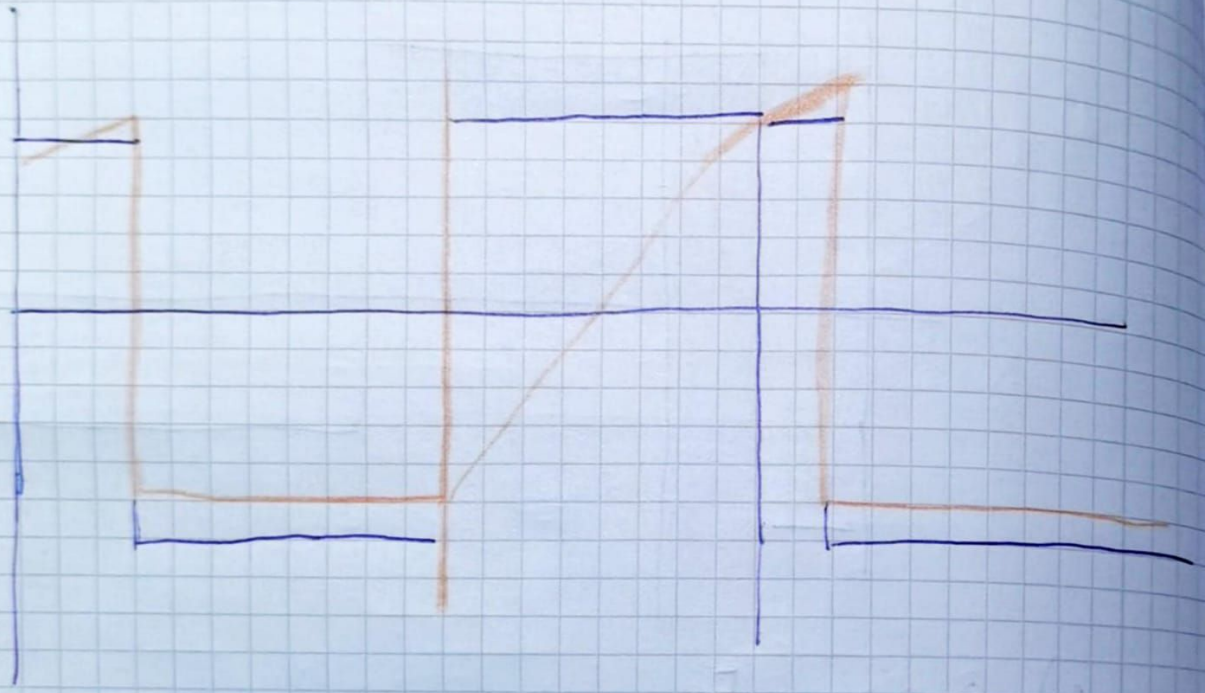
b) $C = 220\,\mu F$



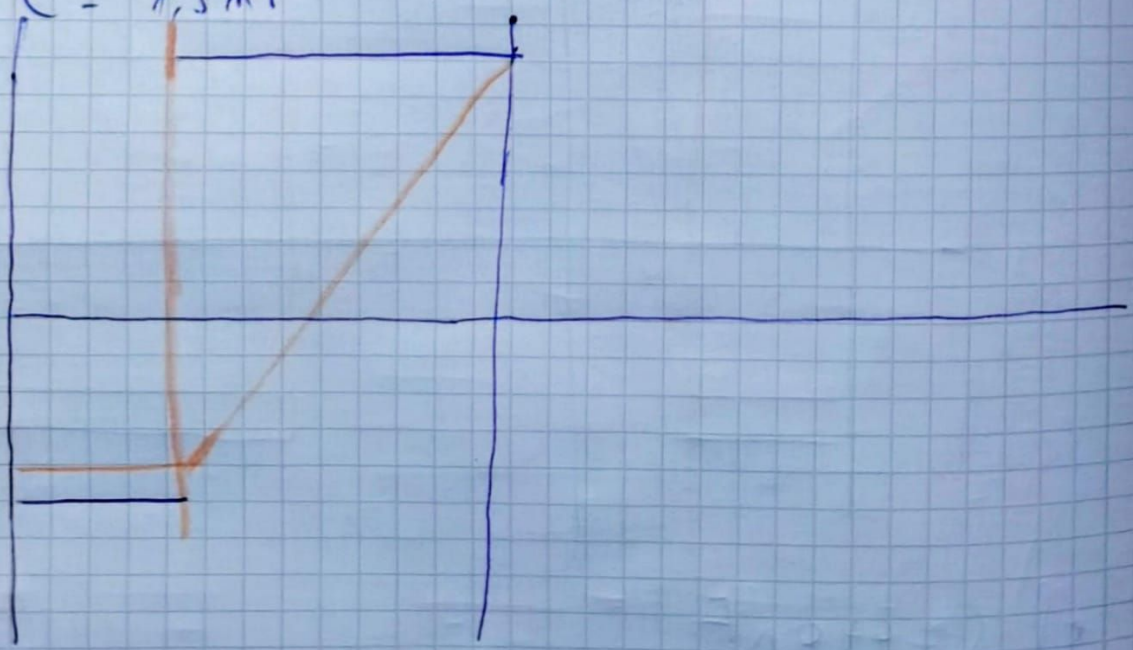
c) $C = 470\,\mu F$



d) $C = 1\,mF$



e) $C = 1{,}5\,mF$



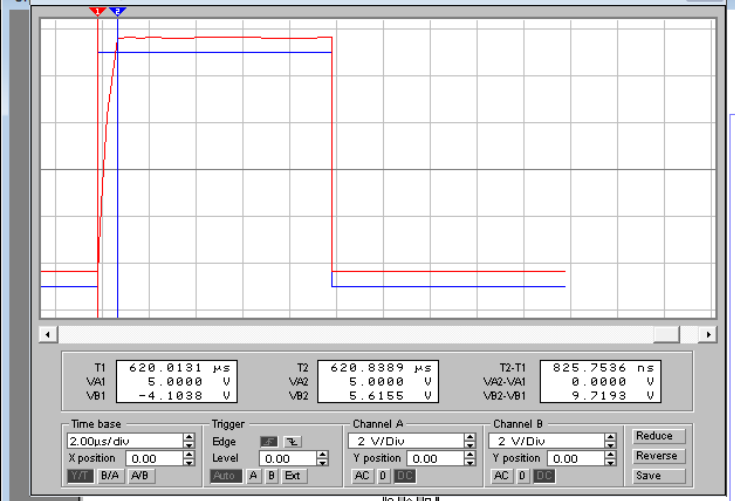
Electronics Workbench

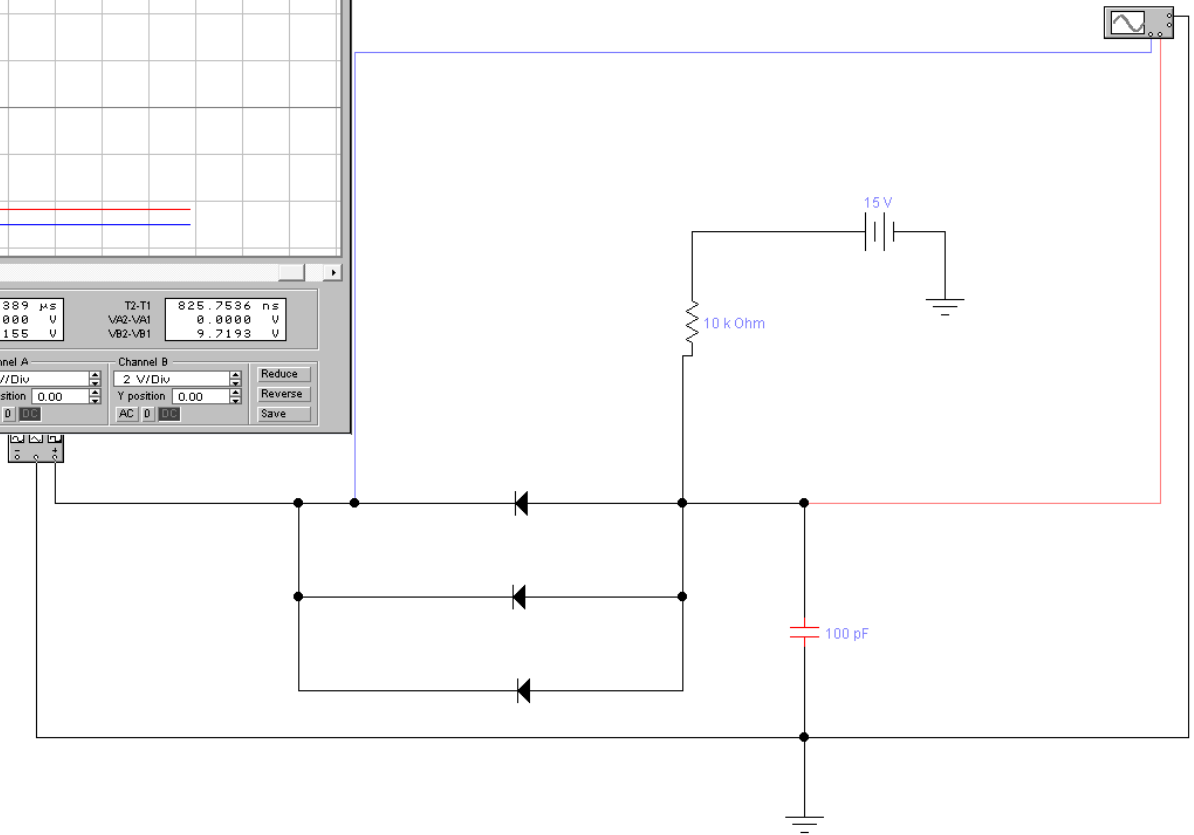
File Edit Circuit Analysis Window Help

80%

Pause

Oscilloscope




Ready 433.42 us Temp: 27

Electronics Workbench

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80%

Pause

Oscilloscope

| | | | | | |
|---|---|---|---|---|---|
| T1 | 520.0131 µs | T2 | 521.6777 µs | T2-T1 | 1.6646 µs |
| VA1 | 5.0000 V | VA2 | 5.0000 V | VA2-VA1 | 0.0000 V |
| VB1 | -4.2411 V | VB2 | 5.5928 V | VB2-VB1 | 9.8339 V |

Time base: 2.00µs/div, X position 0.00, Y/T B/A A/B

Trigger: Edge, Level 0.00, Auto A B Ext

Channel A: 2 V/Div, Y position 0.00, AC 0 DC

Channel B: 2 V/Div, Y position 0.00, AC 0 DC

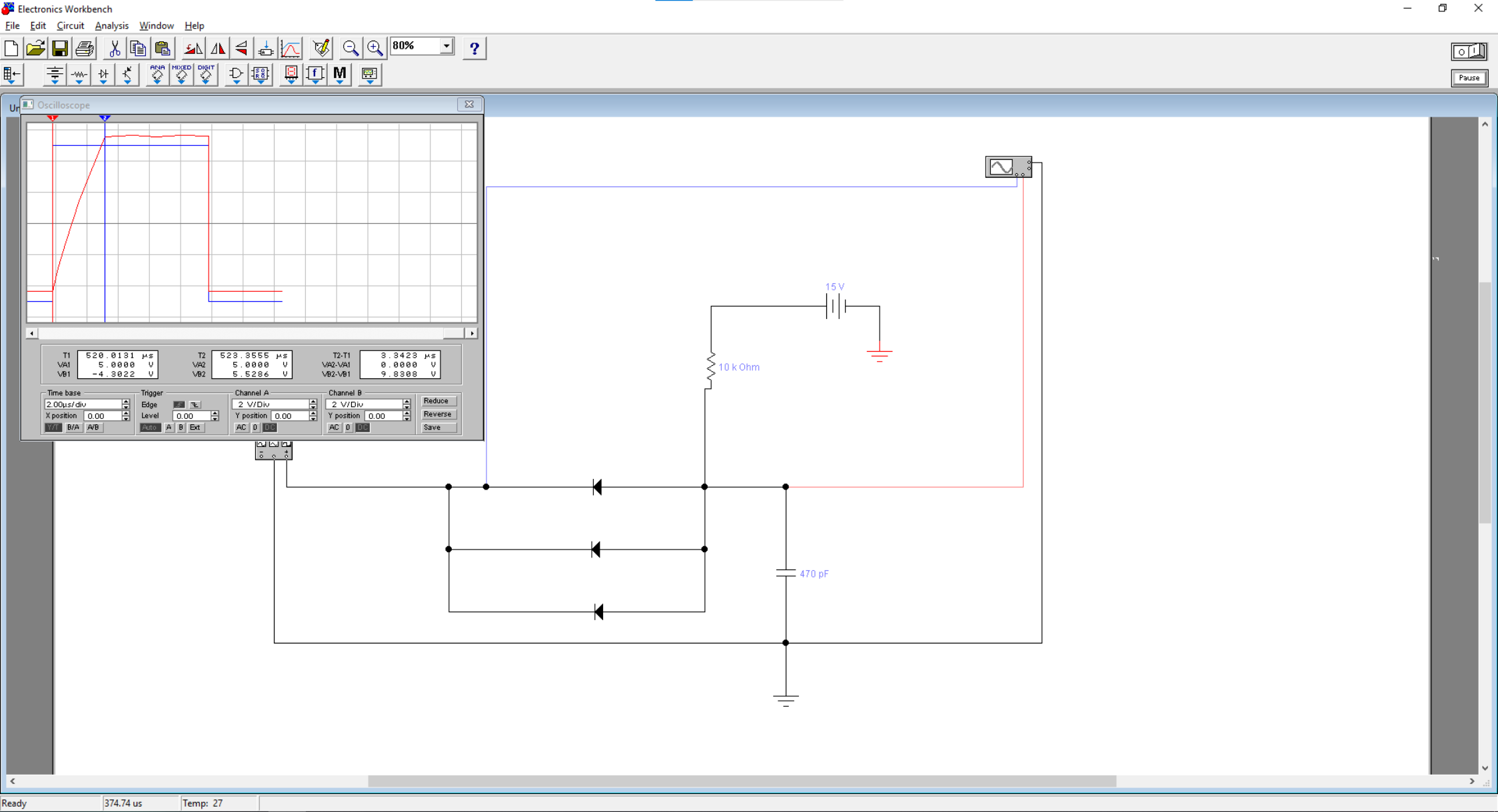
Reduce Reverse Save

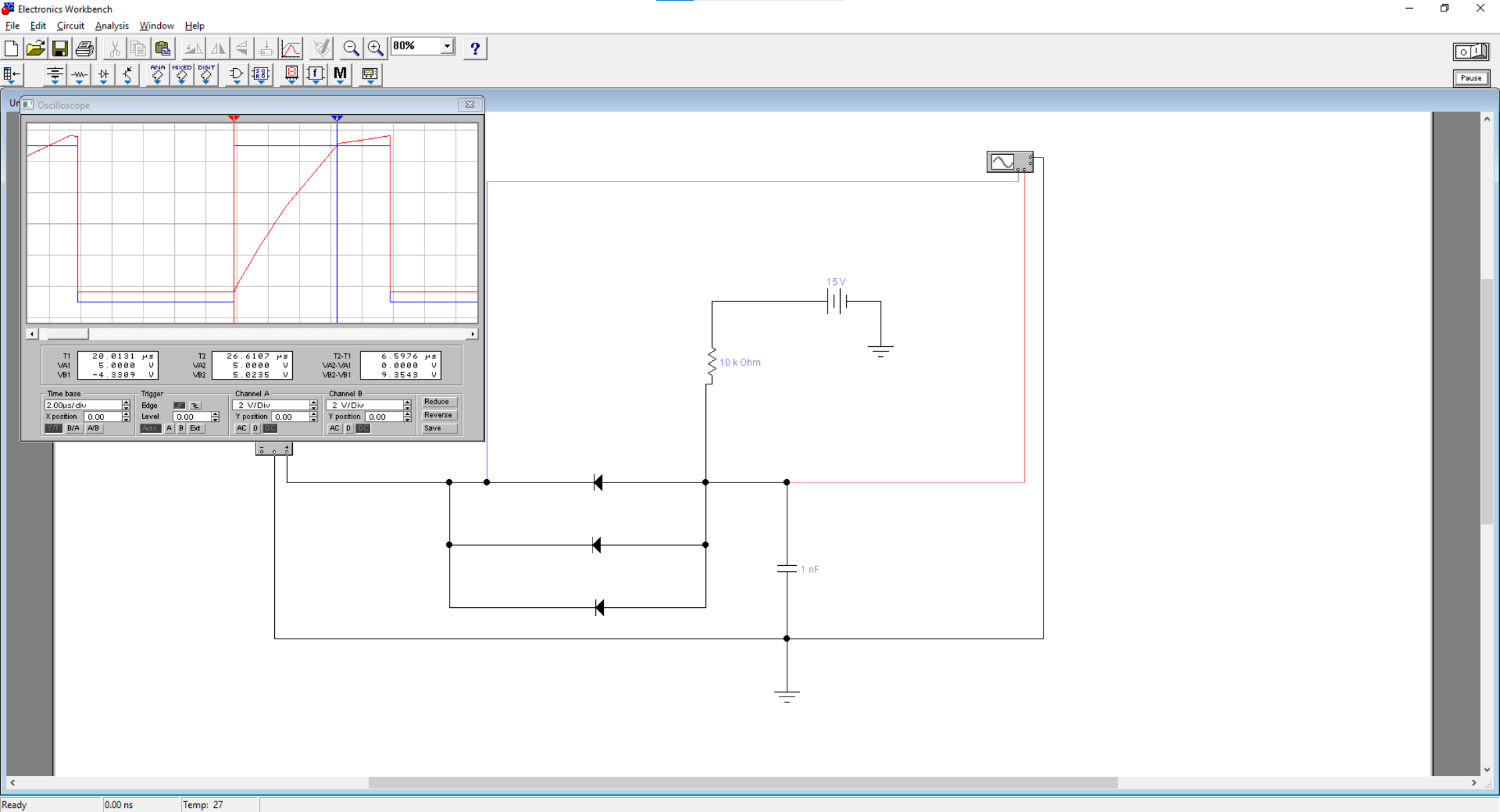
15 V

10 k Ohm

220 pF

Ready 403.36 us Temp: 27


Electronics Workbench
File Edit Circuit Analysis Window Help
80%
Pause
Oscilloscope
T1 520.0131 µs
VA1 5.0000 V
VB1 -4.3022 V
T2 523.3555 µs
VA2 5.0000 V
VB2 5.5286 V
T2-T1 3.3423 µs
VA2-VA1 0.0000 V
VB2-VB1 9.8308 V
Time base
2.00µs/div
X position 0.00
Trigger
Edge
Level 0.00
Channel A
2 V/Div
Y position 0.00
Channel B
2 V/Div
Y position 0.00
Reduce
Reverse
Save
15 V
10 k Ohm
470 pF
Ready
374.74 us
Temp: 27


Electronics Workbench
File Edit Circuit Analysis Window Help
80%
Pause
Oscilloscope
T1 20.0131 µs
VA1 5.0000 V
VB1 -4.3309 V
T2 26.6107 µs
VA2 5.0000 V
VB2 5.0235 V
T2-T1 6.5976 µs
VA2-VA1 0.0000 V
VB2-VB1 9.3543 V
Time base
2.00µs/div
X position 0.00
Y/T B/A A/B
Trigger
Edge
Level 0.00
Auto A B Ext
Channel A
2 V/Div
Y position 0.00
AC 0 DC
Channel B
2 V/Div
Y position 0.00
AC 0 DC
Reduce
Reverse
Save
15 V
10 k Ohm
1 nF
Ready
0.00 ns
Temp: 27

Electronics Workbench

File Edit Circuit Analysis Window Help

80%

Pause

Oscilloscope

T1 320.0131 µs
VA1 5.0000 V
VB1 -4.3393 V

T2 330.0139 µs
VA2 -5.0000 V
VB2 -4.3399 V

T2-T1 10.0007 µs
VA2-VA1 -10.0000 V
VB2-VB1 -607.3517 µV

Time base: 2.00µs/div, X position 0.00, Y/T B/A A/B
Trigger: Edge, Level 0.00, Auto A B Ext
Channel A: 2 V/Div, Y position 0.00, AC 0 DC
Channel B: 2 V/Div, Y position 0.00, AC 0 DC
Reduce Reverse Save

15 V

10 k Ohm

1.5 nF

Ready 0.00 ns Temp: 27