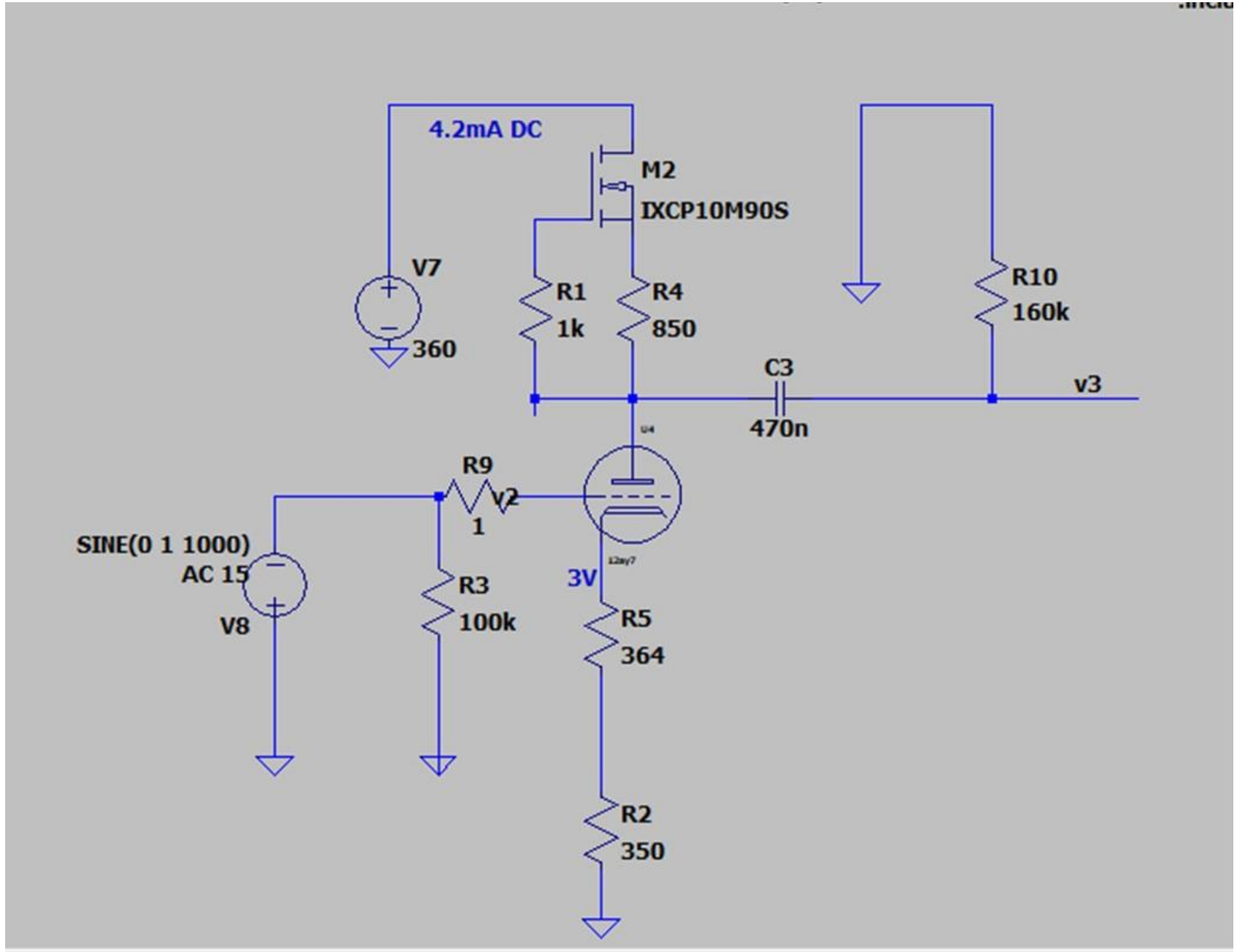
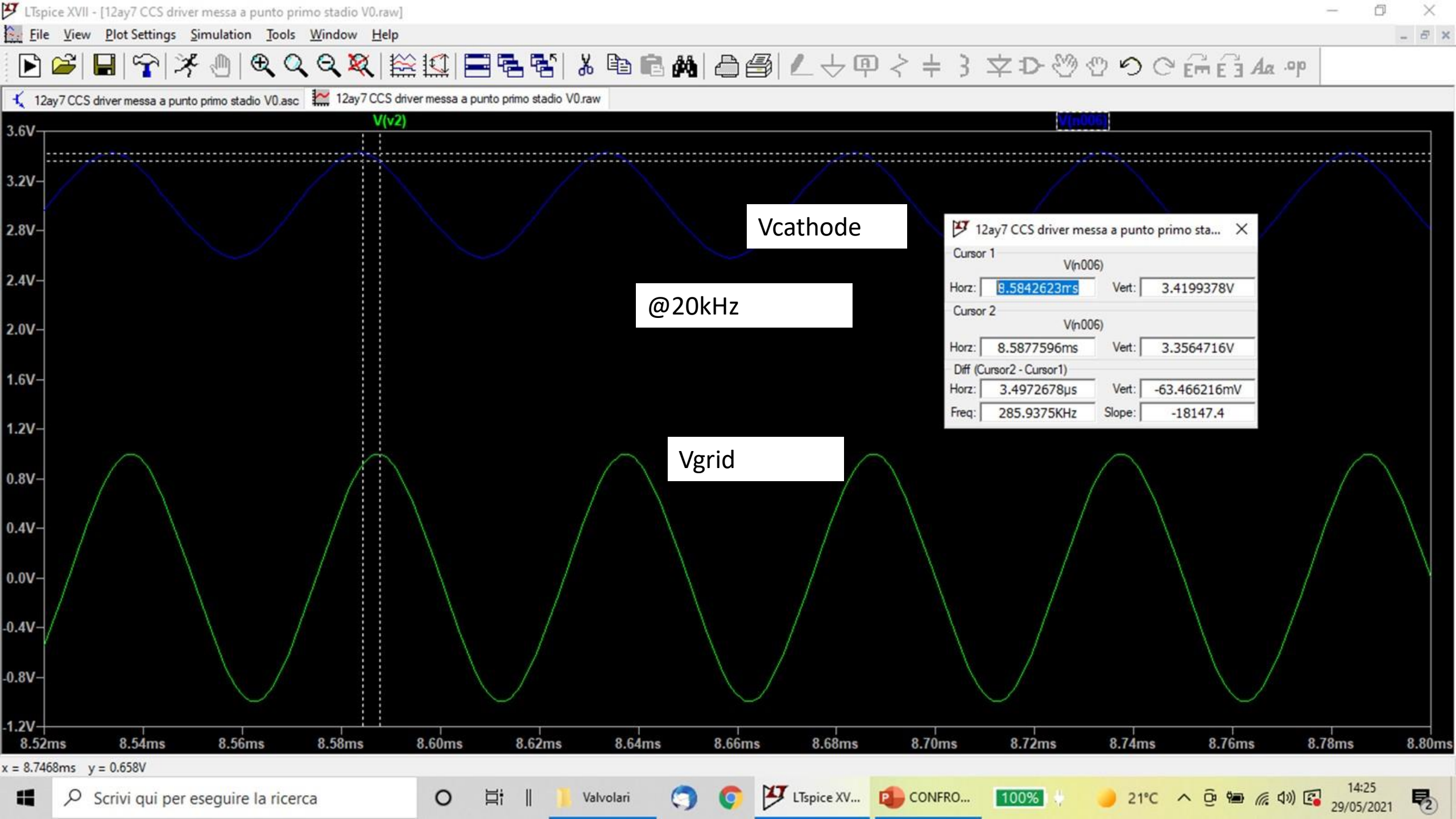
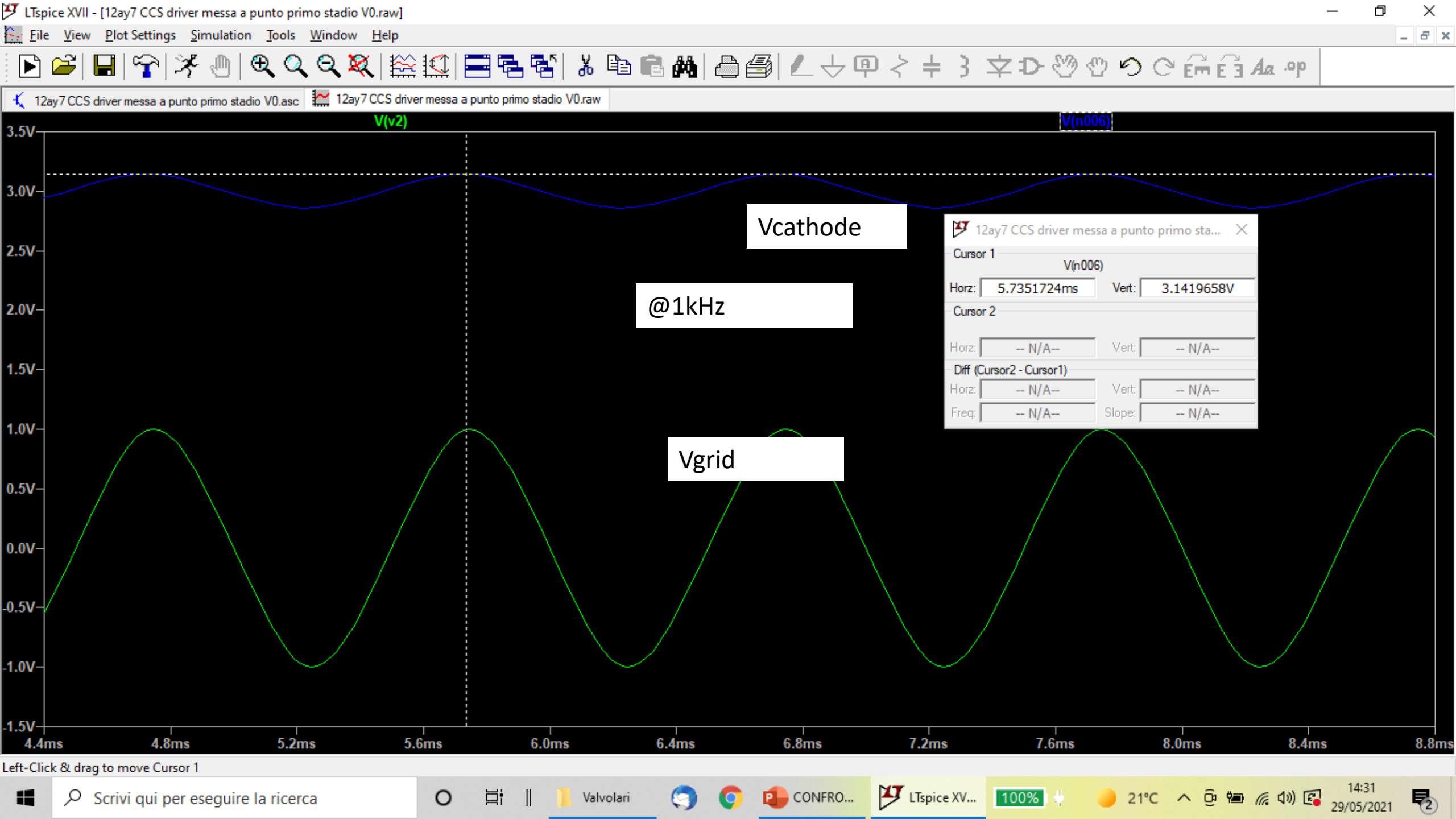

4.2mA DC
M2
IXCP10M90S
V7
360
R1
1k
R4
850
R10
160k
C3
470n
v3
R9
1
V2
SINE(0 1 1000)
AC 15
V8
R3
100k
3V
R5
364
R2
350

Simulated values

Tube	Vgk	Ia (mA)	Rload	Vin (V)	Vout@1kHz	Vout@20kHz	Ratio (dB)
12ay7	-3	4.2	160k	1	31	20	-3.8
12ay7	-3	4.2	50k	1	20.2	16.2	-1.9
12ay7	-3	4.2	30k	1	15.2	13.3	-1.2
12au7	-3	4.2	160k	1	14	12.5	-1
12ay7	-3	4.2	100k	1	27	19	-3
12au7	-3	4.2	100k	1	13.1	12	-0.8


LTspice XVII - [12ay7 CCS driver messa a punto primo stadio V0.raw]
File View Plot Settings Simulation Tools Window Help
12ay7 CCS driver messa a punto primo stadio V0.asc
12ay7 CCS driver messa a punto primo stadio V0.raw
V(v2)
V(n006)
3.6V
3.2V
2.8V
2.4V
2.0V
1.6V
1.2V
0.8V
0.4V
0.0V
-0.4V
-0.8V
-1.2V
Vcathode
@20kHz
Vgrid
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(n006)
Horz: 8.5842623ms
Vert: 3.4199378V
Cursor 2
V(n006)
Horz: 8.5877596ms
Vert: 3.3564716V
Diff (Cursor2 - Cursor1)
Horz: 3.4972678µs
Vert: -63.466216mV
Freq: 285.9375KHz
Slope: -18147.4
8.52ms 8.54ms 8.56ms 8.58ms 8.60ms 8.62ms 8.64ms 8.66ms 8.68ms 8.70ms 8.72ms 8.74ms 8.76ms 8.78ms 8.80ms
x = 8.7468ms y = 0.658V
Scrivi qui per eseguire la ricerca
Valvolari
LTspice XV...
CONFRO...
100%
21°C
14:25
29/05/2021

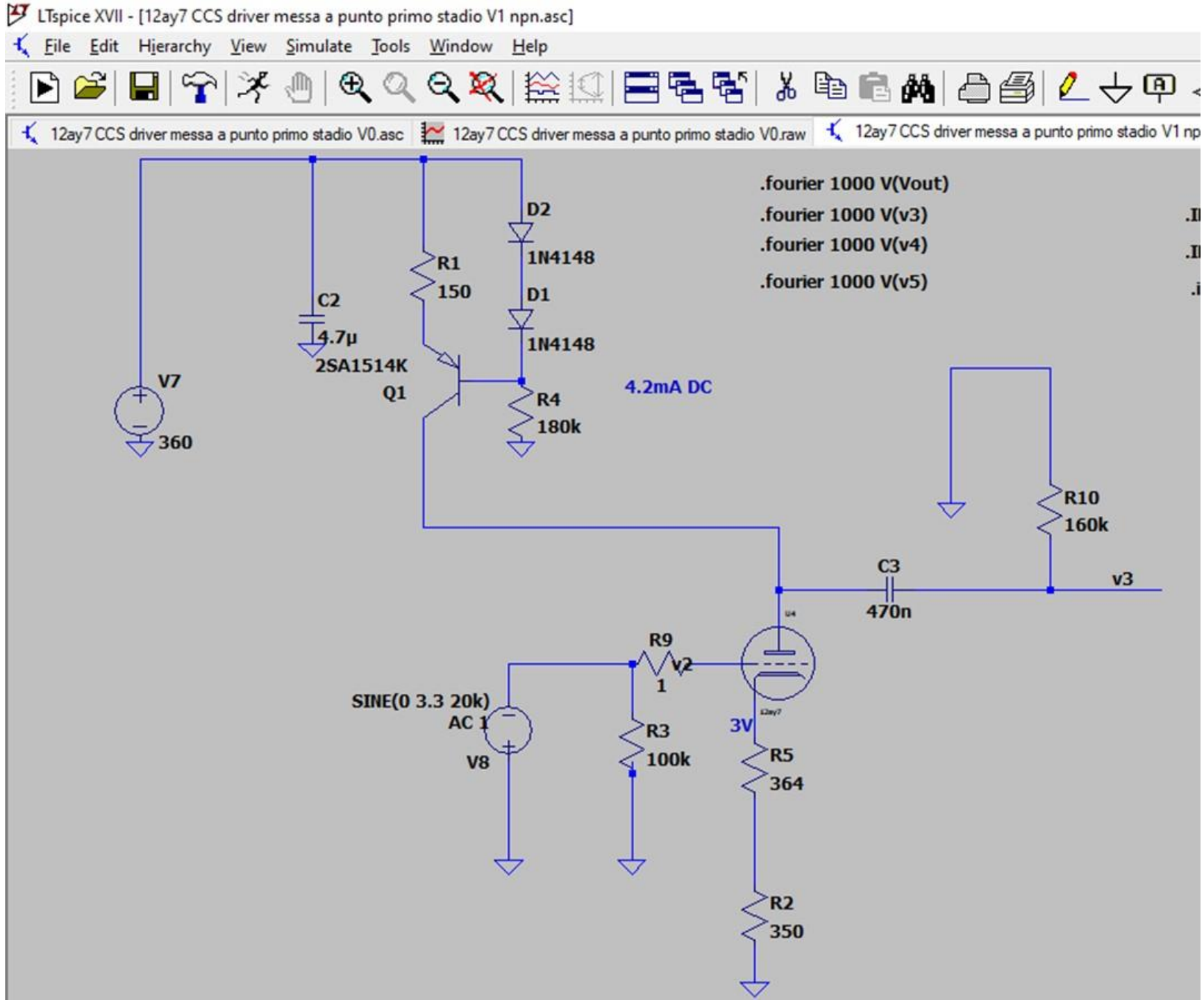

LTspice XVII - [12ay7 CCS driver messa a punto primo stadio V0.raw]
File View Plot Settings Simulation Tools Window Help
12ay7 CCS driver messa a punto primo stadio V0.asc
12ay7 CCS driver messa a punto primo stadio V0.raw
V(v2)
V(n006)
3.5V
3.0V
2.5V
2.0V
1.5V
1.0V
0.5V
0.0V
-0.5V
-1.0V
-1.5V
4.4ms
4.8ms
5.2ms
5.6ms
6.0ms
6.4ms
6.8ms
7.2ms
7.6ms
8.0ms
8.4ms
8.8ms
Vcathode
@1kHz
Vgrid
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(n006)
Horz: 5.7351724ms
Vert: 3.1419658V
Cursor 2
Horz: -- N/A--
Vert: -- N/A--
Diff (Cursor2 - Cursor1)
Horz: -- N/A--
Vert: -- N/A--
Freq: -- N/A--
Slope: -- N/A--
Left-Click & drag to move Cursor 1
Scrivi qui per eseguire la ricerca
Valvolari
CONFRO...
LTspice XV...
100%
21°C
14:31
29/05/2021

Simulated values

Tube	Vgk	Ia (mA)	Rload	Vin (V)	Vout@1kHz	Vout@20kHz	Ratio (dB)
12ay7	-3	4.2	100k	1	27	19	-3
12au7	-3	4.2	100k	1	13.1	12	-0.8

Really measured values

Tube	Vgk	Ia (mA)	Rload	Vin (V)	Vout@1kHz	Vout@20kHz	Ratio (dB)
12ay7	-3	4.2	100k	1	27.8	16.2	-4.7
12au7	-3	4.2	100k	1	14.6	8.8	-4.4



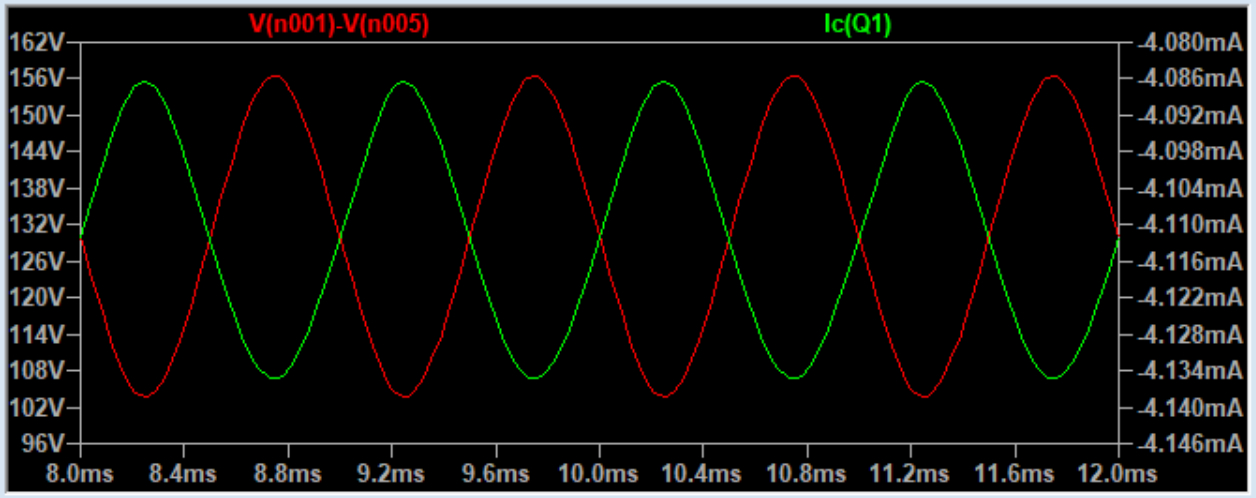
With a PNP CCS, vontage across it anc current through it are «in phase» (180°)

LTspice XVII - 12ay7 CCS driver messa a punto primo stadio V0.raw

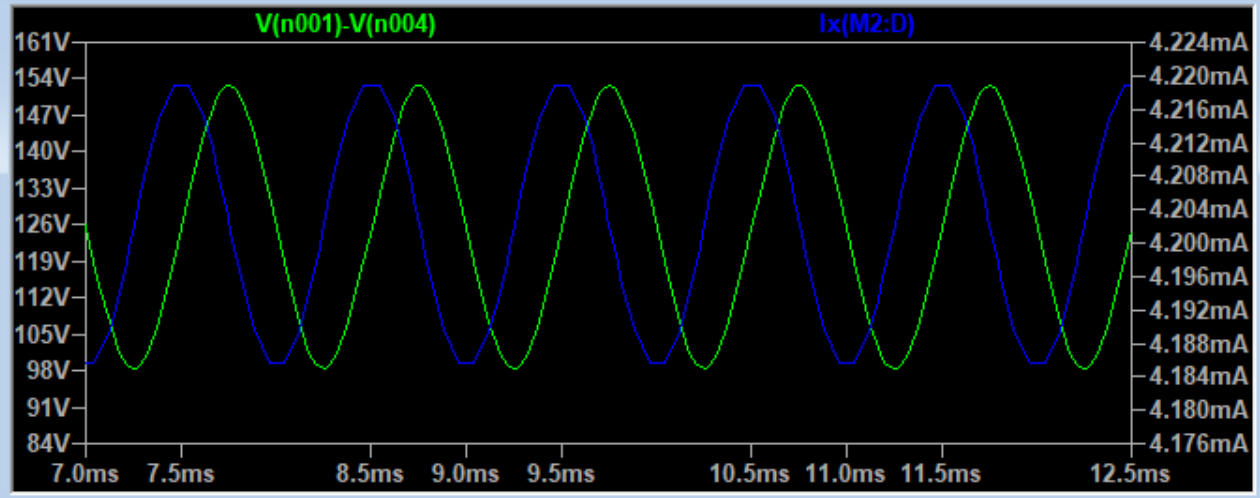
File View Plot Settings Simulation Tools Window Help

12ay7 CCS driver messa a punto primo stadio V0.asc | 12ay7 CCS driver messa a punto primo stadio V0.raw | 12ay7 CCS driver messa a punto primo stadio V1 npn.asc | 12ay7 CCS driver messa a punto primo stadio V1 npn.raw

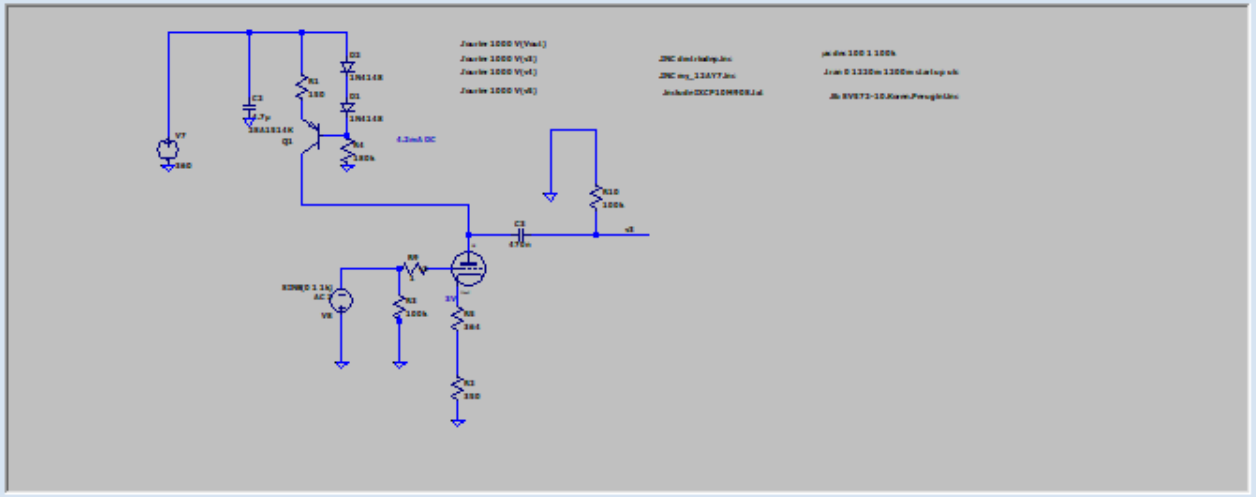
12ay7 CCS driver messa a punto primo stadio V1 npn.raw



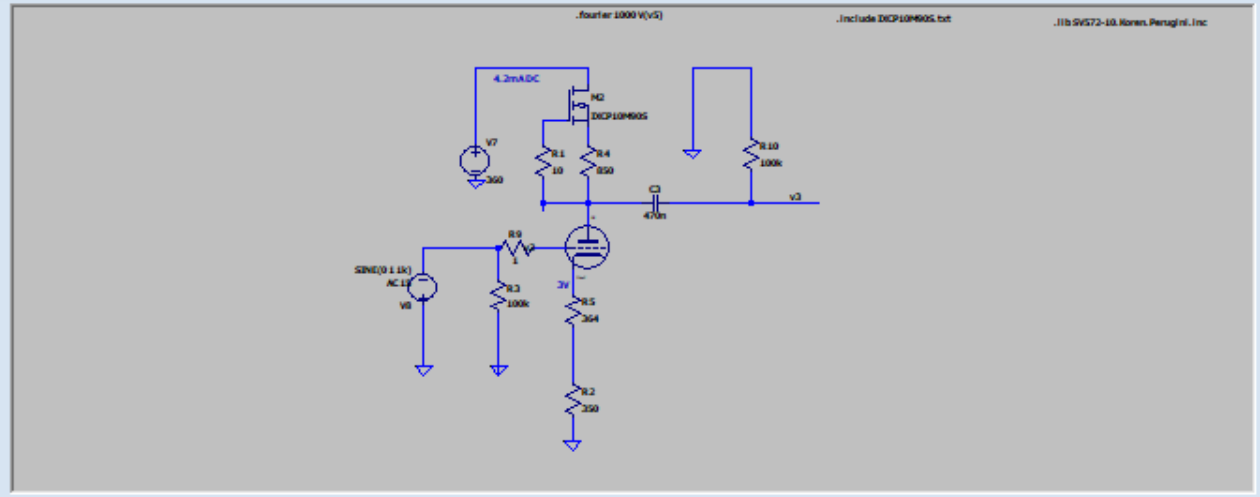
12ay7 CCS driver messa a punto primo stadio V0.raw



12ay7 CCS driver messa a punto primo stadio V1 npn.asc



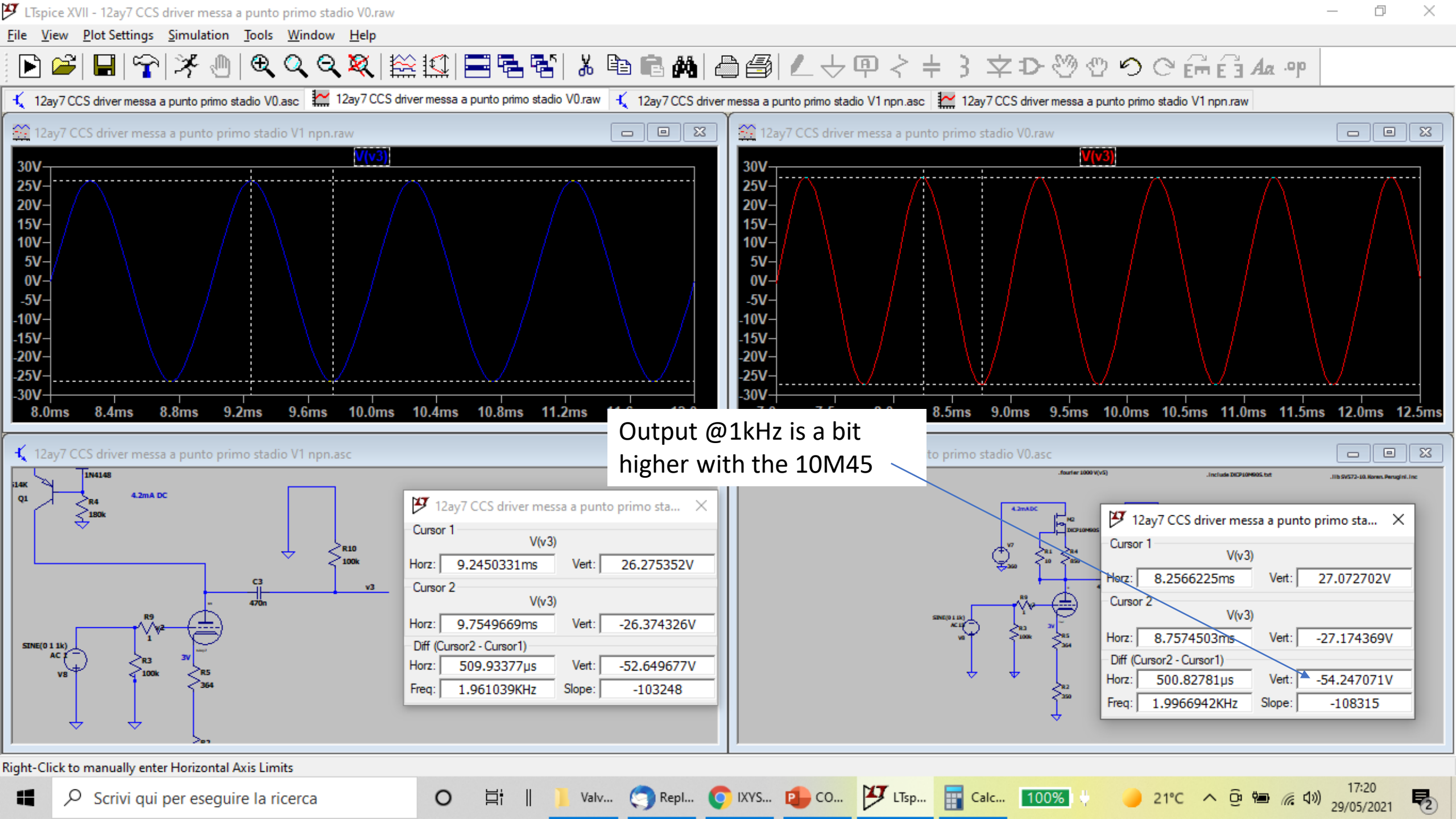
12ay7 CCS driver messa a punto primo stadio V0.asc

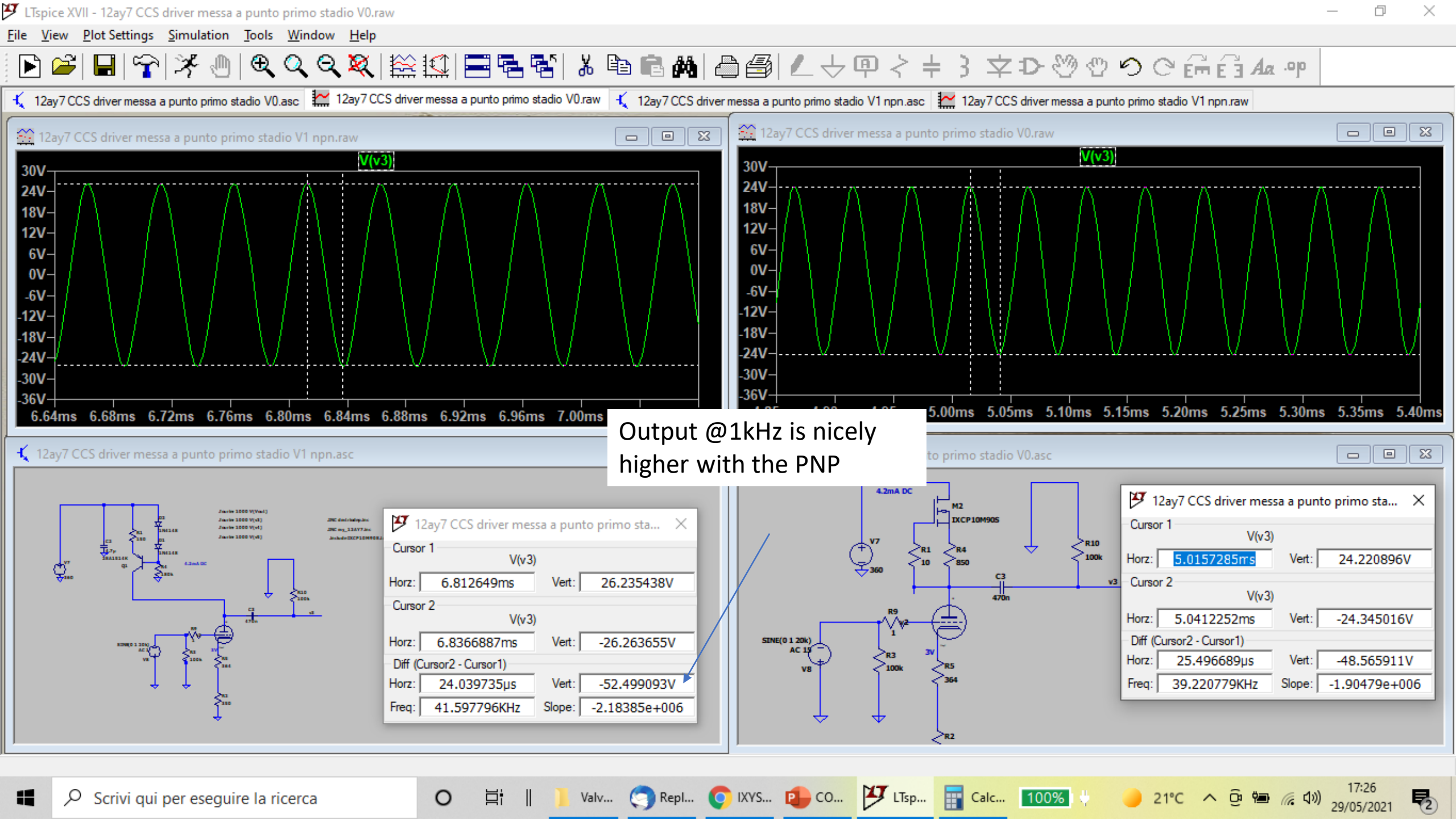


Right-Click to manually enter Horizontal Axis Limits

Scrivi qui per eseguire la ricerca

Valv... Repl... IXYS... CO... LTsp... Calc... 100% 21°C 17:19 29/05/2021


LTspice XVII - 12ay7 CCS driver messa a punto primo stadio V0.raw
File View Plot Settings Simulation Tools Window Help
12ay7 CCS driver messa a punto primo stadio V0.asc
12ay7 CCS driver messa a punto primo stadio V0.raw
12ay7 CCS driver messa a punto primo stadio V1 npn.asc
12ay7 CCS driver messa a punto primo stadio V1 npn.raw
12ay7 CCS driver messa a punto primo stadio V1 npn.raw
V(v3)
30V 25V 20V 15V 10V 5V 0V -5V -10V -15V -20V -25V -30V
8.0ms 8.4ms 8.8ms 9.2ms 9.6ms 10.0ms 10.4ms 10.8ms 11.2ms
12ay7 CCS driver messa a punto primo stadio V0.raw
V(v3)
30V 25V 20V 15V 10V 5V 0V -5V -10V -15V -20V -25V -30V
8.5ms 9.0ms 9.5ms 10.0ms 10.5ms 11.0ms 11.5ms 12.0ms 12.5ms
Output @1kHz is a bit higher with the 10M45
12ay7 CCS driver messa a punto primo stadio V1 npn.asc
1N4148
Q1
R4
180k
4.2mA DC
R10
100k
C3
470n
v3
R9
R3
100k
R5
364
3V
SINE(0 1 1k)
AC 1
V8
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(v3)
Horz: 9.2450331ms Vert: 26.275352V
Cursor 2
V(v3)
Horz: 9.7549669ms Vert: -26.374326V
Diff (Cursor2 - Cursor1)
Horz: 509.93377µs Vert: -52.649677V
Freq: 1.961039KHz Slope: -103248
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(v3)
Horz: 8.2566225ms Vert: 27.072702V
Cursor 2
V(v3)
Horz: 8.7574503ms Vert: -27.174369V
Diff (Cursor2 - Cursor1)
Horz: 500.82781µs Vert: -54.247071V
Freq: 1.9966942KHz Slope: -108315
Right-Click to manually enter Horizontal Axis Limits
Scrivi qui per eseguire la ricerca
21°C
17:20
29/05/2021

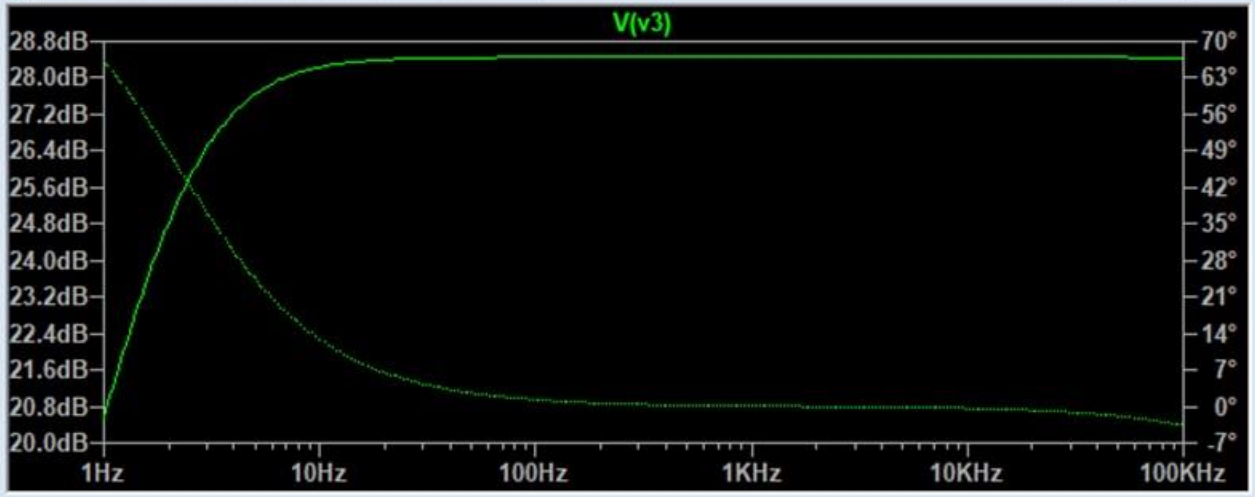

LTspice XVII - 12ay7 CCS driver messa a punto primo stadio V0.raw
File View Plot Settings Simulation Tools Window Help
12ay7 CCS driver messa a punto primo stadio V0.asc
12ay7 CCS driver messa a punto primo stadio V0.raw
12ay7 CCS driver messa a punto primo stadio V1 npn.asc
12ay7 CCS driver messa a punto primo stadio V1 npn.raw
12ay7 CCS driver messa a punto primo stadio V1 npn.raw
V(v3)
30V 24V 18V 12V 6V 0V -6V -12V -18V -24V -30V -36V
6.64ms 6.68ms 6.72ms 6.76ms 6.80ms 6.84ms 6.88ms 6.92ms 6.96ms 7.00ms
12ay7 CCS driver messa a punto primo stadio V0.raw
V(v3)
30V 24V 18V 12V 6V 0V -6V -12V -18V -24V -30V -36V
5.00ms 5.05ms 5.10ms 5.15ms 5.20ms 5.25ms 5.30ms 5.35ms 5.40ms
Output @1kHz is nicely higher with the PNP
12ay7 CCS driver messa a punto primo stadio V1 npn.asc
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(v3)
Horz: 6.812649ms Vert: 26.235438V
Cursor 2
V(v3)
Horz: 6.8366887ms Vert: -26.263655V
Diff (Cursor2 - Cursor1)
Horz: 24.039735µs Vert: -52.499093V
Freq: 41.597796KHz Slope: -2.18385e+006
12ay7 CCS driver messa a punto primo stadio V0.asc
4.2mA DC
M2
IXCP10M90S
V7
360
R1
10
R4
850
C3
470n
R10
100k
v3
R9
1
V2
SINE(0 1 20k)
AC 15
V8
R3
100k
3V
R5
364
R2
12ay7 CCS driver messa a punto primo sta...
Cursor 1
V(v3)
Horz: 5.0157285ms Vert: 24.220896V
Cursor 2
V(v3)
Horz: 5.0412252ms Vert: -24.345016V
Diff (Cursor2 - Cursor1)
Horz: 25.496689µs Vert: -48.565911V
Freq: 39.220779KHz Slope: -1.90479e+006
Scrivi qui per eseguire la ricerca
Valv... Repl... IXYS... CO... LTsp... Calc... 100%
21°C
17:26
29/05/2021

LTspice XVII - 12ay7 CCS driver messa a punto primo stadio V0.asc

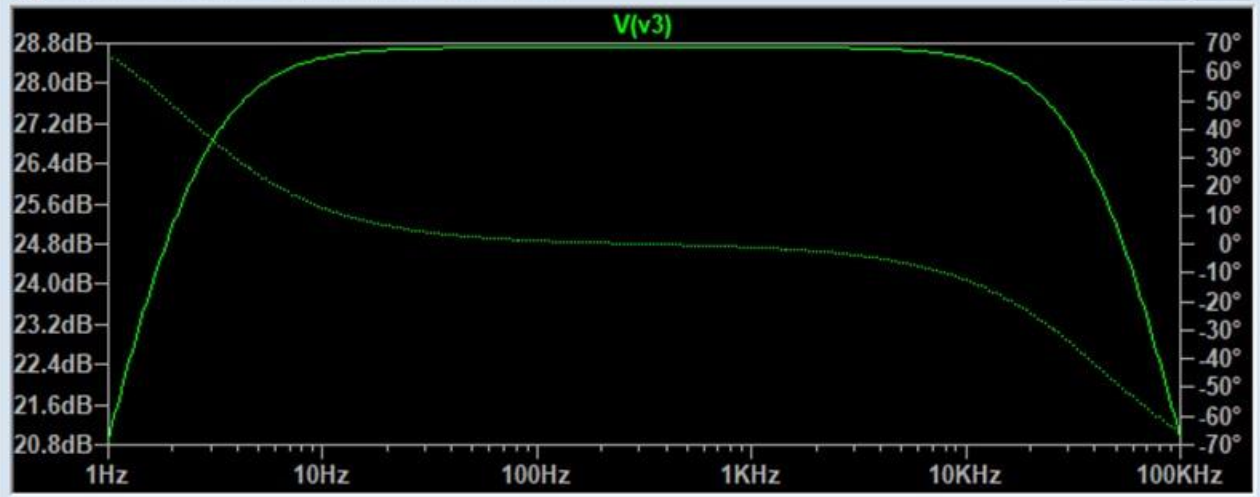
File Edit Hierarchy View Simulate Tools Window Help

12ay7 CCS driver messa a punto primo stadio V0.asc | 12ay7 CCS driver messa a punto primo stadio V0.raw | 12ay7 CCS driver messa a punto primo stadio V1 npn.asc | 12ay7 CCS driver messa a punto primo stadio V1 npn.raw

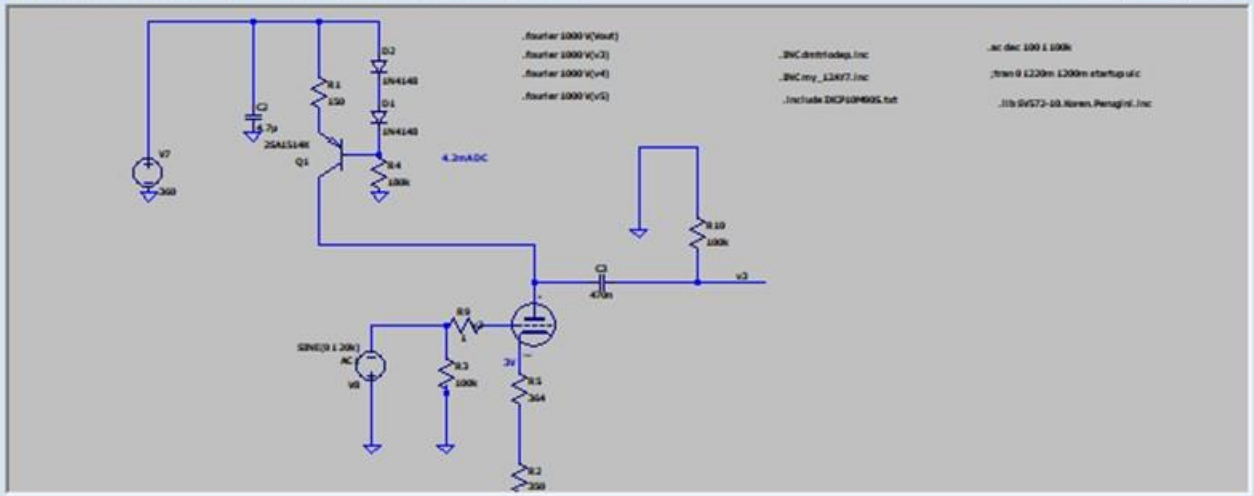
12ay7 CCS driver messa a punto primo stadio V1 npn.raw



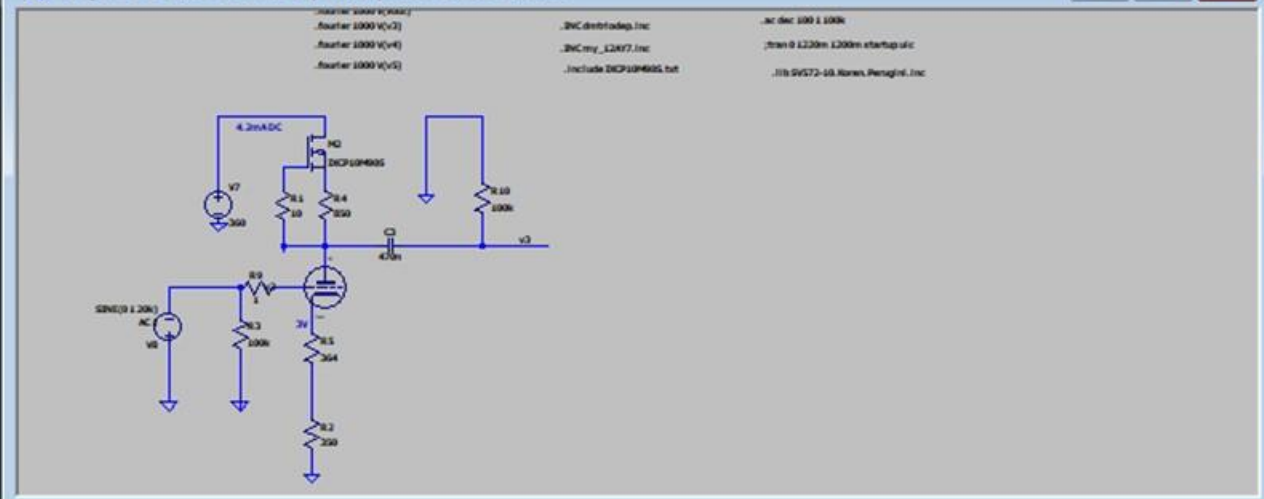
12ay7 CCS driver messa a punto primo stadio V0.raw



12ay7 CCS driver messa a punto primo stadio V1 npn.asc



12ay7 CCS driver messa a punto primo stadio V0.asc



Scrivi qui per eseguire la ricerca

Val... Re... Tu... LTs... Ca... C... A... 100% 21°C 17:49 29/05/2021