微电子专业基础实验作业

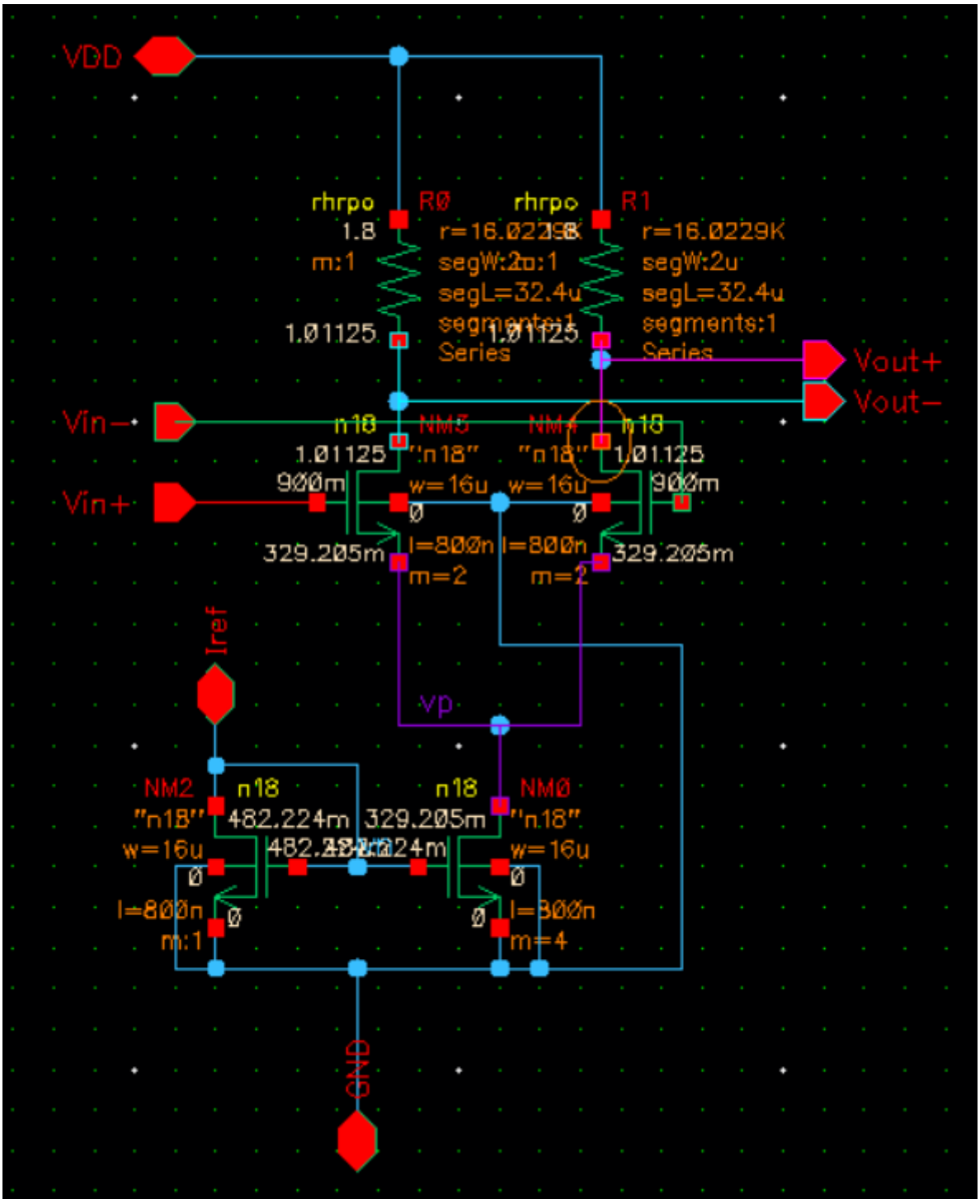
PB21511897 李霄奕

模拟部分

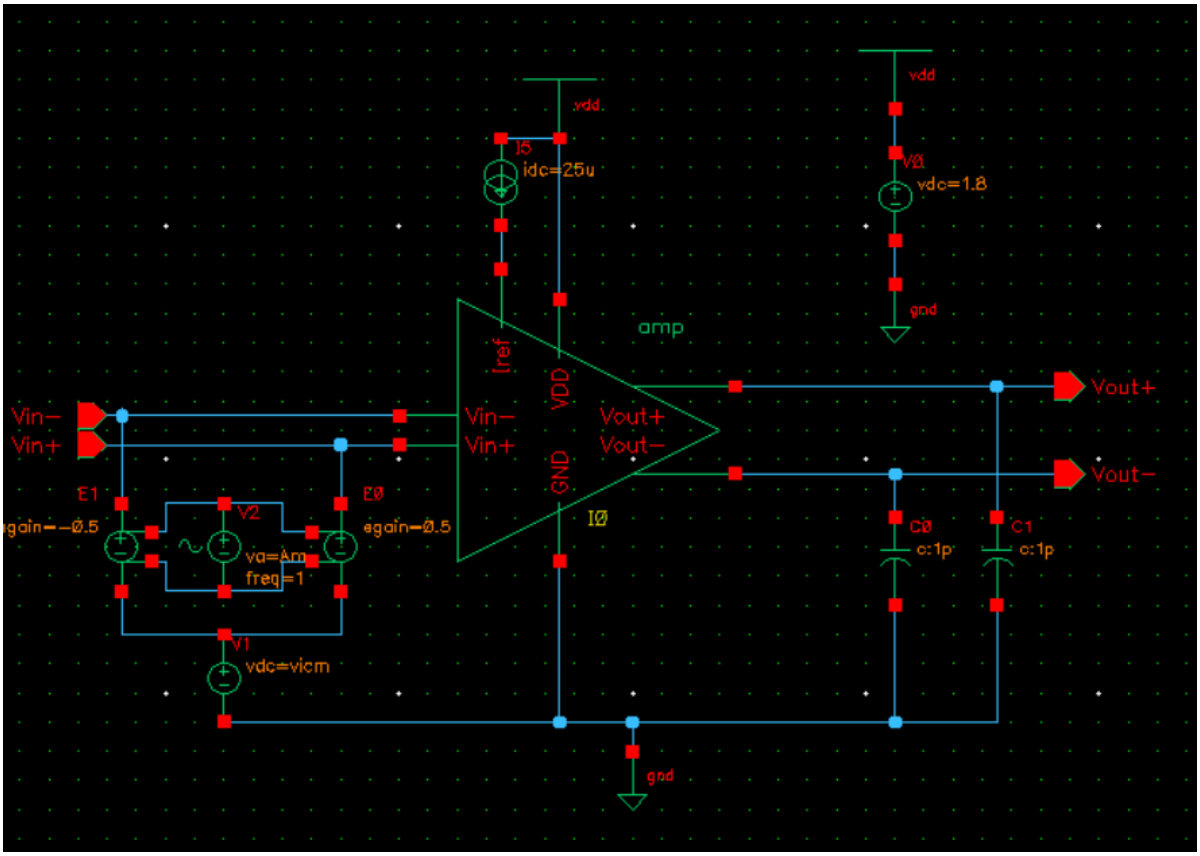
实验3

原理图

amp原理图：



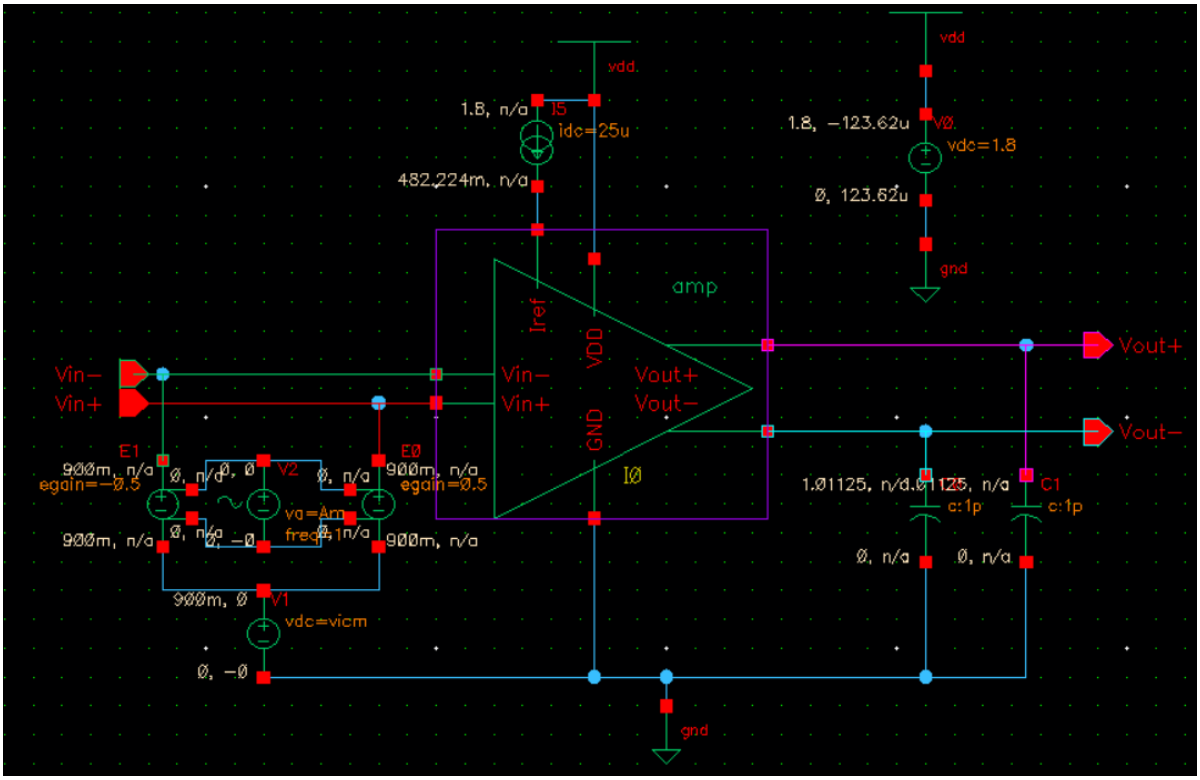
amptest原理图：



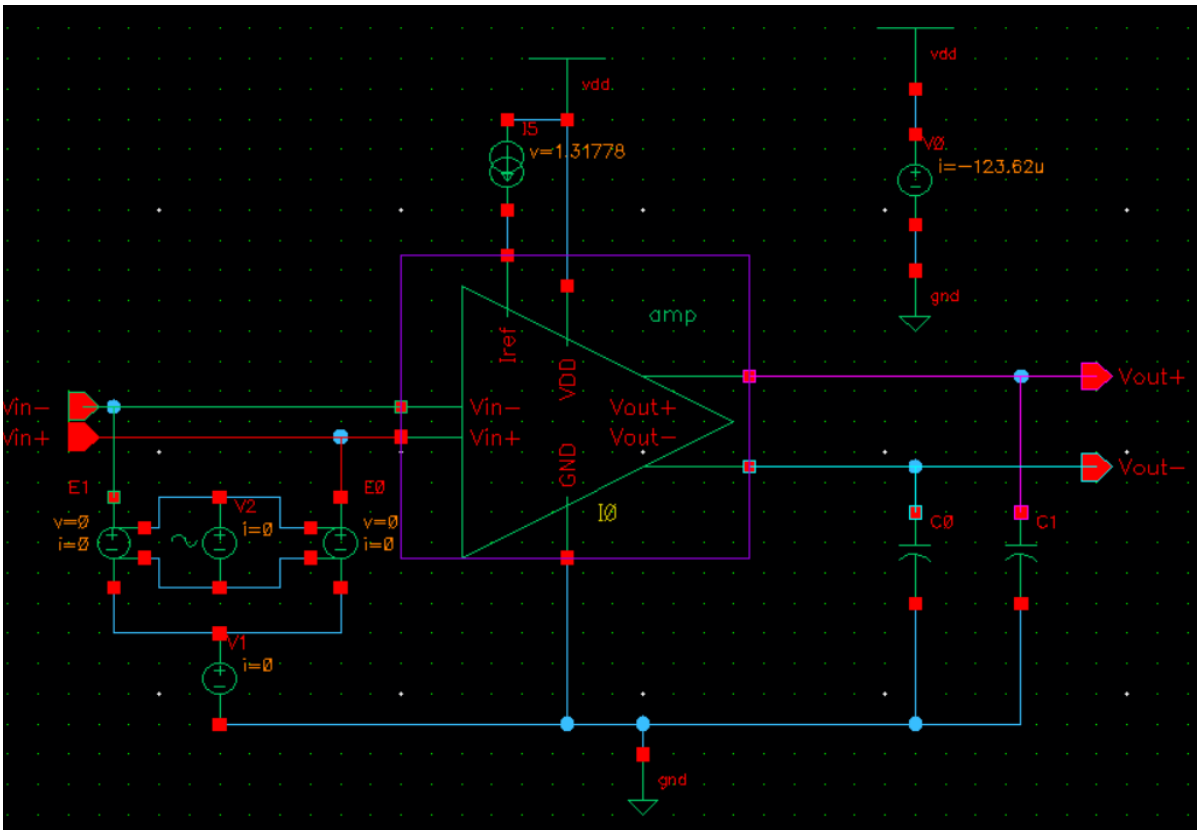
DC仿真

DC仿真结果：

DC电流电压

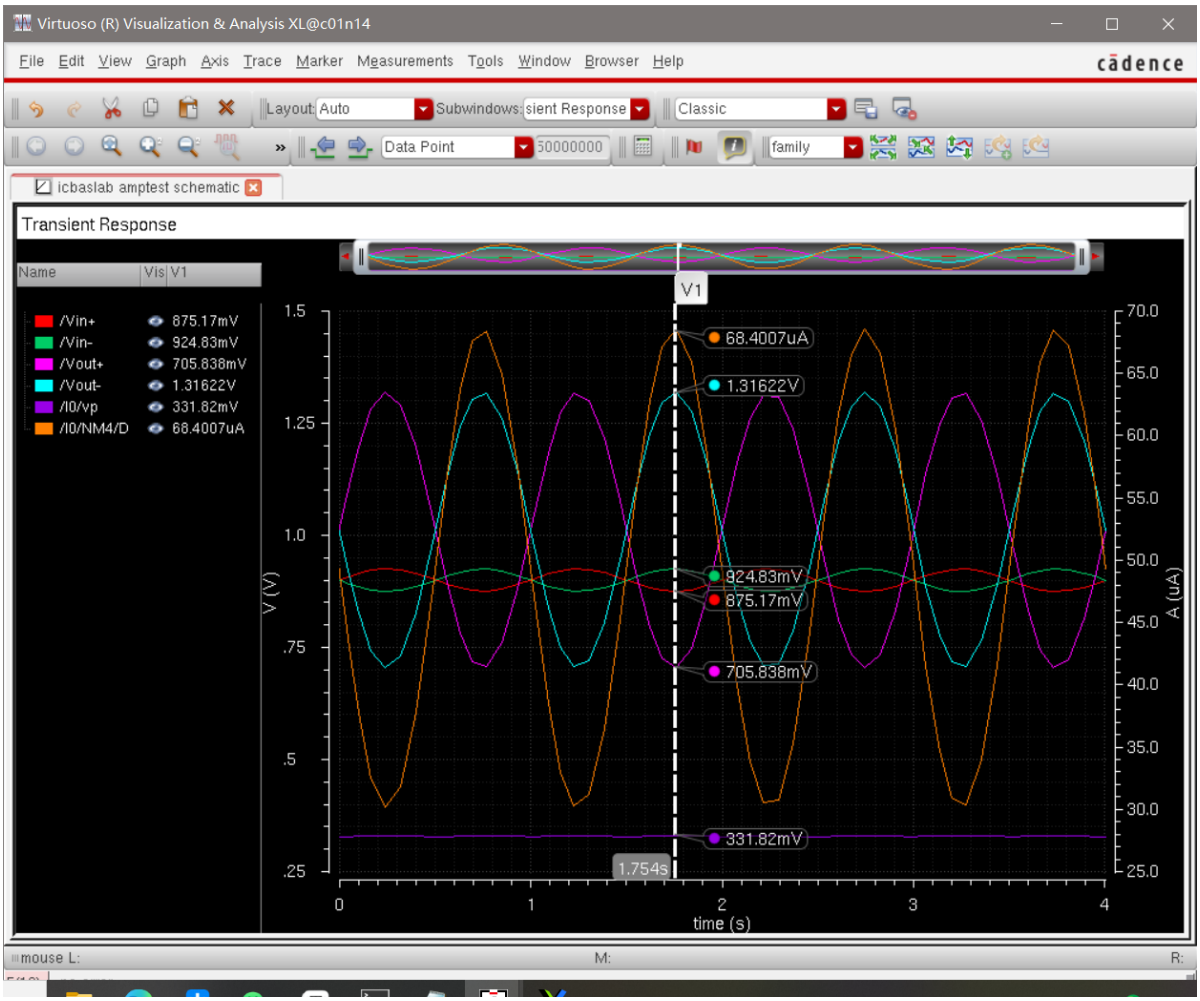


DC工作点



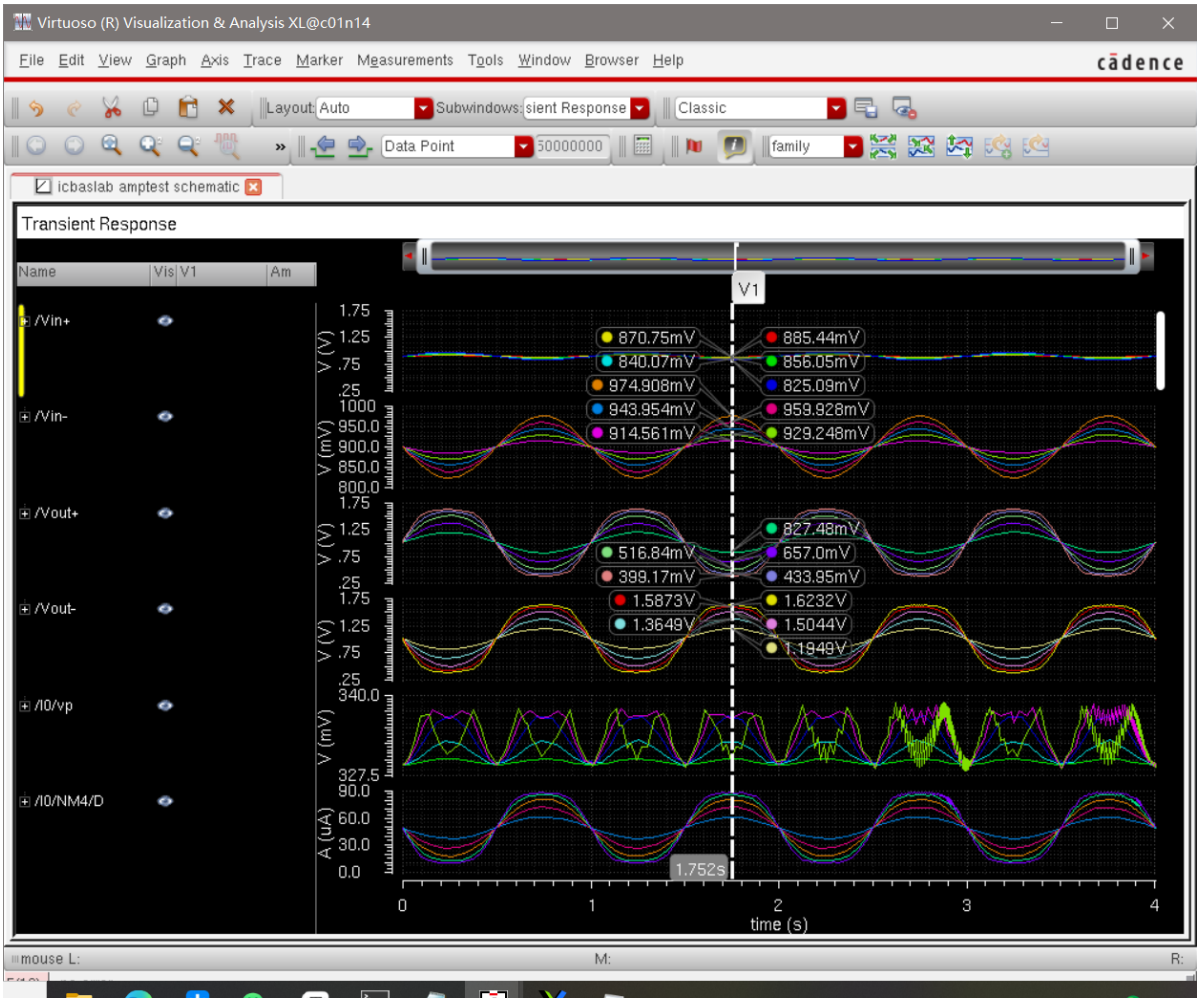
Tran仿真

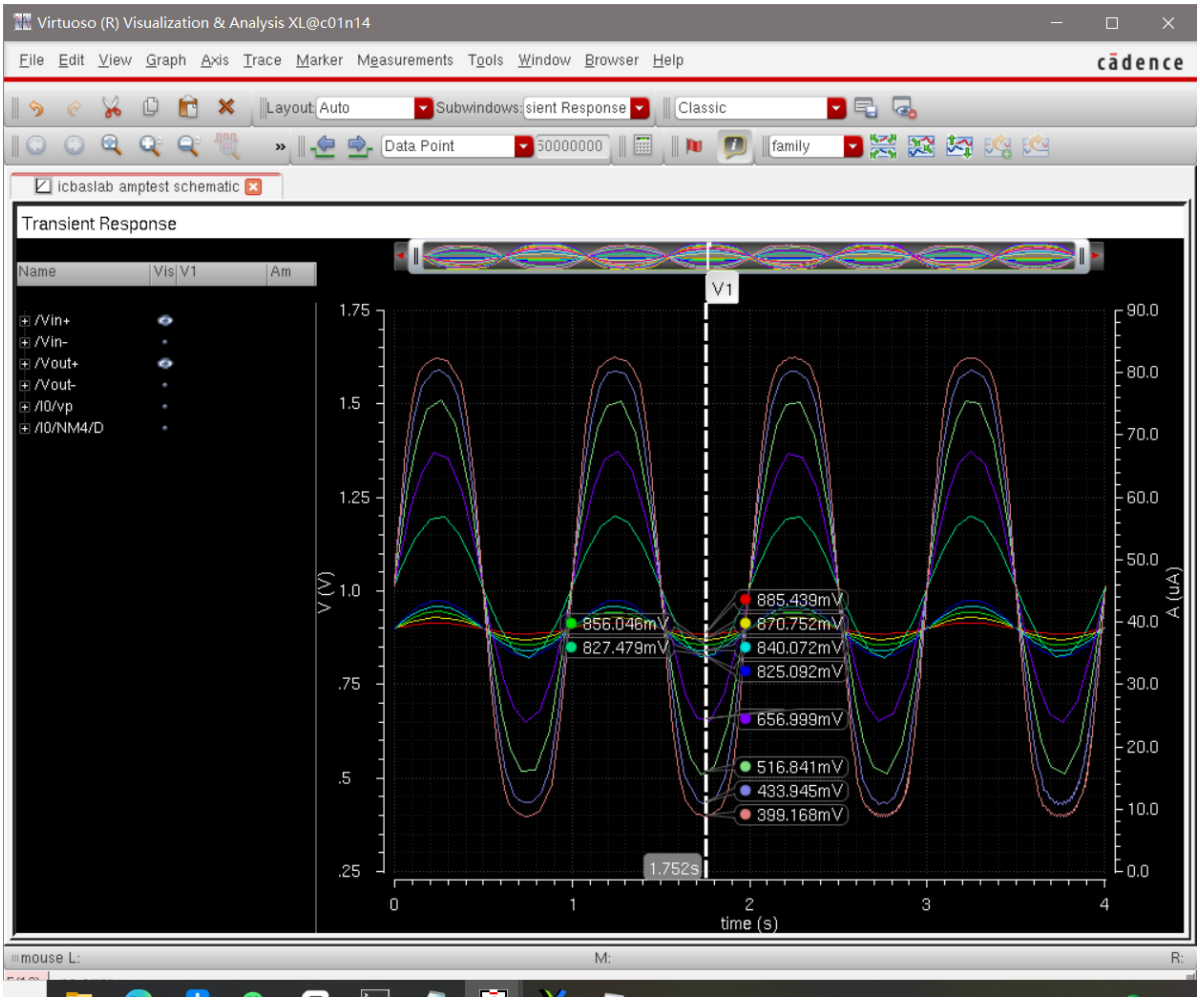
Tran仿真结果

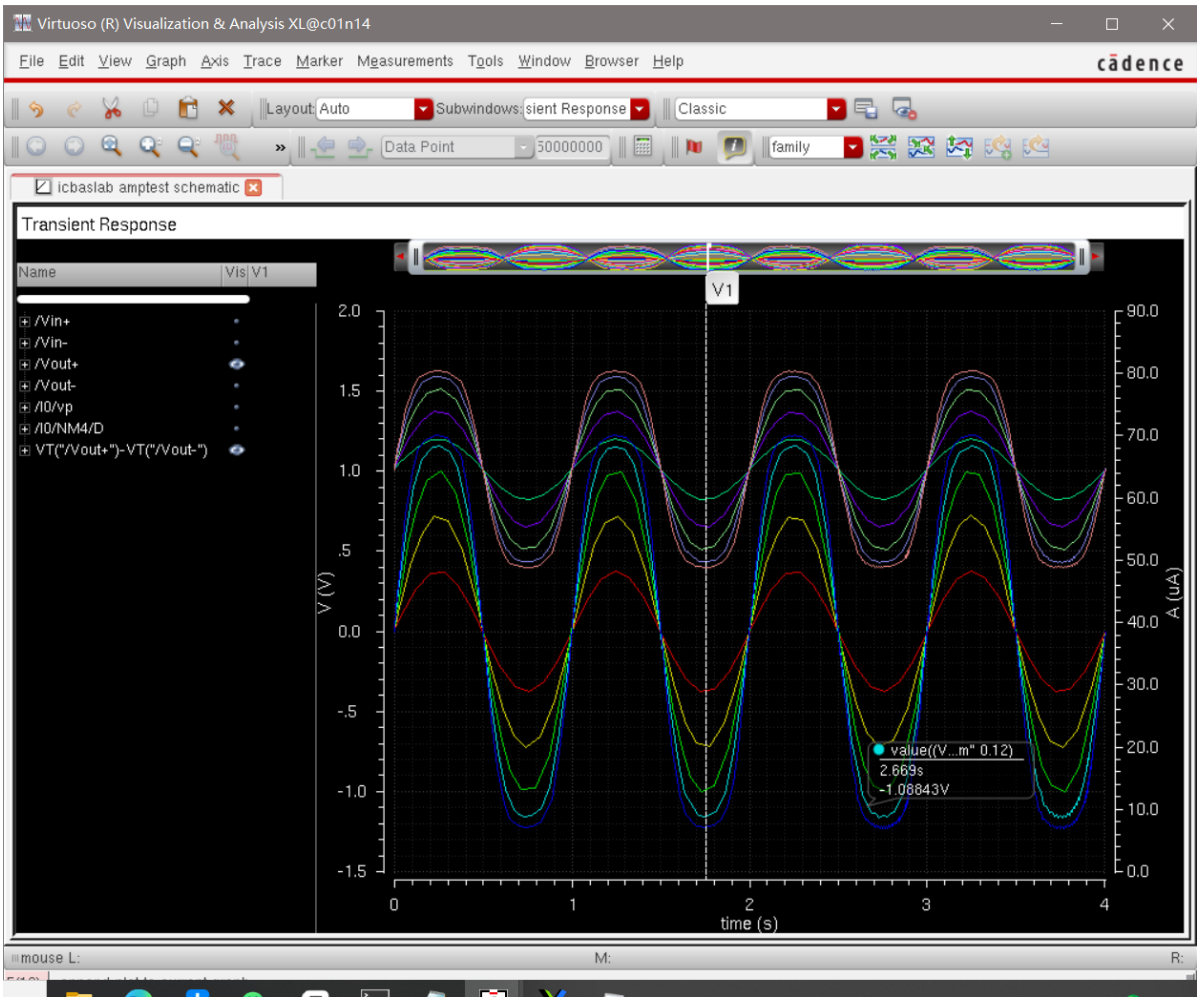

Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
icbaslab amptest schematic
Transient Response
Name Vis V1
/Vin+ 875.17mV
/Vin- 924.83mV
/Vout+ 705.838mV
/Vout- 1.31622V
/I0/vp 331.82mV
/I0/NM4/D 68.4007uA
V1
68.4007uA
1.31622V
924.83mV
875.17mV
705.838mV
331.82mV
1.754s
V (V)
A (uA)
time (s)
mouse L:
M:
R:


Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
icbaslab amptest schematic
Transient Response
Name Vis V1
/Vin+ 875.22mV
/Vin- 924.775mV
/Vout+ 706.46mV
/Vout- 1.3156V
/I0/vp 331.8094mV
/I0/NM4/D 68.362uA
V1
875.22mV
924.775mV
706.46mV
1.3156V
331.8094mV
68.362uA
1.752s
V (V)
V (mV)
A (uA)
time (s)
mouse L:
M:
R:

对正弦信号幅度 Am 参数进行扫描分析：

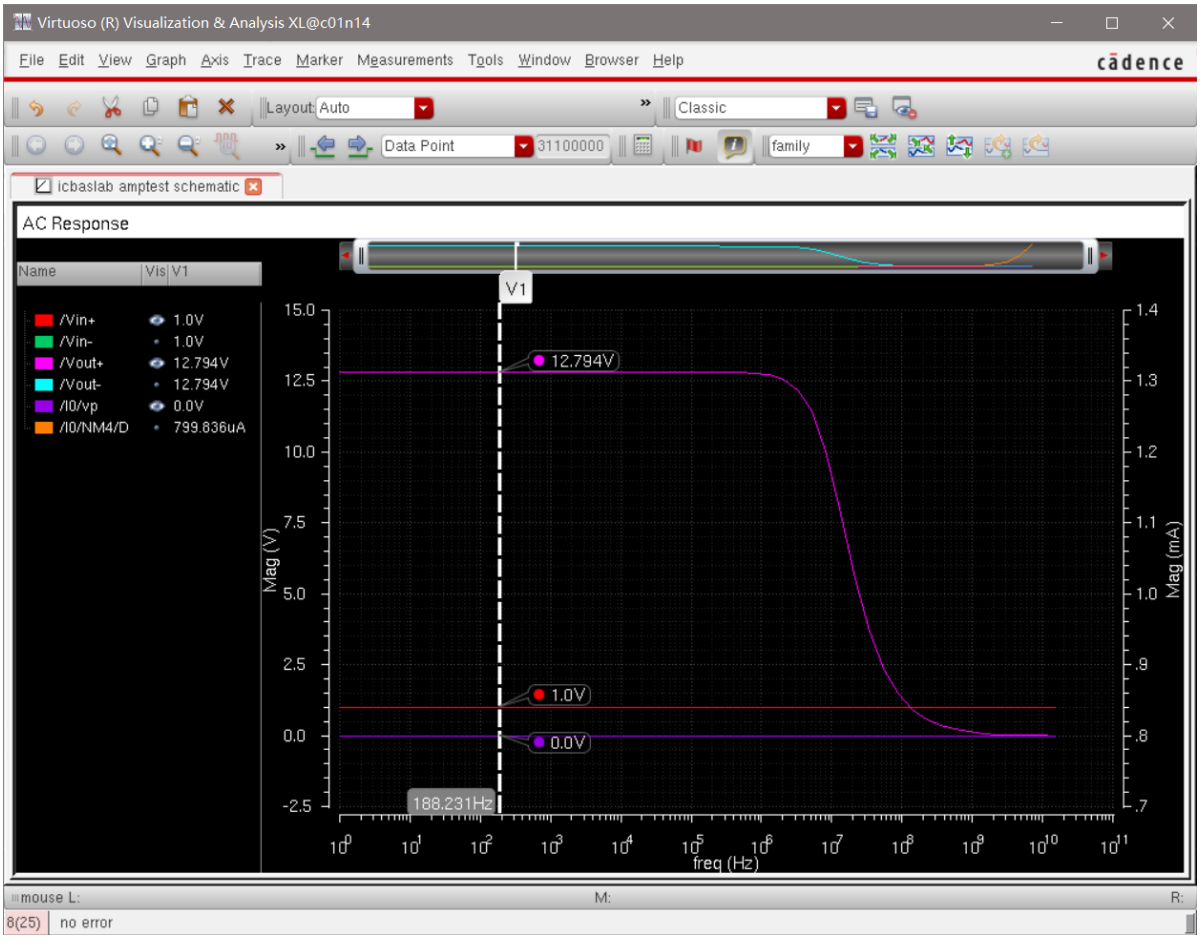




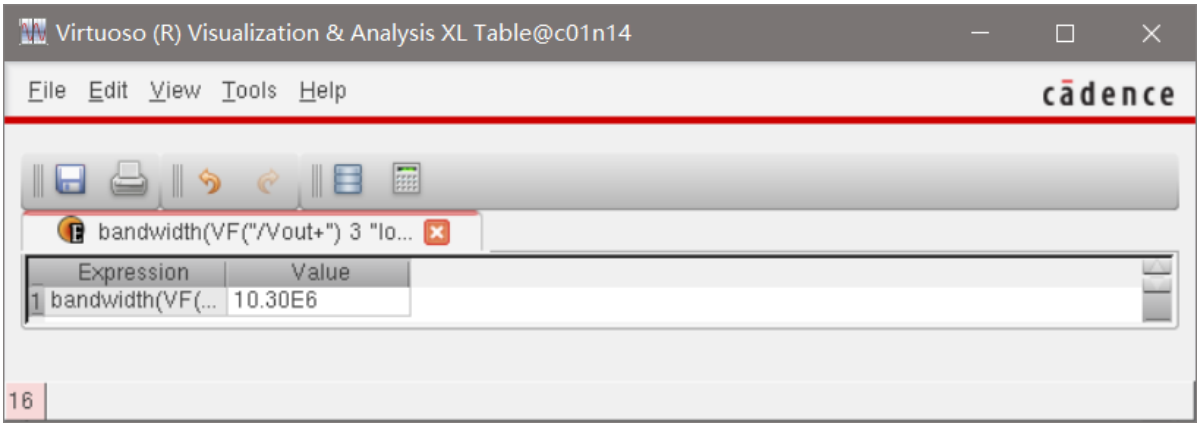

Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
Layout: Auto
Subwindows: sient Response
Classic
Data Point
family
icbaslab amptest schematic
Transient Response
Name
Vis
V1
/Vin+
/Vin-
/Vout+
/Vout-
/I0/vp
/I0/NM4/D
VT("/Vout+")-VT("/Vout-")
V1
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
V (V)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
A (uA)
value((V...m" 0.12)
2.669s
-1.08843V
0
1
2
3
4
time (s)
mouse L:
M:
R:

AC仿真

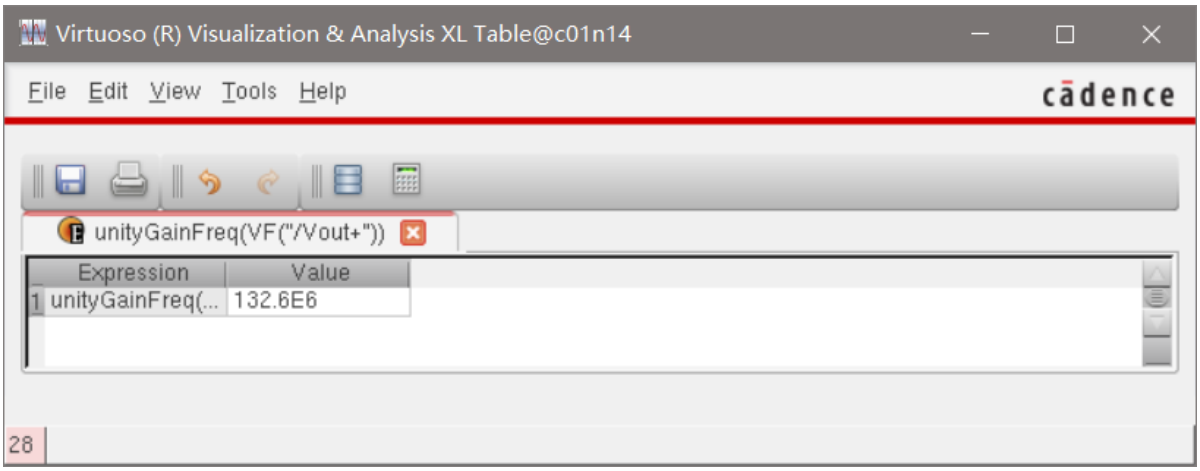
ac仿真结果：


Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
Layout: Auto
Classic
Data Point
31100000
family
icbaslab amptest schematic
AC Response
Name
Vis
V1
/Vin+ 1.0V
/Vin- 1.0V
/Vout+ 12.794V
/Vout- 12.794V
/I0/vp 0.0V
/I0/NM4/D 799.836uA
V1
12.794V
1.0V
0.0V
188.231Hz
15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
Mag (V)
1.4
1.3
1.2
1.1
1.0
.9
.8
.7
Mag (mA)
freq (Hz)
mouse L:
M:
R:
8(25)
no error

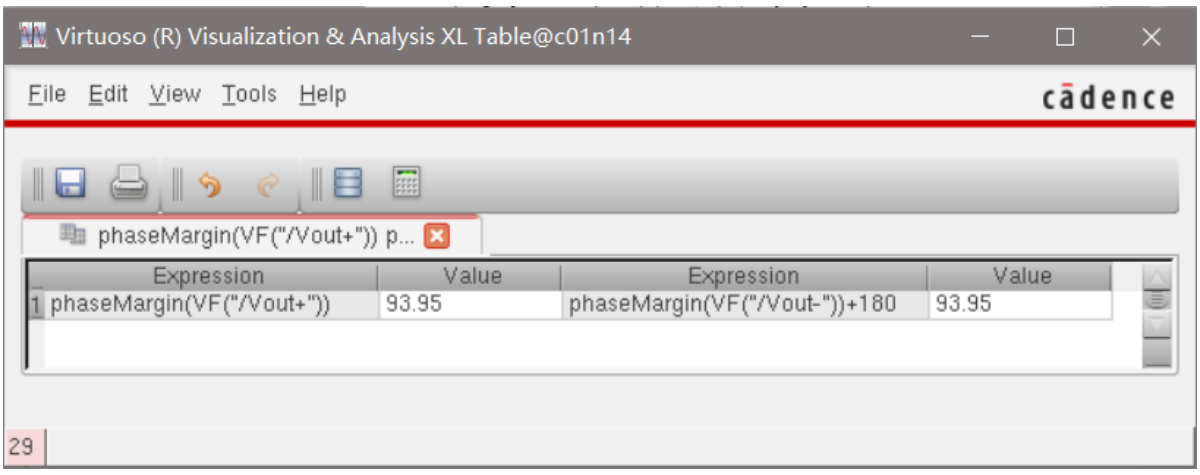
3dB带宽：



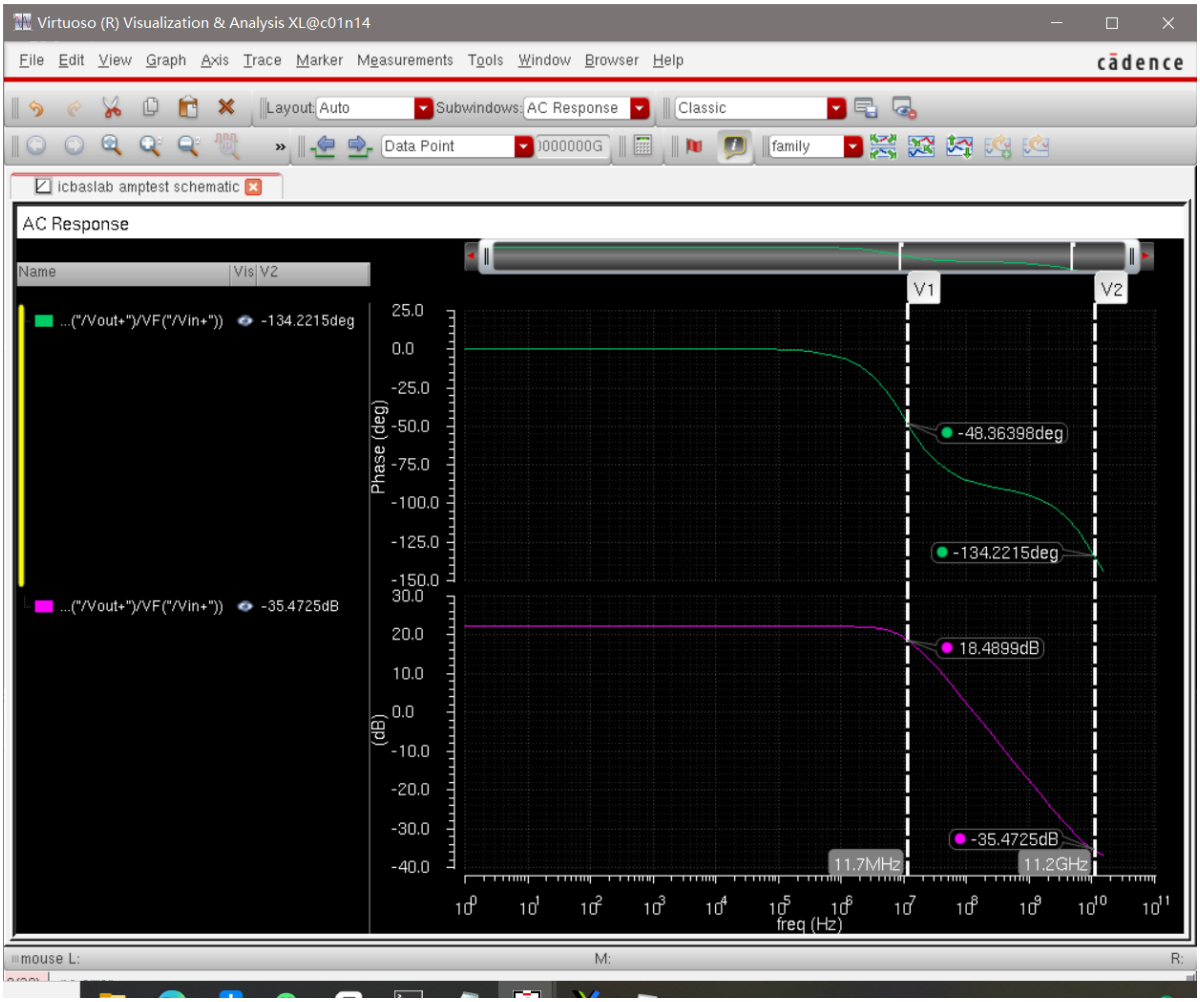
单位增益带宽：



相位裕度：



幅频与相频曲线：



零极点仿真

零极点分析：

Poles (Hz)

	Real	Imaginary	Qfactor
1	-1.01775e+07	0.00000e+00	5.00000e-01

Zeros (Hz)
at V(Vout+,Vout-)/V2

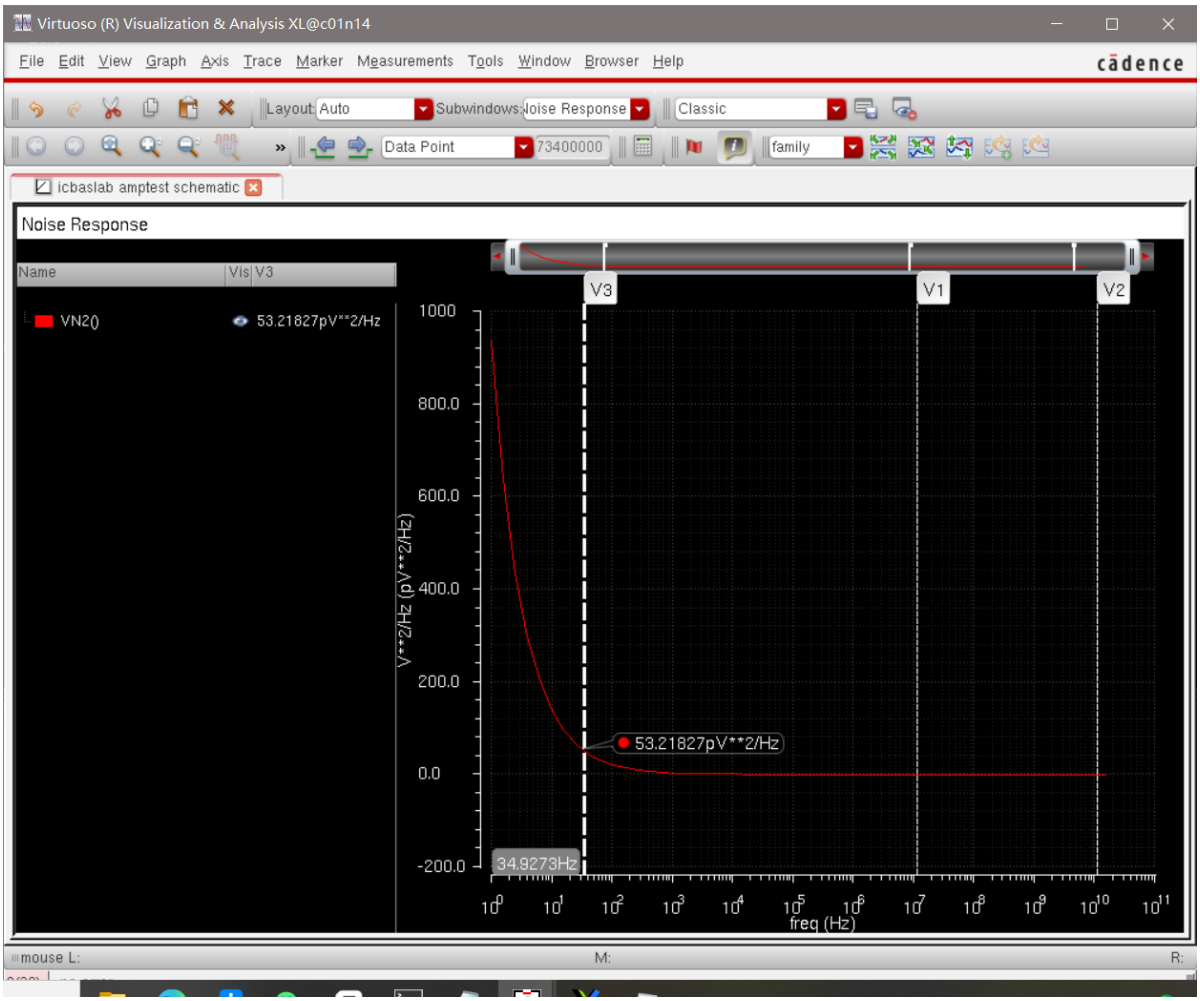
	Real	Imaginary	Qfactor
1	1.12068e+10	0.00000e+00	-5.00000e-01

Constant factor = 1.16108e-02

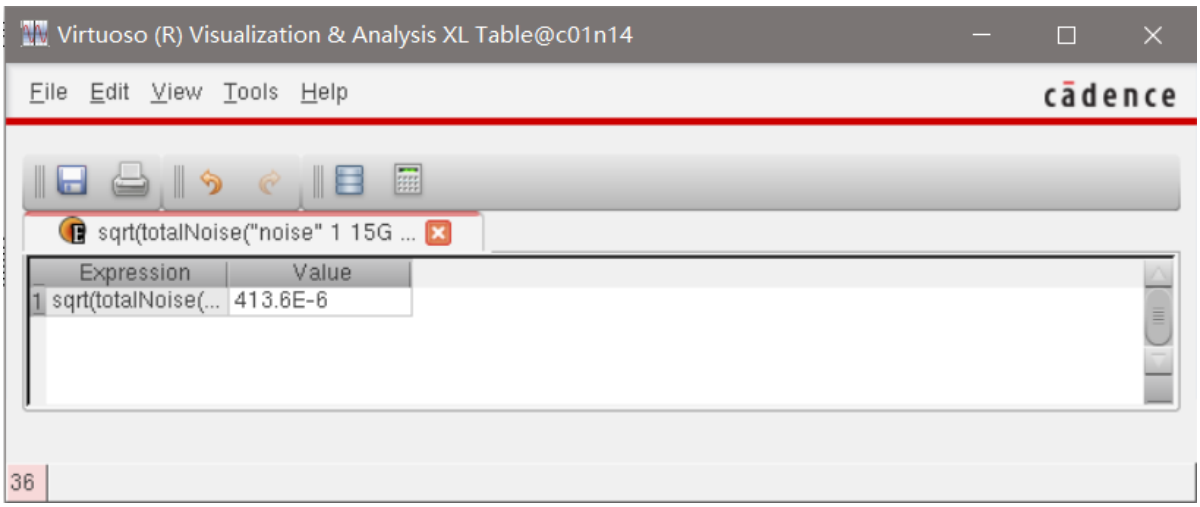
DC gain = 1.27851e+01

噪声仿真

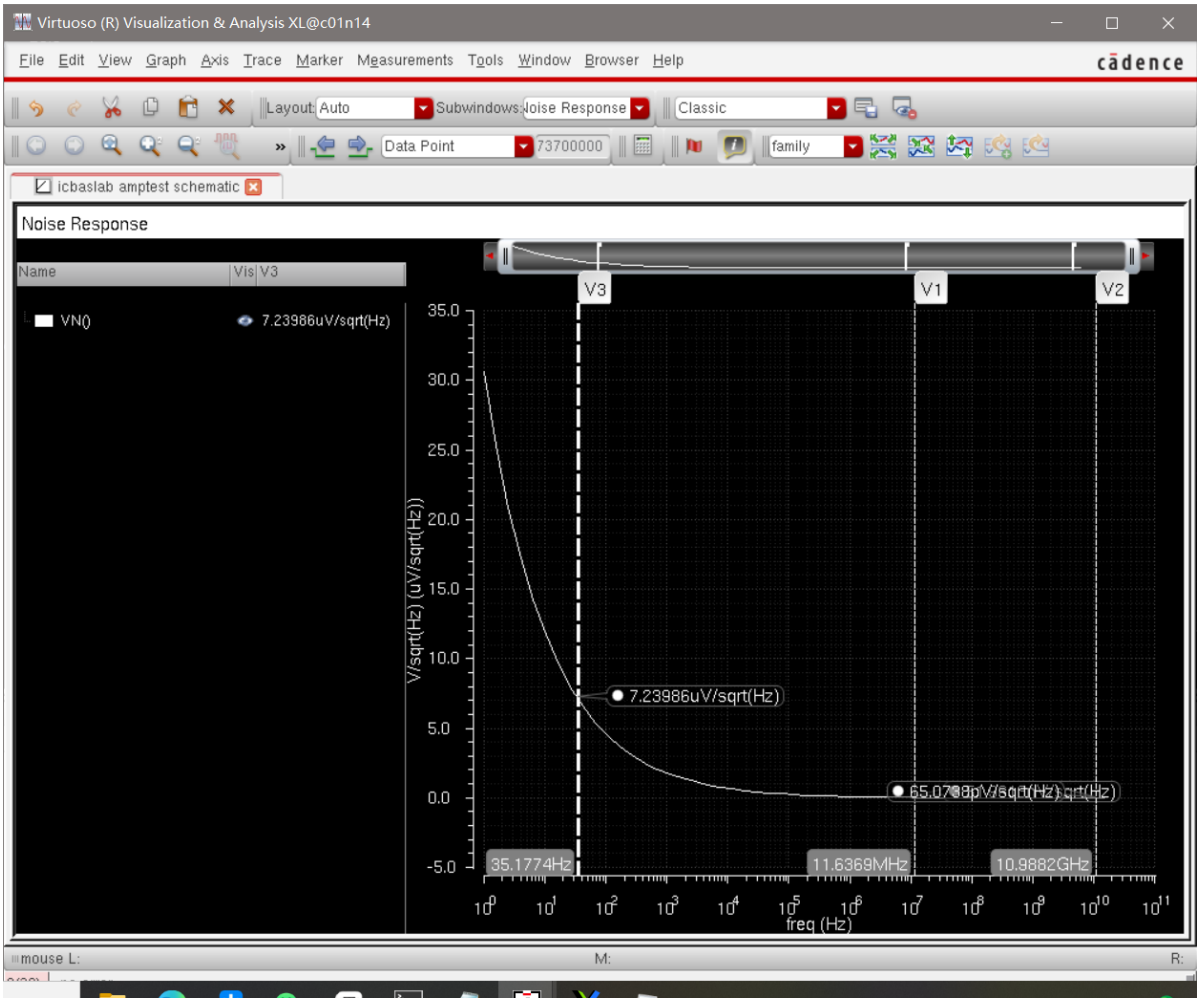
噪声分析：


Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
Layout Auto
Subwindows
Classic
Data Point
73400000
family
icbaslab amptest schematic
Noise Response
Name
Vis
V3
VN2()
53.21827pV**2/Hz
V3
V1
V2
1000
800.0
600.0
400.0
200.0
0.0
-200.0
(zHz**A0) zHz**A
53.21827pV**2/Hz
34.9273Hz
freq (Hz)
mouse L:
M:
R:

输出噪声电压：


Virtuoso (R) Visualization & Analysis XL Table@c01n14
File Edit View Tools Help
cadence
sqrt(totalNoise("noise" 1 15G ...
Expression
Value
1 sqrt(totalNoise(...
413.6E-6
36

输出噪声电压谱：


Virtuoso (R) Visualization & Analysis XL@c01n14
File Edit View Graph Axis Trace Marker Measurements Tools Window Browser Help
cadence
Layout Auto Subwindows Noise Response Classic
Data Point 73700000 family
icbaslab amptest schematic
Noise Response
Name Vis V3
VN() 7.23986uV/sqrt(Hz)
V3
V1
V2
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
V/sqrt(Hz) (uV/sqrt(Hz))
7.23986uV/sqrt(Hz)
35.1774Hz
11.6369MHz
10.9882GHz
freq (Hz)
mouse L:
M:
R: