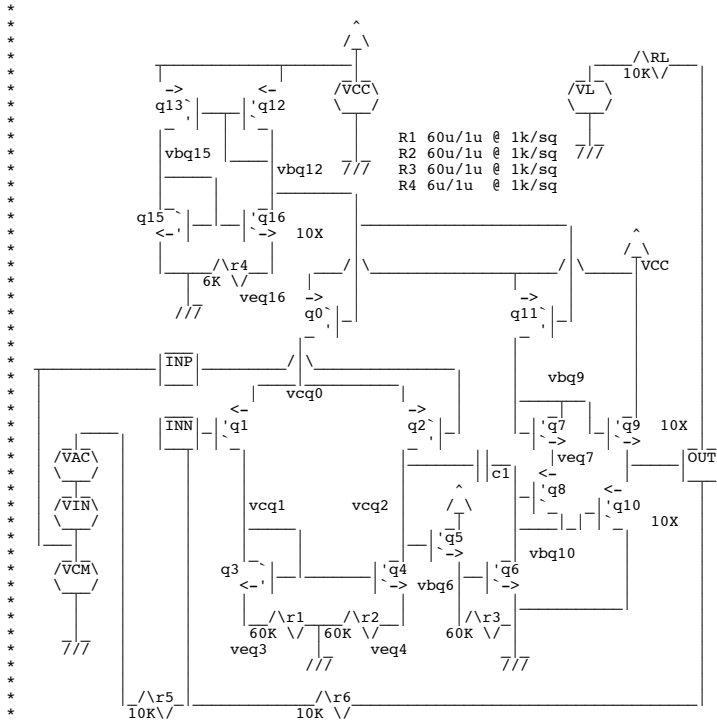


Auto_Corner_Checker



=====
-----NETLIST-----

```

*-----NETLIST-----*
.OPTIONS GMIN=1e-15 METHOD=gear ABSTOL=1e-15 TEMP=27 ITL1=600
*-----*
*V_DC_NUM NODE_P NODE_N DC VALUE
*-----*
VCC VCC 0 DC 5
VCM INP 0 DC 1.5
VIN VIN INP DC 1u
VAC VAC VIN AC 1m DC 0
VL VL 0 DC 1
*-----*
*Q_NUMB NCOL NBASE NEMIT NSUB MODEL AREA
*-----*
q13 vbg15 vbg12 Vcc pnpl 1
q12 vbg12 vbg12 Vcc pnpl 1
q15 vbg15 vbg15 0 npnv 1
q16 vbg12 vbg15 veq16 npnv 10
q0 vcq0 vbg12 Vcc pnpl 1
q11 vbg9 vbg12 Vcc pnpl 3
q1 vcq1 INN vcq0 pnpl 1
q2 vcq2 INP vcq0 pnpl 1
q3 vcq1 vcq1 veq3 npnv 1
q4 vcq2 vcq1 veq4 npnv 1
q5 Vcc vcq2 vbg6 npnv 1
q6 vbg10 vbg6 0 npnv 3
q7 vbg9 vbg9 veq7 npnv 1
q9 Vcc vbg9 OUT npnv 10
q8 vbg10 vbg10 veq7 pnpl 1
q10 0 vbg10 OUT pnpl 10
*-----*
*R_NUMB NODE1 NODE2 RVALUE MODEL L=VAL W=VAL
*-----*
r1 veq3 0 RMODEL L=60u W=1u
r2 veq4 0 RMODEL L=60u W=1u
r3 vbg6 0 RMODEL L=60u W=1u
r4 veq16 0 RMODEL L=6u W=1u
c1 vcq1 vbg10 5p
r5 VAC INN 10k
r6 OUT INN 10k
r1 OUT VL 10k

```

=====
-----SIMULATION-----
* 2 SupplyVoltages X 3 Temperatures X 2 PNPL beta X 2 ResOhmperSq = 24 Datasheet tests

```

.control
set outfile = "OpAmpCornerData.txt"
echo "OpampCornerTester" > $outfile

foreach processval 1 2 3
echo "-----PROCESS_CHANGE-----" >> $outfile
if ( $processval = 2 )
alter @rmodel[rsh] = 1100
end
if ( $processval = 3 )
alter @pnpl[bf] = 120
end
let npnbf = @nnpv[bf]
let npnvaf = @nnpv[vaf]
let pnpbf = @pnpl[bf]
let pnpvaf = @pnpl[vaf]
let resq = @rmodel[rsh]
echo "nnpbf=$nnpbf npnvaf=$nnpnvaf pnpbf=$pnpbf pnpvaf=$pnpvaf Resq=$resq" >> $outfile

```

```

foreach tempval -25 27 125

```

```

set temp = $tempval
foreach vsval 1 2
echo
if ( $vsval = 1 )
op
*DC SOURC1 VSTART VSTOP VSTEP SOURC2 START2 STOP2 STEP2
=====
dc vcm 1.5 1.501 .001 vcc 5 5.001 .001
end
***<-- if $vsval
if ( $vsval = 2 )
dc vcm 1.5 1.501 .001 vcc 10 10.001 .001
end
***<-- if $vsval

let TT = @q1[temp]
let Vs = VCC[0]
let Vcmm = INP[0]
let Vout = OUT[0]
let Is = -vcc#branch[0]
let Iin = (@q1[ib] + @q2[ib])/2
let Ioff = abs(@q2[ib]-@q1[ib])
let vos = INP[0]-INN[0]
let avos = abs(INP[0]-INN[0])
let Cmr = -db(abs(INP[0]-INN[0]-INP[1]+INN[1]))-60
let Psrr = -db(abs(INP[0]-INN[0]-INP[2]+INN[2]))-60
let Iout = (OUT[0]-VL[0])/10000
echo
echo "Temp_C= $&TT Vcc=$&Vs Vcm=$&Vcmm Vout=$&Vout Iout=$&Iout Is=$&Is" >> $outfile
echo "vos = $&vos Iin = $&Iin Ioff=$&Ioff Cmr_db=$&Cmr Psrr_db=$&Psrr " >> $outfile
if ( avos > 1m or Iin > 1u or Ioff > 1u or cmr < 90 or psrr < 90 )
"spec failure #####" >> $outfile
***<-- if avos > 1m etc....

*DC SOURC1 VSTART VSTOP VSTEP SOURC2 START2 STOP2 STEP2
=====
dc vin lu 1001u .001 v1 -29 31 30
let Avol = -db(abs(INP[2]-INN[2]-INP[3]+INN[3]))-60
let Ioutn = (OUT[0]-VL[0])/10000
let Ioutp = (OUT[4]-VL[4])/10000
echo
echo "Avol_db=$&Avol Ioutn = $&Ioutn Ioutp = $&Ioutp" >> $outfile
if ( Avol < 80 or Ioutn < 2m or Ioutp > -2m )
"spec failure #####" >> $outfile
***<-- if Avol < 80u etc....

*AC DECADE NUMDEC FSTART FSTOP
=====
ac dec 2 .1Meg 10Meg
let GBW = mag(out[0]/inn[0])/10
let Pmarg = phase(inn[2]) -phase(out[2])
echo
echo "GBW_MHz = $&GBW Pmarg_deg = $&Pmarg " >> $outfile

end **** <--foreach vsval
end **** <--foreach tempval
end **** <--foreach processval

echo "done"
.endc

```

```

=====MODELS=====
*
.model RMODEL R (RSH=1000 TC1= 0.00138 TC2=0.0000000078 )

.model npnv npn (
+IS=1E-15 NF=1.0 BF=150 VAF=200 IKF=6e-03
+CJE=1.7E-13 CJC=1.8E-13 CJS=2.9E-12 TF=1.6E-9
+XTB=2 EG=1.11 XTI=10 TNOM=25

.model pnp1 pnp (
+IS=7.91E-17 NF=1.01 BF=150 VAF=200 IKF=0.002
+CJE=1.7E-13 CJC=1.8E-13 CJS=2.9E-12 TF=1.6E-9
+XTB=2 EG=1.11 XTI=7 TNOM=25 )

.end

```