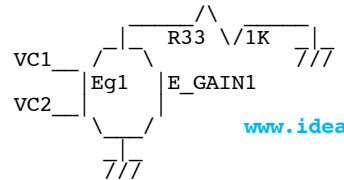
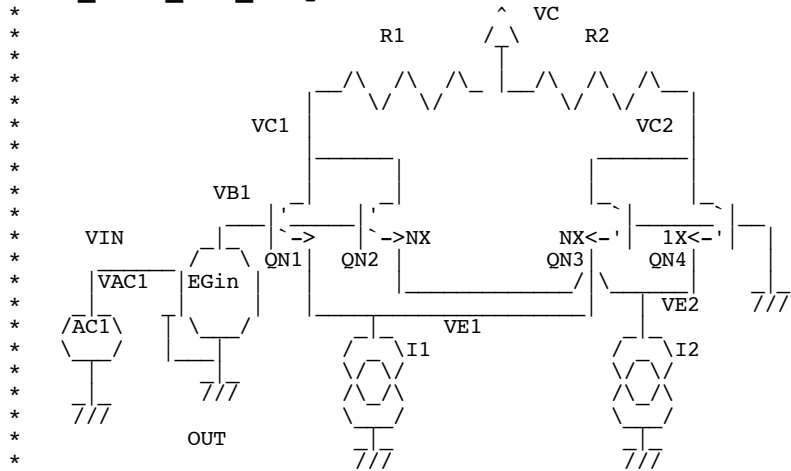


DUAL_DIFF_Thd_Temp



www.idea2ic.com dsauersanjose@aol.com 4/15/08

```
.OPTIONS GMIN=1e-18 METHOD=trap srcsteps = 1 gminsteps = 1
=====
VCC      VC      0      DC      10
VAC1     VIN     0      DC      0      SIN( 0      1      1000 )
I1       VE1     0      1u
I2       VE2     0      1u
QN1      VC1     VB1     VE1     NPN1   1.00
QN2      VC1     VB1     VE2     NPN1   4.25
QN3      VC2     0       VE1     NPN1   4.25
QN4      VC2     0       VE2     NPN1   1.00
R1       VC1     VC      52K
R2       VC2     VC      52K
E_GAIN1  OUT     0       VC1     1
E_GAININ VB1     0       VIN     0      1m
```

```
.control
tran      25u      5m      0      1u
plot      out
echo      "THD% versus VIN_vpk "
setplot   new
set       NameList = (      Nx4 Nx4pt25 Nx4pt5 Nx5 )
compose   NxVals   values  4  4.25  4.5  5
compose   VinVals  values  10m 15m 20m 22m 25m 30m 32m 35m 40m 43m 45m 50m 55m 60m 70m 80m 90m
settype   voltage   VinVals
let       NoOfNx   = length(NxVals)
let       NoOfVin  = length(VinVals)
```

```
begin
unset    interrupt
* =====Loop_Nx=====
let      j      = 1
while    (j      <= NoOfNx )
let      Nx     = NxVals[j-1]
alter    QN2   area = $&Nx
alter    QN3   area = $&Nx
set      thisName = $NameList[$&j]
let      $thisName = 0*vector(NoOfVin)

* =====Loop_Vin=====
let      k      = 1
while    (k      <= NoOfVin )
let      Vin    = VinVals[k-1]
alter    e_gainin gain = $&Vin
tran     25u    5m    0    1u
linearize
set      specwindow= "blackman"
spec     200    8k    200    v(out)
let      thdsq = mag(out[9])^2 +mag(out[14])^2 +mag(out[19])^2 +mag(out[24])^2
let      thd_percent= 100*sqrt(thdsq)/mag(out[4])
echo     "$&unknown.Vin      $&thd_percent"
let      unknown.{ $thisName}[unknown.k-1] = thd_percent
```

```

repeat          3
destroy
end
if              ($?interrupt)
goto           bail
endif
let            k =          k + 1
endwhile
setscale      VinVals
plot          $NameList loglog title "DUAL_DIFF THD_% vs Vin_pK and Nx"
let          j =          j + 1
endwhile
label        bail
echo        "Done."
end
.endc

```

```

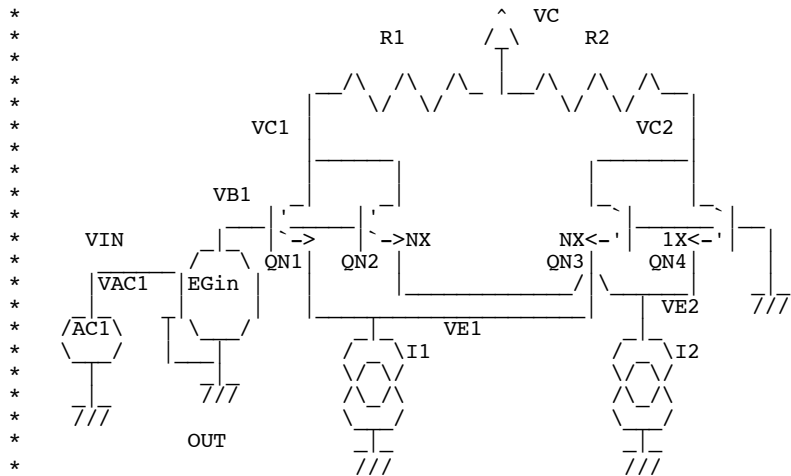
=====
.model      NPN1      NPN(      BF=2100 VAF=216 )
.model      PNP1      PNP(      BF=2100 VAF=21 )
.end

=====END_OF_SPICE=====

```

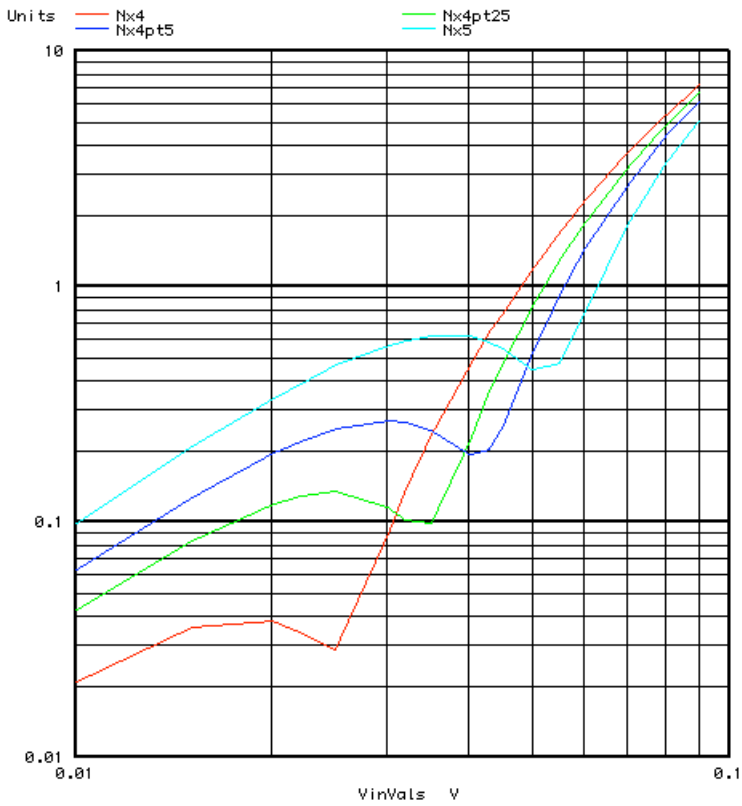
To Covert PDF to plain text click below
<http://www.fileformat.info/convert/doc/pdf2txt.htm>

**This simulation only works on MacSpice for now.
Data in spice apparently gets stored in vectors which
are ready to be plotted.**



In an attempt to improve the distortion of a differential input stage it was found that two offsetted differential input stages would be connected in parallel such that there is some distortion cancelation taking place. The amount of offset is a mater of taste. This simulation plots distortion as a input voltage and scaling. The results are shown below. For instance with a scale factor of 5, the 1 % input level can be increased to 65mVs which is certainly much better than the 18mV level for a normal differential input stage.

Graph 133 - unknown1452: DUAL_DIFF THD_% vs Vin_pK and Nx



While this input stage goes a long way in reducing the need for a pre-distortion stage, neither the overall effects of offset and noise are reduced because of there is an addition of more transistors.