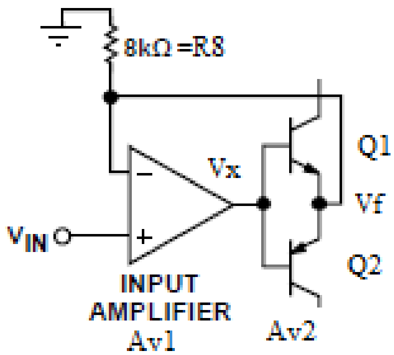
I will not be deriving the following two formulas as its very easy to do that,
Voltage Gain of Emitter Follower,

$$A_V = \frac{\left(g_m + \frac{1}{r_e}\right)}{\left(g_m + \frac{1}{r_e} + \frac{1}{r_o} + \frac{1}{R_L}\right)}$$

Current gain of Common base, $I_{out} = g_m V_{in}$

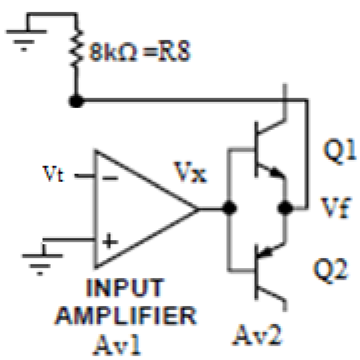
The AD746 ckt for the High Z AC coupled mode.



If Q1 operates, Q2 remains in cutoff and vice-versa. Av2 is same for both polarity of inputs and Q1=Q2.

The open loop gain without feedback is, $A_{OL} = \frac{V_f}{V_x} \times \frac{V_x}{V_{in}} = A_{V1}A_{V2}$

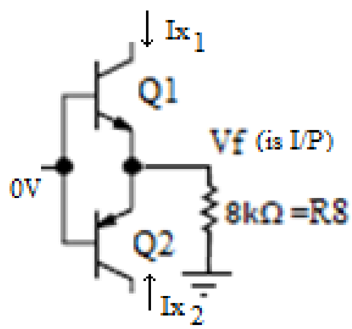
Q1 and Q2 acts as emitter follower for input at Vx. $A_{V2} = \frac{\left(g_{m1} + \frac{1}{r_{e1}}\right)}{\left(g_{m1} + \frac{1}{r_{e1}} + \frac{1}{r_{o1}} + \frac{1}{R_L}\right)}$



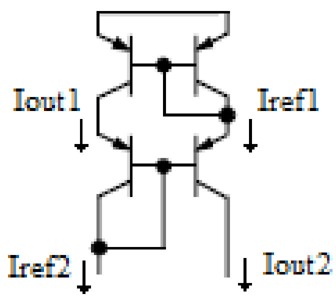
The loop gain = $A\beta = \frac{V_f}{V_t} = -A_{V1}A_{V2}$

Thus the closed loop gain, $\frac{V_f}{V_{in}} = A_{CL} = \frac{A_{OL}}{1 - A_{LG}} = \frac{A_{V1}A_{V2}}{1 + A_{V1}A_{V2}} \approx 1$ As Av1 >> 1

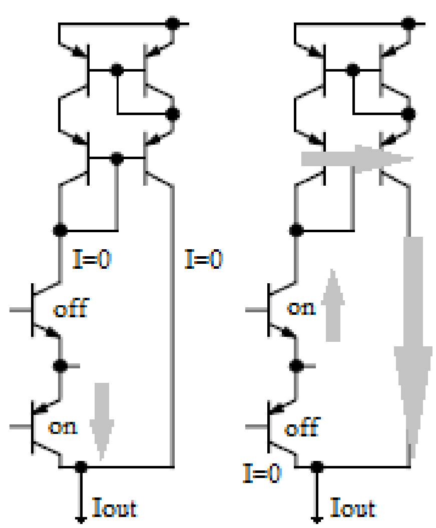
Thus Vf follows Vin and Vx remains at 0V.



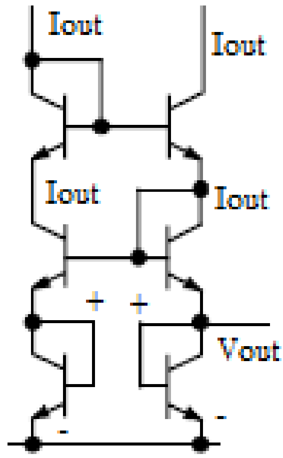
In this common base mode the output currents are,
When Vin = +|Vin|, Ix1 = 0 and Ix2 = -gm1|Vin|
When Vin = +|Vin|, Ix2 = 0 and Ix1 = gm1|Vin|



This is a bootstrapped current mirror. If we say beta >> 1 and Ib is negligible, all the four currents are same. Like Iref1 = Ix, Iout1 will be Ix due to current mirroring. Applying KCL, Iref2 will also be Ix. This makes Iout2 = Ix due to mirroring, which finally keeps Iref1 as Ix obeying KCL.



The current paths for two each cycle is shown in grey arrows. This arrangements gives rectified current Iout = gm1|Vin|

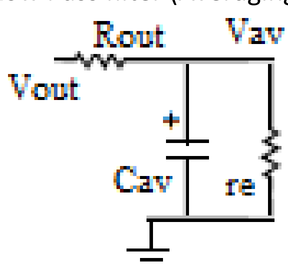


Yet another bootstrapped current mirror on top of two diode-connected loads. The input current in the loads are gm1|Vin|

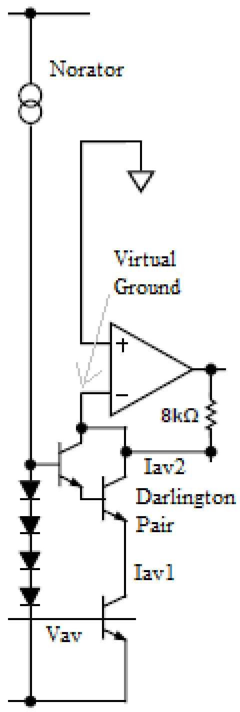
Small signal analysis gives, $V_{out} = \dfrac{I_{in}}{g_{m2} + \dfrac{1}{r_{e2}} + \dfrac{1}{r_{o2}}}$ where suffix 2 denotes the load transistor.

Thus we get, $$V_{out} = \frac{g_{m1}|V_{in}|}{g_{m2} + \dfrac{1}{r_{e2}} + \dfrac{1}{r_{o2}}}$$

Low Pass filter (Averaging) filter,

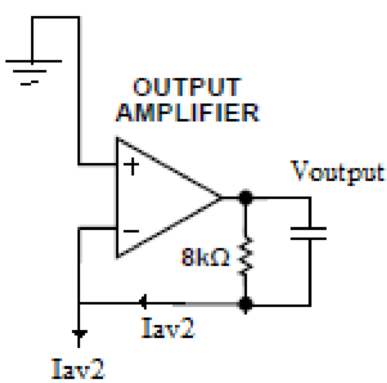


$Vav(s) = \dfrac{r_e}{r_e + R_{out} + sC_{av}r_eR_{out}} V_{out}(s)$ The ILT of this thing will be some integration which will do the average. Re is emitter resistance f next stage and Rout is Vout/Iin given in previous paragraph.



Norator supports arbitrary voltage and current across it.

This stage is a common emitter followed by a Darlington pair. $I_{av1} = g_{m5}V_{av}$ and $I_{av2} = \beta_6{}^2 g_{m5}V_{av}$
Here beta6 is the beta of each transistor in Darlington pair and gm5 is transconductance of common emitter.



$$V_{output} = R_8 I_{av2} = \beta_6{}^2 g_{m5} R_8 \left[AVG\left(\frac{g_{m1}|V_{in}|}{g_{m2} + \frac{1}{r_{o2}} + \frac{1}{r_{e2}}} \right) \right]$$

CF at output can be used for further smoothing of output.