A low power operational amplifier is widely used as a bio-potential amplifier where it is used to amplify and filter extremely weak bio-potential signals. The first block is an input differential amplifier and it was designed to provide very high input impedance, low noise and also high gain. The output is single ended so that the rest of the op-amp did not contain symmetrical differential stage and since the transistors is operating in the saturation region, there is an appropriate dc voltage difference between input and the output signals of the input stage. Second block will perform level shifting, added gain and single to ended conversion. Level shifting is needed to compensate for dc voltage change occurring in the input stage so that an appropriate dc bias can be assured for the following stages. The added gain is used to provide gain or an additional amplification to the input stage as it is not sufficient. The conversion to single ended signal is performed in a subsequent stage as in some circuits, the input stage has a differential output. Proposed design specification are:

Gain greater than 60dB; GBW equal to 30MHz; Phase Margin greater than 60 degrees; VDD equal to 1.8V; Load capacitance equal to 2pF; Length of the transistor equal to 500nm.

Our main region of interest is Gain and Phase Margin in our analysis. Our simulation results show us that Gain is somewhere between 90 to 95 dB and phase margin is nearly equal to 60 degrees. This shows that our designed circuit is strictly following all our proposed design specification.