In this paper, we study the effect of different bridges on the electronic and optical properties of four organic small molecules based on thieno[3,2-b]indole with D-π-A-π -D structure as a core considering to use them as a potential donor with PCBM in bulk heterojunction (BHJ) solar cells using together DFT and TD-DFT methods. The obtained results would give insight for developing more efficient organic molecule for BHJ solar cells which would help for designing and synthetizing new incoming materials. Moreover, the band gap energy and the maximum absorption wavelength can also be considered as key results for this system to be used in photovoltaics.