Integrated circuits have shown a dramatic increase in the frequency of operation in recent years, up to tens of GHz. At GHz level frequencies, interdigitated capacitors suffer severe parasitic effects, making the accurate modeling of these devices more difficult. To aid in their design, the most common tool available for accurate modeling is numerical EM solvers. However, their use is often very time consuming and computationally very expensive. This report proposes a lumped pi-model representation of the interdigitated capacitor that is accurate up to and including the first resonant frequency of the device. Based upon the Partial Element Equivalent Circuit (PEEC) distributed model, approximations are made to simplify the distributed model down to a more useful pi-lumped circuit model that enables the designer to visualize the parasitic impedances that each device experiences. Although other lumped circuit models are outlined in the literature, in most of them the component values are determined using empirically derived or approximated formulas. The method in this paper is more rigorous and physically derived, using the partial capacitance matrix and partial inductance matrix, along with a resistance matrix that takes into account the skin effect.