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(54) **SUBSTRATE GEOMETRY FOR THREE DIMENSIONAL PHOTOVOLTAICS FABRICATION**

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(57) **ABSTRACT**

A thin film photovoltaic device with back contacts is disclosed. The thin film photovoltaic device may comprise 1) a first contact disposed in a first layer and having an upper surface and a lower surface; 2) a first semiconductor disposed in a second layer and having a lower surface disposed on the upper surface of the first contact; 3) an insulator or second semiconductor disposed in a third layer and on an upper surface of the first semiconductor; 4) a second contact disposed in a fourth layer and on the insulator or second semiconductor; and 5) an absorber disposed in a fifth layer and about the second contact. The absorber may comprise a p-type or a n-type semiconductor and the first semiconductor may comprise the other of the p-type and n-type semiconductor. The second contact may be patterned.

