PHOTOVOLTAIC CELL AND LAMINATE METALLIZATION

TECHNICAL FIELD

[0001] Embodiments of the subject matter described herein relate generally to photovoltaic assemblies including solar cells, photovoltaic laminates and photovoltaic modules. More particularly, embodiments of the subject matter relate to photovoltaic laminates and fabrication processes.

BACKGROUND

[0002] Solar cells are well known devices for converting solar radiation to electrical energy. They can be fabricated on a semiconductor wafer using semiconductor processing technology. A photovoltaic cell or a solar cell includes P-type and N-type diffusion regions. Solar radiation impinging on the solar cell creates electrons and holes that migrate to the diffusion regions, thereby creating voltage differentials between the diffusion regions. In a backside contact solar cell, both the diffusion regions and the metal contact fingers coupled to them are on the backside of the solar cell. The contact regions and contact fingers allow an external electrical circuit to be coupled to and be powered by the solar cell. Solar cells can be packaged into a photovoltaic laminate using various processes and encapsulant materials, where photovoltaic laminates can be further packaged to into a photovoltaic module. One or more embodiments pertain to photovoltaic cells or solar cells and photovoltaic laminate fabrication processes.

SUMMARY

[**0002a**] In a first aspect, the present disclosure provides a photovoltaic laminate comprising: a first solar cell; a first continuous metal layer with a first plurality of contact fingers, a second plurality of contact fingers, and an interconnect, the interconnect of the first continuous metal layer being between the first plurality of contact fingers and the second plurality of contact fingers of the first continuous metal layer; and a second continuous metal layer forming a first plurality of contact fingers, a second plurality of contact fingers, and an interconnect, the interconnect of the second continuous metal layer being between the first plurality of contact fingers and the second plurality of contact fingers of the second continuous metal layer, the first plurality of contact fingers of the

second continuous metal layer being interdigitated with the first plurality of contact fingers of the first continuous metal layer on a backside of the first solar cell.

[0002b] In a second aspect, the present disclosure provides a photovoltaic laminate comprising: a first solar cell; a first contact finger having a first end on a backside of the solar cell; a second contact finger having a first end on the backside of the solar cell; and a third contact finger having a first end on the backside of the solar cell, wherein the first end of the first contact finger, the first end of the second contact finger, and the first end of the third contact finger are alternately arranged on the backside of the first solar cell.

[0002c] In a third aspect, the present disclosure provides a photovoltaic laminate comprising: a first solar cell; a first continuous metal layer comprising a first bus bar and a first plurality of contact fingers, the first bus bar and the first plurality of contact fingers being coupled to a backside of the first solar cell by a first plurality of metal bonds; and a second continuous metal layer comprising a second bus bar and a second plurality of contact fingers, the second bus bar and the second plurality of contact fingers being coupled to the backside of the first solar cell by a second plurality of metal bonds.

[0003] A photovoltaic laminate is disclosed. The photovoltaic laminate can include a substantially transparent layer, a first encapsulant layer on the substantially transparent layer, a solar cell and a metal foil on the solar cell. Embodiments can include a metal bond coupling the metal foil to the first solar cell. In some embodiments, the metal bond can include a metal contact region. Embodiments can also include a backing material on the metal foil and a back layer on the backing material.

[0004] A method for metallization for a photovoltaic laminate is disclosed. The method can include placing a first encapsulant on a substantially transparent layer. The