SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0007]

~~An object~~ Embodiments of the invention~~, which has been made under the above-mentioned circumstances, is~~seek to provide a solar cell and a solar cell module, featuring mitigated warpage of a solar cell substrate against high adhesive strength of distal portions of finger electrodes and possible electric conduction of a finger electrode to a bus bar electrode even if the electrodes are locally cut or broken, eventually having long-term reliability and high conversion efficiency, and maintaining high output.

SOLUTION TO PROBLEM

[0008]

~~To attain the above object,~~ Embodiments of the invention provide~~s~~ a solar cell and solar cell module as defined below.

[1] A solar cell comprising a semiconductor substrate having at least a pn junction formed therein, a multiplicity of finger electrodes which are formed in comb shape on at least one surface of the semiconductor substrate, and a plurality of bus bar electrodes which extend orthogonal to the longitudinal direction of the finger electrodes and are connected to the finger electrodes, wherein

first finger electrodes which are connected to a first bus bar electrode are spaced apart from second finger electrodes which are connected to a second bus bar electrode extending parallel with the first bus bar electrode, and longitudinal ends of adjacent two or more of the finger electrodes connected to each bus bar electrode are electrically connected together by an auxiliary electrode.

The solar cell in embodiments of the invention may eliminates drawbacks associated with breaks of finger electrodes and may offers a high fill factor, high conversion efficiency, mitigated cell warpage, improved manufacture yield, least cost increase, and long-term reliability. The solar cell module comprising such solar cells hasmay have a high percent output retention.

BRIEF DESCRIPTION OF DRAWINGS

[0010]

[FIG. 1] FIG. 1 is a cross-sectional view showing the construction of a conventional solar cell.

[FIG. 2] FIG. 2 is a plane view showing an electrode pattern on the front surface of the conventional solar cell.

[FIG. 3] FIG. 3 is a plane view showing an electrode pattern on the back surface of the conventional solar cell.

[FIG. 4] FIG. 4 is a plane view showing an electrode pattern on the front surface of a prior art solar cell.

[FIG. 5] FIG. 5 is a plane view showing an electrode pattern on the front surface of a solar cell in one embodiment of the invention.

[FIG. 6] FIG. 6 is a plane view showing an electrode pattern on the front surface of a solar cell in another embodiment of the invention.

[FIG. 7] FIG. 7 is a plane view showing a modified example (1) of the electrode pattern on the front surface of the solar cell of FIG. 5.

[FIG. 8] FIG. 8 is a plane view showing a modified example (2) of the electrode pattern on the front surface of the solar cell of FIG. 5.

[FIG. 9] FIG. 9 is a schematic cross-sectional view showing the basic construction of a conventional solar cell module.

[FIG. 10] FIG. 10 illustrates how to evaluate warpage of a solar cell.