CLAIMS:

1. A solar cell comprising a crystalline silicon substrate having at least a p-n junction, a passivation film formed thereon, and electrodes formed thereon by printing and heat treating a conductive paste, characterized in that

the electrodes include a first electrode ~~which is~~ formed ~~such that~~ as an extraction electrode which may contact the silicon substrate for extracting photogenerated carriers from the silicon substrate, and a second electrode ~~which is~~ formed on the first electrode ~~such that a~~ as extraction and collector electrodes having a higher conductivity than the first electrode, wherein the first electrode is entirely overlaid with the second electrode, the collector electrode portion of the second electrode may contact the first electrode for collecting the carriers drawn in the first electrode, and the second electrode and the silicon substrate contact only partially or nowhere ~~at least~~ outside the point of contact between the first and second electrodes.

2. The solar cell of claim 1 wherein the area of the non-contact portion between the collector electrode portion of the second electrode and the silicon substrate, excluding the area of a contact portion between the first electrode and the collector electrode portion of the second electrode~~s~~, accounts for at least 20% of the area equal to the area given by the width and the overall length of the collector electrode portion of the second electrode minus the area of a contact portion between the first electrode and the collector electrode portion of the second electrode~~s~~.

~~3. The solar cell of claim 1 or 2 wherein the first electrode is partially contacted or entirely overlaid with~~

~~the second electrode.~~

3. The solar cell of claim 1 or 2 wherein the first electrode is entirely overlaid with the extraction electrode portion and a part of the collector electrode portion of the second electrode.

4. The solar cell of any one of claims 1 to 3 wherein the first electrode is formed from a conductive paste containing B, Al, Ga, P, As , In or Sb alone or a compound thereof, and a region having a high concentration of the element diffused therein is included in the silicon substrate beneath the first electrode.

5. The solar cell of any one of claims 1 to 4 wherein the passivation film comprises silicon oxide, silicon nitride, silicon carbide, aluminum oxide, amorphous silicon, microcrystalline silicon or titanium oxide or a combination thereof.

6. The solar cell of any one of claims 1 to 5 wherein the collector electrode comprising the first and second electrodes combined is formed on a light-receiving surface or a non-light-receiving surface of the solar cell or both.

7. A solar cell module comprising electrically connected solar cells according to any one of claims 1 to 6.

8. A method for manufacturing a solar cell, comprising the steps of:

forming a diffusion layer on a surface of a crystalline silicon substrate to form a p-n junction,

forming a passivation film on the diffusion layer,

printing a first conductive paste containing conductive powder and glass frit on the passivation film using a printing plate having a pattern of an extraction electrode alone,

firing the printed first conductive paste to form an extraction electrode as a first electrode which penetrates through the passivation film to establish electrical conduction to the silicon substrate,

printing a second conductive paste having a less content of glass frit than the glass frit content in the first conductive paste or zero content of glass frit on the first electrode and the passivation film using a printing plate having a pattern of extraction and collector electrodes combined so as to overlie the first electrode, and

firing the printed second conductive paste to form

extraction and collector electrodes as a second electrode having a higher conductivity than the first electrode, wherein the first electrode is overlaid with the second electrode, the collector electrode portion of the second electrode may contact the first electrode for collecting the carriers drawn in the first electrode, and the second electrode and the silicon substrate contact only partially or nowhere outside the point of contact between the first and second electrodes.

9. The method of claim 8 wherein the area of the non-contact portion between the collector electrode portion of the second electrode and the silicon substrate, excluding the area of a contact portion between the first electrode and the collector electrode portion of the second electrode, accounts for at least 20% of the area equal to the area given by the width and the overall length of the collector electrode portion of the second electrode minus the area of a contact portion between the first electrode and the collector electrode portion of the second electrode.

10. The method of claim 8 or 9 wherein the glass frit content of the first conductive paste is 8 to 20% by weight, and the glass frit content of the second conductive paste is 0 to 2% by weight.

11. The method of any one of claims 8 to 10 wherein the first conductive paste contains B, Al, Ga, P, As, In or Sb alone or a compound thereof, and a region having a high concentration of the element diffused therein is formed in the silicon substrate beneath the first electrode.