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Lee et al.

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(54) **PHOTO DETECTOR**

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See application file for complete search history.

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(57) **ABSTRACT**

A photo detector is disclosed. The photo detector comprises a substrate, a flat metal layer, a dielectric layer, a patterned metal layer, and a semiconductor film. The flat metal layer is formed on the substrate. The dielectric layer is formed on the flat metal layer. The patterned metal layer is formed on the dielectric layer. The patterned metal layer comprises a first interdigitated electrode and a second interdigitated electrode. The first interdigitated electrode is adjacent to the second interdigitated electrode. The semiconductor film is formed on the dielectric layer and covering the first interdigitated electrode and the second interdigitated electrode. When the semiconductor film receives an incident light, the flat metal layer and the patterned metal layer are operated in a localized surface plasmon mode or a waveguide mode for absorbing a certain narrow bandwidth radiation light of the incident light. Therefore, the electrical conductivity of the semiconductor film is changed and the optical energy absorbed by the photo detector is determined.

42 Claims, 7 Drawing Sheets

