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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Michelle K. Lee

Director of the United States Patent and Trademark Office

(12) **United States Patent**
Peng et al.

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(54) **LED PACKAGE STRUCTURE FOR INCREASING HEAT-DISSIPATING AND LIGHT-EMITTING EFFICIENCY AND METHOD FOR MANUFACTURING THE SAME**

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(58) **Field of Classification Search** .... None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,316,822	B1 *	11/2001	Venkateshwaran et al.	257/666
2003/0210213	A1 *	11/2003	Wu	345/82
2004/0222427	A1 *	11/2004	Hsiung	257/79
2008/0029775	A1 *	2/2008	Liu et al.	257/98
2010/0327295	A1 *	12/2010	Peng et al.	257/88

* cited by examiner

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(57) **ABSTRACT**

An LED package structure for increasing heat-dissipating and light-emitting efficiency includes a substrate unit, an alloy unit, a light-emitting unit, a conductive unit and a package unit. The substrate unit has a substrate body, a first conductive pad, a second conductive pad and a chip-placing pad. The alloy unit has a Ni/Pd alloy formed on the chip-placing pad. The light-emitting unit has an LED chip positioned on the Ni/Pd alloy of the alloy unit by solidified solder ball or glue. The conductive unit has two conductive wires, and the LED chip is electrically connected to the first conductive pad and the second conductive pad by the two conductive wires, respectively. The package unit has a light-transmitting package gel body formed on the top surface of the substrate body in order to cover the light-emitting unit and the conductive unit.

17 Claims, 3 Drawing Sheets