June 8, 2018

Certification

TRANSLATION REVIEWER'S DECLARATION:

I, Hiroki Fukuyama, hereby declare:

That I possess advanced knowledge of the Japanese and English languages. I reviewed and edited the attached Japanese into English translation and, to the best of my knowledge and belief, it is a true and accurate translation of:

JP(Tokugan)2008-225408

In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent which is under review in this proceeding.

Hiroki Fukuyama

NICHIA EXHIBIT 2022
Vizio, Inc. v. Nichia Corp.
Case IPR2018-00437

[Document] Patent Application
[File Number] 12008077
[Filing Date] September 3, 2008
[Recipient] Commissioner, Japan Patent Office
[International Patent Classification]
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[Fee Notation]
[Prepayment Ledger Number] 010526
[Prepayment Amount] 15,000 yen
[Catalogue of Exhibits]

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[Document] Claims

[Claim 1]

A method of manufacturing a light emitting device having a resin package which provides an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, and in which a resin part and a lead are formed in a substantially same plane in an outer side surface,

the method comprising: a step of sandwiching a lead frame provided with notch parts, by means of an upper mold and a lower mold; a step of transfer-molding a thermosetting resin containing a light reflecting material in a mold sandwiched by the upper mold and the lower mold to form a resin-molded body on the lead frame; and

a step of cutting the resin-molded body and the lead frame along the notch parts.

[Claim 2]

The method of manufacturing a light emitting device according to claim 1, wherein plating processing is applied to the lead frame before the lead frame is sandwiched by the upper mold and the lower mold.

[Claim 3]

The method of manufacturing a light emitting device according to claim 1 or 2, wherein the notch parts in a cut part of the lead frame is about half the entire surrounding periphery or greater.

[Claim 4]

The method of manufacturing a light emitting device according to any one of claims 1 to 3, wherein a hole part is provided in the lead frame before the lead frame is sandwiched by the upper mold and the lower mold.

[Claim 5]

The method of manufacturing a light emitting device according to any one of claims 1 to 4, wherein a groove is provided in the lead frame before the lead frame is sandwiched by the upper mold and the lower mold.

[Claim 6]

The method of manufacturing a light emitting device according to any one of claims 1 to 5, wherein the upper mold and the lower mold sandwich a part of the lead frame where a light emitting element is placed or near a hole part.

[Claim 7]

A light emitting device having a resin package having an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, wherein a resin part and a lead are formed in a substantially same plane in an outer side surface, and wherein at least one surface of a bottom surface and an upper surface of a lead is plated and a part of the outer side surface of the lead is not plated.

[Claim 8]

The light emitting device according to claim 7, wherein the lead is exposed at four corners of the resin package.

[Claim 9]

The light emitting device according to claim 7 or 8, wherein four corners of the resin package are formed in an arc shape seen from a bottom surface side.

[Claim 10]

The light emitting device according to any one of claims 7 to 9, wherein a step which is lower than the outer side surface and the outer bottom surface of the lead is provided in the lead.

[Claim 11]

A method of manufacturing a resin package having an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, wherein a resin part and a lead are formed in a substantially same plane in an outer side surface, the method comprising:

a step of sandwiching a lead frame provided with notch parts, by means of an upper mold and a lower mold;

a step of transfer-molding a thermosetting resin containing a light reflecting material in a mold sandwiched by the upper mold and the lower mold to form a resin-molded body on the lead frame; and

a step of cutting the resin-molded body and the lead frame along the notch parts.

[Claim 12]

The method of manufacturing a resin package according to claim 11, wherein plating processing is applied to the lead frame before the lead frame is sandwiched by the upper mold and the lower mold.

[Claim 13]

A resin package having an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, wherein a

resin part and a lead are formed in a substantially same plane in an outer side surface, and wherein at least one surface of a bottom surface and an upper surface of the lead is plated, and the outer side surface of the lead is not plated.

[Claim 14]

A method of manufacturing a resin-molded body having an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, wherein a plurality of concave parts are formed, and in which a part of a lead frame is exposed in inner bottom surfaces of the concave parts, the method comprises:

a step of sandwiching the lead frame by means of an upper mold which has convex parts in positions where the concave parts adjacent in the resin-molded body are molded and a lower mold, the lead frame being provided with notch parts;

a step of transfer-molding a thermosetting resin containing a light reflecting material in a mold sandwiched by the upper mold and the lower mold to fill the thermosetting resin in the notch parts, and

forming the resin-molded body on the lead frame.

[Claim 15]

A resin-molded body having an optical reflectivity equal to or more than 70% at a wavelength between 350 nm and 800 nm after thermal curing, wherein a plurality of concave parts are formed, and in which a part of a lead frame is exposed in inner bottom surfaces of the concave parts, wherein the lead frame is provided with notch parts in which a thermal curing resin forming a resin-molded body is filled, and wherein a side wall portion is provided between the adjoining concave parts.

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