UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
NICHIA CORPORATION,
Petitioner,
v.
DOCUMENT SECURITY SYSTEMS, INC.,
Patent Owner.
CASE NO. IPR2018-00966
U.S. Patent No. 7,652,297

## PETITIONER'S DEMONSTRATIVE EXHIBITS



## Nichia Corporation

V.

Document Security Systems, Inc. IPR2018-00966 (U.S. Patent No. 7,652,29)

**ORAL ARGUMENT - JULY 30, 2019** 



## U.S. PATENT NO. 7,652,297

(12) United States Patent Hon et al.

US 7,652,297 B2 (45) Date of Patent: Jan. 26, 2010

(54) LIGHT EMITTING DEVICE

(75) Inventors: Lee Kee Hon, Penang (MY); Tan Kheng Leng, Fort Collins, CO (US); Lee Chiau Jin, Fort Collins, CO (US); Ng Keat Chuan, Fort Collins, CO (US) Oon Slang Ling, Fort Collins, CO (US): Ong Klam Soon, Fort Collins, CO (US)

(73) Assignee: Avago Technologies ECBU IP (Singapore) Pte. Ltd., Singapore (SG)

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 103 days. (\*) Notice:

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(22) Filed:

Prior Publication Data Mar. 12, 2009 US 2009/0065793 A1

(51) Int. Cl. H01L 27/15 

257/82, 91, 99, 100, 116, 117, 432-437, 257/749, E33.056-E33.059, E25.032 See application file for complete search history.

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Primary Examiner-Fernando L Toledo Assistant Examiner-Mamadou Diallo

ABSTRACT

A light emitting device is disclosed herein. An embodiment of the light emitting device comprises a substrate and a reflector extending from the substrate. The reflector forms a cavity in conjunction with the substrate. A light emitter is located in the cavity. At least one first recessed portion is located in the reflector, the at least one first recessed portion extends substantially axially around the reflector.

17 Claims, 2 Drawing Sheets

(10) Patent No.:

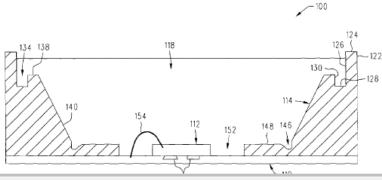
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(45) Date of Patent:

Jan. 26, 2010

## LIGHT EMITTING DEVICE

Filed: Sep. 11, 2007





## **CLAIMS 1-17 ARE UNPATENTABLE**

Claims	Prior Art Grounds
1-6	Anticipated by Loh '842
	Obvious over Loh '842
	Anticipated by Loh '819
	Obvious over Loh '819 alone, or alternatively, with Andrews, if not co- incorporated by reference
9	Obvious over Loh '842
	Obvious over Loh '819 alone, or alternatively, with Andrews, if not co- incorporated by reference
7-8, 10-17*	Obvious over Loh '842 and Fujiwara or Uraya
	Obvious over Loh '819 and Fujiwara or Uraya, or alternatively, with A if not considered incorporated by reference
	9

<sup>\*</sup>It is not disputed that claims 10-17 rise and fall with claims 1-9



## CLAIMS 1-9

- A light emitting device comprising:
- a substrate;
- a reflector extending from said substrate, said reflector forming a cavity in conjunction with said substrate;
- a light emitter located in said cavity; and
- at least one first notch located in said reflector, said at least one first notch extending substantially axially around said reflector, said at least one first notch being formed by a first wall and a second wall wherein said first wall and said second wall extend substantially perpendicular to said substrate.
- 2. The light emitting device of claim 1 and further comprising an encapsulant located in said cavity, wherein said encapsulant is also located in said at least one first notch.
- 3. The light emitting device of claim 1, wherein said reflector has an upper portion and a lower portion, said lower portion being located proximate said substrate, said at least one first notch being located proximate said upper portion.
- 4. The light emitting device of claim 1, wherein said reflector has an upper portion and a lower portion, said lower portion being located proximate said substrate, said at least one first notch being located proximate said lower portion.
- 5. The light emitting device of claim 1, wherein said light emitter is electrically connected to said substrate.

- 6. The light emitting device of claim 1, wherein tor comprises a slanted portion that intersects wherein said platform is located proximate said so wherein said at least one notch is located at the in said slanted portion and said platform.
- 7. The light emitting device of claim 1, where strate comprises at least one recessed portion a said light emitter is located on said at least or portion.
- 8. The light emitting device of claim 7 and fi prising an adhesive located in said at least one re tion, said adhesive serving to bond said light em substrate.
- 9. The light emitting device of claim 1, wherein tor comprises:
  - a first wall extending substantially perpendic substrate:
  - a first platform extending from said first wall;
  - a second wall extending from said first platform said first wall, the space between said first w second wall constituting one of said at least
  - a second platform extending from said second the center of said light emitting device;
  - a slanted portion extending from said secon toward said substrate; and
  - a third platform located on said substrate and said slanted portion;
  - wherein a second of said at least one notch is lo intersection of said third platform and said





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