

(19) **United States**
 (12) **Patent Application Publication** (10) **Pub. No.: US 2024/0213202 A1**
 Davis et al. (43) **Pub. Date: Jun. 27, 2024**

(54) **ENCAPSULANT-DEFINED LAND GRID ARRAY (LGA) PACKAGE AND METHOD FOR MAKING THE SAME**

(71) Applicant: **Deca Technologies USA, Inc.**, Tempe, AZ (US)

(72) Inventors: **Robin Davis**, Vancouver, WA (US);
Craig Bishop, Scottsdale, AZ (US);
Paul R. Hoffman, San Diego, CA (US);
Clifford Sandstrom, Richfield, MN (US)

H01L 2224/2105 (2013.01); *H01L 2224/214* (2013.01); *H01L 2224/215* (2013.01); *H01L 2924/01013* (2013.01); *H01L 2924/01022* (2013.01); *H01L 2924/01028* (2013.01); *H01L 2924/01029* (2013.01); *H01L 2924/01046* (2013.01); *H01L 2924/01047* (2013.01); *H01L 2924/0105* (2013.01); *H01L 2924/01074* (2013.01); *H01L 2924/01079* (2013.01)

(21) Appl. No.: **18/389,741**

(22) Filed: **Dec. 19, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/435,211, filed on Dec. 23, 2022.

Publication Classification

(51) **Int. Cl.**
H01L 23/00 (2006.01)
H01L 21/56 (2006.01)
U.S. Cl.
 CPC *H01L 24/19* (2013.01); *H01L 21/568* (2013.01); *H01L 24/20* (2013.01); *H01L 23/3135* (2013.01); *H01L 2224/19* (2013.01);

(57) ABSTRACT

A method and related structure for a encapsulant defined land grid array (LGA) may comprise a semiconductor chip comprising conductive studs disposed over an active layer of the semiconductor chip, and a first encapsulant disposed around at least a portion of sidewalls of the conductive studs. A surface of the first encapsulant and conductive studs may be planarized. Conductive traces may be disposed over the encapsulant and coupled with the conductive studs. A dielectric layer may be disposed adjacent the conductive traces. LGA pads may be coupled with the conductive traces. A second encapsulant may be disposed over the dielectric layer and the LGA pads. A planar surface may be formed comprising the second encapsulant around the LGA pads and attachment areas on or over the LGA pads. The plurality of attachment areas may be coplanar or recessed the planar surface.

