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Semiconductor IC Package EMI Shield using Bare Die

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I. OVERVIEW

- Critical semiconductor integrated circuits (IC) packages like that of Fig. 1 have signals that are sensitive to electromagnetic interference (EMI), consequently affecting and degrading the functionality of the input/output (I/O) signals

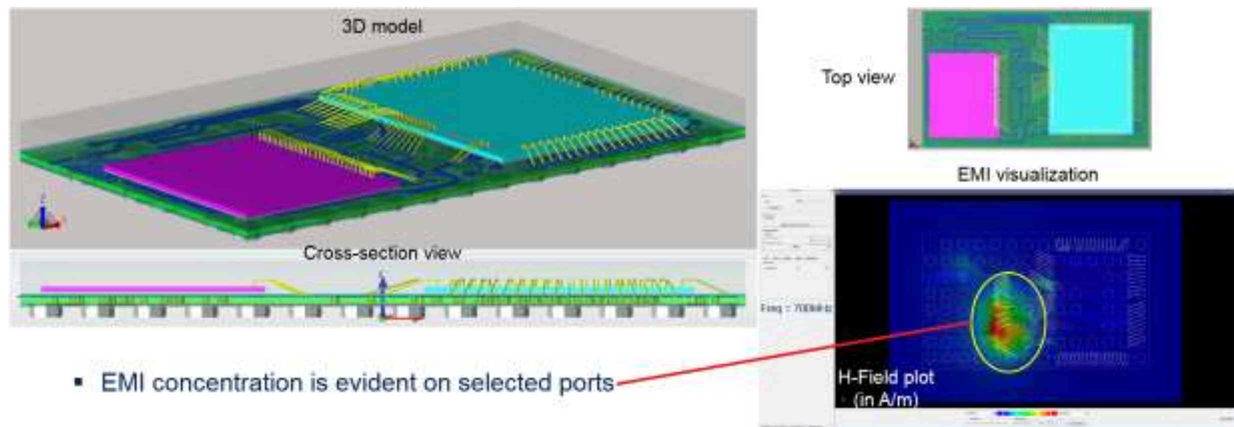

Fig. 1. Example of semiconductor IC package with EMI problem.

II. PACKAGE DESIGN SOLUTION AND IMPROVEMENT

- A bare die with top-side metallization is employed on top of the active die and effectively used as an EMI shield
- The bare die is wirebonded from its top-side metallization to the metal trace on the substrate, which is then connected to the ground signal (GND, VSS, or equivalent) of the semiconductor IC package

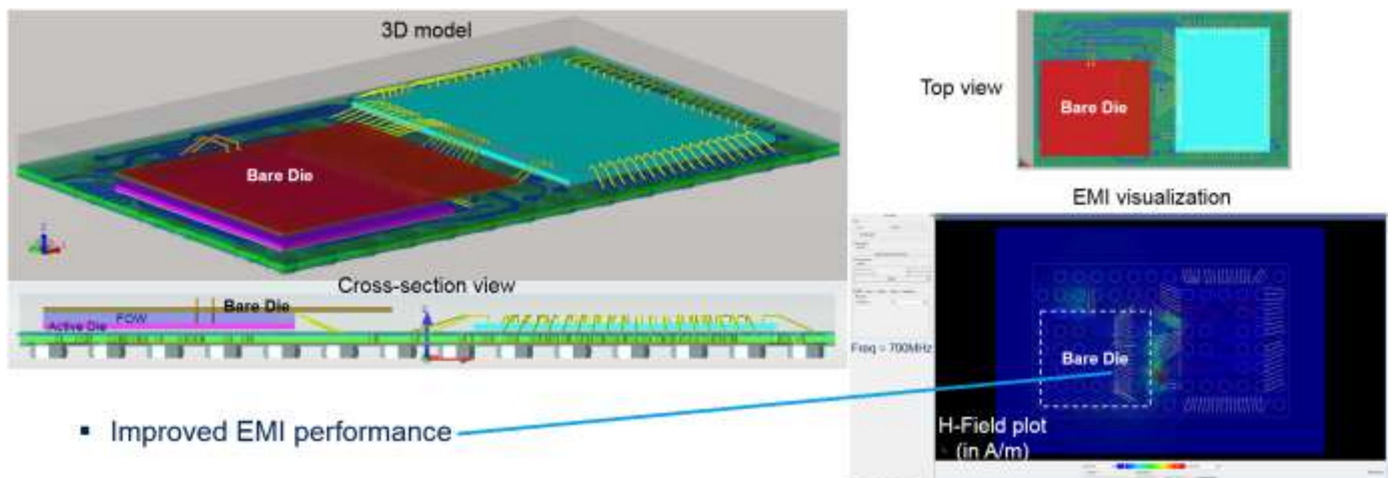

Fig. 2. Improvement on EMI shielding or protection.

- The GND-connected bare die provided EMI protection, covering the active die, wirebonds, metal traces, and nearby components
- Package electrical modeling and simulation confirmed the results of the improvement on EMI shielding performance of the semiconductor IC package

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