

# Bridge-Type Stacked Die EMI Shield for Multi-Die Substrate-Based Packages

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**Abstract**—The paper presents an enhancement on the semiconductor substrate-based package design for improved electromagnetic interference (EMI) protection.

**Keywords**— EMI; bridge-type stacked die; substrate; semiconductor.

## I. PROBLEM IDENTIFICATION

- Some semiconductor packages have signals that are sensitive to electromagnetic interference (EMI), eventually affecting and degrading the functionality of the signals and of the end product

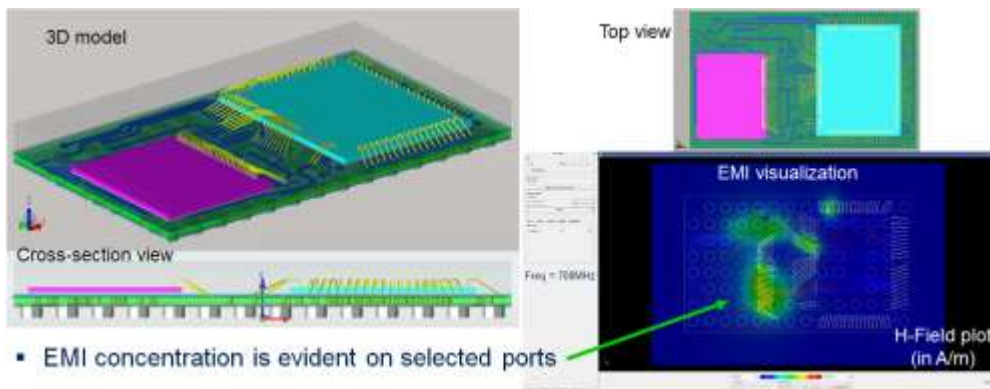


Fig. 1. Sample substrate-based package with EMI problem.

## II. PACKAGE DESIGN IMPROVEMENT

- A bare die with top-side metallization implemented in a bridge-type stacked dice configuration placed on top of two or more active dice is 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 package

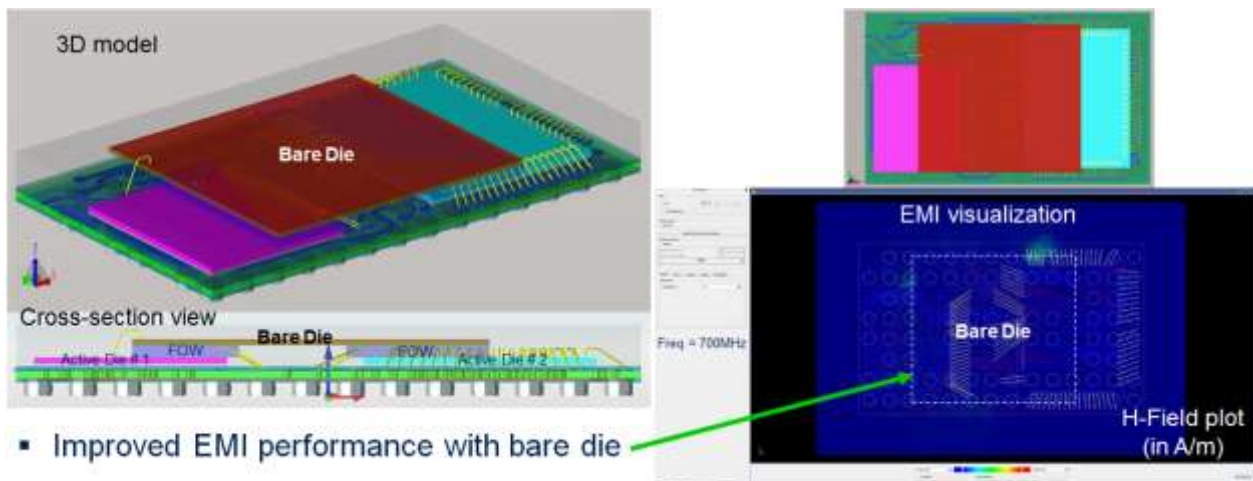


Fig. 2. Improvement on EMI protection.

- Package electrical modeling simulation results confirmed the improvement on EMI shielding performance of the package