



1



1 *Distribution of the electric field strength: finger close to the sensing electrode and extraction of L and C possible*

## SIMULATION OF ELECTRIC PARASITICS AND FIELDS

### Simulation opportunities

- Parasitic electric effects – extraction of capacitance, conductance, inductance and resistance matrices
- Electric and electromagnetic simulation
- Circuit simulation of complex power electronics
- Simulations not limited to power electronics

### Parasitic extraction

- 3D and 2D extraction of parasitics in electronic packaging
- Computation of the capacitance, conductance, inductance and resistance matrices
- Generation of a netlist by extracted LCR parameters of any design, for instance SML or SPICE format
- Calculation of the inductance and capacitance values of PCB or standard power module designs as well as of sensors and other similar applications

### Fraunhofer IISB

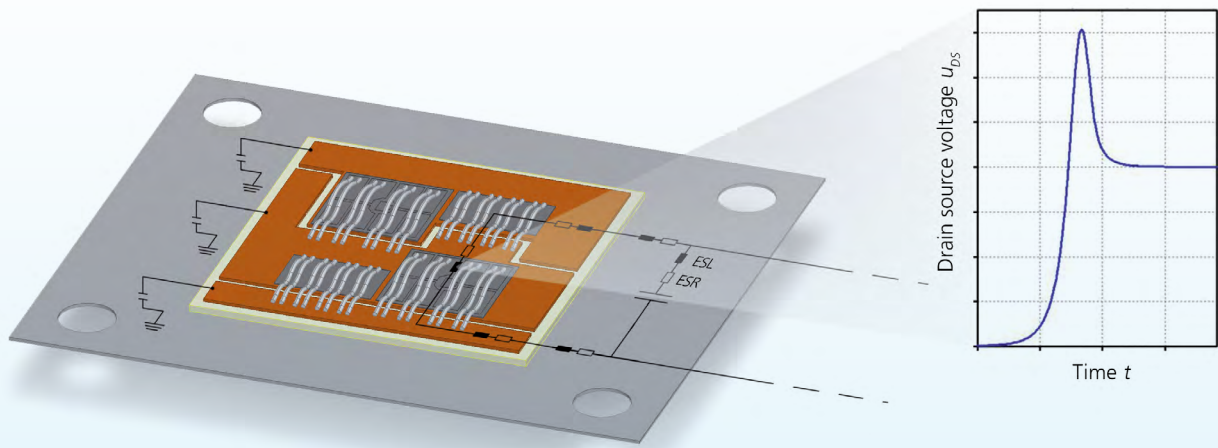
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2

### Circuit simulation

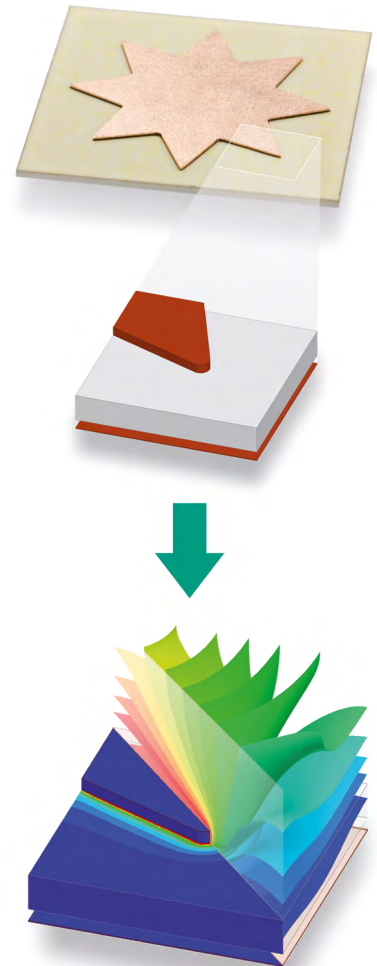
- Circuit simulation of power modules, for instance half-bridge or commutation cells
- Circuits based on designed layouts, the extracted parasitics serve as input parameters
- Realistic answers of the system to applied voltage and current wave forms

### Electric and electromagnetic simulation

- Static and transient simulations (2D and 3D)
- Electric field strength distribution
- Identification of critical areas on the modules due to enhancement of the electric field strength
- Parametric studies of dependencies with respect to the field distribution
- Electromagnetic losses in high frequency applications
- Wide parameter studies of power coupling through coils
- Illustration of the magnetic field distribution

### Software used for simulation

Always up-to-date versions of simulation software for multiphysics and electromagnetic simulation, for instance ANSYS Emag, Maxwell, Q3D



3

2 Parasitic extraction (inductance, capacitance) of a power module as input parameter for circuit simulation - turn off overshoot due to the inductance (right)

3 Star-shaped copper on a ceramic (DCB) and the simulated electric field strength (left) and the electric potential (right) due to an applied voltage on the upper copper layer