

Patented Technology:

Wafer-Level Switching Parameter (Ton/Toff etc.) Testing Solution for SiC/IGBT

Power discrete devices traditionally only required DC parameter testing (sometimes with avalanche and gate resistance tests) at the wafer level, with little demand for switching parameter testing. Even when such testing was needed, it was typically conducted at the final product testing stage, not during wafer probing.

However, with evolving technological requirements, a large number of bare dies are now used directly in the assembly of power switching modules. This demands that both the DC and Switching parameters of the bare dies meet module specifications. Furthermore, to improve the overall switching performance of the modules, it is necessary to match the AC and DC parameters of the individual dies. As a result, AC parameter testing at the die level has become an essential step.

Currently, the double-pulse method is widely used for testing the switching parameters of power devices, as it has broad applicability. However, this method faces inherent challenges when applied to wafer-level AC parameter testing, especially for switching characteristics. Accurate switching parameter testing of power devices requires extremely low stray inductance in the main test loop—typically below 50 nH, otherwise, large current and high-speed switching can generate significant voltage spikes. These spikes, caused by stray inductance, not only compromise data accuracy but also pose risks to the device itself.

Our solution innovatively utilizes neighbour dies as part of the test loop, which keeps inductance variations (i.e., stray inductance) minimal and controlled throughout the double or multi-pulse testing process. Combined with specially designed probes and probe cards, this enables mass testing of switching parameters at the wafer level (as illustrated below). This approach eliminates the need for expensive, inefficient, and complex mechanical KGD (Known Good Die) solutions. Please contact us if you are interested to know more about this solution.

