

R2POWER

Preparation of R2 extension to 300mm for BCD Smart Power and Power Discrete

STMicroelectronics srl, Italy

Smart Power BCD technology is the combination of Bipolar, CMOS and DMOS devices on the same IC. This technology has been a market winner during the last decade as BCD includes a large set of product's families shaped in different voltage/current range allowing to serve a variety of application domains, from high voltage industrial application, to high current in automotive and peripherals, motor drivers, LED drivers for luminaires, and power drivers for MEMS.

Actually, the tough market competition combined with a significant pressure on price (thus margin erosion) are setting the stage for the next technology wave, which will require huge strategic investments to push forward both the technology and the manufacturing facilities. In short, we need to make the technology and the manufacturing fab ready to move from 200mm to 300mm wafer size.

The transition to 300mm will shape up for Power Discrete devices as well, i.e. IGBT and power MOSFET, whose rising volume's demand and large device's area are even more demanding.

The goals of this project are:

1. Set the stage for the future extension to 300mm of the R2 Fab facility located in Agrate Brianza (Italy),
2. To evaluate, characterize and optimize the equipments and process necessary to achieve the new BCD10 technology, featuring 90nm lithography, at 300 mm wafer size.
3. Preparatory to BCD10, the project will develop also the new BCD9 110nm on 200mm, featuring the unique combination of Non Volatile Memory (i.e. Phase Change Memory) embedded into a BCD bulk. The embedded PCM will allow to design highly integrated SoC solutions with large SW/DATA storage with dedicated microcontroller and multi-cores architectures in a sea of BCD. In addition, the non-volatile memory will unleash a new set of very flexible SW retargettable platforms in combination with leading edge smart power capabilities on the same die.
4. Feasibility of Power Discrete devices in terms of enabling equipment and process flow. It will be initially based on 200mm, then preparing the process's scalability to 300mm. A few dedicated equipments will be installed for Power Discrete technologies at 300mm (e.g. targeting the wafer thinning and other preparation tools).
5. Advanced System in Packages with Embedded Die Technology for, integrating many devices directly on a PCB or BGA/LGA substrate with a direct die pad-to-PCB (or substrate) connection through Cu filled vias. The main advantages will be: tighter package integration and miniaturization, shielding, shortening the interconnections.