Introducing the Smart Power Gate Arrays™
New ASIC platform in Gate Array technology with integrated power components

During the two-year recently finalized research project it was successfully proven that a technology platform for 24 V-ASICs is feasible using the cost-efficient Gate Array principle. This way application-specific integrated circuits can be realized that allow high-voltage and power electronics in addition to analog and digital functions combined on the same micro chip. Using the Gate Array principle Smart Power Gate Arrays™ can be manufactured in relatively small quantities and, thus, making this technology available to small and medium-sized companies at a reasonable price. Within the frame of this project typical industrial requirements for a 24 V-ASIC cell library were gathered and a universal 24 V-ASIC master concept was designed in a high-voltage technology. In a test production three different circuit designs were successfully manufactured on one master. In order to test the chips a trial board and pc software for easy chip setup were developed and provided to the project participants. 24 V-ASICs offer innovative one-chip-circuit solutions for an industrial control technology that predominantly works with 24 V signal levels and is suited for the direct input signal of small power components (relays, magnet valves, actuators). Using the robust HV process (working temperature of up to 200°C and voltages between 25 V and 700 V) various new application areas become accessible to these ASICs, such as in energy technologies, facility automation, electro-mobility etc.

Cost and time-efficient production methods for customer-specific integrated circuits in small series have been known and established for quite some time, the Gate Array principle in particular. Microchips with standardized base structures are manufactured without initially connecting the individual elements of the base structures. This makes it possible to use the advantages of a large series production and to produce wafers with these preprocessed chips. In order to generate customer-specific circuits from them the base structure elements required for the circuits are connected to each other by metal layers.

Evaluation kit for 24 V-ASICs

With the GATE FOREST® technology that is available at IMS CHIPS for many years, there has been a small series technology that can be manufactured depending on the requirements as space-approved GFN or as size-optimized GFQ series and so far enable digital or analog as well as mixed-signal circuits. The future Smart Power Gate Array™ will complement the ASIC portfolio at IMS CHIPS with an important and innovative component in the high-voltage and power electronics sector.

Within the "24VoltASICs" project an update of the robust Gate Array principle to the power application TFSMART1 technology of the Heilbronn-based semiconductor manufacturer Telefunken Semiconductors was achieved. Telefunken Semiconductor and IMS CHIPS cooperated closely on this project and, thus, enabled the development of the new Smart Power Gate Arrays™. The first industrial companies have begun to express a concrete interest into manufacturing their own ASICs based on these arrays. Following the proof of concept the production start of the innovative features of the Smart Power Gate Arrays™, the upgrade of the IP library as well as the entire design and manufacturing process according to the qualification requirements by IMS CHIPS and Telefunken Semiconductor are currently worked on in several projects. The first Smart Power Gate Arrays™ for industrial applications made by IMS CHIPS are expected by the end of 2012.

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