2003
First-generation Visconti™ T5BG3XBG Image Recognition Processor (Toshiba)
~ Integrated Circuit ~

T5BG3XBG, the first generation of Visconti™, is an image recognition processor developed by Toshiba in 2003, intended for automotive applications. T5BG3XBG was developed and commercialized assuming Advanced Driver Assistance Systems (ADAS).

Development of Visconti ™ image recognition technology and its test chip leading to commercialization of T5BG3XBG started from the late 1990s prior to product development. This Visconti ™ test chip is an image processing engine composed of 32-bit RISC MeP (Media Embedded Processor) and an image processing engine composed of coprocessor IVC (Image recognition VLIW Coprocessor), data cache memories for commands and data respectively, data memory, and peripheral control functions. The core image processing engine has powerful image processing performance such as parallel execution of multiple SIMD (Single Instruction Multiple Data) instructions. It is an LSI that adopted 0.25μm 4-layer metal CMOS process, realizing 125MHz operation and computational performance of 4GOPS. The content of this development was announced at ISSCC 2001. This Visconti™ test chip was applied to the image recognition in the automotive rear view monitoring system.

The first-generation product of Visconti™ which was developed and designed based on the development result of the Visconti™ test chip is the image recognition processor T5BG3XBG. This product is a multicore configuration image recognition processor with 3 channels of MPE (Media Processing Engine) composed of RISC and IVC processing system developed on the test chip. In addition, an accelerator for geometric transformation (affine transformation) processing such as enlargement/reduction/rotation and the like which are frequently used in image recognition processing is also mounted, together with various peripheral functions. By installing these abundant and powerful multicore processing systems, it is possible to process the video input from the in-vehicle camera in real time, realizing high object recognition performance with low power corresponding to ADAS requirements. It adopts 0.13μm 6-layer metal CMOS process, realizing 150MHz operation, computing performance of 18 GOPS, and its contents were announced at CICC Custom Integrated Circuits Conference 2003.

This product was adopted in the Advanced Safety Vehicle (ASV) in 2004 and demonstrated high pedestrian recognition performance during night driving by combining with an in-vehicle infrared camera. In addition to these automotive applications, it has been widely adopted for automatic detection of abnormal images in indoor and outdoor surveillance camera systems, too.

Image recognition technology based on image sensing that has been developed with Visconti™ T5BG3XBG etc. is not only for advanced driver assistance but also serves in technical field which is the foundation of automatic driving, robot, artificial intelligence, etc., and its importance will be increased
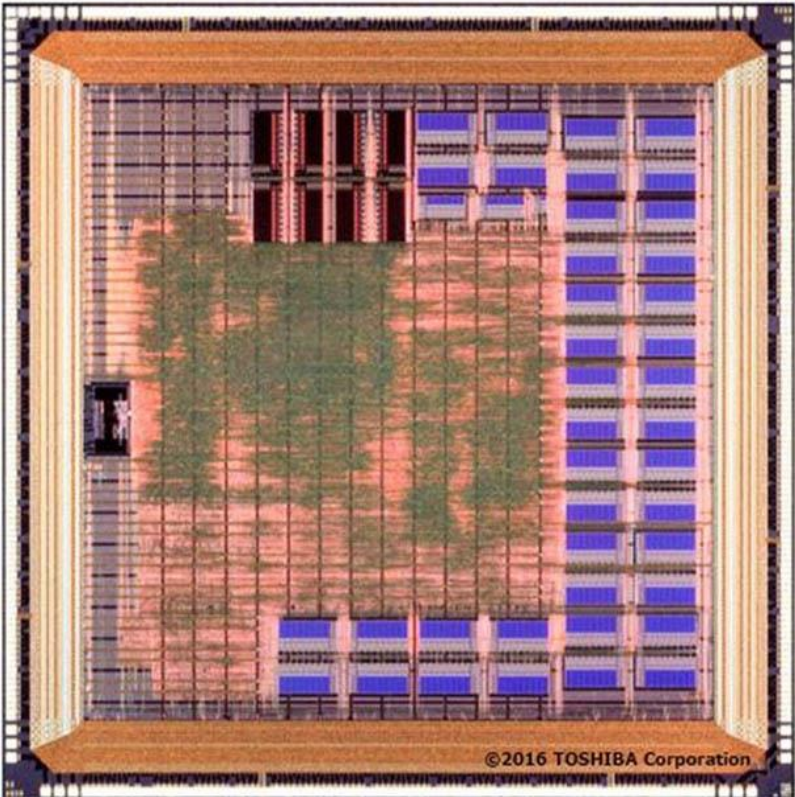
in the future.

Fig.1: Test Chip of Visconti^{TM} (By courtesy of Toshiba)