

Design Rule	65nm (50nm drawn gate) CMOS process 8-layer Cu + 1-layer Al
Power Supply	Core : 1.2V Analogue : 2.5V I/O: 2.5V / 3.3V (1.8V option)
Gate Delay (F/O=1, CQIVX4 Gate)	Three types of transistors are available with different threshold voltages: 10.2ps (Low-Power Library) 7.8ps (High-Speed Library) 7.2ps (Very-High-Speed Library)
Gate Density	800kgates/mm ² or more
Power Dissipation	5.68nW/MHz/gate (F/O=0, CQIVX4 gate)

Ultra-high-density process combines high performance and low power for next generation SoC and SiP designs

65nm technology provides performance, memory, IP and support for advanced multimedia designs with minimum turn-around-time

Toshiba Electronics Europe (TEE) has announced European availability and local technical support for its next generation TC320 ultra-high-density, ultra-low-power high-performance CMOS technology (http://www.toshiba-components.com/ASIC/data/Toshiba_TC320.pdf). The new process technology delivers the high performance, low power, small footprint, system-on-chip (SoC) and system-in-package (SiP) solutions demanded by next generation mobile phones, gaming systems and other portable mass market and consumer applications.

Fabricated using Toshiba's new CMOS5 65nm process, the TC320 ASIC family combines a low-k dielectric with up to eight levels of copper and one level of aluminium interconnect. Analogue and application-specific digital IP cores can be mixed on the same chip,

while memory options include embedded DRAM (eDRAM), tightly stacked semi-embedded DRAM, and single- and multi-port SRAM. Toshiba's new technology offers double the logic density of its previous generation 90nm process, a 30% reduction in power per gate and a 20% reduction in gate delay. A multi-threshold technique allows mixing of logic cells operating at different logic voltages while core voltages down to just 1.2V coupled with advanced power saving techniques reduce dynamic power consumption and leakage current.

The TC320 family offers synthesis-friendly primitive cells designed to address high speed and low power requirements. Two types of I/O cells support requirements for high pin count and core limited designs respectively. A wide range of mixed-signal and digital IP cores include ADCs, DACs, ARM and MIPS processors and options for Ethernet, HDMI, ATA, PCI and USB connectivity.

Toshiba is supporting the new TC320 technology with advanced design environment that will significantly reduce turn-around-time (TAT). Toshiba's European LSI Design & Engineering Centre (ELDEC) can also help to minimise TAT through dedicated project management and support for every stage of the SoC and SiP design and implementation process.

Discussing the launch of the TC320 technology, Eugen Pfumfel, a Principal Engineer for SoC market and application development at Toshiba, states: "High-quality multimedia streaming and gaming applications are pushing integration levels, memory size and speed requirements to the limit. At the same time there is a need to widen the interface to external components through high speed serial links and double data rate parallel interfaces. Toshiba's TC320 technology supports these design requirements, while our combination of advanced design methodologies and local support dramatically shortens development time for European customers."

TC320 designs can be supplied in a variety of packaging options that meet the requirements of advanced SiPs. For designs requiring high pin counts (600 to over 2000), flip-chip BGA packaging (PBGA[FC]) offers high I/O density and electrical performance, while PFBGAs with 41 to more than 300 balls pins are optimal for applications requiring minimal form factor. PBGAs with 256 to 868 pins are cost-effective solutions for mid-range I/O pin count requirements. For price-sensitive applications with low

pin-count, the extremely thin WCSP (Wafer Level Chip Scale Package) is available. QFN options are also available.

To find out more about Toshiba's ASIC & Foundry business, visit www.toshiba-components.com/ASIC.

About Toshiba

Toshiba Corporation is a leader in information and communications systems, electronic components, consumer products and power systems. The company's integration of these wide-ranging capabilities assures its position as an innovator in advanced components, products and systems. Toshiba has more than 172,000 employees worldwide and annual sales of over US\$54 billion (FY2005).

Toshiba Electronics Europe (TEE) is the European Headquarters for the electronic components business of Toshiba Corporation, which is the world's fourth largest semiconductor vendor according to estimates by Dataquest.

Providing design, manufacturing, marketing and sales, TEE was formed in 1973 in Neuss, Germany. The company now has headquarters in Düsseldorf, Germany and subsidiaries in France, Italy, Spain, Sweden and the United Kingdom. Company president is Mr Shikama and the total number of personnel in Europe is around 400.

Toshiba Electronics Europe offers one of the industry's broadest IC and discrete product lines including high-end memory, microcontrollers, ASICs, ASSPs and display products for automotive, multimedia, consumer, telecoms and networking applications. The company also has a wide range of power semiconductor solutions.

For more company information visit Toshiba's web site at www.toshiba-components.com

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