

GEON SECURE EXECUTION PROCESSOR

Cryptographically secure and highly efficient processor

OVERVIEW

Geon Secure Execution Processor delivers secure code execution by supporting two secure contexts. All code and data belonging to a secure context is cryptographically isolated in main memory, so even complete software breach outside of secure context do not compromise its security (confidentiality or integrity). Cryptographic operations can be performed with single Keccak (SHA3) core or by combination of cryptographic hash primitives (SHA3 or SHA2) and symmetric ciphers.

Despite upgrades allowing for secure execution processing, the Geon processor maintains high configurability, performance and efficiency of the proven BA22. Performance is remaining in-line with BA22-CE.

The processor is already verified at system level and suitable for diverse security needs.

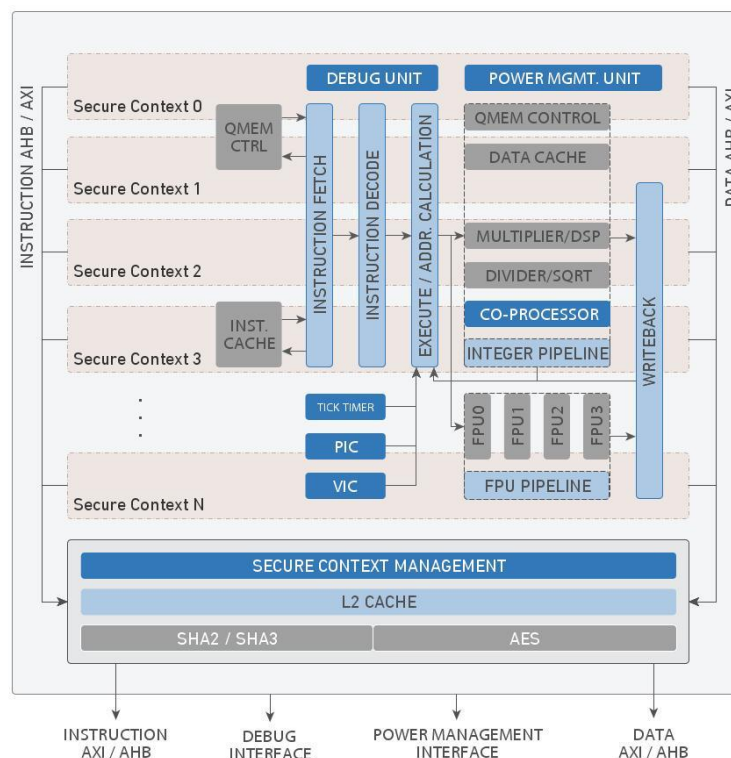
KEY BENEFITS

- 1.79 DMIPS/MHz; +450 MHz in a 65 nm technology
- Less than 20k gates; 0.05 mW/MHz on 90 nm
- High customization of the Beyond BA22 processor
- Cryptographic isolation of sensitive information
- Operating with wide range of security algorithms, including AES and SHA3
- Complete software development environment

APPLICATIONS

- Internet of things
- Industrial internet of things
- Automotive
- Networking and telecom

BLOCK DIAGRAM



FEATURES

Security Features

- Two cryptographically isolated secure execution contexts
- Cryptographic primitives agnostic
- Lowest overhead implementation with single Keccak (SHA3) core
- Alternatively any cryptographic hash function and symmetric cipher can be used
- Supports and validated with Rubicon Zero-Knowledge Identity Platform

High Performance 32-bit CPU

- 1.79 DMIPS/MHz
- Variable length (16/24/32/48 bits) instruction encoding
- Single-cycle execution on most instructions
- Fast and precise internal interrupt response
- Custom user instructions

Small Silicon Footprint & Low Power

Consumption

- Industry-leading code density
 - Compact code minimizes instruction memory area & power
 - 32-bit architecture reduces power-draining memory accesses
- 35k gates and low as 0.05mW/MHz on 90nm

Fast & Flexible Memory Access

- Harvard-style, separate Instructions and Data caches
- Tightly coupled Quick Memory for fast and deterministic access to code and/or data
- Memory Management Unit for virtual memory support

Efficient Power Management

- Further reduces power consumption by 2x to 100x using dynamic clock gating for individual units
- Software controlled clock frequency in slow and idle modes
- Interrupt wake-up in doze and sleep modes

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Advanced Debug Capability

- Conventional target-debug agent with a debug exception handler
- Non-intrusive debug/trace for both CPU and system
- Complex chained watchpoint and breakpoint conditions

Optional Processor Units

- Programmable Vectored Interrupt Controller
- Timer Unit
- Debug Unit
 - MDB support
 - Trace port support
- ROM patching Unit
- Floating Point Unit
- Hardware Multiplier/Divider

Integrated Peripherals

- Standard: 32 bit tick timer, programmable interrupt controller with 32 maskable interrupt sources

RELATED PRODUCTS

- [Beyond SHA-3 Secure Hash Function IP Core](#), a high-throughput, area-efficient hardware implementation of the SHA-3 cryptographic hashing functions, compliant to NIST's FIPS 180-4 and FIPS 202 standards.



Beyond Semiconductor is addressing challenges of systemic complexity in today's electronic devices, empowering its customers to create new and secure experiences for end users.

Initially known for its processor expertise, Beyond quickly gained acceptance among top semiconductor companies and evolved into a company leveraging processing, software and system-wide view competence to provide its customers with secure and effectively designed IP, ASIC and dedicated hardware security products.

Email: sales@beyondsemi.com; Tel: +386 5 90 90 100