

# Intel® Atom™ Processor E3800 Product Family

For context-aware, securely managed embedded devices that connect seamlessly to networks, clouds and each other.

## Product Overview

The Intel® Atom™ processor E3800 product family is the first system-on-chip (SoC) family designed for intelligent systems, delivering outstanding compute, graphical and media performance while operating in an extended range of thermal conditions.‡ Highlights include high I/O connectivity, integrated memory controller, virtualization, Error Correcting Code (ECC), and built-in security capabilities within a thermal design power (TDP) range of 3W to 10W.1‡ This product family is ideal for efficient imaging workflows, digital signage with secure content delivery, visually appealing interactive clients (interactive kiosks, intelligent vending, ATM and point-of-sale (POS) terminals), portable medical devices, industrial control systems, and in-vehicle infotainment (IVI) systems.‡

These SoCs, based on the Silvermont microarchitecture, deliver numerous enhancements over previous-generation Intel Atom processor families. Utilizing Intel's industry-leading 22nm process technology with 3-D Tri-Gate transistors, this new microarchitecture features significant improvements in computational performance and energy efficiency, along with a new out-of-order execution engine for superior compute performance, outstanding power management capabilities, and enhanced security.‡ Intel® Virtualization Technology<sup>2</sup> increases virtualization performance by allowing the operating system more direct access to the hardware.

Three Intel® Celeron® processors, based on the same microarchitecture, are offered alongside the Intel Atom processor E3800 product family on Intel's embedded roadmap. While they do not offer an industrial temperature range or ECC, they provide many of the same features and performance-per-watt benefits, making them ideal for PC-like designs, such as thin clients, retail transactional clients, and digital signage.



## Platform Highlights

Advancements in visual processing capabilities over previous-generation Intel Atom processors: Enables faster media conversions, stereoscopic 3D, immersive web browsing, enhanced HD video transcoding with Intel® Gen 7 graphics, and highly efficient image processing.

The product family also features a low-power SoC SKU, suitable for headless applications, or where limited display capabilities are appropriate.

**Outstanding integration of I/O interfaces:** Supports display interfaces with graphics processing, camera interfaces with image processing, audio with digital signal processing, multiple storage types, and legacy embedded I/O. Provides interface expansion

capabilities through industry-standard high-bandwidth interfaces such as PCI Express\* Gen 2.0, Hi-speed USB 2.0, and USB 3.0 connectivity.

**Security enhancement and content protection:** Hardware-assisted capabilities include Intel® AES New Instructions<sup>3</sup> (Intel® AES-NI) and Secure Boot.

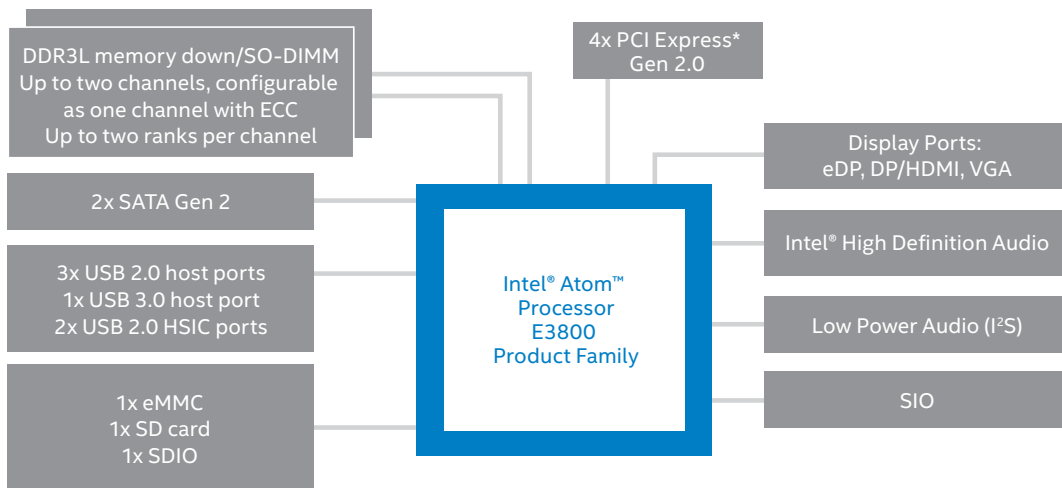
**Integrated 64-bit memory controller:** Features either one or two channels of up to 8 GB DDR3L system memory and optional ECC memory.

**Options for industrial temperature range:** Excellent reliability for rugged designs and extreme environments, such as industrial control and automation applications found in factories and in-vehicle infotainment systems in consumer and commercial vehicles.

**Solution scalability:** Product line features multiple SKUs with quad-, dual-, and single-core offerings that are pin-compatible, allowing scalable end solutions that are feature-compatible and share design cost.

**Embedded ecosystem support:** From modular components to market-ready systems, Intel and the 250+ global member companies of the Intel® Internet of Things Solutions Alliance ([intel.com/iotsolutionsalliance](http://intel.com/iotsolutionsalliance)) provide the performance, connectivity, manageability, and security developers need to create smart, connected systems.

**Extended life cycle product support:** Protects system investment by enabling extended product availability for embedded customers.



A range of SoCs in the Intel® Atom™ processor E3800 product family offer from one to four cores. Not all hardware features shown are supported on all processors. Please refer to the table on page 4 for details.

## INTEL® ATOM™ PROCESSOR E3800 PRODUCT FAMILY AT A GLANCE

FEATURES	BENEFITS
System-on-chip (SoC)	<ul style="list-style-type: none"> <li>• Single die on a single package delivers the high levels of integrated functionality needed for intelligent system designs.</li> <li>• One-chip solution helps save on bill of materials (BOM) cost and allows for smaller form factor solutions over previous-generation, two-chip offerings.</li> </ul>
Integrated, highly efficient and dedicated image signal processing	<ul style="list-style-type: none"> <li>• Saves time-to-market and helps reduce BOM cost by reducing or, in certain cases, eliminating the need to develop custom ASICs/FPGAs to perform imaging functions. Applicable usages include multifunction printers and ultrasound machines.</li> </ul>
Graphics turbo capability	<ul style="list-style-type: none"> <li>• Delivers graphical performance throughput for demanding applications such as complex 3D drawings and gaming.</li> </ul>
Intel® AES-NI <sup>3</sup> and Secure Boot	<ul style="list-style-type: none"> <li>• Hardware-assisted capabilities help secure endpoints, protect content and allow only chosen software to run on the device.</li> </ul>
Very low standby power (milli-watt range)	<ul style="list-style-type: none"> <li>• Enables very low power consumption for embedded solutions that spend significant time in sleep states, such as printers and ATMs.</li> </ul>
Error Correcting Code (ECC)	<ul style="list-style-type: none"> <li>• Detects multiple-bit memory errors and locates/corrects single-bit errors to keep a system up and running without requiring system reset. Helps to enhance performance, uptime and autonomous operation.</li> </ul>
Industrial temperature range (Tjunction ranges from -40° C to 110° C)	<ul style="list-style-type: none"> <li>• Supports systems that must exist in extreme environments, either hot or cold.</li> </ul>
Intel® Virtualization Technology <sup>2</sup> (Intel® VT-x)	<ul style="list-style-type: none"> <li>• Hardware-based Intel® Virtualization Technology provides near-native performance of virtualized workloads for greater reliability, security, investment protection, and flexible resource management.</li> </ul>
Intel Firmware Support Package (Intel® FSP)	<ul style="list-style-type: none"> <li>• Provides key programming information for initializing Intel® silicon, and can be easily integrated into a boot loader of the developer's choice.</li> <li>• Easy to adopt, scalable to design and economical to build for reduced time-to-market.</li> </ul>

### Software Overview

The following independent operating system, BIOS, and boot loader vendors provide support for these platforms.

#### OPERATING SYSTEM

Microsoft Windows\* 8, Windows Embedded Standard 8 (non-connected standby)  
 Microsoft Windows 7, Windows Embedded Standard 7  
 Linux\* Tizen (select in-vehicle infotainment (IVI) customers only)  
 Linux based on Yocto Project\* Tools  
 Linux based on Fedora\* distribution  
 Microsoft Embedded Compact 7 and 2013  
 Wind River VxWorks\*  
 Android\* (JB MR2 4.3)

#### SOLUTIONS DELIVERY AND SUPPORT

Microsoft (Intel provides drivers<sup>4</sup>)  
 Microsoft (Intel provides drivers<sup>4</sup>)  
 Intel provides drivers<sup>4</sup>  
 Yocto Project  
 Timesys  
 Bsquare, Adeneo  
 Wind River  
 Wind River, Insyde, Timesys, Archermind, American Megatrends, Mobica

BIOS and boot-loader solutions are available from independent third-party partners.

#### BIOS

American Megatrends  
 Insyde Software  
 Byosoft  
 Phoenix Technologies

#### BOOT LOADER

American Megatrends  
 Insyde Software  
 Sage Electronic Engineering  
 Waris Technologies  
 Wind River Systems

## INTEL® ATOM™ AND INTEL® CELERON® PROCESSORS

PRODUCT NAME <sup>A</sup>	CORES	CORE SPEED (GHz)	L2 CACHE	GRAPHICS FREQUENCY (MHz)	MEMORY FREQUENCY	MEMORY CHANNELS	THERMAL DESIGN POWER <sup>1</sup>	TEMPERATURE RANGE	PACKAGE	ECC
Intel® Atom™ Processor E3845	4	1.91	2 MB	542/792 (Turbo)	DDR3L-1333	2	10W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3827	2	1.75	1 MB	542/792 (Turbo)	DDR3L-1333	2	8W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3826	2	1.46	1 MB	533/667 (Turbo)	DDR3L-1066	2	7W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3825	2	1.33	1 MB	533 (no Turbo)	DDR3L-1066	1	6W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3815	1	1.46	512 KB	400 (no Turbo)	DDR3L-1066	1	5W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3805	2	1.33	1 MB	N/A	DDR3L-1066	1	3W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Celeron® Processor J1900	4	2.0, 2.41 (burst)	2 MB	688/854 (Turbo)	DDR3L-1333	2	10W	Commercial 0° to 105° C	Type-3 25x27 mm	No
Intel® Celeron® Processor N2930	4	1.83, 2.16 (burst)	2 MB	311/854 (Turbo)	DDR3L-1333	2	7.5W	Commercial 0° to 105° C	Type-3 25x27 mm	No
Intel® Celeron® Processor N2807	4	1.58, 2.16 (burst)	1 MB	313/750 (Turbo)	DDR3L-1333	1	4.3W	Commercial 0° to 105° C	Type-3 25x27 mm	No

Intel in the Internet of Things: [intel.com/iot](http://intel.com/iot)

<sup>A</sup> Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. Go to: [http://www.intel.com/products/processor\\_number](http://www.intel.com/products/processor_number) for details.

<sup>1</sup> Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

<sup>2</sup> The TDP specification should be used to design the processor thermal solution. TDP is not the maximum theoretical power the processor can generate.

<sup>3</sup> Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit <http://www.intel.com/go/virtualization>.

<sup>4</sup> No computer system can provide absolute security. Requires an enabled Intel® processor and software optimized for use of the technology. Consult your system manufacturer and/or software vendor for more information.

<sup>5</sup> Drivers available at: [downloadcenter.intel.com](http://downloadcenter.intel.com).

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