

Altera automotive products

“The Cyclone® II FPGA and the Nios® II embedded processor offer a high level of functionality at a tremendous value, enabling us to implement advanced signal processing functions more efficiently than with alternative components....the benefits of Altera’s solution played a key role in our delivery of the industry’s first off-the-shelf automotive camera with features previously available only in luxury model vehicles.”

*Hitoshi Hongo, Manager,
Automotive Company Advanced
Technology Center,
SANYO Electric Co., Ltd.*

With each model year, your automotive applications are expected to deliver increasingly sophisticated and integrated functionality. From navigation to driver assistance, networking to infotainment, automotive systems call for high-quality, highly reliable underlying technology, as well as design flexibility to meet emerging needs. For more and more automotive electronics designers, that underlying technology is programmable logic.

In response to rapid changes in consumer electronics as well as government mandates, turn to programmable logic devices (PLDs) to get your unique products out the door faster. When you need to prototype and demonstrate your designs to OEMs, count on PLDs to help you meet your timeline—and even let you make last-minute modifications without changing your board. Without the design respins common in ASIC development, PLDs can also present a cost and time advantage. What’s more, PLDs enable a single “platform” design which can easily be modified to suit the needs of different vehicle classes, from mass market to luxury models.

Altera is known and trusted for offering the market’s broadest range of high-quality, automotive-grade PLDs and structured ASICs. Our commitment to the automotive industry is demonstrated not only by our reliable devices but also the reference designs, intellectual property (IP), software tools, and development kits that help you get off the ground fast.

Altera® automotive product families

Device category	Product
CPLD	MAX® series devices*
FPGA	Cyclone series devices*
Structured ASICs	HardCopy® structured ASICs*

**Selected device members in each family are available in automotive grade*

Our automotive-grade devices support a junction temperature range of -40°C to +125°C (MAX 7000 AE devices support up to +130°C). Contact your local Altera sales representative for a list of automotive-grade ordering codes.

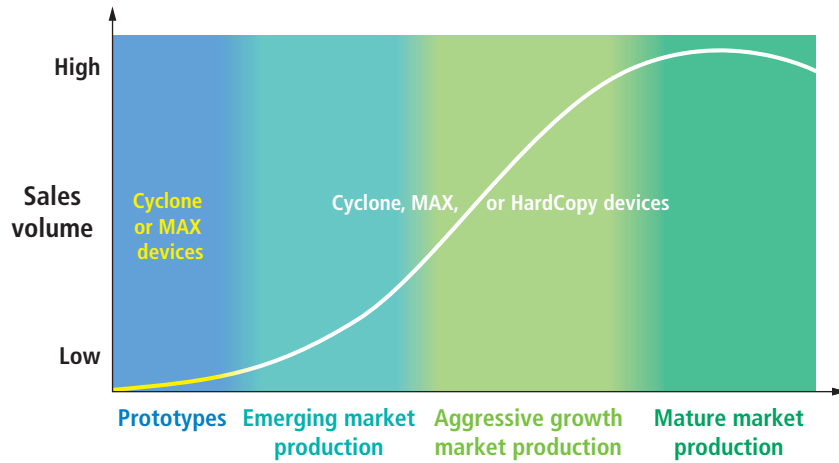


Design flexibility and long product life cycles

PLDs provide a high level of design flexibility—critical in the automotive industry and not possible with ASICs or ASSPs. The high NRE costs and long lead times typical of ASIC design don't encourage flexibility. With their fixed functionality, ASSPs inhibit the product differentiation that is so critical in an automotive market increasingly influenced by consumer applications.

Programmable logic is a different story. You can prototype with Cyclone FPGAs or MAX CPLDs, or go into production with Cyclone or MAX devices. When your product is ready for high-volume production or in a mature market, you can migrate your design to HardCopy structured ASICs. Pin-compatible with our Stratix series FPGAs, HardCopy structured ASICs reduce power consumption, your design risks, and total cost while enabling faster time to market. Programmable solutions also give you the advantage of long product life cycles, so you don't have to worry about product obsolescence.

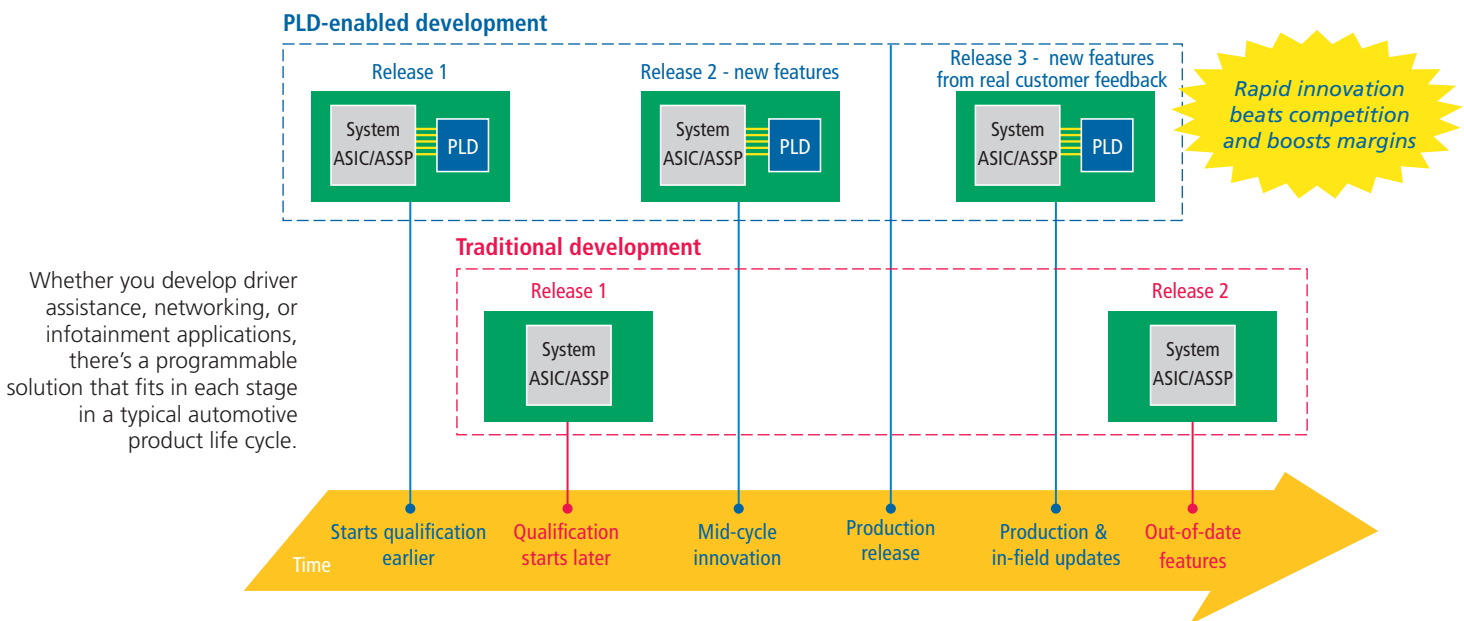
How Altera devices fit into a typical product life cycle



Driving quality into your designs

- Aggressive zero parts-per-million roadmap
- Best-in-class track record for shipping quality products
- Close collaboration with long-time manufacturing partner, Taiwan Semiconductor Manufacturing Company (TSMC), on the latest processing technologies to ensure defect-free, on-time silicon
- Member of the Automotive Electronics Council (AEC), tested according to AEC-Q100 specifications
- All automotive-grade products manufactured at TS16949-compliant facilities
- More than 70 Production Part Approval Process (PPAP) submissions to detail all of our manufacturing quality processes

How PLDs enable automotive electronics platform development



On the road to productivity

Take advantage of design resources that can help you work smarter:

- The PARIS (Platform ASSP Replacement Infotainment System) scalable controller development platform, available from Altera partner TRS-STAR. This reference platform supports coprocessor and system-on-a-chip architecture. Providing full scalability on a single FPGA-based platform, the PARIS solution can speed development time and lower your total cost of ownership for head-unit, driver assistance, and navigation systems. Designs can be quickly and easily migrated to HardCopy structured ASICs incorporated onto real working boards, or ported to Cyclone FPGAs.
- Automotive development platform with a Cyclone II FPGA-based board and a graphics accelerator
- Nios II Embedded Evaluation Kit, a flexible graphics acceleration platform featuring a Cyclone III FPGA-based board and multiple design examples. No FPGA experience is required to use this kit, as the design examples are enabled via an interactive menu through the kit's touch-panel LCD.
- An array of automotive reference designs, such as the automotive graphics controller reference design with Cyclone FPGAs and Nios II embedded processors
- Our Quartus® II design software, which is easy to use with all of our devices, and delivers fast compile times to get you on your way. Quartus software provides a simple development environment for designing with all of Altera's automotive products—CPLDs, FPGAs, HardCopy structured ASICs, Nios II 32-bit embedded processors, and a large number of IP blocks (i.e., memory controllers, interface controllers, digital signal processing, and video/imaging functions).

HardCopy structured ASICs, in particular, can provide a substantial productivity boost in your design effort. After utilizing Stratix series FPGAs in the prototype stage (via the PARIS platform), experience a seamless, guaranteed migration path to pin- and package-compatible HardCopy structured ASICs at a fraction of the cost and risk of traditional custom ASIC solutions. Altera is currently the only PLD vendor offering automotive-grade ASICs. With this development approach, you use a single design, methodology, design tool, and IP set to create an implementation for an FPGA and one for an ASIC.

Altera device benefits

Device	Concept to emerging market benefits	Aggressive growth to mature market benefits
MAX series CPLDs	<ul style="list-style-type: none"> • Industry's lowest-cost CPLD solution • Non-volatile • Reprogrammable • Enables rapid innovation for automotive OEMs 	<ul style="list-style-type: none"> • Industry's lowest-cost CPLD solution • Eliminates need and cost of migrating to standard product solution • Enables continued innovation while volume ramps significantly: feature updates and differentiation
Cyclone series FPGAs	<ul style="list-style-type: none"> • Industry's lowest-cost FPGA solution • Reprogrammable • Supports rapid prototyping as well as high-volume production requirements • Allows you to differentiate as you go into production without cost pressure of a custom ASIC or ASSP • Cyclone III FPGAs are the first 65-nm products offered in automotive grade 	<ul style="list-style-type: none"> • Industry's lowest-cost FPGA solution • Increases product functionality at fraction of cost of ASIC solutions • Enables rapid innovation: feature updates and differentiation
HardCopy series structured ASICs	<ul style="list-style-type: none"> • Low power • Reduced risk • Reduced total cost • Faster time to market • Faster time to profit • ASIC-strength single event upset (SEU) and design security • HardCopy derivative devices are applicable for higher volume production products • HardCopy structured ASICs are applicable for medium-volume production products 	

Want to dig deeper?

To learn more about Altera's automotive-grade products, contact your local FAE or sales representative. You can download automotive handbooks, white papers, and application notes; register for webcasts; purchase development kits; and more from our website at www.altera.com/automotive.



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