



DEFENSE-GRADE LATTICE FPGA PORTFOLIO

Low Power Lattice Avant™ Mid-range FPGAs and Lattice CertusPro™-NX FPGAs Enable Reliable Operations in Extreme Environments

Overview

Lattice’s Defense-Grade FPGA portfolio, featuring the Lattice Avant mid-range FPGAs and the Lattice CertusPro-NX FPGA, is designed for power-efficient, mission-critical aerospace and defense systems. These devices are available in ruggedized, leaded packages and die attach materials that remain solid at high temperatures and do not become brittle at cold temperatures. They deliver reliable operation in extreme environments and support military temperature ranges. Extreme temperature reliability is a top concern in defense and avionics. Low power FPGAs directly address this by dramatically improving thermal performance which translates to higher reliability. Integrated security features, including a built-in engine with an embedded physically unclonable function (PUF), provide differential power analysis (DPA) protection and post-quantum resilience to safeguard sensitive applications.

Lattice FPGAs are trusted in a wide range of aerospace and defense applications, including commercial and military avionics, UAVs and guidance systems, software-defined radios, and radar and electronic warfare. Their robust design and advanced security make them ideal for demanding environments where reliability and long-term performance are essential. See Table 1.

Table 1: Lattice FPGA Features

FEATURE	DESCRIPTION
Device Family	All Lattice Avant mid-range FPGAs, Lattice CertusPro-NX
Ruggedized Package	Leaded (Pb) packages for enhanced reliability in defense and aerospace applications
Mask-set Control	Ensures silicon consistency and traceability
Assurance	20+ years supply longevity for long program lifecycles
Temperature Range	Military Temp: -55°C to +125°C Tj
Testing	Full functional and parametric testing at extreme temperatures
Key Reports	Comprehensive test reports for quality/information assurance
Security	Hardened engine with user data protection, anti-counterfeiting, anti-tamper
Functional Safety	Supports DO-254 compliant solutions

The Lattice FPGA Advantage: Performance, Efficiency, and Security

Lattice defense-grade FPGAs deliver industry-leading advantages for aerospace and defense applications. They offer up to 4X lower operating power consumption, 10X smaller package size, and 2X faster serial bandwidth compared to competing solutions. With up to 10X faster configuration times and 100X lower soft error rates, Lattice FPGA devices set new standards for reliability and performance. Lattice FPGAs excel at maintaining reliability in extreme thermal conditions. By generating less heat, the device stays cooler, which slows failure mechanisms due to overheating or thermal wearout. Advanced security features including crypto agility, quantum-safe cryptography, and Root of Trust ensure robust protection for mission-critical systems. See Figure 1.

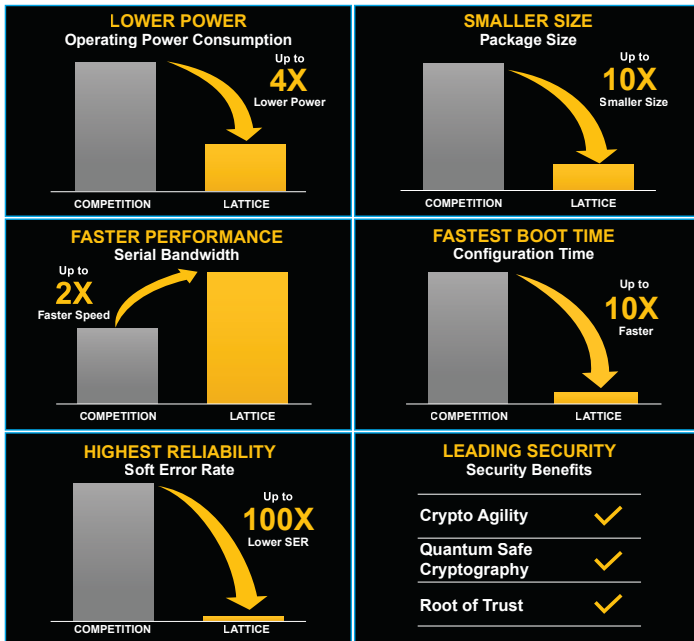
KEY CHALLENGES

- Reliable operation in extreme temperatures and harsh environments
- Stringent MIL-STD environment tests and DO-254 design assurance
- Secure boot and robust protection against evolving threats
- Durability under high shock, vibration, and prevention of tin whiskers

LATTICE SOLUTION

- FPGAs tested across the full military temperature range (-55°C to +125°C Tj)
- Ruggedized, leaded (Pb) packaging for enhanced reliability and tin whisker mitigation
- Mask-set control for silicon consistency and traceability
- Extended supply longevity (20+ years) for long program lifecycles
- Advanced anti-tamper features and post-quantum security resilience
- Safe, deterministic operation with a focus on functional safety (supports DO-254 solutions)

Figure 1: The Lattice FPGA Advantage



there is less charge available to trigger latch-up. Lattice's mature manufacturing process ensures consistent quality and reliability. See Table 2.

Table 2: Compliance and Materials Comparison

ATTRIBUTE	LATTICE INDUSTRIAL/AUTO	LATTICE DEFENSE GRADE
Device Family	All	All Lattice Avant mid-range FPGAs, Lattice CertusPro-NX
Package	Lead-free BGA only	MIL-PRF-38535 Pb-content compliant
FPGA	Random assembly lot	Random assembly lot
Mask Set	N/A	Mask set control
Assurance	15+ years assured supply	20+ years supply longevity
Temperature	-40°C to +100°C / +125°C Tj (Auto qual)	-55°C to +125°C Tj (Military temp)
Key Reports	Production part approval	Full-range test at extended temperatures
Longevity	15 years	20+ years
Security	Secure boot	Cybersecurity and physical protection

Reliability and Quality

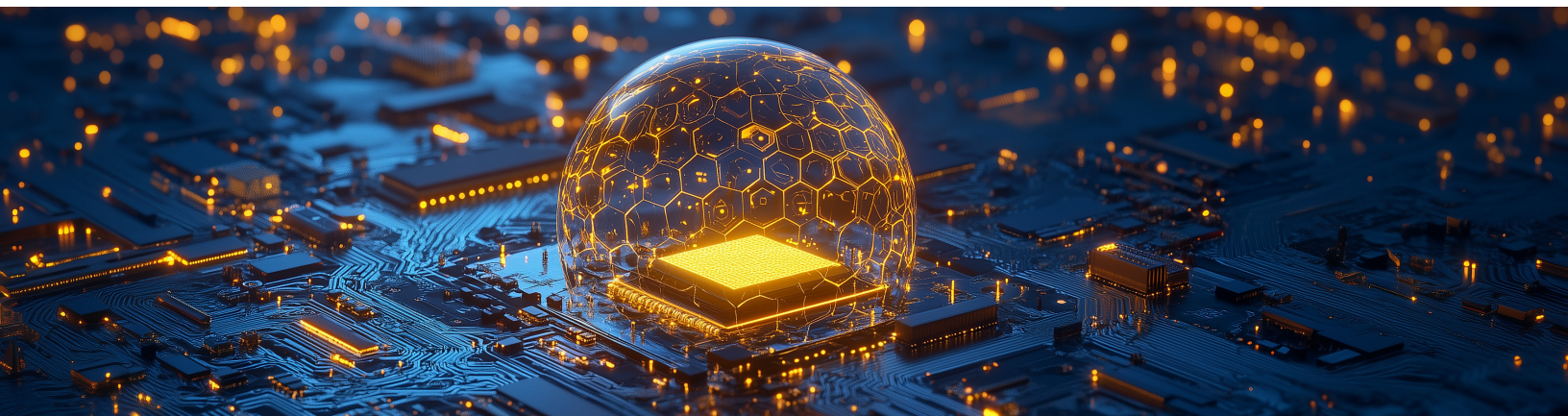
Lattice offers a variety of FPGAs that are engineered for aerospace and defense, withstanding extreme operational stresses and long service life. Only devices passing stringent qualification and testing are approved for these applications.

Latch-Up Resistant Design

High temperatures can exacerbate the risk of CMOS latch-up, a condition where a parasitic transistor structure turns on, shorting power to ground and often destroying the chip. Latch-up is more likely when high currents or certain voltage spikes occur, which can be triggered by intense switching activity or radiation events, especially at elevated temperatures. Low power FPGAs significantly reduce this risk because they draw much less current. As a result, even during a transient event,

Conclusion

In conclusion, low power FPGAs play a critical role in defense and avionics systems that must operate reliably in extreme environments, from frigid altitudes to high-temperature engine areas. Lattice offers a comprehensive portfolio of aerospace and defense hardware, software, and IP, backed by decades of industry collaboration and proven reliability, security, and performance. Through adherence to aerospace standards and extensive field deployment, Lattice solutions have a long-standing heritage in engine controllers, flight control systems, and other mission-critical platforms.



Ready to Learn More?

To learn more about Lattice low power FPGA-based solutions for industrial, automotive, communications, computing, and consumer applications, visit www.latticesemi.com or contact us at sales@latticesemi.com.

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