BROCHURE

Aerospace and Defense

Trusted Low Power FPGA Solutions for Mission-critical Defense and Space Systems

LATTICE SEMICONDUCTOR

The Low Power Programmable Leader

The Low Power FPGA Standard for Defense

Headquartered in the United States for more than 40 years, Lattice Semiconductor is the world's leading developer of low power programmable logic devices. From space-grade, radiation-tolerant FPGAs to platform firmware security with post-quantum cryptography (PQC), Lattice delivers award-winning devices, platforms, solutions, design tools, and direct field support that your programs depend on.

The Lattice Nexus™ and Lattice Avant™ platforms, built on 28 nm Fully Depleted Silicon on Insulator (FD-SOI) and 16 nm FinFET processes, respectively, set the industry benchmark for power efficiency, reliability, and security. These innovations make Lattice the clear choice for next-gen defense and aerospace systems that demand size, weight, power, and cost (SWaP-C) optimization.

Key Capability Highlights

Defense and Military-grade

FPGAs with ruggedized packages and full military temperature support

Space-grade Radiation Tolerant FPGAs and Platform

Heritage with Lattice Certus™-NX and Lattice CertusPro™-NX FPGAs, and Lattice Avant platforms

Post-quantum Secure with Lattice MachXO5™-NX TDQ

The industry's first Commercial National Security Algorithm (CNSA) 2.0-compliant FPGA

Hardware Root of Trust (RoT)

Securing firmware from design to manufacture and deployment

20+ Year Supply Guarantee

Geographically diverse manufacturing operations with expanding domestic manufacturing capabilities.

Dedicated Aerospace and Defense

DO-254 safety pedigree and reliability earned at scale with extended partner ecosystem

Why Choose Lattice Semiconductor?

Industry-leading Low Power

The Lattice Nexus platform delivers up to 3X lower power than competing FPGAs, along with up to 5X smaller form factor and 5X faster configuration time. These advantages are critical for SWaP-C constrained platforms, including UAVs, soldier-worn gear, satellite payloads, and guidance systems.

Defense and Space-grade Devices

Lattice offers military-grade FPGAs with ruggedized SnPb packages, military temperature operation, and single-event latch-up immunity. Space-grade, radiation-tolerant devices, including Lattice Certus-NX, Lattice CertusPro-NX, and Lattice Avant, are supported by a strong space heritage and the high volume shipment of flight-grade units.

Comprehensive Solution Stacks and IP

Lattice provides complete, pre-validated solutions spanning real-time sensor fusion for AI and machine learning inference, embedded vision for video interfacing and processing, and deterministic motion control. These solution stacks help reduce development cycles from months to weeks.

Post-quantum and Hardware Security

The Lattice MachXO5-NX TDQ is the industry's first CNSA 2.0-compliant PQC FPGA, with built-in anti-tamper protection and resistance to side-channel attacks. The Lattice Avant platform enhances security with side-channel and Differential Power Analysis (DPA) resilience, supported by Lattice SupplyGuard™, an end-to-end supply chain protection service.

Unmatched Reliability: FD-SOI Process

Up to 100X better soft error rate (SER) than bulk CMOS, at 1.3 FIT/Mb. FD-SOI technology provides radiation tolerance, latch-up immunity, and operation across a temperature range from -55 °C to +125 °C.

Industry's Longest Product Longevity

Lattice assures FPGA availability for 20+ years with geographically diverse manufacturing and offers Known Good Die (KGD) products that match or exceed your platform's lifecycle.

40+
Years of Defense Heritage

#1
Low Power FPGA Volume Leader

20+
Years Supply Longevity Guarantee

3X
Lower Power vs. Competition

SWaP-C Optimized | Defense Grade | Space Grade | Post-quantum Secure

FPGA Platforms: The Foundation of SWaP-C Excellence

Lattice Nexus Platform: 28 nm FD-SOI | Production Ready | Defense and Space Qualified

The award-winning Lattice Nexus platform is the only low power FPGA platform built on 28 nm FD-SOI process technology. FD-SOI provides inherent radiation tolerance, exceptional single-event latch-up immunity, and up to 100X better SER than conventional bulk CMOS. It also features a built-in hardened scrubber and supports a wide operating temperature range, making it purpose-built for the demanding requirements of defense and space applications.

Process Node	28 nm FD-SOI (only low power FPGA on FD-SOI)
SER Performance	1.3 FIT/Mb, 100X better than bulk CMOS
Temperature Range	-55 °C to +125 °C (military temp), MIL-PRF-38535 leaded pkg and mask-set control
Security	Hardware RoT, AES-256, ECDSA, TRNG, HMAC, SHA, DPA-resistant
Key Products	Lattice CertusPro-NX, Lattice MachXO5D™-NX, Lattice MachXO5-NX TDQ
Space Variants	Space grade Lattice Certus-NX, and Lattice CertusPro-NX

Lattice Avant Platform: 16 nm FinFET | 25 Gbps SERDES | Low Power

The Lattice Avant platform pushes the performance frontier for low power FPGAs. Built on 16 nm FinFET technology, Avant delivers up to 3X power reduction, 25 Gbps SERDES, PCIe® Gen 4, DDR5 / DDR4/ LPDDR4 support, and crypto-agility with post-quantum readiness in a package up to 5X smaller than comparable competing devices.

Process Node	16 nm FinFET, manufactured by TSMC in Taiwan
Logic Capacity	230k to 670k system logic cells
Power Advantage	Power efficient device architecture, IP and tools methodologies
Reliability	Field tested and flown in space environment, hardened fast scrubber
SERDES	25 Gbps SERDES supports multiple protocols including 25 GbE, JESD204C, PCIe Gen 4
Memory Interfaces	DDR5 / DDR4 /LPDDR4 up to 2400 Mbps, DDR3L up to 1866 Mbps
Configuration Speed	Up to 5X faster secure configuration time
Security	Crypto-agility, post-quantum readiness, anti-tamper protection, side channel attack resistance
Key Products	Lattice Avant-E, Lattice Avant-G, and Lattice Avant-X

Product Portfolio: Non-Volatile Control FPGAs

BATTLE-PROVEN FOR SWAP-C BRIDGING AND MANAGEMENT

Secure Control, Non-Volatile FPGAs

Lattice MachXO5-NX TDQ

NEW

Industry's First CNSA 2.0 PQC-ready FPGA

The Lattice MachXO5-NX TDQ is the world's first FPGA family with full CNSA 2.0-compliant PQC support. Purpose-built for defense, government, and critical infrastructure, this device protects against both current and future quantum computing threats.

This secure control FPGA supports NIST-approved algorithms, including ML-DSA, ML-KEM, LMS, XMSS, AES-256-GCM, and SHA-3. It enables crypto agility with in-field algorithm updates and anti-rollback protection and features a hardware RoT supporting up to 2,048 image signing keys. Additional support includes DICE, SPDM, and Lattice SupplyGuard.

14k–53k LCs | Lattice Nexus Platform | Crypto-agile PQC

Lattice MachXO5D-NX

Advanced secure control FPGA featuring a hardware RoT, dual boot, and full platform firmware resiliency compliant with NIST SP 800-193. It is ideal for server BMCs, networking equipment, and defense system controllers. Lattice SupplyGuard-enabled, it supports comprehensive supply chain lifecycle management.

14k–53k LCs | Lattice Nexus Platform | Hardware RoT

Lattice MachXO3D™

Widely recognized as a de facto control and management FPGA, it features non-volatile configuration, hardware RoT, and pre-verified cryptographic functions: ECDSA, ECIES, AES, SHA, HMAC, TRNG, and a unique secure ID. It enables protection, detection, and recovery from cyber threats in untrusted environments.

4.3k–9.4k LCs | Non-volatile | Space Heritage

Lattice MachXO4™

NEW

Next-generation control PLD with up to 9,400 LUTs and 448 kb of user flash, improved hot-socketing, and enhanced I/O flexibility. It is ideal for I/O expansion, system control, and bridging in SWaP-constrained platforms.

Up to 9.4k LCs | User Flash | Hot Socketing | Space Heritage

Lattice MachXO3™ / Lattice MachXO3L / Lattice MachXO3C

Non-volatile control FPGA for system control, I/O expansion, fuzing, and bridging. It is one of the most trusted FPGA families in defense systems, supporting applications such as software-defined radios, interfacing, bridging, and sensor fusion.

640–9.4k LCs | Non-volatile | -40 °C to +125 °C | Space Heritage

Lattice MachXO2™

Battle-proven, non-volatile FPGA for system control and I/O bridging. Widely deployed across military fuzing, communications, avionics, and shipboard electronics. Offers flexible reprogramming with leaded package options designed for defense applications.

256–6,864 LCs | Non-volatile | Known Good Die | -40 °C to +125 °C | Space Heritage

Product Portfolio: Defense and Space Grade Devices

Low Power, General-purpose, High-performance, and Small FPGAs

Lattice CertusPro-NX

With up to 100k logic cells and 10G SERDES (8 lanes), it enables PCIe Gen 1–3, LPDDR4/DDR4, CoaXPress, and SLVS-EC. As the only FPGA supporting LPDDR4, it offers an 81 mm² package footprint that is up to 6.5X smaller than competing devices. Ideal for signal processing and sensor fusion in UAV systems.

100k LCs | Lattice Nexus Platform | 10 Gbps SERDES | 7.3 Mb | 28 nm FD-SOI | Space Heritage

Lattice Certus-NX

General purpose FPGA combining 39k logic cells with high-speed I/O, built-in PCIe, MIPI, and USB PHY. Superior SER performance, extended temperature range, and low power consumption make it ideal for distributed systems, avionics control, and rugged wearable applications.

39k LCs | Lattice Nexus Platform | 28 nm FD-SOI | Space Heritage

Lattice Certus-N2

Next-gen FPGA on the Lattice Nexus 2 platform (16 nm FinFET), delivering 3X lower power and supporting 16 Gbps SERDES, DDR4/LPDDR4, and PCIe Gen 4. Ideal as a drop-in upgrade for Lattice Certus-NX and CertusPro-NX designs requiring higher bandwidth and enhanced security.

Lattice Nexus 2 Platform | 16 Gbps SERDES | PCIe Gen 4

Low Power, Mid-range FPGAs: Lattice Avant Platform

Lattice Avant-E

Class-leading FPGA featuring DDR5 and LPDDR4 memory interfaces, a modernized fabric, and a comprehensive I/O suite. It targets sensor fusion and AI/ML, signal processing, and defense platform control applications that require advanced security, higher logic density, and greater memory capacity at reduced power in compact packages.

DDR5/LPDDR4 | Fast Secure Boot | Space Heritage

Lattice Avant-G

Class-leading low power mid-range FPGA with embedded SERDES and LPDDR4 memory interfaces, modernized fabric, and a multi-protocol SERDES operating from 1 Gbps to 16 Gbps. Targets defense and avionics systems with hardened PCI Express, robust security engine and industry leading, power efficient compute acceleration, digital signal processing, and defense system controllers requiring higher throughput at reduced power.

1 Gbps - 16 Gbps SERDES | DDR5/LPDDR4 | Low Power | Space Heritage

Lattice Avant-X

High-speed FPGA with a quantum-safe cryptography engine, in-motion data encryption, and advanced AI and embedded vision capabilities. Featuring integrated 25 Gbps SERDES, up to 1,800 DSP blocks, and FPGA fabric performance of up to 300 MHz, Lattice Avant-X is optimized for efficient compute and signal processing.

25 Gbps SERDES | Hardened Security Engine | Space Heritage

Space-grade and Radiation-tolerant FPGAs

Lattice delivers radiation-tolerant FPGAs for space, satellite, and high-altitude applications. The Lattice Certus-NX and CertusPro-NX FPGA families are built on the Lattice Nexus 28 nm FD-SOI platform, leveraging its inherent radiation tolerance along with active soft error correction (SEC) and soft error detection (SED). The Lattice Avant platform, built on a 16 nm FinFET process, delivers an unmatched balance of power, performance, and radiation resilience.

Lattice Nexus

Radiation Qualified, Flight Grade Units Shipping

- Radiation-tolerant Lattice Nexus 28 nm FD-SOI
- Up to 4X less power than comparable space-grade FPGAs
- Frame-based SED/SEC for configuration memory
- ECC and TMR flow in Lattice Radiant
- AES-256 / ECDSA design security
- Dual 1 MSPS / 12-bit ADC for system monitoring
- SnPb (tin-lead) solder BGA, space-qualified

Radiation Characteristics

- Package: Tin-lead solder BGA with wire-bond and flip-chip options
- SEL: Single Event Latch-up immune
- TID: >100K Rad

Lattice Avant

Qualification Completed, Flights In Progress

- Up to 630k LCs for compact neural network workloads
- 28 SERDES ports with hardened PMA and PCS
- 36 Mb of embedded memory (EBR + LRAM)
- 1,800 18x18 multipliers for DSP acceleration
- PCIe Gen 1–4 with a hardened controller
- Small form-factor organic BGA with low mass
- SnPb (tin-lead) solder BGA, space-qualified

Radiation Characteristics

- Package: Tin-lead solder flip-chip BGA
- SEL: Single Event Latch-up immune
- TID: >100K Rad

Lattice Solution Stacks and Service: From Concept to Deployment, Faster

Lattice solution stacks combine validated IP, reference designs, firmware, software tools, and hardware platforms into turnkey solutions. For defense customers, these solution stacks significantly reduce time-to-field while helping ensure compliance with defense security standards.

Lattice mVision

Embedded Video and Sensor Processing

The Lattice mVision solution stack provides a comprehensive toolkit for sensor bridging, aggregation, and image signal processing in defense platforms such as ISR cameras, EO/IR sensors, and head-mounted display systems. Modular IP blocks and reference designs enable fast integration of MIPI, LVDS, and high-speed video interfaces.

Target Applications	ISR/EO/IR sensors, HMD displays, UAV camera systems, radar imagery
Key Interfaces	MIPI D-PHY (up to 3.2 Gbps), LVDS, SLVS-EC, CoaXPress, HDMI
Platform Devices	Lattice CrossLink-NX, Lattice CertusPro-NX, Lattice Avant
IP Blocks	MIPI aggregation, image pre-processing, ISP pipeline, display bridging

Lattice sensAI

Edge AI/ML for Defense Intelligence

The Lattice sensAI solution stack enables machine learning inference on ultra-low power Lattice FPGAs at the tactical edge. It provides everything needed to evaluate, develop, and deploy AI/ML applications, including modular hardware platforms, neural network IP cores, software tools, and custom design services.

Target Applications	Threat detection, object recognition, human presence, drone identification
Neural Network IP	CNN Compact, CNN Plus, and CNN Accelerator cores
Power Profile	From 1 mW (Lattice iCE40 UltraPlus™) to 200 mW (Lattice CrossLink™-NX)
Platforms Supported	Lattice iCE40 UltraPlus, Lattice ECP5™, Lattice CrossLink-NX, Lattice Certus-NX, Lattice Avant
Tools	Neural network compiler and Lattice Radiant integration

Lattice SupplyGuard

End-to-end Supply Chain Security

Lattice SupplyGuard is a subscription service that tracks and secures Lattice FPGAs throughout their entire lifecycle, from manufacturing and global logistics to assembly, configuration, and deployment. It helps prevent cloning, overbuilding, Trojan insertion, and unauthorized activation, regardless of where a device travels within the global supply chain.

Protection Scope	Manufacturing through end-of-life, full lifecycle tracking
Anti-cloning	Only authorized manufacturers can build and activate designs
Trojan Prevention	Blocks unauthorized firmware/software loading in the field
Key Infrastructure	Secure key management with revokable root and signing keys
Longevity	Supported for 20+ years product lifecycle guarantee

Design Tools: Predictable Convergence & Faster Time-to-field

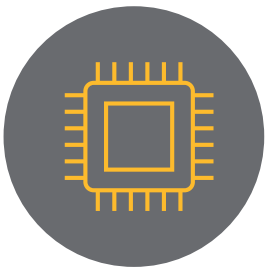
Lattice's dedicated Aerospace and Defense field application engineering team works closely with your programs from early architecture reviews through production qualification. Lattice understands defense program requirements, including security clearance protocols, export controls such as EAR and ITAR, and the long design cycles typical of military system development.

Defense Field Application Engineers (FAEs)

- Dedicated A&D FAEs with defense electronics expertise
- On-site and virtual architecture consultation
- Security architecture and threat modeling review
- Design-for-reliability and radiation analysis support
- ITAR-compliant engagement and handling
- Access to pre-release devices for early adoption

Design Services & Ecosystem Partners

- Lattice-authorized custom design services providers
- Reference design and IP customization services
- Radiation-tolerant space device qualification
- Board-level integration and bring-up support
- Neural network training and Lattice solution stack support
- Third-party IP ecosystem for defense-specific functions



Evaluation Kits & Development Boards

- Lattice CertusPro-NX Versa Board for high-speed I/O evaluation
- Lattice CrossLink-NX EVDK for embedded vision development
- Lattice Avant Evaluation Dev Kit for data path bridging

Ongoing Program Support

- Dedicated New Product Introduction (NPI) support
- Product Change Notice (PCN) advance notification service
- 20+ years longevity commitment with migration path planning
- Lattice Insights online training and certification platform
- Defense program milestone tracking and supply chain planning

Defense and Aerospace Applications

Lattice FPGAs are deployed across virtually every segment of modern defense electronics. Their combination of ultra-low power, compact form factor, robust hardware security, and proven process reliability makes them a preferred choice for system architects designing next-generation platforms.

Avionics and UAV Systems

- Sensor and camera bridging / aggregation
- EO/IR sensor interface bridging
- Flight controller I/O expansion
- AI-based target detection at the edge
- Recommended: Lattice Avant, Lattice CertusPro-NX, Lattice CrossLink-NX, Lattice sensAI

Communications and C4ISR

- Software-defined radio (SDR) waveform processing
- SDR I/O control
- Secure firmware for network edge devices
- Waveform and protocol bridging
- PQC-secured command/control links
- Recommended: Lattice Avant, Lattice MachXO5-NX TDQ, Lattice CertusPro-NX, low power PCI Express

Space and Satellite Systems

- Radiation-tolerant payload
- Distributed satellite computing
- Power efficient signal processing
- On-board AI/neural network processing
- Recommended: Lattice Avant, Lattice Certus-NX, Lattice CertusPro-NX

Ground Systems and Platforms

- Management, control, and bridging
- Secure server platform firmware control
- Battery and power management controllers
- Sensor fusion and data aggregation
- Recommended: Lattice MachXO3D, Lattice MachXO5D-NX

Radar and EW Systems

- High-speed ADC/DAC data path bridging
- Signal processing and DSP acceleration
- Multi-channel SERDES aggregation
- Recommended: Lattice CertusPro-NX, Lattice Avant-X

Soldier Systems and Wearables

- Ultra-low power display bridging
- Battery-efficient AI inferencing
- Mixed reality / HMD interface control
- Wearable biometric sensor processing
- Recommended: Lattice CrossLink-NX, Lattice CertusPro-NX, Lattice sensAI

PARTNER WITH THE LOW POWER FPGA LEADER FOR YOUR DEFENSE PROGRAMS

From post-quantum secure control FPGAs to radiation-tolerant space-grade devices, Lattice has the products, solution stacks, tools, and dedicated defense FAE support to accelerate your program from concept to deployed system.

LEARN MORE

latticesemi.com/avionics | Aerospace&Defense@latticesemi.com | latticesemi-insights.com

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