Commitment to Defense Industry

Headquartered in the U.S. for over 35 years, Lattice is the leading developer of low power programmable semiconductors. Lattice is the largest volume supplier of FPGAs in the world, and the company’s technology is used in many electronics applications in use today. Lattice’s long-standing relationships and commitment to world-class support lets customers quickly and easily create state-of-the-art integrated defense solutions.

The Lattice Nexus™ FPGA development platform is the only one in the low power FPGA industry supporting a 28 nm, FD-SOI manufacturing process. Lattice Nexus FPGAs deliver lower power consumption, smaller form factors, and much higher reliability in comparison to similar competing FPGAs. The Lattice Nexus platform enables the creation of FPGAs with inherent radiation tolerance, a wide operating temperature range, and support for on-chip crypto solutions. Lattice FPGAs are an ideal hardware platform for the development of SWAP-C optimized defense platforms for long lasting mission critical systems.

Focused on Low Power, Smaller Form Factors

Lattice NEXUS is changing the FPGA landscape
Product Offering

**MachXO3D™ – Enhance Secure Control Applications with Hardware Root-of-Trust and Dual Boot Capabilities**
MachXO3D FPGAs enable secure system control by enabling a hardware-based Root-of-Trust and supporting pre-verified cryptographic functions such as ECDSA, ECIES, AES, SHA, HMAC, TRNG, Unique Secure ID and Public/Private Key Generation. The devices help systems protect, detect, and recover from a variety of threats by providing data security, equipment security, data authentication, design security, and brand protection.

**ECP - Break the rules of power, size and cost in your connectivity and acceleration applications**
The Lattice ECP3™, ECP5™ and ECP5-5G™ families are optimized for data and control path bridging and interfacing. The FPGAs are architected with high-performance SERDES, full-featured DSP blocks, and state-of-the-art memory interfaces to support a wide range of applications including situational awareness and signal processing guidance systems.

**Futureproof your control PLD and bridging designs**
The award-winning MachXO2™ FPGA family and MachXO3™ family can be used to quickly implement system control functions and I/O expansion and bridging in applications such as software defined radios, secure server control, and sensor fusion.

**Production ready, lowest power ML/AI solution with flexible interfaces**
Lattice’s ICE40™ family offers the world’s smallest FPGAs at very low power to enable flexible and fast reprogrammability on a standard platform – perfect for implementing unique features on handheld devices and wearables.

**Embedded Vision and Processing**
CrossLink™-NX offers up to 75 percent lower power in comparison similar FPGAs and small form factor packaging as small as 4 mm x 4 mm. CrossLink-NX delivers best-in-class performance for smart and embedded vision applications. With a memory-to-logic cell ratio of 170 bits per logic cell, CrossLink-NX is a compelling device option for accelerating AI inferencing. High-speed I/O IP blocks available on CrossLink-NX include hardened PCI Express Gen II, MIPI D-PHY at 2.5 Gbps, and programmable differential I/O at up to 1.5 Gbps.

### Product Overview

<table>
<thead>
<tr>
<th>Family</th>
<th>Density</th>
<th>Temp. Range</th>
<th>Package Size</th>
<th>I/Os + Ded. I/Os</th>
<th>Serdes</th>
<th>Distl'd Ram</th>
<th>EBR SRAM</th>
<th>PLLs/DLLs</th>
<th>18 x 18 Mult's</th>
<th>Programmability</th>
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</thead>
<tbody>
<tr>
<td>MachXO3L-E</td>
<td>-40 C to 125 C</td>
<td>2.5 x 2.5 to 17 x 17</td>
<td>100</td>
<td>None</td>
<td>5</td>
<td>64</td>
<td>1</td>
<td>None</td>
<td>Non-Volatile, Infinitely Reconfig</td>
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<td>MachXO3L-C</td>
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<td>10 x 10 to 19 x 19</td>
<td>206</td>
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<td>3</td>
<td>92</td>
<td>2</td>
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<td>8 x 8 to 19 x 19</td>
<td>383</td>
<td>None</td>
<td>3</td>
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<td>MachXO2-HE</td>
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<td>MachXO2-ZE</td>
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<td>LatticeXP2</td>
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<td>ECP5-U</td>
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<td>CrossLink-NX</td>
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### Lead Free Package Options

<table>
<thead>
<tr>
<th>Lattice Packages</th>
<th>Wirebond</th>
<th>Flip Chip</th>
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</thead>
<tbody>
<tr>
<td>Wafer Pad or Bump</td>
<td>Lead free</td>
<td>Lead free</td>
</tr>
<tr>
<td>Substrate Bump or Pad Finish</td>
<td>Lead free</td>
<td>Lead free</td>
</tr>
<tr>
<td>Caps</td>
<td>No caps</td>
<td>No caps</td>
</tr>
<tr>
<td>Substrate Solder Balls</td>
<td>Lead</td>
<td>Lead</td>
</tr>
<tr>
<td>Package Reflow</td>
<td>Lead</td>
<td>Lead</td>
</tr>
</tbody>
</table>

Available as Known Good Die

www.latticesemi.com
### Known Good Die Product Overview

Lattice’s most popular FPGAs are available in die form. These die products offer a wide range of logic densities, I/Os, high performance SERDES channels, memory resources, PLLs and multipliers. The products are infinitely programmable (non-volatile) and others are programmable only once (volatile).

Table 2 (see page 4) lists the specific products offered by Lattice in die form and provides a high-level summary of each product family’s features. For a more comprehensive understanding of each family’s capabilities, please refer to the specific device family data sheets on the Lattice web site.

### Defense Solution Highlights

Lattice also provides commercial-off-the-shelf (COTS) FPGAs architected to offer low power, small footprint solutions for the fast prototyping and production of next-generation defense systems.

Select FPGAs offer extended temperature range support and supply chain security thanks to use of a hardware Root-of-Trust to help protect against side-channel attacks.

### Example Applications

- **Mixed Reality Head-Mount Display**
  - CrossLink-NX
  - Image Sensor
  - Image Signal Processing
  - MCU

- **Guidance Systems**
  - ECP5
  - Sensor Control & Data Acquisition and Pre-processing & Data Aggregation
  - DDR
  - CPU

- **Chain of Trust Implementation**
  - MachXO3D
  - Firmware
  - Chipset
  - OS
  - App 1...
  - App X
  - User Data

### Development Tools

Lattice offers a full suite of easy-to-use design software. Customers can download and install their design software in minutes, and the tools support advanced design flows and secure bitstreams. Select Lattice FPGAs have a built-in security block, encrypted and authenticated bootloader, and Platform Firmware Resiliency (PFR) compliant software and hardware that is highly resilient to firmware attacks.

### Tool Suite That Offers Predictable Design Convergence and Ensures Ease of Use
Solutions

sensAI
The full-featured Lattice sensAI™ stack includes everything you need to evaluate, develop, and deploy FPGA-based machine learning (ML) and artificial intelligence (AI) applications, including modular hardware platforms, example demonstrations, reference designs, neural network IP cores, software tools for development, and custom design services.

mVision
The Lattice mVision™ solutions stack uses modular hardware platforms, IP building blocks, easy-to-use FPGA design tools, reference designs and demonstrations, as well as a network of custom design services providers to solve design challenges in sensor connectivity, bridging, aggregation, and image signal processing systems.