Company Overview

• Semiconductor IP company specializing in high-speed memory and interfaces, cryptography/ security, & computational imaging & sensing
  • Approximately 500 employees (~70% engineers)
  • Global development team

• Invest to develop unique solutions for our customers that are protected by a broad patent portfolio
  • Over 2,400 issued & pending patents

• High gross margin from recurring royalties and fees, high EBITDA from disciplined capital budgeting

• Expanding offering to complete solutions
  • Example: CryptoManager™ announced June 2014, with Qualcomm as lead customer

1Refer to non-GAAP to GAAP reconciliation
Customer Engagement Model

Offerings

- Patent Licenses
- Architecture Licenses
- IP Cores
- Chips & Products

Enablement

- Support
- Tools
- Training

Customer Interaction

Hosted Services & Infrastructure
Four Divisions Working Together

Memory + Interfaces

The world’s data. Delivered.
- Flexible models from licensing or physical product
- Buffer chips
- Beyond DDR4

Cryptography Research

The world’s data. Secured.
- Foundational technologies
- CryptoManager platform
- Content protection
- Anti-counterfeiting

LED Lighting Solutions

Illuminating the world.
- LED innovation and IP
- Light guide manufacturing
- Design services

Emerging Solutions

The world’s data. Reimagined.
- Foundational R&D
- Next-gen memory architectures
- Smart sensors for IoT
Memory + Interfaces
The world’s data. Delivered.
Memory + Interface Products and Solutions

**Offerings**

- **R+ DDR4 DIMM Chipset**
  - DDR4 @ 2666Mpbs
  - Register Clock Driver (RCD)
  - Data Buffer (DB)

- **R+ DDRn Memory PHYs**
  - R+ DDR4/DDR3, LPDDR4/3, DDR3/3L
  - R+ Next-Gen DDR
  - R+ HBM2

- **R+ Serial Link PHYs**
  - R+ Multi-Protocol PHYs: CEI6/11/25, PCIe1/2/3/4, XAUI, 10GbE, SATA, JESD, FC, CPRI, HMC, etc.

**Enablement**

- LabStation Validation Platform
- System, Board and Chip Co-Design
- Bring-up, De-bug and Characterization Support

**Markets**

- Data Center
- Enterprise
- Networking
- Storage
- Mobile
R+ DDR4 Server DIMM Chipset

Built for speed, power efficiency and reliability, the R826 DDR4 chipset for RDIMM and LRDIMM server modules delivers top-of-the-line performance and capacity needed to meet the growing demands on enterprise and data center systems.

Industry-leading Performance
- Fully-compliant with the latest JEDEC DDR4 RCD02 and DB02 standard at 2666 Mbps
- Operational upto 2933 Mbps

Enhanced Margin
- Wide margin I/O design with advanced programmability
- Exceed JEDEC reliability standards for ESD and EOS

Optimized Power
- Advanced power management
- Frequency-based, low-power optimization

Superior Debug and Serviceability
- Integrated tools for bring-up and debug
- Works out-of-the-box with no BIOS changes required
Standard Made Better
RB26 DDR4 Server DIMM Chipset

Industry-leading Performance and Margin
- Compliant with latest JEDEC spec @ 2666 Mbps; built-in support for 2933 Mbps
- Wide margin IO design with advanced programmability
- Exceeds JEDEC reliability requirements

Optimized Power
- Frequency-based power optimization

Best-in-class Debug and Serviceability
- Integrated tools for bring-up and debug
- Works out of the box with default system BIOS

Sampling today
R+ DDRn PHYs

With their reduced power consumption and industry-leading data rates, our line-up of enhanced memory interface solutions support a broad range of industry standards with improved margin and flexibility.

**Fully Standards-Compatible**
- Faster time-to-market
- Multi-protocol support

**Enhanced Design Flexibility**
- Flexible packaging options
- Improved margin and yield

**Reduced Power**
- Wide range of PLL clock multipliers
- Fine-grain power-up/down options

**Improved Performance**
- Industry-leading data rates
- Increased bandwidth
R+ Serial Link PHYs

Optimized for power and area, our line-up of R+ Serial Link Interface solutions deliver maximum performance and flexibility for today’s most challenging systems.

**Fully Standards-Compatible**
- Compliant with the latest JEDEC and industry-standard specifications
- Support for multi-modal functionality

**Enhanced Design Flexibility**
- Support for multiple packaging options
- Enhanced margin and yield

**Reduced Power**
- Improved power efficiency
- Lower signaling and stand-by power

**Improved Performance**
- Increased data rates
- Improved bandwidth
- Higher capacity
Cryptography Research Products and Solutions

Offerings
- **DPA Countermeasures**
  - DPA Resistant Cores and Software Libraries
  - Licensed Countermeasures
- **CryptoFirewall Cores**
  - Content Protection Core
  - Anti-counterfeiting Core
- **CryptoManager Platform**
  - Security Engine
  - Infrastructure and Key Provisioning Services

Enablement
- DPA Workstation Platform
- DPA Validation Program
- Design, product evaluation and training

Markets
- Mobile
- IoT
- Enterprise
- Government
- Digital Entertainment
DPA Countermeasures

Protecting nearly 9 billion products a year, our DPA countermeasures include fundamental solutions and techniques for securing devices against side-channel attacks.

**Superior Protection**
- Robust countermeasures to protect against side-channel attacks
- Broad range of hardware, software and protocol approaches to secure tamper-resistant devices
- Cores validated to resist DPA attacks in millions of traces

**Improve Time-to-Market**
- Simplified device testing for power analysis vulnerabilities
- Training, evaluation services and analysis equipment
- Ready-to-use, DPA Resistant solutions

**High Flexibility**
- Solutions can be optimized for performance, size, and security level
- Solutions integrate with standard cipher modes such as CBC, ECB, etc.
CryptoFirewall Cores

Our cores complement existing security implementations, and are ideal for protecting digital content and preventing counterfeiting in a broad number of applications.

**Superior Security**
- Highest level of security for content protection and anti-counterfeiting
- Independent hardware core maintains security even if other parts of the chip are compromised

**Improve Time-to-Market**
- Reduce revenue lost to unauthorized access and counterfeits
- Easy integration in existing systems
- Compatible with standard manufacturing processes
- Simplifies device validation to improve time-to-market

**High Flexibility**
- Support distribution of various Over-the-Top (OTT) content to STBs and Smart TVs
- Supports all content distribution platforms – satellite, cable, IPTV and OTT
CryptoManager Platform

From mobile phones to the Internet of Things (IoT), connected devices have a critical need for robust security. Our key provisioning and feature management platform provides secure foundations of trust for a connected world.

**Secure Supply Chain**
- Robust end-to-end security
- Secure provisioning and tracking
- Protect against the leakage of cryptographic keys

**Improved Profitability**
- Reduce NRE and operating costs
- Improve time-to-market
- Reduce inventory waste

**Streamline Operations**
- Automate provisioning of keys
- Enable common platform across product lines
- Integrate easily into existing manufacturing flow

**Superior Security**
- Provide a robust hardware root-of-trust
- Protect valuable secret keys, identity credentials, and other sensitive data
- Protect against reverse engineering and counterfeiting
CryptoManager Security Platform

- **CryptoManager Security Engine**
  - Hardware root of trust
    + Manages the security of keys and feature controls within the SoC
- **CryptoManager Infrastructure**
  - Appliance
    - Tamper-resistant security appliance co-located at customer factory
      + Distributes keys and feature controls
  - Trust Service
    - A control center for device services with flexible deployment options
    - Includes an advanced Management Console
      + Centrally controls the whole system from the cloud
Feature Enablement Value Chain

Supply and Value Chain

Chip Manufacturers: 10s
- Device Personalization
- Key Provisioning
- Debug Control & Management
- Supply Chain Monitoring and Oversight

Device Manufacturers: 100s
- Feature Management
- Key Provisioning
- Supply Chain Monitoring and Oversight
- ODM Management

MNOs, SPs, App Services: 1000s
- Entertainment
- Finance and mobile payment
- Government / National ID
- Healthcare
- MNO Subscriber Management and Kill Switch
- Remote enterprise
- Ticketing

Revenue
$1B+
$0.005 - $0.075/key

$0.05 - $0.50/key

$0.10 - $2.00/key
Emerging Solutions
The world’s data. Reimagined.
What is ESD?

Memory & Interfaces
Moving the world’s data from memory through interfaces

Cryptography Research
Reinventing embedded security from silicon to cloud

Emerging Solutions
Reimagining computing from sensor to cloud

Foundational R&D
Invention and harvesting
Methods and architecture
Incubation from concept to market
Next-generation Memory Development

Advanced development for future memory
- DDR5+ concepts and technology
- Gen n+2 buffer chips

Emergence of storage-class memory
- Faster than flash; lower cost and more reliable than DRAM
- Addresses slow-down in DRAM cost reduction
- Alternative bit-cell technology to improve memory endurance and power efficiency
- Rambus crosspoint ReRAM IP and technology
Smart Data Acceleration Research Program

A research program focused on improving the performance and power efficiency of next-generation data centers in the age of Big Data by combining FPGAs and large amounts of memory to optimize data movement and system performance.

- **Improved Performance**
  - Utilizes DRAM to deliver higher bandwidth and lower latency vs. SSD

- **Enhanced Power Efficiency**
  - Higher memory capacity reduced time and power spent moving data

- **Accelerated Computing**
  - FPGAs enable parallel offloading and acceleration of compute tasks close to data
Lensless Smart Sensor

Designed for ubiquitous smart sensing

- Diffractive optics combine with optimized algorithms to enable a breadth of capabilities:
  - Image change detection
  - Point tracking
  - Range finding
  - Sophisticated gesture recognition
  - Object recognition
  - Image capture
  - Video streaming

<table>
<thead>
<tr>
<th>Size Comparison</th>
<th>Spiral Grating Detail</th>
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<tbody>
<tr>
<td><img src="~1.5mm" alt="Commercial Sensor Lens" /></td>
<td><img src="0.055mm" alt="LSS Spiral Grating" /></td>
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<tr>
<td>![Top view](Cross-section view)</td>
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Monetization Models

**Patent Licenses**

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>Patent development 2-5 years</th>
<th>Licensing discussions 2-4 years</th>
<th>Royalties 5-10 years</th>
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<tr>
<td>SIP Cores</td>
<td>$</td>
<td>$</td>
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**SIP Cores**

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>Program initiation 3-6 months</th>
<th>Product design/tape-out 6-18 months</th>
<th>Customer product launch 3-12 months</th>
<th>Use fees/royalties 2-10 years</th>
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<tbody>
<tr>
<td>CryptoManager</td>
<td>$</td>
<td>$</td>
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**CryptoManager**

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>Program initiation 3-6 months</th>
<th>Product design/TO infrastructure build 6-18 months</th>
<th>Customer product launch 3-12 months</th>
<th>Programming opportunities 2-10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer Chips</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**Buffer Chips**

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>Chip Design &amp; TO 6-9 months</th>
<th>Sampling &amp; Qualification 6-12 months</th>
<th>Shipping to customers 1-3+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
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</tbody>
</table>

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Cash and Net Cash

- Recently announced a $100M share buyback through an ASR
Substantial Overall Growth Opportunity

- Memory expected to grow through Buffer Chips and SoC engagements
- Security expected to grow through proliferation of CryptoManager and other verticals
- Evolving strategic investments that could become additional businesses
Investment Thesis

• A large portion of our revenue is **fixed, predictable** and committed **long term**

• We continue to utilize our resources and expertise to create **new monetization models** (e.g. CryptoManager, buffer chips)

• **Security** continues to be an increasing concern, and we are well positioned to address new verticals via our **expanding technology and product portfolio**

• We want to influence not only the $300B **semiconductor** industry, but to participate in the $1T “downstream” industry

• Our offerings are **robust** and well protected by an **exceptionally strong** patent portfolio
### Reconciliation of non-GAAP Financial Measures

($M)

<table>
<thead>
<tr>
<th></th>
<th>Q3'14</th>
<th>Q4'14</th>
<th>Q1'15</th>
<th>Q2'15</th>
<th>Q3'15</th>
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<tbody>
<tr>
<td><strong>Net Income</strong></td>
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<tr>
<td>GAAP Net Income (Loss)</td>
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<td>8</td>
<td>10</td>
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<td><strong>Adjustments:</strong></td>
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<td>Acquisition-related transaction costs &amp; retention bonus</td>
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<tr>
<td>Amortization</td>
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<td>Other one-time events</td>
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<tr>
<td>Provision for (benefit from) income taxes</td>
<td>(3)</td>
<td>(3)</td>
<td>(4)</td>
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<td>(177)</td>
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<tr>
<td><strong>Pro Forma Net Income</strong></td>
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<tr>
<td><strong>EBITDA</strong></td>
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<td></td>
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<tr>
<td>GAAP Operating Income</td>
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<td>18</td>
<td>18</td>
<td>16</td>
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<tr>
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<td>31</td>
<td>29</td>
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Certain amounts may be off $1M due to rounding.