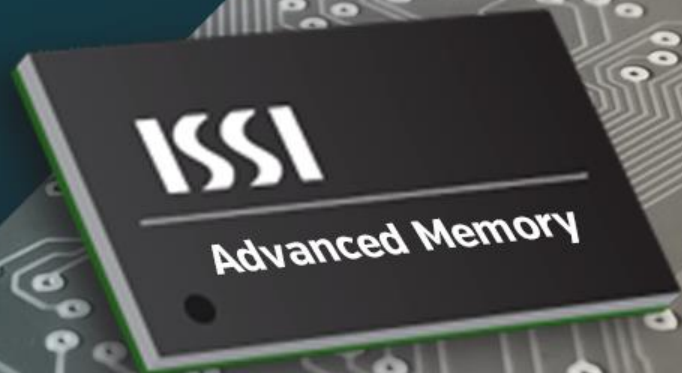




Long-term Support  
World Class Quality

**CORPORATE PRESENTATION**  
**February 2024**



**INTEGRATED SILICON SOLUTION, INC.**

## Company



- Founded in 1988. A Leading Fabless Semiconductor Company.
- We have been providing Memory Solutions to our customers for more than 30 years.
- Approximately 500 people worldwide including offices in US, Europe, Israel, Taiwan, China, Japan, SEA/India and Korea

## Strategy



- Core strategy driven by Automotive and Industrial/Medical markets, 75% revenue from the markets. Also Servicing Targeted Consumer & Enterprise/Communications.
- Provide a broad portfolio of high-quality products coupled with Long Term Support
- ISO 9001 and ISO 14001 certification. ISO 26262 Process and Product Certified.

## Products



- DRAM: Legacy DRAMs (SDR/EDO/DDR/DDR2), DDR3, DDR4, LPDDR2, LPDDR4
- SRAM: High Speed/Low Power Asynchronous, Synchronous, Serial/Octal/Hyper/QUAD
- Flash: Serial NOR, Parallel NOR, SLC NAND, eMMC. UFS, MCPs

## Automotive

Telematics  
Infotainment  
Engine Control  
Braking Systems  
Cluster/Center Stack  
EV Charging/BMS  
HUD Displays, ETS  
Body Electronics/HVAC  
ADAS  
Cameras  
Automotive Lighting  
Vehicle Networking  
Radar/Lidar

## Industrial & Medical

M2M/IIOT  
HMI/PLC  
POS Terminals  
Bar Code Scanners  
Factory Automation  
Medical Instrumentation  
Energy Management  
Security Cameras  
Building Networking  
Smart Building

## Communications, Enterprise, Targeted Consumer

Base Station  
Switches/Routers  
VoIP/Security  
Set Top Boxes  
HDD/SSD  
Server  
White Goods/Appliances

SDR/DDR/DDR2/DDR3/DDR4/RLDRAM/mSDR/mDDR/LPDDR2/LPDDR4 DRAMs

Flash (Serial NOR, Parallel NOR, NAND, eMMC, MCP)

Asynchronous (HS/LP)/Serial/Pseudo/HyperRAM/OctalRAM/QUAD/Synchronous SRAMs

## Automotive



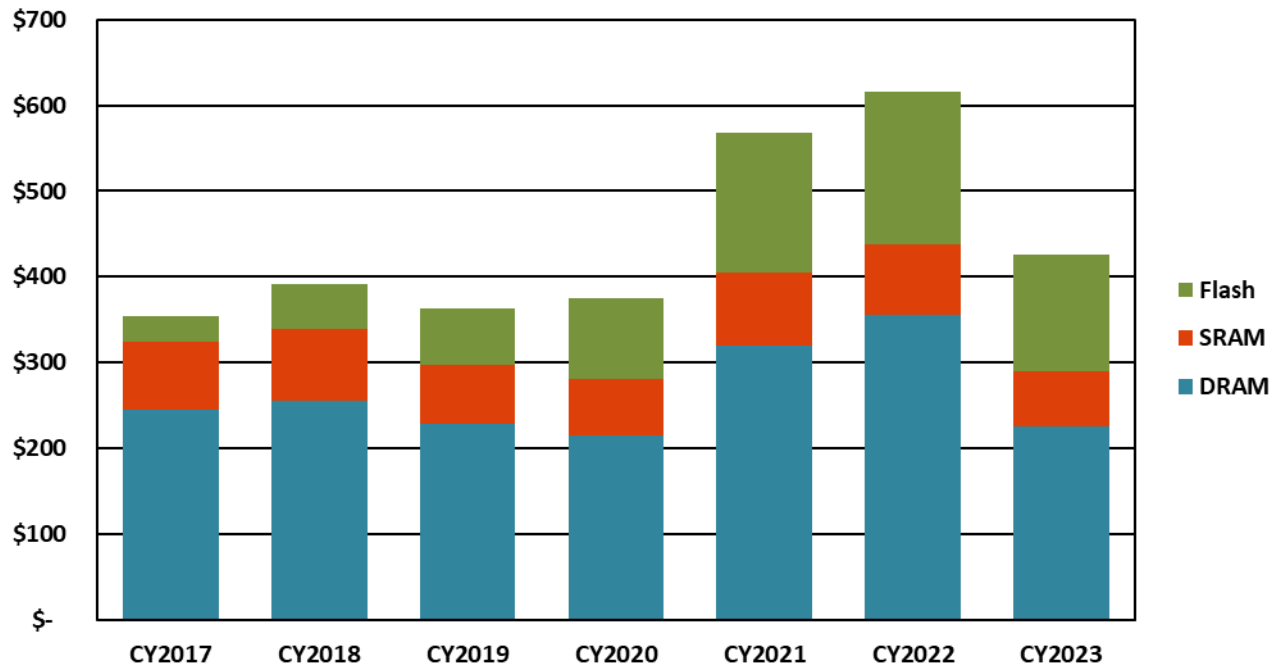
## Industrial and Medical



## Communications, Enterprise, Targeted Consumer



### Memory(Millions \$)



**Automotive &  
Industrial Segments  
Generate ~75% of  
revenue**

Additional Financial Data can be obtained from ISSI under NDA



### Over 20 years supporting the Automotive Market

- ❖ More than 2Bu of ISSI memory shipped to the Automotive Market
- ❖ ISSI's quality and long-term product support are critical to our Automotive customers



Our corporate infrastructure and product planning, design and production are driven by our stringent automotive quality requirements and the knowledge gained by the ISSI Automotive Business.



We have a broad Offering of memory products—SRAM, DRAM and Flash—with Automotive Temperature range, from -40°C to 125°C.



### Certifications and Standards

- ❖ ISSI has ISO 9001 and ISO 14001 certifications, with products qualified to JEDEC and AEC-Q100 standards
- ❖ Fabs and Subcontractors are certified to IATF 16949
- ❖ ISSI is ISO26262 Process Certified, while some products have earned ISO26262 Product Certification



2018

ISSI completed a series of training courses, on-site workshop exercises, and SC-AFSP (Automotive Functional Safety Professional for Semiconductor) training.

2019

ISSI earned a process certificate for the ISO 26262 standard.

2021

ISSI attained its first product certification to ISO26262 for 4Gb DDR3 DRAM with ECC. This product is certified to ASIL-B standards.

Implementing these standards begins with the product design phase, and extends throughout the entire product lifecycle.



We are focused on the Industrial market



- ❖ Our company strategy is fully aligned with customer requirements for long term support of high quality, unchanged products
- ❖ The diverse Industrial market often has very long application lifecycles



- Product Lifecycle Roadmaps for Industrial and Automotive grade products are published quarterly
- ❖ Every DRAM, SRAM and Flash device is covered



There is no cost adder for ISSI's Long Term Support and stable pricing.



Roadmaps give customers visibility on the introduction timing for new, more competitive products. However, we still give customers the choice to continue using the current generation product.



We have a consistent strategy for the Automotive and Industrial markets—which contributes over 70% of company revenue.



World Class Quality, High Mix/Low Volume, and Stable Production







Backward Compatible with Standard Memory



Greatly enhances Data Robustness and Quality



Simplify System Level Design, Save Power and Reduce the Memory footprint on the board.



Ideal fit for High Reliability applications especially the safety critical applications in the Automotive electronics and Industrial/Medical Segments.



Helps the product to achieve higher ASIL level of safety defined in ISO26262.



ISSI is ISO26262 Process Certified.



4Gb DDR3 with ECC is now ASIL-B Certified.

## Memory with ECC

Enhanced Data Reliability



DRAM



FLASH



SRAM

Long-term Support · World Class Quality



- Provide complete low, medium, and high density DRAMs
  - Aligned with needs of Automotive and Industrial customers, and not influenced by the fast-changing consumer and storage market
- Equity investments with Fab Partner Powerchip(PSMC) for guaranteed capacity and long-term support
- Provide high-quality and long-term support for all ISSI DRAM products
- **Recent Highlights**
  - In Production of 25nm based 1Gb, 2Gb, 4Gb, 8Gb, and 16Gb DDR3 products.
    - In Production of 115°C and 125°C Automotive grade
  - In Production of 1Gb and 4Gb DDR3 with on-chip ECC
  - In Production of 2Gb, 4Gb and 8Gb LPDDR4.
  - In Production of 4Gb DDR4 and 8Gb DDR4.

***TAM for ISSI DRAM is very large at ~\$5B per year***

DRAM	16Mb	32Mb	64Mb	128Mb	256Mb	512Mb	1Gb	2Gb	4Gb	8Gb	16Gb
EDO/FP (3.3V)	✓										
SDRAM (3.3V)	✓		✓	✓	✓	✓					
DDR				✓	✓	✓					
DDR2					✓	✓	✓	✓			
DDR3/DDR3L							✓ ECC	✓	✓ ECC	✓ ECC	✓
DDR4									✓	✓	✓
Mobile DRAM	16Mb	32Mb	64Mb	128Mb	256Mb	512Mb	1Gb	2Gb	4Gb	8Gb	16Gb
Mobile SDRAM (1.8V/2.5V/3.3V)		✓	✓	✓	✓	✓					
LPDDR		✓	✓	✓	✓	✓	✓	✓			
LPDDR2					✓	✓	✓	✓	✓	✓	
LPDDR4 (1.1V), LPDDR4X (0.6V)								✓ ECC	✓ ECC	✓ ECC	✓
Specialty DRAM	288Mb	576Mb	1Gb	2Gb							
RLDRAM <sup>®</sup> 2	✓	✓	✓								
RLDRAM <sup>®</sup> 3		✓	✓	✓							

### Features:

- Commercial, Industrial & Automotive Temperature Grade
- Long Term Support
- Halogen-free, RoHS and TSCA Compliant

### Status

- ✓ Production
- ✓ Sampling
- ✓ In Development
- ✓ Under Consideration

**ECC:** On-chip Error Correcting Code is an available option

- Stand Alone Flash Memory and Embedded/IP Flash Solution
  - Comprehensive IP with over 62 patents
  - Shipped more than 7 Billion units (Embedded + Packaged) to date
- Broad voltage offerings including 1.8V, 2.5V and 3.3V coupled with a wide variety of packages including KGD
- Major Design Wins and Increased Sampling activity due to de-emphasis of low density NOR Flash from competitors
- Investing heavily in the Flash product line to provide Long Term Support and Broad Product Solutions (serial (SPI/QSPI)/Octal Flash/Parallel NOR, SLC NAND (serial/parallel), eMMC)
- **Recent Highlights**
  - Volume production of 512Kb to 2Gb QSPI/SPI Automotive Grade (-40 to 125°C) (AECQ) NOR Flash.
  - Volume production of ECC based 256Mb to 2Gb Serial NOR Flash.
  - Production of 32Mb to 256Mb Automotive Grade Parallel NOR Flash (Supports -40 to 125°C)
  - Ramping 1Gb/2Gb/4Gb/8Gb SLC NAND now (-40 to 105°C Automotive Grade).
  - Volume production of Automotive Grade 8GB/32GB/64GB/128GB eMMC, in both 100-ball & 153-ball packages.

***TAM for NOR Flash is > \$2B per year and growing***

SPI/QSPI (Serial NOR)		512Kb	1Mb	2Mb	4Mb	8Mb	16Mb	32Mb	64Mb	128Mb	256Mb	512Mb	1Gb	2Gb
2.5/3V		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓ ECC	✓ ECC	✓ ECC	✓ ECC
1.8V		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓ ECC	✓ ECC	✓ ECC	✓ ECC

1.2V and Wide I/O 1.5V - 3.6V Serial Flash products under development

Twin Quad SPI (2 CE)					512Mb	
3V					✓	
1.8V						

xSPI (Octal Flash)	32Mb 64Mb	128Mb	256Mb	512Mb	1Gb	2Gb
3V	✓	✓	✓	✓	✓	✓
1.8V	✓	✓	✓	✓	✓	✓

Parallel Flash (NOR)	32Mb	64Mb	128Mb	256Mb		
3V w/ VIO = 1.65-3.6V	✓	✓	✓	✓		

MCP	128Mb+ 128Mb	128Mb+ 256Mb	256Mb+ 256Mb	256Mb+ 512Mb	512Mb+ 512Mb
OctalRAM + OctalFlash	✓	✓	✓	✓	✓
HyperRAM + OctalFlash	✓	✓	✓	✓	✓

Industrial & Automotive Temperature Grade, Long Term Support, Leaded or RoHS & Halogen-free Compliance TSCA Compliance

STATUS ✓ Production ✓ Sampling ✓ In Development ✓ Under Consideration **ECC:** On-chip Error Correcting Code is an available option

# Flash Products- NAND and Managed NAND

Advanced Memory

SPI NAND	1Gb	2Gb	4Gb	8Gb		
3V/1.8V	✓ 1bit ECC	✓ 1bit ECC	✓ 8bit ECC	✓ 8bit ECC		
Parallel SLC NAND	1Gb	2Gb	4Gb	8Gb	16Gb	
3V/1.8V; (x8 & x16)	✓ 1 or 4bit ECC	✓ 1 or 4bit ECC	✓ 1, 4, or 8bit ECC	✓ 8bit ECC	✓ 8bit ECC	
eMMC 5.0/5.1	4GB	8GB	16GB	32GB	64GB	128GB
100 & 153 BGA	✓	✓	✓	✓	✓	✓
UFS 2.1/3.1				64GB	128GB	256GB
153 BGA				✓	✓	✓

*Industrial & Automotive Temperature Grade, Long Term Support, Leaded or RoHS & Halogen-free Compliance TSCA Compliance*

STATUS    ✓ Production    ✓ Sampling    ✓ In Development    ✓ Under Consideration    **ECC:** On-chip Error Correcting Code is an available option

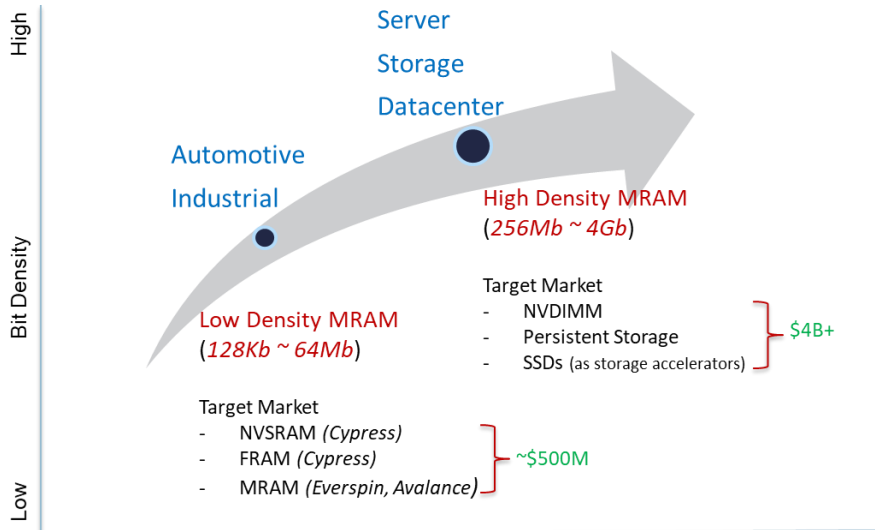
▪ New addition:

- 8GB/16GB eMMC, IS2xEF08G/16G-Jxxx
- Factory set pSLC mode 4GB/8GB eMMC, IS2xEF04GP/08GP-Jxxx

NAND	p/n	Density	pSLC Mode Density	Endurance	Endurance in pSLC Mode	Comments
2D MLC	IS2xEF04GP	4GB	4GB	30K	30K	Factory set pSLC mode
	IS2xEF08GP	8GB	8GB	30K	30K	
	IS21EF08G*-xxxx	8GB	4GB	3K	30K	Endurance is 3K cycles in normal mode and 30K cycles in pSLC mode (density becomes ½)
	IS2xEF16G*-xxxx	16GB	8GB	3K	30K	
3D TLC	IS2xTF32G-xxxx	32GB	10GB	3K	40K	Endurance is 3K cycles in normal mode and 40K cycles in pSLC mode (density becomes 1/3)
	IS2xTF64G-xxxx	64GB	21GB	3K	40K	
	IS2xTF128G-xxxx	128GB	42GB	3K	40K	

SERIES	UFS I/F	PACKAGE	DENSITY	TEMP. GRADE	NAND	ES	CS	MP
Series A	UFS 2.1	153-Ball BGA (11.5 x 13.0 x 1.0mm)	64/128/256GB	AEC-Q100 Grade1 (-40 ~ 85°C)  AEC-Q100 Grade2 (-40 ~ 105°C)	3D TLC	Now!	Q1'24	Q2'24
Series B	UFS 3.1	153-Ball BGA (11.5 x 13.0 x 1.0mm)	64/128/256GB	AEC-Q100 Grade1 (-40 ~ 85°C)  AEC-Q100 Grade2 (-40 ~ 105°C)	3D TLC	Q1'24	Q2'24	Q3'24

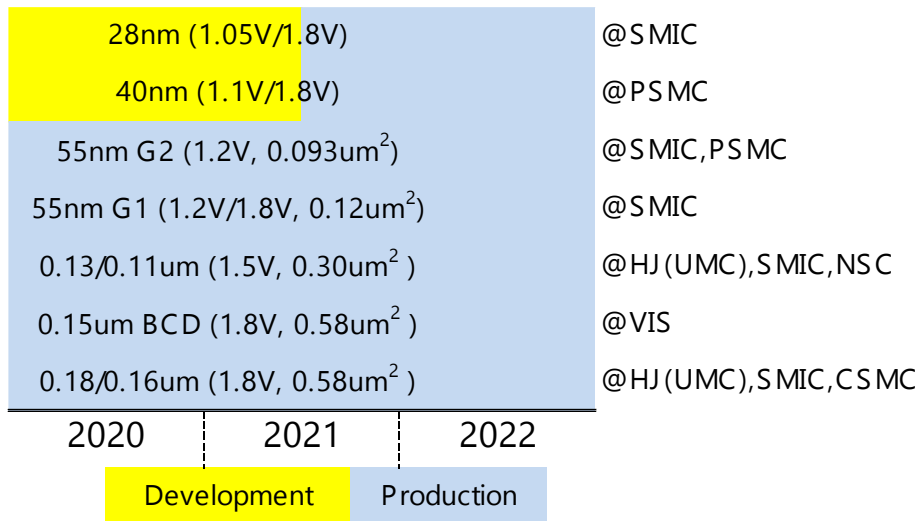




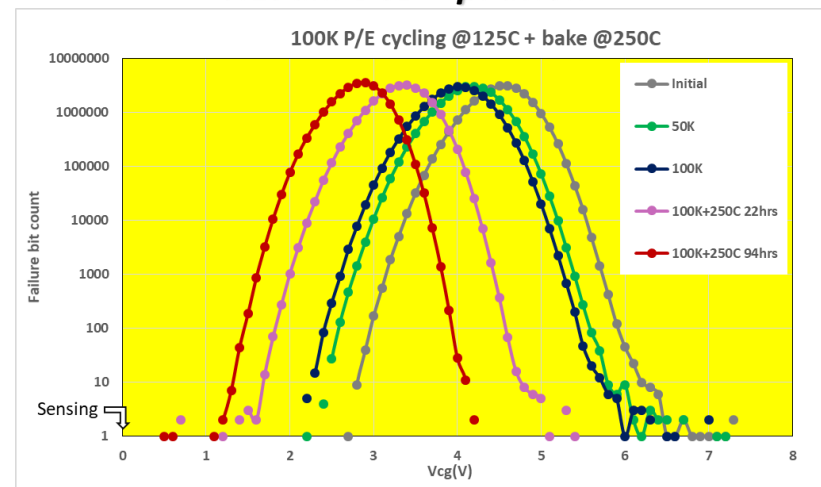
- MRAM is non-volatile, provides high write/read speed like DRAM/SRAM, high endurance and does not require refresh.
- ISSI is currently working on a low-density (4Mb) Parallel (x8/x16) MRAM - the first MRAM product to be launched by ISSI.
- In future, will develop high density MRAM products (w/ DDRx like interface)

- Innovator of pioneering pFusion<sup>®</sup> architecture. Full Patent Coverage.
- Solid data retention, best endurance, fast program/erase and read speed, low power consumption at temp. range of -40°C to +125°C.
- Logic compatible, scalable and small macro.
- Lower process challenge, higher CP, and world-class quality and reliability.

## pFusion<sup>®</sup> : Technology roadmap



## 0.15um BCD + pFusion<sup>®</sup>



- Develop Asynchronous SRAM/Synchronous SRAM/QUAD SRAM products for application and performance specific markets
  - Automotive, Industrial/Medical and Communications
- Total commitment to provide long-term support for all ISSI SRAM portfolio. Growing Market Share as others de-emphasize.
- Continued investment in the latest advanced process nodes and investing in backend capacity.
- Provide complete SRAM product solution
  - 5V SRAMs, High Speed Asynchronous SRAMs, Power Saver SRAMs
  - HyperRAM, Pseudo SRAMs, Serial SRAM, SerialRAM, OctalRAM
  - ECC Based Asynchronous and Synchronous SRAMs
  - QUAD SRAMs, Synchronous SRAMs

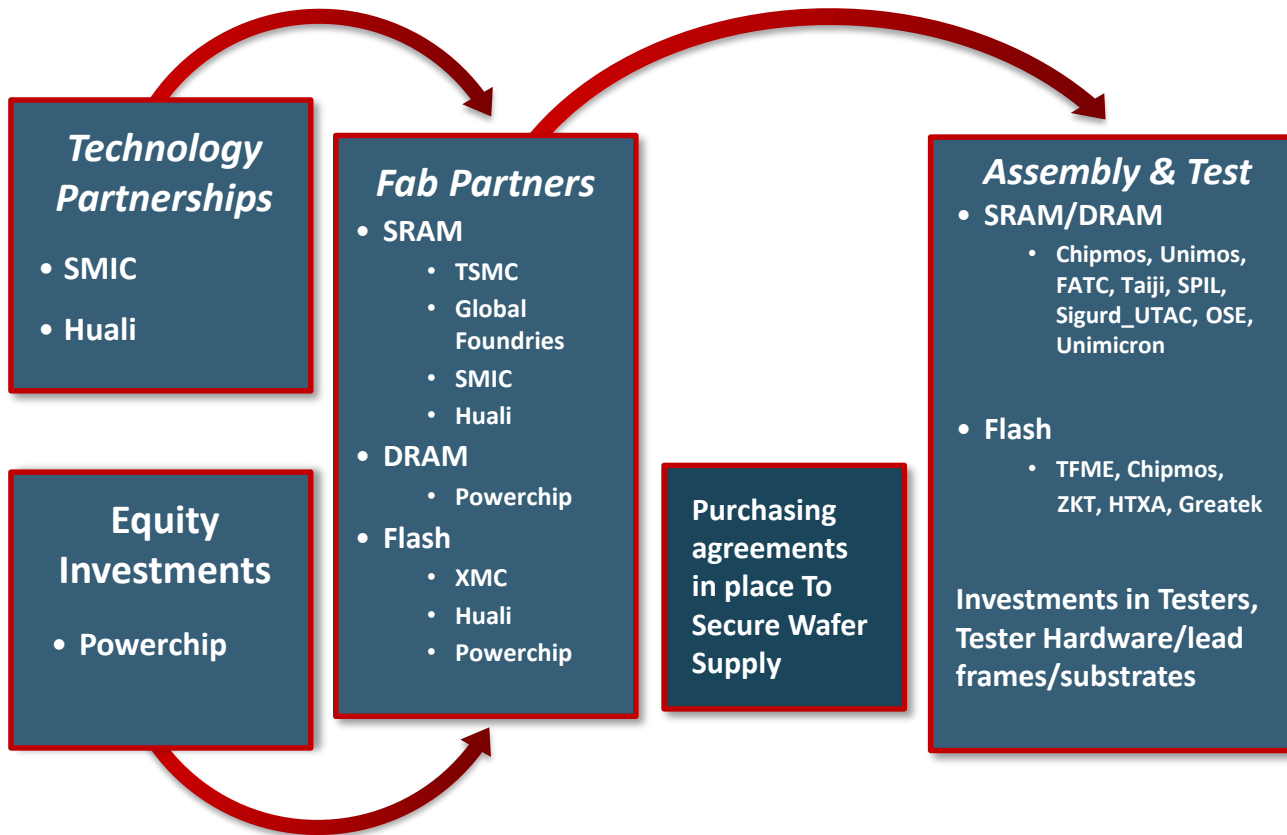
***Overall SRAM Market is large with many diverse applications : \$350M TAM***

# SRAM Product Portfolio

Advanced Memory

Asynchronous SRAM/Pseudo SRAM	64Kb	256Kb	512Kb	1Mb	2Mb	3Mb	4Mb	8Mb	16Mb	32Mb	64Mb			
5V	✓	✓	✓	✓			✓	✓				<b>Industrial &amp; Automotive Temperature Grade</b>		
High Speed Asynchronous		✓	✓	✓ ECC	✓ ECC	✓	✓ ECC	✓ ECC	✓ ECC	✓				
Ultra Low Power		✓		✓	✓		✓ ECC	✓ ECC	✓				<b>Long Term Support</b>	
Pseudo SRAM								✓	✓	✓	✓			
Low Pin Count	512Kb	1Mb	2Mb	4Mb	8Mb	16Mb	32Mb	64Mb	128Mb	256Mb	512Mb	1Gb	<b>Haologen-Free, RoHS &amp; TSCA Compliant</b>	
Serial SRAM	✓	✓	✓	✓										
Serial/QUAD RAM(SPI/QPI)					✓ ECC	✓ ECC	✓	✓	✓					
HyperRAM							✓	✓ ECC	✓ ECC	✓	✓	✓		
OctalRAM							✓	✓ ECC	✓ ECC	✓	✓	✓	<b>ECC: Error Correction Code</b>	
Muxed/Latch Async				✓										
Synchronous SRAM	2Mb	4Mb	8Mb	16Mb	36Mb	72Mb	144Mb						✓	<b>Production</b>
Standard/No-Wait(ZBT) Synchronous	✓	✓ ECC	✓	✓	✓	✓							✓	<b>Sampling</b>
QUAD/DDRII/QUADP/DDRIP (Compatible to QDR-II™)				✓	✓	✓							✓	<b>In Development</b>
													✓	<b>Under Consideration</b>

## A unique position in the semiconductor business



- In 2015 Invested \$73+ million in Powerchip Technology that provides access to leading edge technology and capacity
- In 2019 Invest \$200M in Powerchip Technology
- Continue to make Major Investments in back-end support
- Signed long term wafer supply agreement with partner foundries

*ISSI has a Global Rep Network (extension of ISSI Sales Force) throughout the world*



## ISSI Regional Sales Presence and Logistics Hubs

**Authorized Worldwide Distributors:**





ISSI partners with several leading semiconductor chipset/SOC manufacturers on Reference Designs

Gives ISSI early access to leading-edge chipsets



Reference Designs with our Partners speeds end customer acceptance and simplifies the design-in process



Ensures compatibility of ISSI memories with chipsets supporting a wide variety of Networking, Digital Consumer, Automotive, Industrial, Medical, and IoT applications



Partners Include Altera/Intel, Ambarella, AMD/Xilinx, Analog Devices, Atmel/Microchip, Autotalks, Broadcom, Cypress/Fujitsu, Horizon, NXP, Nvidia, Lattice, Marvell, Mobileye, Qualcomm, Renesas, Semidrive, ST Micro, TI, and Toshiba



Provide our recommendation on popular memory products



Models to help customers' system integration

- IBIS, Verilog, CAD/PCB, BSDL



Provide basic configuration of memory

- Register Settings
- Online Training on Memory interface



Work with customer on controller/chipset interface from memory perspective



On Site FAE Support



Board Layout Guidelines and Review

- Validate Signal/Power Integrity



Use ISSI Regional Applications lab to validate customer boards



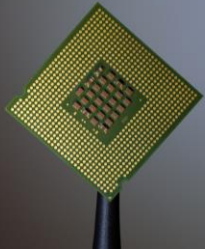


- Full complement of functions in our Silicon Valley-USA, Hsinchu-Taiwan and Shanghai-China locations
- Engineering teams in USA, Taiwan, China, and Korea

- High Quality Manufacturing
- Manufacturing, logistics, reliability, and quality assurance teams in Asia/Taiwan
- High Mix/Low Volume Manufacturing flexibility
- Long Term Support

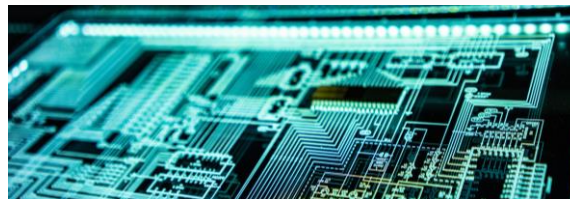


- **Global support with local presence to support customers**
  - Local sales team and applications support in USA, Europe, Japan, Israel, China, Taiwan, Korea and more
  - Regional marketing specialists
  - Strong ties to local distributors
  - Regional Logistics Hubs



- Growing sustainable revenue
- Large and diverse market opportunities (~\$7.5B SAM)
  - Right products (Advanced and Legacy), and tier one customers
- High quality product solutions with long term product support

- Strong balance sheet
- Over 35 years of memory experience
- Core strategy driven by Automotive and Industrial/Medical markets, 75% revenue from the markets. Also Servicing Targeted Consumer & Enterprise/Communications



- Worldwide Presence to Support Customers
  - Full complement of Engineering, Marketing, Sales and Support functions in our Silicon Valley-USA, Hsinchu-Taiwan and Shanghai-China



Automotive



Communications  
Enterprise  
Targeted Consumer



Industrial/Medical



Long-Term Support  
World Class Quality

# Thank You



# Supply Chain Resiliency

## Manufacturing

### Fabs

- *SRAM*: Multiple Fabs in TWN and China
- *DRAM*: Multiple Fabs in TWN
- *Flash*: Multiple Fabs in China  
Working on a Fab in TWN

### Assembly and Test

- *SRAM*: Multiple in TWN and China
- *DRAM*: Multiple in TWN and China  
Adding Malaysia, COO - Malaysia
- *Flash*: Multiple in TWN and China  
Adding Malaysia, COO - Malaysia



## Inventory

### Buffer Inventory at ISSI

Typically maintain 6+ months of buffer inventory in various forms - wafers, die, & finished goods.

### Hubs

We have set up Hubs in various parts of the world to hold dedicated inventory for our customers.

### WW Distributors

We have Global Network of Top Distributors who can hold inventory for our customers.



## Other Arrangements

We can maintain inventory for customers in the Wafer and/or Finished Goods (If needed outside of China and Taiwan).

Continuous Risk Mitigation Efforts

Business Continuity Planning

Our systems have incorporated extensive Cybersecurity Measures





- ✓ ISSI has secured a Volume Purchasing Agreement with our Fab partners, ensuring a guaranteed volume.
- ✓ We adjust our inventory levels monthly based on forecasts, backlogs, and inputs from our customers.
- ✓ We issue wafer starts on a monthly basis to our fabs.
- ✓ We maintain a buffer inventory for a minimum of 6+ months on most of our devices.
- ✓ The majority of our buffer inventory is held in wafer form, while the rest is stored as finished goods in our facilities/warehouses(TWN, HK and USA) and at subcontractors' locations.
- ✓ We can accommodate specific or customized buffer inventory requirements for strategic customers.
- ✓ Supporting automotive customers with buffer inventory and inventory planning is central to our core strategy.