GSI TECHNOLOGY

Aerospace & Defense Brochure 2025

D0106; Rev1.0, 6/2025


GSI TECHNOLOGY

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Introduction to Radiation-Hardened Memories

Radiation-hardened memories are electronic memory devices designed to withstand and operate in harsh radiation environments, such as those encountered in space or nuclear power plants. These environments can cause various types of radiation-induced errors, such as single-event upsets (SEUs), which can corrupt stored data, or total ionizing dose (TID) effects, which can degrade the device's performance over time.

To mitigate these effects, radiation-hardened memories employ various techniques, such as radiation hardening by design (RHBD) and radiation hardening by process (RHBP), which involve using specialized materials, designs, and manufacturing processes that are more resistant to radiation. Additionally, these memories often incorporate error correction codes (ECCs) and redundancy techniques to detect and correct any errors that do occur.

Radiation-hardened memories are critical components in many space applications, including satellites, spacecraft, and interplanetary probes, where they are subject to intense radiation from solar flares and cosmic rays. They are also used in nuclear power plants, where they must operate reliably in the presence of radiation from radioactive materials.

Overall, radiation-hardened memories are essential for ensuring the reliability and safety of electronic systems operating in harsh radiation environments, and their development and optimization continue to be an important area of research in the field of electronics.

GSI's Vanguard Rad-Hard SRAMs

GSI Technology's inaugural projects in the Aerospace and Defense industry are groups of Radiation-Hardened and Radiation-Tolerant synchronous SRAMs:

- **A family of SigmaQuad-II+ products**: available in 288Mb, 144Mb, and 72Mb densities, x18 and x36 configurations, On-Die Termination (ODT), and up to 350 MHz performance

- **A family of SyncBurst & NBT products**: available in 144Mb, 72Mb, and 36Mb densities, x18 and x36 configurations, and up to 333 MHz performance

These Rad-Hard SRAMs serve as a critical element for advanced systems that leverage leading-edge FPGAs, ADCs, and DACs; but until now lacked the high density, high performance, and power efficiency that our outstanding memory products bring. These devices are qualified to Class-Q and Class-V equivalent levels to meet the rigorous requirements of aerospace and defense customers.

GSI Technology's Rad-Hard SRAMs leverage our proven commercial technology and architecture with radiation-hardening, creating an efficient, high performance, leading-edge memory at the 40nm technology node.

For less robust applications, GSI offers Radiation-Tolerant SRAMs, as well.

All GSI Military Temperature memory offerings are shown on pages 9-20.

For more information, contact us at **aerospace@gsitechnology.com**.

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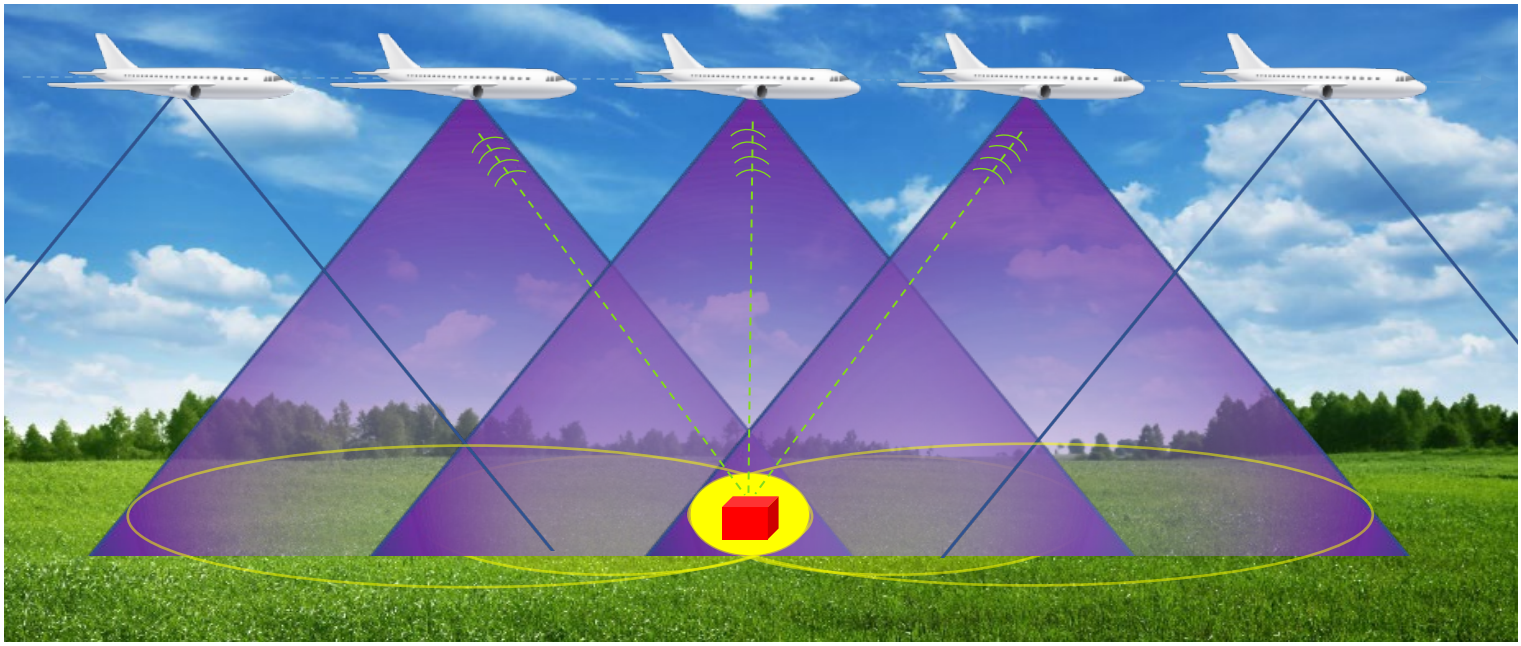
Synthetic Aperture Radar (SAR)

Synthetic Aperture Radar (SAR) is a type of radar that uses the motion of the radar antenna to create high-resolution images of the ground, buildings, and other objects. Instead of using a single antenna, SAR uses a system of multiple antennas that work together to simulate a much larger antenna.

SAR works by transmitting a signal towards the ground and then measuring the signal that is reflected back. By comparing the reflected signal with the transmitted signal, SAR can create an image of the objects on the ground. Because SAR uses a large number of measurements taken over time, it can create high-resolution images even from a moving platform, such as an aircraft or a satellite.

SAR has a number of advantages over other types of imaging technologies, such as optical imaging or traditional radar. SAR can operate in all weather conditions and at night, and it can penetrate through clouds, foliage, and even some types of soil. This makes it useful for a variety of applications, including military surveillance, mapping and cartography, environmental monitoring, and disaster response.



GSI's Accelerated SAR Image Formation with Fast Back Projection

GSI presents the NEW Synthetic Aperture Radar (SAR) Fast BP accelerated processing solution based on GSI's Gemini® APU hardware and the fast back projection algorithm that forms the spotlight synthetic-aperture-radar images from the SAR input array of pulses.

GSI's SAR solution dramatically improves the image formation performance, bringing Real Time (RT) and money saving promise to the field of SAR spotlight remote sensing.

Fast BP Algorithm Advantages

Back projection is widely considered to be the "Gold Standard" algorithm for SAR spotlight-mode image formation. It's best suited for data transmitted from space, airborne platforms, drones, and quadcopters—permitting submeter ground resolution and various frequencies with better image quality and flexibility. However, its usage remains prohibitive, due to the high computational cost of running it on a CPU or GPU.

GSI's APU Hardware Changes It All

The processing speed of the GSI APU is significantly faster than CPU and GPU.

Optimized to take advantage of the GSI chip's parallel computing power, the GSI SAR solution allows:

1. Using the Fast back projection algorithm for best image formation results.
2. Real Time (RT) processing capabilities that significantly shorten the images/data delivery time to customer.
3. Significant total computing cost reduction.
4. On-board processing capabilities, when required, for example, on a manned intelligence mission aircraft, drone, etc.

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How It Works

Satellites, manned mission planes, and drones use SAR sensors to send out Radar beams continuously, day and night, under all weather conditions. The information received back from these beams is then used to form an image of the area.

The GSI server application receives the SAR row data in H5 file format, which includes 2 files—the Pulse file and the DTM file. Using Fast Back Projection (FBP) processed on GSI APU hardware, it is able to analyze the intensity of the radar beams projected back from the ground to the platform and to form an image of the area.

Figure 2: SAR Image

For more information about GSI's innovation in SAR, contact us at **aerospace@gsitechnology.com**.

Radiation-Hardened SRAM Offerings

TID = 200 krads (Si), SEL Immunity = 77 MeV-cm2/mg

Rad-Hard SigmaQuad-II+™ (In Production)									
GSI P/N	Density	Config	Burst Length	Read Latency	ODT	Speed (MHz)	Voltage	165 BGA	
								CCGA (CE)	LGA (LE)
GS82612QT37yy-###a GS82612QT19yy-###a	288Mb	8M x 36 16M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●	●
GS81332QT37yy-###a GS81332QT19yy-###a	144Mb	4M x 36 8M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●	●
GS8692QT37yy-###a GS8692QT19yy-###a	72Mb	2M x 36 4M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●	●
GS82612DT37yy-###a GS82612DT19yy-###a	288Mb	8M x 36 16M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●	●
GS81332DT37yy-###a GS81332DT19yy-###a	144Mb	4M x 36 8M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●	●
GS8692DT37yy-###a GS8692DT19yy-###a	72Mb	2M x 36 4M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ} V	●	●

* yy = Package Designator; ### = Speed Bin Designator. Alpha character at the end of the PN denotes qualification nomenclature (S = Eng Sample; V = Class-V; Q = Class-Q.)

Rad-Hard No Bus Turnaround (Built Upon Request)						
GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 QFP
						QFP (CQ)
GS81320Z36yy-###a GS81320Z18yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS8680Z36yy-###a GS8680Z18yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS8360Z36yy-###a GS8360Z18yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●

* yy = Package Designator; ### = Speed Bin Designator. Alpha character at the end of the PN denotes qualification nomenclature (S = Eng Sample; V = Class-V; Q = Class-Q.)

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Rad-Hard Synchronous Burst (Built Upon Request)						
GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 QFP
						QFP (CQ)
GS8132036yy-###a GS8132018yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS868036yy-###a GS868018yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS836036yy-###a GS836018yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●

* yy = Package Designator; ### = Speed Bin Designator. Alpha character at the end of the PN denotes qualification nomenclature (S = Eng Sample; V = Class-V; Q = Class-Q.)

Radiation-Tolerant SRAM Offerings

TID = 50 krads (Si), SEL Immunity = 42 MeV-cm2/mg

Rad-Tolerant SigmaQuad-II+™ (In Production)								
GSI P/N	Density	Config	Burst Length	Read Latency	ODT	Speed (MHz)	Voltage	165 BGA
								LBGA (RE)
GS82582QT37yy-### GS82582QT19yy-###	288Mb	8M x 36 16M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●
GS81302QT37yy-### GS81302QT19yy-###	144Mb	4M x 36 8M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●
GS8662QT37yy-### GS8662QT19yy-###	72Mb	2M x 36 4M x 18	2	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●
GS82582DT37yy-### GS82582DT19yy-###	288Mb	8M x 36 16M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●
GS81302DT37yy-### GS81302DT19yy-###	144Mb	4M x 36 8M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●
GS8662DT37yy-### GS8662DT19yy-###	72Mb	2M x 36 4M x 18	4	2.0	Weak/Strong	350/250 (Military Temp)	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	●

* yy = Package Designator; ### = Speed Bin Designator.

Rad-Tolerant No Bus Turnaround (Built Upon Request)

GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 TQFP
						TQFP (RT)
GS81280Z36yy-###a GS81280Z18yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS8640Z36yy-###a GS8640Z18yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS8320Z36yy-###a GS8320Z18yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●

* yy = Package Designator; ### = Speed Bin Designator.

Rad-Tolerant Synchronous Burst (Built Upon Request)

GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 TQFP
						TQFP (RT)
GS8128036yy-###a GS8128018yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS864036yy-###a GS864018yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●
GS832036yy-###a GS832018yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	2.5 V/3.3 V V_{DD} 2.5 V/3.3 V V_{DDQ}	●

* yy = Package Designator; ### = Speed Bin Designator.

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Standard Military Temperature SRAMs

SigmaQuad SRAMs

144Mb SigmaQuad-IVe

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS81314LD36GK-120M GS81314LD18GK-120M	4M x 36 8M x 18	1200	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IVe Burst of 4 Read Latency = 6 On-Die Termination Option Multi-Bank, ECCRAM™
GS81314LQ36GK-120M GS81314LQ18GK-120M	4M x 36 8M x 18	1200	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IVe Burst of 2 Read Latency = 6 On-Die Termination Option Multi-Bank, ECCRAM™
GS81314LD37GK-800M GS81314LD19GK-800M	4M x 36 8M x 18	800	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IVe Burst of 4 Read Latency = 5 On-Die Termination Option Single-Bank, ECCRAM™
GS81314LQ37GK-800M GS81314LQ19GK-800M	4M x 36 8M x 18	800	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IVe Burst of 2 Read Latency = 5 On-Die Termination Option Single-Bank, ECCRAM™

Note:
GK package is 6/6 RoHS-compliant. Contact your local sales representative for K package (leaded version) availability.

288Mb SigmaQuad-IIIe

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS82583ED36GK-625M GS82583ED18GK-625M	8M x 36 16M x 18	625	1.3 V V_{DD} 1.2V/1.3 V/1.5 V V_{DDQ}	260 BGA	SigmaQuad-IIIe Burst of 4 Read Latency = 3 On-Die Termination Option
GS82583EQ36GK-450M GS82583EQ18GK-450M	8M x 36 16M x 18	450	1.3 V V_{DD} 1.2V/1.3 V/1.5 V V_{DDQ}	260 BGA	SigmaQuad-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option

144Mb SigmaQuad-IIIe

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS81313LD36GK-714M GS81313LD18GK-714M	4M x 36 8M x 18	714	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IIIe Burst of 4 Read Latency = 3 On-Die Termination Option ECCRAM™
GS81313LQ36GK-714M GS81313LQ18GK-714M	4M x 36 8M x 18	714	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	SigmaQuad-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option ECCRAM™

72Mb SigmaQuad-IIIe

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS8673ED36BGK-625M GS8673ED18BGK-625M	2M x 36 4M x 18	625	1.35 V V_{DD} 1.2 V/1.5 V V_{DDQ}	260 BGA	SigmaQuad-IIIe Burst of 4 Read Latency = 3 On-Die Termination Option ECCRAM™
GS8673EQ36BGK-625M GS8673EQ18BGK-625M	2M x 36 4M x 18	625	1.35 V V_{DD} 1.2 V/1.5 V V_{DDQ}	260 BGA	SigmaQuad-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option ECCRAM™

Note:
GK package is 6/6 RoHS-compliant. Contact your local sales representative for K package (leaded version) availability.

288Mb SigmaQuad-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS82582D38GE-500M GS82582D20GE-500M	8M x 36 16M x 18	500	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (15 x 17 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.5 On-Die Termination Option
GS82582Q37GE-375M GS82582Q19GE-375M	4M x 36 8M x 18	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (15 x 17 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.0 On-Die Termination Option

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288Mb SigmaQuad-II

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS82582D36GE-375M GS82582D18GE-375M	8M x 36 16M x 18	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ} V	165 BGA (15 x 17 mm)	SigmaQuad-II+ Burst of 4
GS82582Q36GE-333M GS82582Q18GE-333M	4M x 36 8M x 18	333	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (15 x 17 mm)	SigmaQuad-II+ Burst of 2

144Mb SigmaQuad-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS81302D38AGD-550M GS81302D20AGD-550M	4M x 36 8M x 18	550	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.5 On-Die Termination Option
GS81302Q37AGD-400M GS81302Q19AGD-400M	4M x 36 8M x 18	400	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.0 On-Die Termination Option

144Mb SigmaQuad-II

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS81302D36AGD-375M GS81302D18AGD-375M	4M x 36 8M x 18	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 4
GS81302Q36AGD-375M GS81302Q18AGD-375M	4M x 36 8M x 18	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 2

72Mb SigmaQuad-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS8662D38CGD-550M GS8662D20CGD-550M	2M x 36 4M x 18	550	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.5 On-Die Termination Option
GS8662D38BD-450M GS8662D20BD-450M GS8662D11BD-450M GS8662D06BD-450M	2M x 36 4M x 18 8M x 9 8M x 8	450	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.5 On-Die Termination Option
GS8662Q37BD-333M GS8662Q19BD-333M GS8662Q10BD-333M GS8662Q07BD-333M	2M x 36 4M x 18 8M x 9 8M x 8	333	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.0 On-Die Termination Option

72Mb SigmaQuad-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8662D36BD-350M GS8662D18BD-350M GS8662D09BD-350M GS8662D08BD-350M	2M x 36 4M x 18 8M x 9 8M x 8	350	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 4
GS8662Q36BD-333M GS8662Q18BD-333M GS8662Q09BD-333M GS8662Q08BD-333M	2M x 36 4M x 18 8M x 9 8M x 8	333	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 2

36Mb SigmaQuad-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8342D38BD-500M GS8342D20BD-500M GS8342D11BD-500M GS8342D06BD-500M	1M x 36 2M x 18 4M x 9 4M x 8	500	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.5 On-Die Termination Option
GS8342Q37BD-333M GS8342Q19BD-333M GS8342Q10BD-333M GS8342Q07BD-333M	1M x 36 2M x 18 4M x 9 4M x 8	333	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.0 On-Die Termination Option

36Mb SigmaQuad-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8342D36BD-350M GS8342D18BD-350M GS8342D09BD-350M GS8342D08BD-350M	1M x 36 2M x 18 4M x 9 4M x 8	350	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 4
GS8342Q36BD-333M GS8342Q18BD-333M GS8342Q09BD-333M GS8342Q08BD-333M	1M x 36 2M x 18 4M x 9 4M x 8	333	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 2

18Mb SigmaQuad-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8182D37BD-400M GS8182D19BD-400M	512K x 36 1M x 18	400	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 4 Read Latency = 2.0

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18Mb SigmaQuad-II					
GSI P/N	**Config**	**Speed (MHz)**	**Voltage**	**Package**	**Features**
GS8182D36BD-375M GS8182D18BD-375M GS8182D09BD-375M GS8182D08BD-375M	512K x 36 1M x 18 2M x 9 2M x 8	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 4
GS8182Q36BD-300M GS8182Q18BD-300M GS8182Q09BD-300M GS8182Q08BD-300M	512K x 36 1M x 18 2M x 9 2M x 8	300	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II Burst of 2

Note:
GE and GD packages are 6/6 RoHS-compliant. Contact your local sales representative for E or D package (leaded version) availability.

SigmaDDR SRAMs

288Mb SigmaDDR-IIIe					
GSI P/N	**Config**	**Speed (MHz)**	**Voltage**	**Package***	**Features**
GS82583ET36GK-625M GS82583ET18GK-625M	8M x 36 16M x 18	625	1.3 V V_{DD} 1.2 V/1.3 V/1.5 V V_{DDQ}	260 BGA	DDR-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option
144Mb SigmaDDR-IIIe					
GSI P/N	**Config**	**Speed (MHz)**	**Voltage**	**Package**	**Features**
GS81313LT36GK-714M GS81313LT18GK-714M	4M x 36 8M x 18	714	1.25 ~ 1.3 V V_{DD} 1.2 ~ 1.3 V V_{DDQ} HSTL I/O	260 BGA	DDR-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option ECCRAM™
72Mb SigmaDDR-IIIe					
GSI P/N	**Config**	**Speed (MHz)**	**Voltage**	**Package***	**Features**
GS8673ET36BHK-550M GS8673ET18BHK-550M	2M x 36 4M x 18	550	1.35 V V_{DD} 1.2 V/1.5 V V_{DDQ}	260 BGA	DDR-IIIe Burst of 2 Read Latency = 3 On-Die Termination Option ECCRAM™

Note:
GK package is 6/6 RoHS-compliant. Contact your local sales representative for K package (leaded version) availability. HK package is 5/6 RoHS-compliant with leaded package balls and lead-free die bumps.

288Mb SigmaDDR-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS82582T38GE-500M GS82582T20GE-500M	8M x 36 16M x 18	500	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (15 x 17 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.0 On-Die Termination Option

144Mb SigmaDDR-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package*	Features
GS81302T38AGD-550M GS81302T20AGD-550M	4M x 36 8M x 18	550	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	DDR-II+ Burst of 2 Read Latency = 2.5 On-Die Termination Option

144Mb SigmaDDR-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS81302T36E-350M GS81302T18E-350M GS81302T09E-350M GS81302T08E-350M	4M x 36 8M x 18 16M x 9 16M x 8	350	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (15 x 17 mm)	DDR-II Burst of 2

72Mb SigmaDDR-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8662T38CGD-550M GS8662T20CGD-550M	2M x 36 4M x 18	550	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	SigmaQuad-II+ Burst of 2 Read Latency = 2.5 On-Die Termination Option
GS8662T38BD-450M GS8662T20BD-450M GS8662T11BD-450M GS8662T06BD-450M	2M x 36 4M x 18 8M x 9 8M x 8	450	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	DDR-II+ Burst of 2 Read Latency = 2.5

72Mb SigmaDDR-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8662T36BD-350M GS8662T18BD-350M GS8662T09BD-350M GS8662T08BD-350M	2M x 36 4M x 18 8M x 9 8M x 8	350	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	DDR-II Burst of 2

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36Mb SigmaDDR-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8342T38BD-500M GS8342T20BD-500M GS8342T11BD-500M GS8342T06BD-500M	1M x 36 2M x 18 4M x 9 4M x 8	500	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	**DDR-II+ Burst of 2** **Read Latency = 2.5** **On-Die Termination Option**

36Mb SigmaDDR-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8342T36BD-350M GS8342T18BD-350M GS8342T09BD-350M GS8342T08BD-350M	1M x 36 2M x 18 4M x 9 4M x 8	350	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	**DDR-II Burst of 2**

18Mb SigmaDDR-II+

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8182T37BD-400M GS8182T19BD-400M	512K x 36 1M x 18	400	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	**DDR-II+ Burst of 2** **Read Latency = 2.0**

18Mb SigmaDDR-II

GSI P/N	Config	Speed (MHz)	Voltage	Package	Features
GS8182T36BD-375M GS8182T18BD-375M GS8182T09BD-375M GS8182T08BD-375M	512K x 36 1M x 18 2M x 9 2M x 8	375	1.8 V V_{DD} 1.5 V/1.8 V V_{DDQ}	165 BGA (13 x 15 mm)	**DDR-II Burst of 2**

Note:
GE and GD packages are 6/6 RoHS-compliant. Contact your local sales representative for E and D package (leaded version) availability.

No Bus Turnaround (NBT™) SRAMs

288Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS82564Z36GB-333M GS82564Z18GB-333M	8M x 36 16M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS82564Z36GD-333M GS82564Z18GD-333M	8M x 36 16M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

144Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS81282Z36GB-333M GS81282Z18GB-333M	4M x 36 8M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS81282Z36GD-333M GS81282Z18GD-333M	4M x 36 8M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

72Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package	Features
				V_{DD}	V_{DDQ}		
GS8642Z36B-250M GS8642Z18B-250M	2M x 36 4M x 18	250	2.3–3.5	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8642Z72C-250M	1M x 72	250	2.3–3.5	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes

Note:
1. GB and GD packages are 6/6 RoHS-compliant. Contact your local sales representative for B and D package (leaded version) availability.

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No Bus Turnaround (NBT™) SRAMs

36Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS8322Z36AB-375M GS8322Z18AB-375M	1M x 36 2M x 18	375	2.5–4.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8322Z36AD-375M GS8322Z18AD-375M	1M x 36 2M x 18	375	2.5–4.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8322Z72C-225M	512K x 72	225	2.5–4.0	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes

18Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS8162Z36DB-375M GS8162Z18DB-375M	512K x 36 1M x 18	375	2.5–3.8	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8162Z36DD-375M GS8162Z18DD-375M	512K x 36 1M x 18	375	2.5–3.8	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8162Z72CC-300M	256K x 72	300	2.8–3.8	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes

9Mb NBT

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package	Features
				V_{DD}	V_{DDQ}		
GS882Z36CB-300M GS882Z18CB-300M	256K x 36 512K x 18	300	2.3–3.8	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS882Z36CD-300M GS882Z18CD-300M	256K x 36 512K x 18	300	2.3–3.8	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

Note:
1. GB and GD packages are 6/6 RoHS-compliant. Contact your local sales representative for B and D package (leaded version) availability.

Synchronous Burst SRAMs

288Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS8256436GB-333M GS8256418GB-333M	8M x 36 16M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8256436GD-333M GS8256418GD-333M	8M x 36 16M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

144Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package*	Features
				V_{DD}	V_{DDQ}		
GS8128236GB-333M GS8128218GB-333M	4M x 36 8M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS8128236GD-333M GS8128218GD-333M	4M x 36 8M x 18	333	2.5–3.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

72Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Package	Features
				V_{DD}	V_{DDQ}		
GS864236B-250M GS864218B-250M	2M x 36 4M x 18	250	2.3–3.5	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS864272C-250M	1M x 72	250	2.3–3.5	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes

Note:
1. GB and GD packages are 6/6 RoHS-compliant. Contact your local sales representative for B and D package (leaded version) availability.

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36Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Packages	Features
				V_{DD}	V_{DDQ}		
GS832236AB-375M GS832218AB-375M	1M x 36 2M x 18	375	2.5–4.0	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS832236AD-375M GS832218AD-375M	1M x 36 2M x 18	375	2.5–4.0	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS832272C-225M	512K x 72	225	2.5–4.0	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes

18Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Packages	Features
				V_{DD}	V_{DDQ}		
GS816272CC-200M	256K x 72	200	2.8–3.8	2.5/3.3 V	2.5/3.3 V	209 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS816236DB-375M GS816218DB-375M	512K x 36 1M x 18	375	2.5–3.8	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS816236DD-375M GS816218DD-375M	512K x 36 1M x 18	375	2.5–3.8	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes

9Mb SyncBurst

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage Options		Packages	Features
				V_{DD}	V_{DDQ}		
GS88236CB-300M GS88218CB-300M	256K x 36 512K x 18	300	2.5–3.8	2.5/3.3 V	2.5/3.3 V	119 BGA	JTAG; FLXDrive™; Pipeline and Flow Through modes
GS88236CD-300M GS88218CD-300M	256K x 36 512K x 18	300	2.5–3.8	2.5/3.3 V	2.5/3.3 V	165 BGA (13 x 15 mm)	JTAG; FLXDrive™; Pipeline and Flow Through modes