GSI TECHNOLOGY

2018 Product Catalog

Supernatural Solutions

Table of Contents

About GSI Technology

GSI Technology designs, develops and markets a broad range of high performance memory products for networking, military, medical, automotive and other applications. We specialize in memory products featuring very high transaction rates, high density, low latency, high bandwidth, fast clock access times, and low power consumption. We offer unusually long product support life cycles, short lead times, the largest high performance memory product portfolio in the market and complete pre and post-sale support.

GSI Technology offers both Static Random Access Memory products (SRAMs) and Low Latency DRAM products (LLDRAM). GSI's SRAMs utilize world-class, low power CMOS process technologies down to 40 nanometer. Our Low Latency DRAM product line is fabricated using a 72nm DRAM process technology. Most GSI products are specifically recommended for use with a variety of host devices, such as NPUs and FPGAs.

GSI Technology is also now offering Radiation-Hardened SRAMs. These Rad-Hard SRAMs are expected to 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. The initial devices will be qualified to Class-Q and Class-V levels to meet the rigorous requirements of aerospace and defense customers.

In late 2015, GSI Technology expanded its corporate footprint to include in-place associative computing for markets including machine learning, computer vision, and cyber security.

At GSI Technology, we focus on providing the best value combination of power, speed, density, quality, reliability and delivery in the world.

Founded in Cupertino, California in March 1995, and now headquartered in Sunnyvale, California, GSI Technology is focused on providing high performance memory for the long run.

Radiation-Hardened SRAMs

GSI Technology is excited to introduce several new high performance Radiation-Hardened synchronous SRAMs.

These Rad-Hard SRAMs are expected to 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. The initial devices will be qualified to Class-Q and Class-V levels to meet the rigorous requirements of aerospace and defense customers.

For our satellite and defense customers that have been anxiously awaiting an alternative to current Rad-Hard memory solutions, our 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 more information regarding this exciting new technology, please contact us at aerospace@gsitechnology.com.

***Radiation-Tolerant SRAMs will be coming soon for those less robust applications.**

SigmaQuad-II+™									
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)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	●
GS81332QT37yy-###a GS81332QT19yy-###a	144Mb	4M x 36 8M x 18	2	2.0	Weak/ Strong	350/250 (Military Temp)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	●
GS8692QT37yy-###a GS8692QT19yy-###a	72Mb	2M x 36 4M x 18	2	2.0	Weak/ Strong	350/250 (Military Temp)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	●

*Alpha character at the end of the part number denotes qualification nomenclature (S = Engineering Sample; V = Class-V; Q = Class-Q.)

No Bus Turnaround						
GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 QFP
						QFP (CQ)
GS81302Z36yy-###a GS81302Z18yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●
GS8680Z36yy-###a GS8680Z18yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●
GS8360Z36yy-###a GS8360Z18yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●

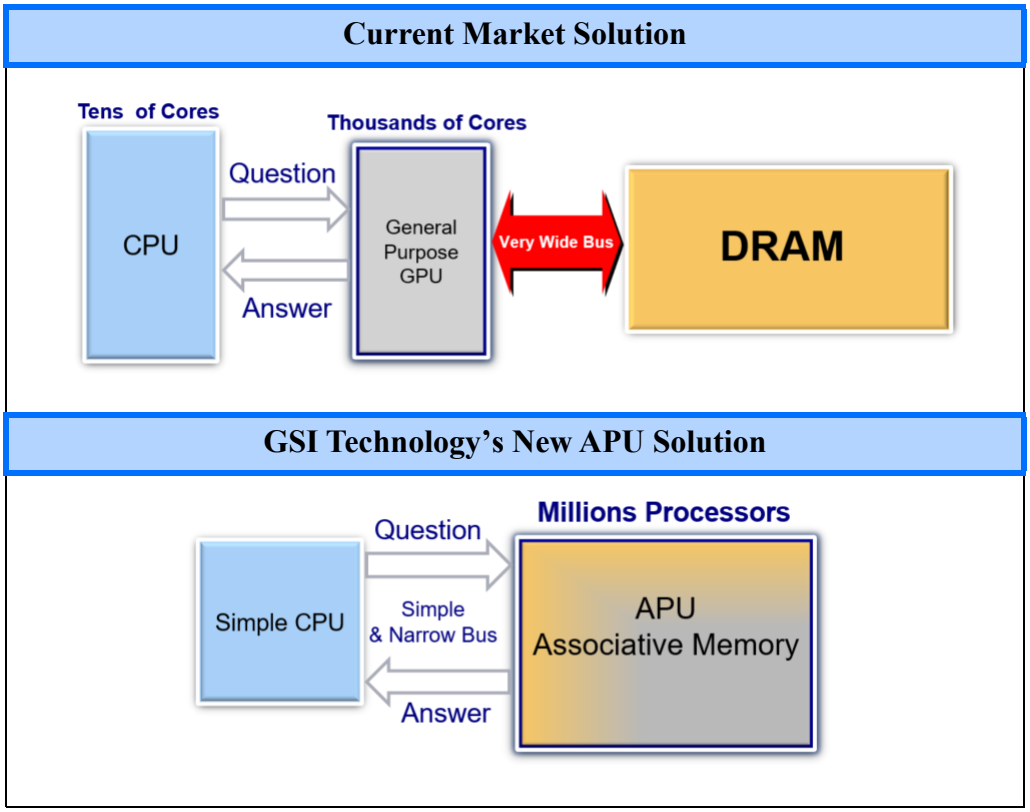
*Alpha character at the end of the part number denotes qualification nomenclature (S = Engineering Sample; V = Class-V; Q = Class-Q.)

Synchronous Burst						
GSI P/N	Density	Config	Speed (MHz)	Pipeline tKQ (ns)	Voltage	100 QFP
						QFP (CQ)
GS8130236yy-###a GS8130218yy-###a	144Mb	4M x 36 8M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●
GS868036yy-###a GS868018yy-###a	72Mb	2M x 36 4M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●
GS836036yy-###a GS836018yy-###a	36Mb	1M x 36 2M x 18	333/250 (Military Temp)	2.5	V_{DD}—2.5 V/3.3 V V_{DDQ}—2.5 V/3.3 V	●

*Alpha character at the end of the part number denotes qualification nomenclature (S = Engineering Sample; V = Class-V; Q = Class-Q.)

In-Place Associative Computing

GSI Technology's New APU Solution



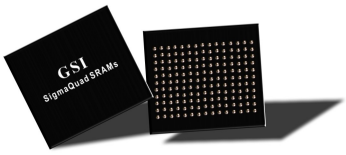
GSI Technology is developing a new, patented Associative Processing Unit (APU) that changes the concept of computing from serial data processing—where data is moved back and forth between the processor and memory—to massive parallel data processing, compute, and search in-place directly in the memory array.

This in-place associative computing technology removes the bottleneck at the I/O between the processor and memory. Data is accessed by content and processed directly in place in the memory array without having to cross the I/O. The result is an orders of magnitude performance-over-power ratio improvement compared to conventional methods that use CPU and GPGPU (General Purpose GPU) along with DRAM.

Target applications include memory-bound sparse matrix-vector multiplication, convolutional neural networks, image detection, signal detection, speech recognition, recommender systems for e-commerce, Natural Language Processing (NLP), Memory Networks, One/Few-Shot Learning, and data mining tasks such as prediction, classification, and clustering.

For more information, please contact us at associativecomputing@gsitechnology.com.

GSI's 4th Generation SigmaQuad™ SRAMs are our highest performance synchronous memories. They come in a 144Mb density with up to a 1333 MHz operating frequency, and are suitable for a variety of applications, including packet processing and image processing.



SigmaQuad SRAMs are synchronous memories with separate read and write data buses. "Quad" refers to their ability to transfer 4 beats of data (2 beats per data bus) in a single clock cycle.

GSI Technology IVe customers have access to free SRAM IP Ports for Xilinx FPGAs. Loaner boards are available.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

SigmaQuad-IVe™ SRAMs

144Mb SigmaQuad-IVe™ ECCRAM™ Multi-Bank

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS81314LQ36yy-### GS81314LQ18yy-###	**4M x 36** **8M x 18**	2	6	●	1333/1200/1066	V_{DD}—1.3 V V_{DDQ}—1.2 V	●
GS81314LD36yy-### GS81314LD18yy-###	**4M x 36** **8M x 18**	4	6	●	1333/1200/1066	V_{DD}—1.3 V V_{DDQ}—1.2 V	●

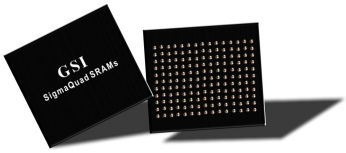
144Mb SigmaQuad-IVe™ ECCRAM™ Single-Bank

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS81314LQ37yy-### GS81314LQ19yy-###	**4M x 36** **8M x 18**	2	5	●	933/800	V_{DD}—1.3 V V_{DDQ}—1.2 V	●
GS81314LD37yy-### GS81314LD19yy-###	**4M x 36** **8M x 18**	4	5	●	933/800	V_{DD}—1.3 V V_{DDQ}—1.2 V	●

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

GSI's 3rd Generation SigmaQuad™ SRAMs are high performance memories with a powerful combination of capacity and transaction rate capability.



SigmaQuad SRAMs are synchronous memories with separate read and write data buses. "Quad" refers to their ability to transfer 4 beats of data (2 beats per data bus) in a single clock cycle.

GSI Technology IIIe customers have access to free SRAM IP Ports for Xilinx FPGAs. Loaner boards are available.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

SigmaQuad-IIIe SRAMs

288Mb SigmaQuad-IIIe™

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS82583EQ36yy-### GS82583EQ18yy-###	**8M x 36** **16M x 18**	2	3	●	500/450/400	V_{DD}—1.3 V V_{DDQ}—1.2 V/1.5 V	●
GS82583ED36yy-### GS82583ED18yy-###	**8M x 36** **16M x 18**	4	3	●	675/625/550/500	V_{DD}—1.3 V V_{DDQ}—1.2 V/1.5 V	●

144Mb SigmaQuad-IIIe™ ECCRAMs™

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS81313LQ36yy-### GS81313LQ18yy-###	**4M x 36** **8M x 18**	2	3	●	800/714/600	V_{DD}—1.3 V V_{DDQ}—1.2 V	●
GS81313LD36yy-### GS81313LD18yy-###	**4M x 36** **8M x 18**	4	3	●	833/714/625	V_{DD}—1.3 V V_{DDQ}—1.2 V	●

72Mb SigmaQuad-IIIe™ ECCRAMs™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS8673EQ36Byy-### GS8673EQ18Byy-###	**2M x 36** **4M x 18**	2	3	●	675/625/550/500	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●
GS8673ED36Byy-### GS8673ED18Byy-###	**2M x 36** **4M x 18**	4	3	●	675/625/550/500	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●

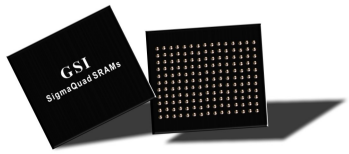
72Mb SigmaQuad-IIIe™ ECCRAMs™—For Use with the GSI Memory Controller IP (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT Weak/Strong/None	Speed (MHz)	Voltage	260 BGA (GK)
GS8673EQ36Byy-###S GS8673EQ18Byy-###S	**2M x 36** **4M x 18**	2	3	●	725/625/550	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●
GS8673ED36Byy-###S GS8673ED18Byy-###S	**2M x 36** **4M x 18**	4	3	●	725/625/550	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

GSI SigmaQuad™ SRAMs are the preferred choice in leading edge applications from data packet statistics to radar signature processing.



SigmaQuad SRAMs are synchronous memories with separate read and write data buses. "Quad" refers to their ability to transfer 4 beats of data (2 beats per data bus) in a single clock cycle.

GSI's SigmaQuad devices are compatible with all competitor Quad Data Rate SRAMs.

GSI Technology II+ customers have access to free SRAM IP Ports for Xilinx FPGAs. Loaner boards are available.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

SigmaQuad-II+ and SigmaQuad-II SRAMs

288Mb SigmaQuad-II+™ and SigmaQuad-II™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS82582QT38yy-### GS82582QT20yy-###	**8M x 36 16M x 18**	2	2.5	●		500/450/400/375	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582Q38yy-### GS82582Q20yy-###	**8M x 36 16M x 18**	2	2.5		●	500/450/400/375	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582DT38yy-### GS82582DT20yy-###	**8M x 36 16M x 18**	4	2.5	●		550/500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582D38yy-### GS82582D20yy-###	**8M x 36 16M x 18**	4	2.5		●	550/500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582QT37yy-### GS82582QT19yy-###	**8M x 36 16M x 18**	2	2.0	●		400/375/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582Q37yy-### GS82582Q19yy-###	**8M x 36 16M x 18**	2	2.0		●	400/375/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582DT37yy-### GS82582DT19yy-###	**8M x 36 16M x 18**	4	2.0	●		450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582D37yy-### GS82582D19yy-###	**8M x 36 16M x 18**	4	2.0		●	450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582Q36yy-### GS82582Q18yy-###	**8M x 36 16M x 18**	2	1.5	n/a	n/a	357/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582D36yy-### GS82582D18yy-###	**8M x 36 16M x 18**	4	1.5	n/a	n/a	400/375/333/ 300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

SigmaQuad-II and SigmaQuad-II+ products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

SigmaQuad-II+ and SigmaQuad-II SRAMs

144Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. A)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302QT38Ayy-### GS81302QT20Ayy-###	**4M x 36** **8M x 18**	2	2.5	●		500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302Q38Ayy-### GS81302Q20Ayy-###	**4M x 36** **8M x 18**	2	2.5		●	500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302DT38Ayy-### GS81302DT20Ayy-###	**4M x 36** **8M x 18**	4	2.5	●		633/550/500/450	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302D38Ayy-### GS81302D20Ayy-###	**4M x 36** **8M x 18**	4	2.5		●	633/550/500/450	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302QT37Ayy-### GS81302QT19Ayy-###	**4M x 36** **8M x 18**	2	2.0	●		450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302Q37Ayy-### GS81302Q19Ayy-###	**4M x 36** **8M x 18**	2	2.0		●	450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302DT37Ayy-### GS81302DT19Ayy-###	**4M x 36** **8M x 18**	4	2.0	●		450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302D37Ayy-### GS81302D19Ayy-###	**4M x 36** **8M x 18**	4	2.0		●	450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302Q36Ayy-### GS81302Q18Ayy-###	**4M x 36** **8M x 18**	2	1.5	n/a	n/a	400/375/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302D36Ayy-### GS81302D18Ayy-###	**4M x 36** **8M x 18**	4	1.5	n/a	n/a	400/375/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

144Mb SigmaQuad-II+™ and SigmaQuad-II™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302DT38yy-### GS81302DT20yy-### GS81302DT11yy-### GS81302DT06yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	2.5	●		500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302D38yy-### GS81302D20yy-### GS81302D11yy-### GS81302D06yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	2.5		●	500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302QT37yy-### GS81302QT19yy-### GS81302QT10yy-### GS81302QT07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.0	●		318/300/250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302Q37yy-### GS81302Q19yy-### GS81302Q10yy-### GS81302Q07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.0		●	318/300/250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

SigmaQuad-II and SigmaQuad-II+ products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

SigmaQuad-II+ and SigmaQuad-II SRAMs

144Mb SigmaQuad-II+™ and SigmaQuad-II™ (Continued)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302DT37yy-### GS81302DT19yy-### GS81302DT10yy-### GS81302DT07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302D37yy-### GS81302D19yy-### GS81302D10yy-### GS81302D07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302Q36yy-### GS81302Q18yy-### GS81302Q09yy-### GS81302Q08yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	1.5	n/a	n/a	300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302D36yy-### GS81302D18yy-### GS81302D09yy-### GS81302D08yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	1.5	n/a	n/a	375/350/333/ 300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

72Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8662DT38Byy-### GS8662DT20Byy-### GS8662DT11Byy-### GS8662DT06Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	2.5	●		550/500/450/400/350 (x18/x36) 500/450/400/350 (x8/x9)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662D38Byy-### GS8662D20Byy-### GS8662D11Byy-### GS8662D06Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	2.5		●	550/500/450/400/350 (x18/x36) 500/450/400/350 (x8/x9)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662QT37Byy-### GS8662QT19Byy-### GS8662QT10Byy-### GS8662QT07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.0	●		357/333/300/ 250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662Q37Byy-### GS8662Q19Byy-### GS8662Q10Byy-### GS8662Q07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.0		●	357/333/300/ 250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662DT37Byy-### GS8662DT19Byy-### GS8662DT10Byy-### GS8662DT07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662D37Byy-### GS8662D19Byy-### GS8662D10Byy-### GS8662D07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaQuad-II and SigmaQuad-II+ products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

SigmaQuad-II+ and SigmaQuad-II SRAMs

72Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. B) (Continued)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8662Q36Byy-### GS8662Q18Byy-### GS8662Q09Byy-### GS8662Q08Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	1.5	n/a	n/a	357/333/300/250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662D36Byy-### GS8662D18Byy-### GS8662D09Byy-### GS8662D08Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	1.5	n/a	n/a	400/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

36Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8342DT38Byy-### GS8342DT20Byy-### GS8342DT11Byy-### GS8342DT06Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	2.5	●		550/500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342D38Byy-### GS8342D20Byy-### GS8342D11Byy-### GS8342D06Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	2.5		●	550/500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342QT37Byy-### GS8342QT19Byy-### GS8342QT10Byy-### GS8342QT07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.0	●		357/333/300/250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342Q37Byy-### GS8342Q19Byy-### GS8342Q10Byy-### GS8342Q07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.0		●	357/333/300/250/200	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342DT37Byy-### GS8342DT19Byy-### GS8342DT10Byy-### GS8342DT07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342D37Byy-### GS8342D19Byy-### GS8342D10Byy-### GS8342D07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaQuad-II and SigmaQuad-II+ products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.
SigmaQuad, SigmaQuad-II, and SigmaQuad-II+ are trademarks of GSI Technology.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

SigmaQuad-II+ and SigmaQuad-II SRAMs

36Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. B) (Continued)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8342Q36Byy-### GS8342Q18Byy-### GS8342Q09Byy-### GS8342Q08Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	1.5	n/a	n/a	357/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342D36Byy-### GS8342D18Byy-### GS8342D09Byy-### GS8342D08Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

18Mb SigmaQuad-II+™ and SigmaQuad-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8182D37Byy-### GS8182D19Byy-###	**512K x 36** **1M x 18**	4	2.0	n/a	n/a	435/400/ 375/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8182Q36Byy-### GS8182Q18Byy-### GS8182Q09Byy-### GS8182Q08Byy-###	**512K x 36** **1M x 18** **2M x 9** **2M x 8**	2	1.5	n/a	n/a	333/300/250/ 200/167/133	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8182D36Byy-### GS8182D18Byy-### GS8182D09Byy-### GS8182D08Byy-###	**512K x 36** **1M x 18** **2M x 9** **2M x 8**	4	1.5	n/a	n/a	400/375/333/300/250/ 200/167	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaQuad-II and SigmaQuad-II+ products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.
SigmaQuad, SigmaQuad-II, and SigmaQuad-II+ are trademarks of GSI Technology.
All other trademarks belong to their respective holders.

SigmaQuad SRAMs

18Mb SigmaQuad™ (Rev. B)

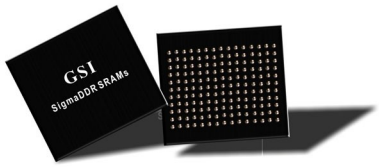
GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8180QV36Byy-### GS8180QV18Byy-###	**512K x 36** **1M x 18**	2	1.5	n/a	n/a	200/167	V_{DD}—2.5 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaQuad™-II and SigmaDDR™-II products are pin and function compatible with QDR-II™ and QDR-II+™ products, respectively.
SigmaQuad, SigmaQuad-II, and SigmaQuad-II+ are trademarks of GSI Technology.
All other trademarks belong to their respective holders.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

GSI's 3rd Generation SigmaDDR™ SRAMs are high performance memories with a powerful combination of capacity and transaction rate capability.



SigmaDDR SRAMs are synchronous memories with a common read and write data bus. "DDR" refers to their ability to transfer 2 beats of data on the data bus in a single clock cycle.

GSI Technology IIIe customers have access to free SRAM IP Ports for Xilinx FPGAs. Loaner boards are available.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

SigmaDDR-IIIe SRAMs

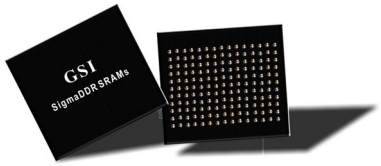
288Mb SigmaDDR-IIIe™							
GSI P/N	**Config**	**Burst Length**	**Read Latency**	**ODT Weak/Strong/None**	**Speed (MHz)**	**Voltage**	**260 BGA (GK)**
GS82583ET36yy-### GS82583ET18yy-###	**8M x 36** **16M x 18**	2	3	●	675/625/550/500	V_{DD}—1.3 V V_{DDQ}—1.2 V/1.5 V	●
144Mb SigmaDDR-IIIe™ ECCRAMs™							
GSI P/N	**Config**	**Burst Length**	**Read Latency**	**ODT Weak/Strong/None**	**Speed (MHz)**	**Voltage**	**260 BGA (GK)**
GS81313LT36yy-### GS81313LT18yy-###	**4M x 36** **8M x 18**	2	3	●	833/714/625	V_{DD}—1.3 V V_{DDQ}—1.2 V	●
72Mb SigmaDDR-IIIe™ ECCRAMs™ (Rev. B)							
GSI P/N	**Config**	**Burst Length**	**Read Latency**	**ODT Weak/Strong/None**	**Speed (MHz)**	**Voltage**	**260 BGA (GK)**
GS8673ET36Byy-### GS8673ET18Byy-###	**2M x 36** **4M x 18**	2	3	●	675/625/550/500	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●
72Mb SigmaDDR-IIIe™ ECCRAMs™—For Use with the GSI Memory Controller IP (Rev. B)							
GSI P/N	**Config**	**Burst Length**	**Read Latency**	**ODT Weak/Strong/None**	**Speed (MHz)**	**Voltage**	**260 BGA (GK)**
GS8673ET36Byy-###S GS8673ET18Byy-###S	**2M x 36** **4M x 18**	2	3	●	725/625/550	V_{DD}—1.35 V V_{DDQ}—1.2 V/1.5 V	●

SigmaDDR-IIIe and ECCRAMs are trademarks of GSI Technology.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

GSI SigmaDDR™ SRAMs are the preferred choice in leading edge applications from data packet statistics to radar signature processing.



SigmaDDR SRAMs are synchronous memories with a common read and write data bus. "DDR" refers to their ability to transfer 2 beats of data on the data bus in a single clock cycle.

GSI's SigmaDDR devices are compatible with all competitor Double Data Rate SRAMs.

GSI Technology II+ customers have access to free SRAM IP Ports for Xilinx FPGAs. Loaner boards are available.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

SigmaDDR-II+ and SigmaDDR-II SRAMs

288Mb SigmaDDR-II+™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS82582TT38yy-### GS82582TT20yy-###	**8M x 36 16M x 18**	2	2.5	●		550/500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582T38yy-### GS82582T20yy-###	**8M x 36 16M x 18**	2	2.5		●	550/500/450/400	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582TT37yy-### GS82582TT19yy-###	**8M x 36 16M x 18**	2	2.0	●		450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS82582T37yy-### GS82582T19yy-###	**8M x 36 16M x 18**	2	2.0		●	450/400/375/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

144Mb SigmaDDR-II+™ (Rev. A)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302TT38Ayy-### GS81302TT20Ayy-###	**4M x 36 8M x 18**	2	2.5	●		633/550/500/450	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302T38Ayy-### GS81302T20Ayy-###	**4M x 36 8M x 18**	2	2.5		●	633/550/500/450	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302TT37Ayy-### GS81302TT19Ayy-###	**4M x 36 8M x 18**	2	2.0	●		450/400/350/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS81302T37Ayy-### GS81302T19Ayy-###	**4M x 36 8M x 18**	2	2.0		●	450/400/350/333	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaDDR-II and SigmaDDR-II+ products are pin and function compatible with DDR II CIO™ and DDR II+ CIO™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

SigmaDDR-II+ and SigmaDDR-II SRAMs

144Mb SigmaDDR-II+™ and SigmaDDR-II™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302TT38yy-### GS81302TT20yy-### GS81302TT11yy-### GS81302TT06yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.5	●		500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302T38yy-### GS81302T20yy-### GS81302T11yy-### GS81302T06yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.5		●	500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302TT37yy-### GS81302TT19yy-### GS81302TT10yy-### GS81302TT07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302T37yy-### GS81302T19yy-### GS81302T10yy-### GS81302T07yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302T36yy-### GS81302T18yy-### GS81302T09yy-### GS81302T08yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	1.5	n/a	n/a	375/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●
GS81302R36yy-### GS81302R18yy-### GS81302R09yy-### GS81302R08yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	4	1.5	n/a	n/a	375/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

72Mb SigmaDDR-II+™ and SigmaDDR-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8662TT38Byy-### GS8662TT20Byy-### GS8662TT11Byy-### GS8662TT06Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.5	●		550/500/450/400/350 (x18/x36) 500/450/400/350 (x8/x9)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662T38Byy-### GS8662T20Byy-### GS8662T11Byy-### GS8662T06Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.5		●	550/500/450/400/350 (x18/x36) 500/450/400/350 (x8/x9)	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662TT37Byy-### GS8662TT19Byy-### GS8662TT10Byy-### GS8662TT07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662T37Byy-### GS8662T19Byy-### GS8662T10Byy-### GS8662T07Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaDDR-II and SigmaDDR-II+ products are pin and function compatible with DDR II CIO™ and DDR II+ CIO™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

SigmaDDR-II+ and SigmaDDR-II SRAMs

72Mb SigmaDDR-II+™ and SigmaDDR-II™ (Rev. B) (Continued)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8662T36Byy-### GS8662T18Byy-### GS8662T09Byy-### GS8662T08Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8662R36Byy-### GS8662R18Byy-### GS8662R09Byy-### GS8662R08Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	4	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

36Mb SigmaDDR-II+™ and SigmaDDR-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8342TT38Byy-### GS8342TT20Byy-### GS8342TT11Byy-### GS8342TT06Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.5	●		550/500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342T38Byy-### GS8342T20Byy-### GS8342T11Byy-### GS8342T06Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.5		●	550/500/450/400/350	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342TT37Byy-### GS8342TT19Byy-### GS8342TT10Byy-### GS8342TT07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.0	●		450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342T37Byy-### GS8342T19Byy-### GS8342T10Byy-### GS8342T07Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	2.0		●	450/400/350/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342T36Byy-### GS8342T18Byy-### GS8342T09Byy-### GS8342T08Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8342R36Byy-### GS8342R18Byy-### GS8342R09Byy-### GS8342R08Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	4	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaDDR-II and SigmaDDR-II+ products are pin and function compatible with DDR II CIO™ and DDR II+ CIO™ products, respectively.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

SigmaDDR-II+ and SigmaDDR-II SRAMs

18Mb SigmaDDR-II+™ and SigmaDDR-II™ (Rev. B)									
GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8182T37Byy-### GS8182T19Byy-###	**512K x 36** **1M x 18**	2	2.0	n/a	n/a	435/400/ 375/333/300	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8182T36Byy-### GS8182T18Byy-### GS8182T09Byy-### GS8182T08Byy-###	**512K x 36** **1M x 18** **2M x 9** **2M x 8**	2	1.5	n/a	n/a	400/375/333/300/ 250/200/167	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	
GS8182R36Byy-### GS8182R18Byy-### GS8182R09Byy-### GS8182R08Byy-###	**512K x 36** **1M x 18** **2M x 9** **2M x 8**	4	1.5	n/a	n/a	400/375/333/300/ 250/200/167	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaDDR-II and SigmaDDR-II+ products are pin and function compatible with DDR II CIO™ and DDR II+ CIO™ products, respectively.
SigmaDDR-II and SigmaDDR-II+ are trademarks of GSI Technology.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

SigmaSIO DDR-II SRAMs

288Mb SigmaSIO DDR-II™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS82582S36yy-### GS82582S18yy-###	**8M x 36** **16M x 18**	2	1.5	n/a	n/a	400/375/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

144Mb SigmaSIO DDR-II™ (Rev. A)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302S36Ayy-### GS81302S18Ayy-###	**4M x 36** **8M x 18**	2	1.5	n/a	n/a	400/375/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

144Mb SigmaSIO DDR-II™

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS81302S36yy-### GS81302S18yy-### GS81302S09yy-### GS81302S08yy-###	**4M x 36** **8M x 18** **16M x 9** **16M x 8**	2	1.5	n/a	n/a	375/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V		●

72Mb SigmaSIO DDR-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8662S36Byy-### GS8662S18Byy-### GS8662S09Byy-### GS8662S08Byy-###	**2M x 36** **4M x 18** **8M x 9** **8M x 8**	2	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

36Mb SigmaSIO DDR-II™ (Rev. B)

GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8342S36Byy-### GS8342S18Byy-### GS8342S09Byy-### GS8342S08Byy-###	**1M x 36** **2M x 18** **4M x 9** **4M x 8**	2	1.5	n/a	n/a	400/350/333/300/250	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaSIO DDR-II™ products are pin and function compatible with DDR II SIO™ products.
SigmaSIO DDR-II is a trademarks of GSI Technology.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

SigmaSIO DDR-II SRAMs

18Mb SigmaSIO DDR-II™ (Rev. B)									
GSI P/N	Config	Burst Length	Read Latency	ODT		Speed (MHz)	Voltage	165 BGA	
				Weak/ Strong	Weak/ None			13 x 15 mm (GD)	15 x 17 mm (GE)
GS8182S36Byy-### GS8182S18Byy-### GS8182S09Byy-### GS8182S08Byy-###	**512K x 36** **1M x 18** **2M x 9** **2M x 8**	2	1.5	n/a	n/a	400/375/333/300/250/ 200/167	V_{DD}—1.8 V V_{DDQ}—1.5 V/1.8 V	●	

SigmaSIO DDR-II™ products are pin and function compatible with DDR II SIO™ products.
SigmaSIO DDR-II is a trademarks of GSI Technology.
All other trademarks belong to their respective holders.

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

GSI NoBusTurnaround™ (NBT) SRAMs have been the workhorses for midrange data acquisition designs for over 15 years and are available in a huge assortment of densities, packages and design options. These SRAMs also come with the best long-term memory IC support plan in the business.

NBT SRAMs are synchronous, burst-capable memories with a simplified interface that is designed to use a data bus's maximum bandwidth. NBT devices do not require "turnaround" cycles (idle clock cycles between a read and write operation).

NBT SRAMs are used in networking, industrial, automotive and medical imaging applications where a mid-range performance point (typically a 333–166 MHz clock rate) is required.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

No Bus Turnaround (NBT™) SRAMs

288Mb (2-Die Module)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS82564Z36yy-### GS82564Z18yy-###	8M x 36 16M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3	●	●				●	●	●
GS82564Z36yy-###V GS82564Z18yy-###V	8M x 36 16M x 18	333/ 250/200	2.5–3.0	1.8/2.5	●	●				●	●	●

144Mb

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS81282Z36yy-### GS81282Z18yy-###	4M x 36 8M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3	●	●				●	●	●
GS81280FZ36yy-### GS81280FZ18yy-###	4M x 36 8M x 18	6.5 (ns)	n/a	2.5/3.3					●	FT Only		
GS81280Z36yy-### GS81280Z32yy-### GS81280Z18yy-###	4M x 36 4M x 32 8M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3					●	●	●	
GS81282Z36yy-###V GS81282Z18yy-###V	4M x 36 8M x 18	333/ 250/200	2.5–3.0	1.8/2.5	●	●				●	●	●
GS81280Z36yy-###V GS81280Z32yy-###V GS81280Z18yy-###V	4M x 36 4M x 32 8M x 18	333/ 250/200	2.5–3.0	2.5/3.3					●	●	●	

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

No Bus Turnaround (NBT™) SRAMs (Continued)

72Mb

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS8642Z72yy-### GS8642Z36yy-### GS8642Z18yy-###	1M x 72 2M x 36 4M x 18	300/250/200/167	2.3–3.5	2.5/3.3	●			●		●	●	●
GS8640FZ36yy-### GS8640FZ32yy-### GS8640FZ18yy-###	2M x 36 2M x 32 4M x 18	6.5 (ns)	n/a	2.5/3.3					●	FT Only		
GS8640Z36yy-### GS8640Z32yy-### GS8640Z18yy-###	2M x 36 2M x 32 4M x 18	300/250/200/167	2.3–3.5	2.5/3.3					●	●	●	
GS8644Z36yy-### GS8644Z18yy-###	2M x 36 4M x 18	250/225/200/ 166/150/133	2.5–4.0	2.5/3.3			●			●	●	●
GS8642Z72yy-###V GS8642Z36yy-###V GS8642Z18yy-###V	1M x 72 2M x 36 4M x 18	250/200/167	3.0–3.5	1.8/2.5	●			●		●	●	●
GS864036yy-###V GS864032yy-###V GS864018yy-###V	2M x 36 2M x 32 4M x 18	250/200/167	3.0–3.5	1.8/2.5					●	●	●	
GS864436yy-###V GS864418yy-###V	2M x 36 4M x 18	250/225/200/ 166/150/133	2.5–4.0	1.8/2.5			●			●	●	●

36Mb (Rev. A)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS8322Z36Ayy-### GS8322Z18Ayy-###	1M x 36 2M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3	●	●				●	●	●
GS8321Z36Ayy-### GS8321Z32Ayy-### GS8321Z18Ayy-###	1M x 36 1M x 32 2M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3		●				●	●	
GS8320Z36Ayy-### GS8320Z18Ayy-###	1M x 36 2M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3					●	●		
GS8322Z36Ayy-###V GS8322Z18Ayy-###V	1M x 36 2M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5	●	●				●	●	●
GS8321Z36Ayy-###V GS8321Z32Ayy-###V GS8321Z18Ayy-###V	1M x 36 1M x 32 2M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5		●				●	●	
GS8320Z36Ayy-###V GS8320Z18Ayy-###V	1M x 36 2M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5					●	●		

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

No Bus Turnaround (NBT™) SRAMs (Continued)

36Mb (Original Rev.)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS8322Z72yy-###	512K x 72	250/225/200/166/ 150/133	3.0–4.0	2.5/3.3				●		●	●	●
GS8322Z72yy-###V	512K x 72	250/225/200/166/ 150/133	3.0–4.0	1.8/2.5				●		●	●	●

18Mb (Rev. D)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS8162Z36Dyy-### GS8162Z18Dyy-###	512K x 36 1M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3	●	●				●	●	●
GS8161Z36Dyy-### GS8161Z32Dyy-### GS8161Z18Dyy-###	512K x 36 512K x 32 1M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3		●			●	●	●	
GS8160Z36Dyy-### GS8160Z18Dyy-###	512K x 36 1M x 18	400/375/333/ 250/200/150	2.5–3.8	2.5/3.3					●	●		
GS8162Z36Dyy-###V GS8162Z18Dyy-###V	512K x 36 1M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5	●	●				●	●	●
GS8161Z36Dyy-###V GS8161Z32Dyy-###V GS8161Z18Dyy-###V	512K x 36 512K x 32 1M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5		●			●	●	●	
GS8160Z36Dyy-###V GS8160Z18Dyy-###V	512K x 36 1M x 18	333/250/ 200/150	3.0–3.8	1.8/2.5					●	●		

18Mb (Rev. C)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
GS8162Z72Cyy-###	256K x 72	333/300/250/ 200/150	2.8–3.8	2.5/3.3				●		●	●	●
GS8162Z72Cyy-###V	256K x 72	250/200/150	3.0–3.8	1.8/2.5				●		●	●	●

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

No Bus Turnaround (NBT™) SRAMs (Continued)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features		
					BGA				TQFP			
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	JTAG	FLXDrive™
9Mb (Rev. C)												
GS882Z36Cyy-### GS882Z18Cyy-###	256K x 36 512K x 18	333/300/250/ 200/150	2.5–3.8	2.5/3.3	●	●				●	●	●
GS881Z36Cyy-### GS881Z32Cyy-### GS881Z18Cyy-###	256K x 36 256K x 32 512K x 18	333/300/250/ 200/150	2.5–3.8	2.5/3.3		●			●	●	●	
GS880Z36Cyy-### GS880Z18Cyy-###	256K x 36 512K x 18	333/300/250/ 200/150	2.5–3.8	2.5/3.3					●	●		
GS882Z36Cyy-###V GS882Z18Cyy-###V	256K x 36 512K x 18	250/200/150	3.0–3.8	1.8/2.5	●	●				●	●	●
GS881Z36Cyy-###V GS881Z32Cyy-###V GS881Z18Cyy-###V	256K x 36 256K x 32 512K x 18	250/200/150	3.0–3.8	1.8/2.5		●			●	●	●	
GS880Z36Cyy-###V GS880Z18Cyy-###V	256K x 36 512K x 18	250/200/150	3.0–3.8	1.8/2.5					●	●		
4Mb (Rev. C)												
GS842Z36Cyy-### GS842Z18Cyy-###	128K x 36 256K x 18	250/200/166/ 150/100	3.2–4.5	3.3 2.5/3.3	●					●	●	●
GS841Z36Cyy-### GS841Z18Cyy-###	128K x 36 256K x 18	250/200/166/ 150/100	3.2–4.5	3.3 2.5/3.3					●	●	●	
GS840Z36Cyy-### GS840Z18Cyy-###	128K x 36 256K x 18	250/200/166/ 150/100	3.2–4.5	3.3 2.5/3.3					●	●		

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended, Automotive, or Military temperature option parts.

GSI SyncBurst™ SRAMs have been the workhorses for midrange data acquisition designs for over 15 years and are available in a huge assortment of densities, packages and design options. These SRAMs also come with the best long-term memory IC support plan in the business. SyncBurst SRAMs provide a "burst" of 2 to 4 words in response to a single clock signal.

SyncBurst SRAMs are used in networking, industrial, automotive and medical imaging applications where a mid-range performance point (typically a 333–166 MHz clock rate) is required.

***GSI offers all products in lead-free (6/6 RoHS compliant) packages; therefore, only these products are listed. Leaded (5/6 RoHS-compliant) packages are still available for our 65nm and 90nm product families. Please contact your local sales representative if you are interested in a 5/6 part.**

Synchronous Burst (SyncBurst™) SRAMs

288Mb (2-Die Module)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS8256436yy-### GS8256418yy-###	8M x 36 16M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3	●	●				●		●	●	●
GS8256436yy-###V GS8256418yy-###V	8M x 36 16M x 18	333/ 250/200	2.5–3.0	1.8/2.5	●	●				●		●	●	●

144Mb

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS8128236yy-### GS8128218yy-###	4M x 36 8M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3	●	●				●	●	●	●	●
GS81280E36yy-### GS81280E32yy-### GS81280E18yy-###	4M x 36 4M x 32 8M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3					●	●		●		
GS81280F36yy-### GS81280F18yy-###	4M x 36 8M x 18	6.5 (ns)	n/a	2.5/3.3					●	FT Only				
GS8128036yy-### GS8128032yy-### GS8128018yy-###	4M x 36 4M x 32 8M x 18	400/333/ 250/200	2.5–3.0	2.5/3.3					●	●	●			
GS8128236yy-###V GS8128218yy-###V	4M x 36 8M x 18	333/ 250/200	2.5–3.0	1.8/2.5	●	●				●	●	●	●	●
GS81280E36yy-###V GS81280E32yy-###V GS81280E18yy-###V	4M x 36 4M x 32 8M x 18	333/ 250/200	2.5–3.0	2.5/3.3					●	●		●		
GS8128036yy-###V GS8128032yy-###V GS8128018yy-###V	4M x 36 4M x 32 8M x 18	333/ 250/200	2.5–3.0	2.5/3.3					●	●	●			

72Mb

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS864272yy-### GS864236yy-### GS864218yy-###	1M x 72 2M x 36 4M x 18	300/250/200/ 167	2.3–3.5	2.5/3.3	●			●		●	●	●	●	●

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Synchronous Burst (SyncBurst™) SRAMs (Continued)

72Mb (Continued)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS8640E36yy-### GS8640E32yy-### GS8640E18yy-###	2M x 36 2M x 32 4M x 18	300/250/200/167	2.3–3.5	2.5/3.3					●	●		●		
GS8640F36yy-### GS8640F32yy-### GS8640F18yy-###	2M x 36 2M x 32 4M x 18	6.5 (ns)	n/a	2.5/3.3					●	FT Only				
GS864036yy-### GS864032yy-### GS864018yy-###	2M x 36 2M x 32 4M x 18	300/250/200/167	2.3–3.5	2.5/3.3					●	●	●			
GS864436yy-### GS864418yy-###	2M x 36 4M x 18	250/225/200/166/150/133	2.5–4.0	2.5/3.3			●			●	●	●	●	●
GS864272yy-###V GS864236yy-###V GS864218yy-###V	1M x 72 2M x 36 4M x 18	250/200/167	3.0–3.5	1.8/2.5	●			●		●	●	●	●	●
GS8640E36yy-###V GS8640E32yy-###V GS8640E18yy-###V	2M x 36 2M x 32 4M x 18	250/200/167	3.0–3.5	1.8/2.5					●	●		●		
GS864036yy-###V GS864032yy-###V GS864018yy-###V	2M x 36 2M x 32 4M x 18	250/200/167	3.0–3.5	1.8/2.5					●	●	●			
GS864436yy-###V GS864418yy-###V	2M x 36 4M x 18	250/225/200/166/150/133	2.5–4.0	1.8/2.5			●			●	●	●	●	●

36Mb (Rev. A)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS832236Ayy-### GS832218Ayy-###	1M x 36 2M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3	●	●				●	●	●	●	●
GS8321E36Ayy-### GS8321E32Ayy-### GS8321E18Ayy-###	1M x 36 1M x 32 2M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3		●				●		●	●	
GS832136Ayy-### GS832132Ayy-### GS832118Ayy-###	1M x 36 1M x 32 2M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3		●				●			●	
GS8320E36Ayy-### GS8320E32Ayy-### GS8320E18Ayy-###	1M x 36 1M x 32 2M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3					●	●		●		
GS8320F36Ayy-### GS8320F32Ayy-### GS8320F18Ayy-###	1M x 36 1M x 32 2M x 18	6.5 (ns)	n/a	2.5/3.3					●	FT Only				
GS832036Ayy-### GS832032Ayy-### GS832018Ayy-###	1M x 36 1M x 32 2M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3					●	●	●			

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Synchronous Burst (SyncBurst™) SRAMs (Continued)

36Mb (Rev. A) (Continued)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS832236Ayy-###V GS832218Ayy-###V	1M x 36 2M x 18	333/250/200/150	3.0–3.8	1.8/2.5	●	●				●	●	●	●	●
GS8321E36Ayy-###V GS8321E32Ayy-###V GS8321E18Ayy-###V	1M x 36 1M x 32 2M x 18	333/250/200/150	3.0–3.8	1.8/2.5		●				●		●	●	
GS832136Ayy-###V GS832132Ayy-###V GS832118Ayy-###V	1M x 36 1M x 32 2M x 18	333/250/200/150	3.0–3.8	1.8/2.5		●				●			●	
GS8320E36Ayy-###V GS8320E32Ayy-###V GS8320E18Ayy-###V	1M x 36 1M x 32 2M x 18	333/250/200/150	3.0–3.8	1.8/2.5					●	●		●		
GS832036Ayy-###V GS832032Ayy-###V GS832018Ayy-###V	1M x 36 1M x 32 2M x 18	333/250/200/150	3.0–3.8	1.8/2.5					●	●	●			

36Mb (Original Rev.)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS832272yy-###	512K x 72	250/225/200/166/150/133	3.0–4.0	2.5/3.3				●		●	●	●	●	●
GS832272yy-###V	512K x 72	250/225/200/166/150/133	3.0–4.0	1.8/2.5				●		●	●	●	●	●

18Mb (Rev. D)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS816236Dyy-### GS816218Dyy-###	512K x 36 1M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3	●	●				●	●	●	●	●
GS8161E36Dyy-### GS8161E32Dyy-### GS8161E18Dyy-###	512K x 36 512K x 32 1M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3		●			●	●		●	●	
GS816136Dyy-### GS816132Dyy-### GS816118Dyy-###	512K x 36 512K x 32 1M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3		●			●	●			●	
GS8160E36Dyy-### GS8160E32Dyy-### GS8160E18Dyy-###	512K x 36 512K x 32 1M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3					●	●		●		
GS8160F36Dyy-### GS8160F32Dyy-### GS8160F18Dyy-###	512K x 36 512K x 32 1M x 18	6.5/7.5 (ns)	n/a	2.5/3.3					●	FT Only				
GS816036Dyy-### GS816032Dyy-### GS816018Dyy-###	512K x 36 512K x 32 1M x 18	400/375/333/250/200/150	2.5–3.8	2.5/3.3					●	●	●			

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Synchronous Burst (SyncBurst™) SRAMs (Continued)

18Mb (Rev. D) (Continued)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS816236Dyy-###V GS816218Dyy-###V	512K x 36 1M x 18	333/250/200/150	3.0–3.8	1.8/2.5	●	●				●	●	●	●	●
GS8161E36Dyy-###V GS8161E32Dyy-###V GS8161E18Dyy-###V	512K x 36 512K x 32 1M x 18	333/250/200/150	3.0–3.8	1.8/2.5		●			●	●		●	●	
GS816136Dyy-###V GS816132Dyy-###V GS816118Dyy-###V	512K x 36 512K x 32 1M x 18	333/250/200/150	3.0–3.8	1.8/2.5		●			●	●			●	
GS8160E36Dyy-###V GS8160E32Dyy-###V GS8160E18Dyy-###V	512K x 36 512K x 32 1M x 18	333/250/200/150	3.0–3.8	1.8/2.5					●	●		●		
GS816036Dyy-###V GS816032Dyy-###V GS816018Dyy-###V	512K x 36 512K x 32 1M x 18	333/250/200/150	3.0–3.8	1.8/2.5					●	●	●			

18Mb (Rev. C)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS816272Cyy-###	256K x 72	333/300/250/200/150	2.8–3.8	2.5/3.3				●		●	●	●	●	●
GS816272Cyy-###V	256K x 72	250/200/150	3.0–3.8	1.8/2.5				●		●	●	●	●	●
GS816273Cyy-###	256K x 72	333/300/250/200/150	2.3–2.5	2.5/3.3				●		PL Only	●	●	●	●
GS816273Cyy-###V	256K x 72	250/200/150	2.5	1.8/2.5				●		PL Only	●	●	●	●

9Mb (Rev. C)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS88236Cyy-### GS88218Cyy-###	256K x 36 512K x 18	333/300/250/200/150	2.5–3.8	2.5/3.3	●	●				●	●	●	●	●
GS881E36Cyy-### GS881E32Cyy-### GS881E18Cyy-###	256K x 36 256K x 32 512K x 18	333/300/250/200/150	2.5–3.8	2.5/3.3		●			●	●		●	●	
GS88136Cyy-### GS88132Cyy-### GS88118Cyy-###	256K x 36 256K x 32 512K x 18	333/300/250/200/150	2.5–3.8	2.5/3.3		●			●	●			●	
GS880E36Cyy-### GS880E32Cyy-### GS880E18Cyy-###	256K x 36 256K x 32 512K x 18	333/300/250/200/150	2.5–3.8	2.5/3.3					●	●		●		

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Synchronous Burst (SyncBurst™) SRAMs (Continued)

9Mb (Rev. C) (Continued)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS880F36Cyy-### GS880F32Cyy-### GS880F18Cyy-###	256K x 36 256K x 32 512K x 18	4.5/5/5.5/ 6.5/7.5 (ns)	n/a	2.5/3.3					●	FT Only	●			
GS88036Cyy-### GS88032Cyy-### GS88018Cyy-###	256K x 36 256K x 32 512K x 18	333/300/250/ 200/150	2.5–3.8	2.5/3.3					●	●	●			
GS88237Cyy-###	256K x 36	333/300/250/ 200	2.0–2.7	2.5/3.3	●					PL Only	●	●	●	●
GS88037Cyy-###	256K x 36	333/300/250/ 200	2.0–2.7	2.5/3.3					●	PL Only	●			
GS88236Cyy-###V GS88218Cyy-###V	256K x 36 512K x 18	250/200/150	3.0–3.8	1.8/2.5	●	●				●	●	●	●	●
GS881E36Cyy-###V GS881E32Cyy-###V GS881E18Cyy-###V	256K x 36 256K x 32 512K x 18	250/200/150	3.0–3.8	1.8/2.5		●			●	●		●	●	
GS88136Cyy-###V GS88132Cyy-###V GS88118Cyy-###V	256K x 36 256K x 32 512K x 18	250/200/150	3.0–3.8	1.8/2.5		●			●	●			●	
GS880E36Cyy-###V GS880E32Cyy-###V GS880E18Cyy-###V	256K x 36 256K x 32 512K x 18	250/200/150	3.0–3.8	1.8/2.5					●	●		●		
GS880F36Cyy-###V GS880F32Cyy-###V GS880F18Cyy-###V	256K x 36 256K x 32 512K x 18	5.5/6.5/7.5 (ns)	n/a	1.8/2.5					●	FT Only	●			
GS88036Cyy-###V GS88032Cyy-###V GS88018Cyy-###V	256K x 36 256K x 32 512K x 18	250/200/150	3.0–3.8	1.8/2.5					●	●	●			
GS88237Cyy-###V	256K x 36	333/300/ 250/200	2.5	1.8/2.5	●					PL Only	●	●	●	●
GS88037Cyy-###V	256K x 36	333/300/ 250/200	2.5	1.8/2.5					●	PL Only	●			

4Mb (Rev. C)

GSI P/N	Config	Speed (MHz)	Pipeline tKQ (ns)	V_{DD} V_{DDQ}	Packages					Features				
					BGA				TQFP					
					119 (GB)	165 (GD)	165 (GE)	209 (GC)	100 (GT)	FT/PL	SCD	DCD	JTAG	FLXDrive™
GS84036Cyy-### GS84032Cyy-### GS84018Cyy-###	128K x 36 128K x 32 256K x 18	250/200/166/ 150	2.5–3.8	3.3 2.5/3.3	●				●	●	●			

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Low Latency DRAM—2nd Generation (LLDRAM II)

GSI's 2nd generation Low Latency DRAM (LLDRAM II) is an ideal solution for advanced data networking applications. It offers an eight-bank memory array architecture for high transaction rates, a simplified address interface, and double data rate transfers. The result is a device that can maintain near-100% bus utilization for many networking tasks.

GSI's LLDRAM devices are ideal for 10GbE, 40GbE and 100GbE packet buffering, lookup tables, and inspection tasks. A variety of Network Processors and high performance FPGAs are already equipped with RAM ports ready to host LLDRAM II devices.

Drop-in compatible with RLDRAM 2 (Reduced Latency DRAM)

- 533 MHz DDR interface (1.067Gbit/s/pin)
- Common (x9, x18, x36) & Separate (x9, x18) I/O
- 8-bank architecture
- 15 ns tRC
- Single-cycle (SRAM-like) address load

A complete set of design options:

- Configurable read/write latencies & cycle times
- Configurable burst lengths (2/4/8)
- On-Die Input Termination
- IEEE 1149.1 boundary scan
- Traditional multiplexed address bus option for backward compatibility

576Mb LLDRAM II							
GSI P/N	Config	V_{EXT} and V_{DD} Voltage	I/O Voltage	I/O		Speed (MHz)	144 FBGA (GM)
				Common	Separate		
GS4576C36yy-### GS4576C18yy-### GS4576C09yy-###	16M x 36 32M x 18 64M x 9	V_{EXT}—2.5 V V_{DD}—1.8 V	1.5 and 1.8 V HSTL	●		533/400/300	●
GS4576S18yy-### GS4576S09yy-###	32M x 18 64M x 9	V_{EXT}—2.5 V V_{DD}—1.8 V	1.5 and 1.8 V HSTL		●	533/400/300	●
288Mb LLDRAM II							
GSI P/N	Config	V_{EXT} and V_{DD} Voltage	I/O Voltage	I/O		Speed (MHz)	144 µBGA (GL)
				Common	Separate		
GS4288C36yy-### GS4288C18yy-### GS4288C09yy-###	8M x 36 16M x 18 32M x 9	V_{EXT}—2.5 V V_{DD}—1.8 V	1.5 and 1.8 V HSTL	●		533/400/300	●
GS4288S18yy-### GS4288S09yy-###	16M x 18 32M x 9	V_{EXT}—2.5 V V_{DD}—1.8 V	1.5 and 1.8 V HSTL		●	533/400/300	●

Part Number Notes:
yy = Package Designator; ### = Speed Bin Designator

All parts are available in Commercial and Industrial temperature options.
Contact your sales representative for Extended or Military temperature option parts.

Part Number Decoder—SigmaQuad™/SigmaDDR™

GSI /QQ
GS P DDD O FF WWW R KK - BBB T C S

P = Product Line Code
(1 digit)

8 = Sync SRAM

D = Density/Product Family
(Up to 3 digits)

18 = 16 or 18Mb
34 = 32 or 36Mb
66, 67, 69 = 64 or 72Mb
130,131, 133 = 128 or 144Mb
258, 261 = 256 or 288Mb

O = Option
(Up to 1 digit)

2 = II/II+
3 = IIIe
4 = IVe

FF = Function Code
(Up to 2 alpha)

D = SigmaQuad B4
DT = SigmaQuad B4 (Weak/Strong ODT)
DV = 2.5 V SigmaQuad B4
E = LV and HV HSTL
H = HV (1.5 V) HSTL
L = LV (1.2 V) HSTL
P = POD
Q = SigmaQuad B2
QT = SigmaQuad B2 (Weak/Strong ODT)
QV = 2.5 V SigmaQuad B2
R = SigmaDDR B4
S = SigmaSIO DDR
T = SigmaDDR B2
TT= SigmaDDR B2 (Weak/Strong ODT)

WWW = I/O Width/Variation
(Up to 3 digits)

6, 7, 8 = x8
9, 10, 11 = x9
18, 19, 20, 21 = x18
36, 37, 38, 39 = x36

R = Revision Level
(Up to 1 alpha)

Blank = Original Mask Set
A = 2nd Generation
B = 3rd Generation
C = 4th Generation

KK = Package
(Up to 2 alpha)

CE = 21 mm x 25 mm, 165 CCGA (Rad-Hard)
D = 13 mm x 15 mm, 165 FPBGA
E = 15 mm x 17 mm, 165 FPBGA
K = 14 mm x 22 mm, 260 BGA
LE = 21 mm x 25 mm, 165 CLGA (Rad-Hard)
GD = Green 13 mm x 15 mm, 165 FPBGA
GE = Green 15 mm x 17 mm, 165 FPBGA
GK = Green 14 mm x 22 mm, 260 BGA
RE = 165 LBGA (Rad-Tolerant)

BBB = Speed Bin
(Up to 3 digits)

XX = ns or MHz

T = Temp Grade
(Up to 1 alpha)

Blank = Commercial (0º to 70ºC)
I = Industrial (–40º to 85ºC)
E = Extended (–40º to 125ºC)
M = Military (–55º to 125ºC)

C = Customization

V = Voltage Variation
X = Non-catalog Post-assembly Option

Note: If "X" is shown in the Customization field, the Speed Bin field may become a general purpose alphanumeric custom part number field.

S = Shipping Optionl
(Up to 1 alpha)

Blank = Bulk
T = Tape and Reel

QQ = Qualification Status
(Up to 1 symbol and 2 alpha)

Blank = Pre-Qual or Qualified
/ES = Eng Sample*

*Note: The /ES mark may appear anywhere on the top surface of the package. The /ES mark supersedes any other qualification status mark that may appear on the device.

Part Number Decoder—Synchronous Burst/No Bus Turnaround

GSI /QQ
GS P DDD O FF WWW R KK - BBB T C S

P = Product Line Code
(1 digit)

8 = Sync SRAM

D = Density/Product Family
(Up to 3 digits)

4 = 4 or 4.5Mb
8 = 8 or 9Mb
16 = 16 or 18Mb
32, 36 = 32 or 36Mb
64, 68 = 64 or 72Mb
128, 130 = 128 or 144Mb
256= 288Mb

O = Option
(Up to 1 alpha)
(Specific meaning varies by product family)

X = Non-catalog Assembly Option

Note: If "X" is shown in the Option Code field, the Function Code and Speed Bin fields become general purpose alphanumeric custom part number fields.

FF = Function Code
(Up to 2 alpha)

DW = Double Late Write
E = Dual Cycle Deselect (DCD)
F = Flow Through Only
H = High Drive Output
L = Low Drive Output
LW = Late Write
Z = No Bus Turnaround

WWW = I/O Width/Variation
(Up to 3 digits)

8 = x8
18 = x18
32 = x32
36, 37, 38 = x36
72, 73 = x72

R = Revision Level
(Up to 1 alpha)

Blank = Original Mask Set
A = 2nd Generation
B = 3rd Generation
C = 4th Generation

KK = Package
(Up to 2 alpha)

B = 14 mm x 22 mm, 119 BGA
C = 14 mm x 22 mm, 209 FPBGA
CQ = Ceramic QFP (Rad-Hard)
D = 13 mm x 15 mm, 165 FPBGA
E = 15 mm x 17 mm, 165 FPBGA
GB = Green 14 mm x 22 mm, 119 BGA
GC = Green 14 mm x 22 mm, 209 FPBGA
GD = Green 13 mm x 15 mm, 165 FPBGA
GE = Green 15 mm x 17 mm, 165 FPBGA
GT = Green TQFP

BBB = Speed Bin
(Up to 3 digits)

XX = ns or MHz

T = Temp Grade
(Up to 1 alpha)

Blank = Commercial (0º to 70ºC)
I = Industrial (–40º to 85ºC)
E = Extended (–40º to 125ºC)
M = Military (–55º to 125ºC)

C = Customization

V = Voltage Variation
X = Non-catalog Post-assembly Option

Note: If "X" is shown in the Customization field, the Speed Bin field may become a general purpose alphanumeric custom part number field.

S = Shipping Optionl
(Up to 1 alpha)

Blank = Bulk
T = Tape and Reel

QQ = Qualification Status
(Up to 1 symbol and 2 alpha)

Blank = Pre-Qual or Qualified
/ES = Eng Sample*

*Note: The /ES mark may appear anywhere on the top surface of the package. The /ES mark supersedes any other qualification status mark that may appear on the device.

Part Number Decoder—LLDRAM

GSI /QQ
GS P DDD O FF WWW R KK - BBB T C S

P = Product Line Code
(1 digit)

4 = LLDRAM

DDD = Density/Product Family
(Up to 3 digits)

288 = 288Mb
576 = 576Mb

O = Option
(Up to 1 alpha)
(Specific meaning varies by product family)

X = Non-catalog Assembly Option

Note: If "X" is shown in the Option Code field, the Function Code and Speed Bin fields become general purpose alphanumeric custom part number fields.

FF = Function Code
(Up to 2 alpha)

C = Common I/O
S = Separate I/O

WWW = I/O Width/Variation
(Up to 3 digits)

9 = x8
18 = x18
36 = x36

R = Revision Level
(Up to 1 alpha)

Blank = Original Mask Set
A = 2nd Generation
B = 3rd Generation
C = 4th Generation

KK = Package
(Up to 2 alpha)

GL = RoHS-compliant (6/6) 144 µBGA
GM = RoHS-compliant (6/6) 144 FBGA

BBB = Speed Bin
(Up to 3 digits)

XX = ns or MHz

T = Temp Grade
(Up to 1 alpha)

Blank = Commercial (0º to 70ºC)
I = Industrial (–40º to 85ºC)
E = Extended (–40º to 125ºC)
M = Military (–55º to 125ºC)

C = Customization

V = Voltage Variation
X = Non-catalog Post-assembly Option

Note: If "X" is shown in the Customization field, the Speed Bin field may become a general purpose alphanumeric custom part number field.

S = Shipping Optionl
(Up to 1 alpha)

Blank = Bulk
T = Tape and Reel

QQ = Qualification Status
(Up to 1 symbol and 2 alpha)

Blank = Pre-Qual or Qualified
/ES = Eng Sample*

*Note: The /ES mark may appear anywhere on the top surface of the package. The /ES mark supersedes any other qualification status mark that may appear on the device.

Part Number Decoder—Asynchronous

GSI /QQ
GS P D O WW R KK - BBB T C S

P = Product Line Code
(1 digit)

7 = Async SRAM

D = Density/Product Family
(1 digit)

0 = 256K
1 = 1Mb
2 = 2Mb
3 = 3Mb
4 = 4 or 4.5Mb
6 = 6Mb
8 = 8 or 9Mb

O = Option
(Up to 1 alpha)
(Specific meaning varies by product family)

X = Non-catalog Assembly Option

Note: If "X" is shown in the Option Code field, the Function Code and Speed Bin fields become general purpose alphanumeric custom part number fields.

WW = I/O Width/Variation
(Up to 2 digits)

1 = x1
4 = x4
8 = x8
16, 17 = x16
24 = x24
32 = x32

R = Revision Level
(Up to 1 alpha)

Blank = Original Mask Set
A = 2nd Generation
B = 3rd Generation
C = 4th Generation

KK = Package
(Up to 2 alpha)

B = 14 mm x 22 mm, 119 BGA
U = 6 mm x 8 mm, 48 FPBGA
X = 6 mm x 10 mm, 48 FPBGA
GB = Green 14 mm x 22 mm, 119 BGA
GP = Green TSOP-II
GU = Green 6 mm x 8 mm, 48 FPBGA
GX = Green 6 mm x 10 mm, 48 FPBGA

BBB = Speed Bin
(Up to 3 digits)

XX = ns or MHz

T = Temp Grade
(Up to 1 alpha)

Blank = Commercial (0º to 70ºC)
I = Industrial (–40º to 85ºC)
E = Extended (–40º to 125ºC)
M = Military (–55º to 125ºC)

C = Customization

V = Voltage Variation
X = Non-catalog Post-assembly Option

Note: If "X" is shown in the Customization field, the Speed Bin field may become a general purpose alphanumeric custom part number field.

S = Shipping Optionl
(Up to 1 alpha)

Blank = Bulk
T = Tape and Reel

QQ = Qualification Status
(Up to 1 symbol and 2 alpha)

Blank = Pre-Qual or Qualified
/ES = Eng Sample*

*Note: The /ES mark may appear anywhere on the top surface of the package. The /ES mark supersedes any other qualification status mark that may appear on the device.

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