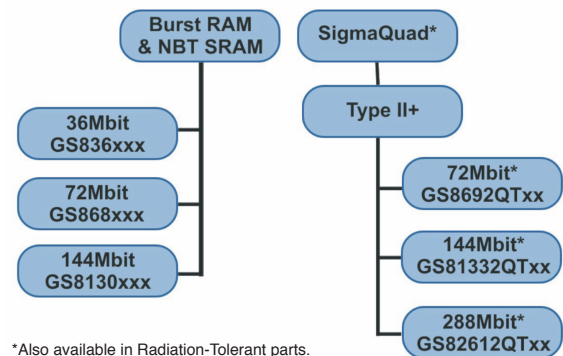


Radiation-Hardened and Radiation-Tolerant SRAMs

Founded in 1995, GSI Technology, Inc. is a leading provider of high performance semiconductor memory solutions for military, medical, automotive and other applications.

- GSI currently offers Rad-Hard products from the SigmaQuad-II+, Synchronous Burst, and NBT families.
- For less robust applications, GSI also offers Radiation-Tolerant SigmaQuad-II+ SRAMs.
- Devices are qualified to meet requirements of Aerospace and Defense customers•
 - Military Temperature – 55 Deg Cel to +125 Deg Cel
 - Class-Q and Class-V levels
 - Speeds up to 350 MHz
 - JEDEC-standard Pinout and Package
 - 40nm Technology

Our Innovative NEW line of radiation-Hardened Military Temperature SRAMs:



Technical Notes



Timing Designer

Rad-Tolerant SigmaQuad-II+™ Burst Length 2, Read Latency 2.0, Speed 350/250 MHz						
GSI P/N	Density	Config	ODT	Voltage	165 BGA	
					CCGA (CE)	LGA (LE)
GS82582QT37yy-### GS82582QT19yy-###	288Mb	8M x 36 16M x 18	Weak/ Strong	$V_{DD} - 1.8 V$ $V_{DDQ} - 1.5 V / 1.8 V$	•	•
GS81302QT37yy-### GS81302QT19yy-###	144Mb	4M x 36 8M x 18	Weak/ Strong	$V_{DD} - 1.8 V$ $V_{DDQ} - 1.5 V / 1.8 V$	•	•
GS8662QT37yy-### GS8662QT19yy-###	72Mb	2M x 36 4M x 18	Weak/ Strong	$V_{DD} - 1.8 V$ $V_{DDQ} - 1.5 V / 1.8 V$	•	•

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

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

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

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

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

Rad-Hard vs. Rad-Tolerant

	Rad-Hard	Rad-Tolerant
Densities	288Mb/144Mb/72Mb (SigmaQuad) 144Mb/72Mb/36Mb (SyncBurst & NBT)	
Speed Bins	350 MHz/250 MHz (SigmaQuad) 333MHz/250 MHz (SyncBurst & NBT)	
Configurations	X18/x36	
Package	165 CCGA or LGA (SigmaQuad) 100 Ceramic QFP (SyncBurst & NBT)	165 LBGA (SigmaQuad) 100 TQFP (SyncBurst & NBT)
Total Ionizing Dose (TID)	>300krads(Si)	>50krads(Si)
Single Event Latchup Immunity	>80 MeV.cm2/mg (125°C)	>42.2 MeV.cm2/mg (100°C)



Radiation-Hardened Memories



BURST & NBT SRAMs
100 Ceramic QFP
PL/FT

SIGMAQUAD-II+
165 CCGA/165 LGA
RL = 2.0

228Mb

GS82612QT(z)19/37
350 MHz/250MHz

144Mb

GS81320(z)18/36
333 MHz/250MHz

GS81332QT(z)19/37
350 MHz/250MHz

72Mb

GS8680(z)18/36
333 MHz/250MHz

GS8692QT19(z)19/37
350 MHz/250MHz

36Mb

GS8360(z)18/36
333 MHz/250MHz

Military Temp Range (Tj) = -55C to +125C

Radiation-Tolerant Memories

BURST & NBT SRAMs
100 TQFP
PL/FT

SIGMAQUAD-II+
165 BGA
RL = 2.0

228Mb

GS82582QT19/37
350 MHz/250MHz

144Mb

GS81280(z)18/36
333 MHz/250MHz

GS81302QT19/37
350 MHz/250MHz

72Mb

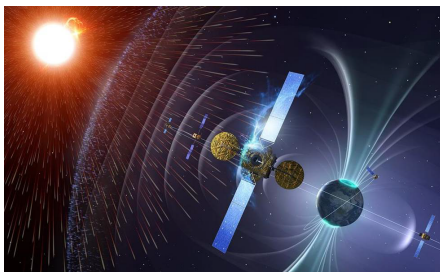
GS8640(z)18/36
333 MHz/250MHz

GS8662QT(z)19/37
350 MHz/250MHz

36Mb

GS8320(z)18/36
333 MHz/250MHz

Military Temp Range (Tj) = -55C to +125C



Radiation Hardening QML-V

- Certified Independent Lab DPA (Destructive Physical Analysis) Testing
- Certified Independent Lab Outgassing Testing
- Total Ionizing Dose (TID) Testing
- Single Event Latchup (SEL) Testing
- Plastic Package – 165p LBGA

SigmaQuad-II+TM Controller IP For FPGAs

- Available for Free to GSI Customers
- Available for use with the following FPGAs:
 - Xilinx: Virtex/Kintex 7
 - Altera: Stratix 5
 - Microsemi RTG4 (forthcoming)
 - Microsemi PolarFire (forthcoming)

Resources / Deliverables:

- Source Code (Verilog) & Associated User Guide
- Design Constrain File
- Simulation Models
- Reference Board & associated User Guide, Schematics, Gerber Files, and BOM (upon request)

