Product Reliability Summary — SiT1408/SiT1602/SiT8008 Product Family

Purpose of Stress Testing

This report documents production qualification of the SiT1602 product family. Qualification testing was done on SiT1602 product and by similarity the results of this qualification qualify the SiT1408, SiT1409, SiT1602, SiT1603, SiT1604, SiT5008, SiT8008, SiT8009, SiT9201, SiT2001, and SiT2002 product die for full production release.

Early Life Results (EFR) JEDEC STD-22 A108

Condition:	Dynamic, 125°C, Vcc (max), 168 hours				
Quantity Stressed:	325	**Quantity Passed:**	325	**Failure Rate:**	0

High Temperature Operating Life (HTOL) JEDEC STD-22 A108

Condition:	Dynamic, 125°C, Vcc (max), 1000 hours				
Quantity Stressed:	722	**Quantity Passed:**	722	**Quantity Failed:**	0
Semiconductor FIT Calculation:		0.65	**FIT**[Note 1]		
Confidence Level:	90%	Ea (activation energy in eV):	0.7	Derating:	25°C

Extended Operating Life Test (HTOL) JEDEC STD-22 A108

Condition:	Dynamic, 125°C, Vcc (max), 5000 hours				
Quantity Stressed:	77	**Quantity Passed:**	77	**Quantity Failed:**	0

ESD

Human Body Model (HBM) JESD22-A114

Condition:	one +ve and -ve pulse, all pin combinations			ESD level:	2000 V
Quantity Stressed:	3	**Quantity Passed:**	3	**Failure Rate:**	0

Machine Model (MM) JEDEC STD-EIA/JESD-22 A115

Condition:	one +ve and -ve pulse, all pin combinations			ESD level:	200 V
Quantity Stressed:	3	**Quantity Passed:**	3	**Failure Rate:**	0

Charged Device Model (CDM) JEDC STD-JESD-22 C101

Condition:	one +ve and -ve pulse, all pins			ESD level:	750 V
Quantity Stressed:	3	**Quantity Passed:**	3	**Failure Rate:**	0

Latch Up	**JEDEC STD-JESD78**				
Condition:	100 mA @ 125°C, Vcc (max) and voltage overstress				
Quantity Stressed:	6	**Quantity Passed:**	6	**Failure Rate:**	0

NVM Data Retention [Note 2]					
Condition:	NVM High Temp Storage (NVM HTS), 150°C, 1000 hours				
Quantity Stressed:	93	**Quantity Passed:**	93	**Quantity Failed:**	0
Programing:	Checkerboard pattern, Specific Custom Pattern				
Condition:	NVM Operating Life (NVM HTOL), Dynamic, 125°C, Vcc (max), 1000 hours				
Quantity Stressed:	95	**Quantity Passed:**	95	**Quantity Failed:**	0
Programing:	Checkerboard pattern				

Mechanical Shock (MS) MIL-STD-883 Method 2002					
Condition:	Peak acceleration 10 kg				
Quantity Stressed:	39	**Quantity Passed:**	39	**Failure Rate:**	0

Variable Frequency Vibration (VFV) MIL-STD-883 Method 2007					
Condition:	Peak acceleration 70 g				
Quantity Stressed:	39	**Quantity Passed:**	39	**Failure Rate:**	0

Vibration Fatigue (VF) MIL-STD-883 Method 2005 [Note 3]					
Condition:	Peak acceleration 20 g, 30 hours				
Quantity Stressed:	39	**Quantity Passed:**	39	**Failure Rate:**	0

Constant Acceleration (CA) MIL-STD-883 Method 2001					
Condition:	Y1 plane, 30 kg				
Quantity Stressed:	39	**Quantity Passed:**	39	**Failure Rate:**	0

Product Information

Wafer Fabrication

Factory:	CMOS:	TSMC, Taiwan	**Process:**	1P5M CMOS-8"	**Design Rule:**	0.18 um
Factory:	MEMS:	BOSCH, Germany	**Process :**	PFD1_A	**Design Rule:**	0.25 um

Notes:

1. The oscillator family failure rate of 0.65 FIT, calculated based on large HTOL sample size, applies due to process technology and design rule similarity.
2. NVM data retention testing was done on SiT8208 product as test vehicle; however, because of structural and process similarities between SiT8208 and SiT14xx/SiT16xx/SiT8008/ SiT89xx/SiT200x base products, data sharing is used.
3. Data share with SiT8208 product is done because of structural and process similarity between SiT8208 and SiT14xx/SiT16xx/SiT8008/SiT89xx/SiT200x base products.

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