



P1/2

PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000431

Date: October 2nd, 2017

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☐	

Change Details

Part Number(s) Affected:

- GS4900BCNE3
- GS4901BCNE3
- GS4910BCNE3
- GS4911BCNE3

Customer Part Number(s) Affected: ☒ N/A

Description, Purpose and Effect of Change:

As part of Semtech SIP's ongoing Supply Security Program the above products will be able to be tested at ASE(M) Malaysia, as well as the current test location at ISE Labs. The Supply Security Program is to ensure, where possible, a minimum of two approved production sites are available for each production stage. This change also increases Semtech SIP's production capacity to meet the increased demand for production volumes.

Note that ASE(M) is current supplier of test services to Semtech.

As of April 19, 2018, GS4900BCNE3, GS4901BCNE3, GS4910BCNE3 and GS4911BCNE3 products shipped to customers may have been tested at any of the qualified production sites. Earlier shipment from ASEM is possible upon customer approval.

Change Classification	☒ Major ☐ Minor	Impact to Form, Fit, Function	☐ Yes ☒ No
Impact to Data Sheet	☐ Yes ☒ No	New Revision or Date	☒ N/A

Impact to Performance, Characteristics or Reliability:

No impact to fit, form, function, quality or reliability.

Implementation Date	April 19, 2018	Work Week	
Last Time Ship (LTS) Of unchanged product	N/A	Affecting Lot No. / Serial No. (SN)	N/A
Sample Availability	October 2, 2017	Qualification Report Availability	October 2, 2017

Supporting Documents for Change Validation/Attachments:

GS49xx Qualification Report



P2/2

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Issuing Authority		
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	Title:	GS4900B / 01B / 10B / 11B ASEM Qualification Report	Project Name:	GS49xx
	Security Level:	External / Customer	Document Status:	Active
	Division:	SIP Product Engineering	Revision Date:	9/28/2017
	Author(s):	Oon Swee Hwa	Page 1 of 8	



GS4900B / 01B / 10B / 11B

ASE(M) Final Test Qualification Report

Project: GS49xx
Status: Active
Author(s): Oon Swee Hwa

Revision Date: 9/28/2017
Revision: 1.0
Creation Date: 5/30/2017

Location: Semtech Burlington

	Title:	GS4900B / 01B / 10B / 11B ASEM Qualification Report	Project Name:	GS49xx
	Security Level:	External / Customer	Document Status:	Active
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	Author(s):	Oon Swee Hwa	Page 2 of 8	

Table of Contents

1. Process Changes	4
1.1 Process Change Summary	4
1.2 Product Affected	4
1.3 Qualification Approach	4
1.3.1 Sampling	4
1.3.2 Procedure	4
2. Correlation Analysis	5
2.1 Means Comparison	5
2.2 StdDev Comparison	5
2.3 Histogram Comparison	6
2.4 Bin Correlation	6
2.5 Repeatability Comparison	6
2.6 Larger Quantity Run	7
3. Conclusion	8



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Revision History

Status	Date	Rev. #	Reviser/Group	Description
Draft	5/30/2017	0.0	Oon Swee Hwa	Initial Draft
Active	9/28/2017	1.0	Oon Swee Hwa	Update Final Result And Release

1 Process Changes

1.1 Process Change Summary

The GS4900B, GS4901B, GS4910B and GS4911B are currently final tested at ISE Labs (California USA). We qualified these products for additional test location at ASE (M -Malaysia).

This report details the correlation analysis and process verification performed to qualify ASE (M) test facility for testing the GS49XX family of product.

Those products from this family share the same active circuitry and tester resources, so GS4910B and GS4911B was selected as vehicle for the qualification - Qualifications of the other product from this family is bridged to GS4900B and GS4901B qualification.

The tester platforms, hardware, software, test coverage will remain unchanged from the current production location at ISE Labs (California USA) – The only change is the introduction of this family of products to the existing Semtech test location at ASE (M).

1.2 Affected Products

Final Product
GS4900BCINE3
GS4901BCINE3
GS4910BCINE3
GS4911BCINE3

1.3 Qualification Approach

1.3.1 SAMPLING

Samples of 50 GS4910B and GS4911B devices were used for qualification - 35 passing devices from Bin1 and 15 failing devices from reject Bins.

1.3.2 PROCEDURE

- 1 The 50 samples are serialized.
- 2 The 50 serialized samples are tested on the Reference Test System at ISE Labs (California USA) with a production test board and test program.
- 3 Additionally, two samples from the serialized sample set are selected to fill up available test sites and perform repeatability test (50 x loops). The samples used for each set and site are recorded.
- 4 The 50 samples, test board and test program are sent to ASE (M).
- 5 ASE (M) repeats items #2 and #3 above on the New Test System using the same device samples and sequence.
- 6 The test data is then compared to ensure tester-to-tester correlation.
- 7 Larger quantity of untested devices is tested after initial data analysis to verify the performance before completion the qualification process.

2 Correlation Analysis

Basic statistics consisting of mean and standard deviation are calculated for each parameter on each test system. A one-to-one comparison is then made for each parameter. A visual verification of the individual test histograms is done to ensure consistent distributions. Correlation coefficient is calculated for each parametric parameter to ensure they are correlated on both test systems. In addition, a bin-to-bin correlation is done to ensure the New Test System reports the same failure mode and reject rate. Explanation is given for tests that do not meet these criteria.

2.1 Means Comparison

For the means comparison, acceptance is achieved if the mean value from the New Test System is within 10% of the mean value from the Semtech Reference Test System as it relates to the guard-banded test

boundaries. The calculated value is as follows:

$$\frac{|\bar{X}_{NEW} - \bar{X}_{REF}|}{T_{high} - T_{low}} \leq 10\%$$

Results

Table 2.1.1 - Mean Summary Result

Test Category	Mean ≤ 10%		Comment
	GS4910B	GS4911B	
Continuity	PASS	PASS	
IDD Current	PASS	PASS	
Leakage	PASS	PASS	
Jtag 1.8V	PASS	PASS	
Jtag 3.3V	PASS	PASS	
Scan	PASS	PASS	
Rom Bist	PASS	PASS	
Function	PASS	PASS	
DPPS	PASS	PASS	
Custum Clock	PASS	PASS	

2.2 StdDev Comparison

For the standard deviation comparison, acceptance is achieved if the standard deviation from the New Test System is within 10% of the standard deviation from the Semtech Reference Test System as it relates to the guard-banded test boundaries.

The calculated value is as follows:

$$\frac{|\sigma_{NEW} - \sigma_{REF}|}{T_{high} - T_{low}} \leq 10\%$$

Results

Table 2.2.1 - Standard Deviation Summary Result

Test Category	StdDev ≤ 10%		Comment
	GS4910B	GS4911B	
Continuity	PASS	PASS	
IDD Current	PASS	PASS	
Leakage	PASS	PASS	
Jtag 1.8V	PASS	PASS	
Jtag 3.3V	PASS	PASS	
Scan	PASS	PASS	
Rom Bist	PASS	PASS	
Function	PASS	PASS	
DPPS	PASS	PASS	
Custum Clock	PASS	PASS	

2.3 Histogram Comparison

Each histogram is compared to historic histograms one-to-one and evaluated for anomalies such as multimodes, skew, and kurtosis. The histograms compared were from the first trial lot (500 units) to ensure a more accurate representation of the product performance.

Results

The comparison of the ISE and ASEM histograms showed no anomalies between test results.

2.4 Bin Correlation

The Bin from New Test System and Reference Test System is compared for each sample; both the common and unique failures are reviewed and analyzed. Bin to Bin correlation is achieved if all samples have the same Bin and failure mode on both test systems.

Results

It was found that within the margin of error all parts were binned equivalently on both test sites.

2.5 Repeatability Comparison

For the repeatability comparison, acceptance is achieved if the standard deviation value from the device looping run on the New Test System is within 5% of the standard deviation value from looping the same devices on the Semtech Reference Test System as it relates to the guard-banded test boundaries. The

calculated value is as follows:
$$\frac{|\sigma_{NEW} - \sigma_{REF}|}{T_{high} - T_{low}} \leq 5\%$$

Results

Two sets of repeatability data were compared between the ISE and the ASEM test system.

Table 2.5.1 - Repeatability Summary Result

Test Category	StdDev ≤ 5%?		Comment
	GS4910B	GS4911B	
Continuity	PASS	PASS	
IDD Current	PASS	PASS	
Leakage	PASS	PASS	
Itag 1.8V	PASS	PASS	
Itag 3.3V	PASS	PASS	
Scan	PASS	PASS	
Rom Bist	PASS	PASS	
Function	PASS	PASS	
DPPS	PASS	PASS	
Custum Clock	PASS	PASS	

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	Author(s):	Oon Swee Hwa	Page 7 of 8	

2.6 Larger Quantity Run

500 devices were tested after initial data analysis to verify the performance before completion the qualification process. The results were analyzed and compared to the production material tested on the reference testers in ISE Labs (California USA). All QA samples pass without failures.

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	Author(s):	Oon Swee Hwa	Page 8 of 8	

3 Conclusion

Based on the analysis described in this document, GS4900B, GS4901B, GS4910B and GS4911B are qualified for production testing on the New Test System at ASE (M).