



PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000746

Date: SEP-08-2021

P1/2

Semtech Canada Corporation, 4281 Harvester Road, Burlington, Ontario L7L 5M4 Canada

Change Details

Part Number(s) Affected:

GS1661AIBE3	GS1671-IBE3	GS2971AIBE3
GS1661AIBTE3	GS1671-IBTE3	GS2971AIBTE3
GS1661-IBE3	GS2961AIBE3	GS2971-IBE3
GS1661-IBTE3	GS2961AIBTE3	GS2971-IBTE3
GS1671AIBE3	GS2961-IBE3	
GS1671AIBTE3	GS2961-IBTE3	

Customer Part Number(s) Affected: N/A

Description, Purpose and Effect of Change:

Semtech has qualified the use of an external unit, the Agilent N4903B (JBERT), to replace aging LTX hardware, the VX-GTOs and VX-GTOmL, which will no longer be supported by LTX in 2022.

The LTX (HFI-Fusion) tester platform is currently used for the final testing of the GS2971 product family (see part numbers affected above).

With this in place, Semtech will be able to test on the LTX with an external JBERT or on the LTX with full original tester configuration until the aging LTX hardware is no longer supported by LTX.

Change Classification	<input type="checkbox"/> Major <input checked="" type="checkbox"/> Minor	Impact to Form, Fit, Function	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Impact to Data Sheet	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	New Revision or Date	<input checked="" type="checkbox"/> N/A

Impact to Performance, Characteristics or Reliability:

There will be no impact because the product's form, function, and fit will not change. The existing test coverage was duplicated and qualified using an external JBERT.

The GS2971A was selected as the vehicle for qualification because all of the products in this family share the same active circuitry and tester resources.

Implementation Date	DEC-01-2021	Work Week	48
Last Time Ship (LTS) Of unchanged product	N/A	Affecting Lot No. / Serial No. (SN)	N/A
Sample Availability	AUG-16-2021	Qualification Report Availability	AUG-16-2021

Supporting Documents for Change Validation/Attachments:

- PRODDOC024906 Final Test Qualification Report Rev. 1.0

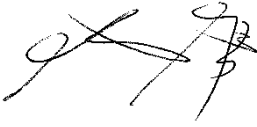
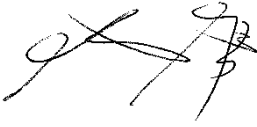
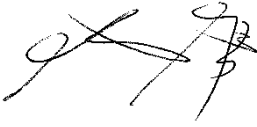



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Issuing Authority			
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<small>Ya</small> 	Title:	GS2971 Family ASEM Qualification Report	Project Name:	GS2971 JBERT
	Security Level:	External / Customer	Document Status:	Active
	Division:	SIP Product Engineering	Revision Date:	7/21/2021
	Author(s):	YAP YON CHET	Page 1 of 7	



GS2971 Family


ASE(M) Final Test Qualification Report

Project: GS2971 JBERT	Revision Date: 7/21/2021
Status: Active	Revision: 1.0
Author(s): YAP YON CHET	Creation Date: 7/12/2021
Location: Semtech Penang	

<small>Ya</small> 	Title:	GS2971 Family ASEM Qualification Report	Project Name:	GS2971 JBERT
	Security Level:	External / Customer	Document Status:	Active
	Division:	SIP Product Engineering	Revision Date:	7/21/2021
	Author(s):	YAP YON CHET	Page 2 of 7	


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Revision History

Status	Date	Rev. #	Reviser/Group	Description
Draft	7/12/2021	0.0	YAP YON CHET	Initial Draft
Active	7/21/2021	1.0	YAP YON CHET	Update Final Result And Release

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1 Process Changes

1.1 Process Change Summary

The final test of GS2971 product family, see affected device part numbers, is currently performed using the LTX HFI-Fusion tester platform.

Semtech has now qualified the use of an external unit Agilent N4903B [JBERT] to replace aging LTX hardware [VX-GTOs and VX-GTOML], which will have ceased to be supported by LTX in 2022.

Comparison of both test systems showed no discrepancies between test coverage.


With this implemented, Semtech will have the option of testing on the LTX with an external JBERT or on the LTX with full original tester configuration, until the aging LTX hardware is no longer supported by LTX.

This report details the qualification procedure and correlation analysis performed to qualify the use of external JBERT as part of the test system.

Those products from this family share the same active circuitry and tester resources, so GS2971A was selected as vehicle for the qualification.

1.2 Affected Products

Final Product
GS2971-IBE3
GS2971-IBTE3
GS1671-IBE3
GS1671-IBTE3
GS2961-IBE3
GS2961-IBTE3
GS1661-IBE3
GS1661-IBTE3
GS2971AIBE3
GS2971AIBTE3
GS1671AIBE3
GS1671AIBTE3
GS2961AIBE3
GS2961AIBTE3
GS1661AIBE3
GS1661AIBTE3

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1.3 Qualification Procedure

1.3.1 Procedure

The qualification consisted of 3 main components:

- 1) Correlation testing
- 2) Gauge R&R (GR&R) testing
- 3) Large volume trial lot testing

1.3.2 Qualification Devices

The sample size for correlation of test results is summarized in the following table.

Function	Quantity	Comment
Yield Correlation	117 units from 2 lots	88 passing units, 29 reject units
Bin Correlation	117 units from 2 lots	88 passing units, 29 reject units
Key Parameter Correlation GR&R	12 units from 1 lot	12 units from 1 lot
Repeatability / GR&R	12 units from 1 foundry lot	12 units from 1 foundry lot
Trial lot	1000 units from 1 foundry lot	Fresh material

2 Analysis


The correlation exercise consisted of a GR&R experiment and analysis to examine repeatability and tester platform variation. Results for all parametric tests were examined. For yield and bin correlation, a sample of 50 devices were run, and to conclude the yield verification, a new sample of 1000 fresh untested devices were tested.

2.1 Yield Comparison

Overall yields were compared between the Reference Test System and the New Test System. Correlation is achieved if yields are within 2%.

Results

The correlation units tested had comparable yield on both test systems.

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2.2 Bin Correlation

The GS2971 family final test programs consists of multiple pass and fail software bins. The correlation units were tested on both test systems and a bin movement table was created to identify if parts were binned identically on both test systems.

Results

It was found that all parts were binned equivalently on both test solutions.

2.3 Gauge R&R

GR&R analysis is a statistical method of systematically comparing the repeatability and reproducibility variances between two measurement systems. This is accomplished by using ANOVA (Analysis of Variance) to calculate the percentages of the repeatability and reproducibility variance components to the pass windows as defined by the test program limits. The goal of GR&R is to demonstrate that the new system will match or exceed the current benchmark, production test system performance on all critical parameters. The GRR maximum allowed for the total tolerance is 30%, this includes combined reproducibility and repeatability. 30% is an agreed industry standard.

For this qualification, the GR&R experiment was conducted with the following control factors:


- o 12 Known good samples
- o 2 Test platforms
- o 1 Loadboard per platform
- o 1 Test site per Loadboard
- o 2 insertions
- o 10 loops for repeatability

Results

The comparison of both test systems showed no discrepancies between test results.

Test category	GR&R Total Tolerance Acceptance Criteria	GR&R Test Platform Compare	GR&R Repeatability	Bin Compare	Yield Compare
Continuity / ESD	<30%	Pass	Pass	Pass	Pass
Trim Checks	<30%	Pass	Pass	Pass	Pass
IDD/Power	<30%	Pass	Pass	Pass	Pass
DC Swing	<30%	Pass	Pass	Pass	Pass
Eye Mask*	<30%	Pass	Pass	Pass	Pass
Jitter*	<30%	Pass	Pass	Pass	Pass
BER*	<30%	Pass	Pass	Pass	Pass
Voltages Levels	<30%	Pass	Pass	Pass	Pass
Scans	<30%	Pass	Pass	Pass	Pass

*Note: * Tests that were migrated to external JBERT for measurement.*

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2.4 Large Volume Trial Test Run

A final trial lot test run of 1000 fresh units was completed using the new test system and test program. Review of this data showed that yields and failure Pareto were as expected.

3 Conclusion

The LTX test platform using external JBERT provides equivalent test coverage to the original LTX test platform.

The LTX test platform using external JBERT is deemed qualified for production testing of the GS2971 product family.