



PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000660

Date: Jan 18, 2021

P1/2

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☐	

Change Details

Part Number(s) Affected:

GS1660AIBE3; GS1660AIBTE3
GS1660-IBE3; GS1660-IBTE3
GS1670AIBE3; GS1670AIBTE3
GS1670-IBE3; GS1670-IBTE3
GS2960AIBE3; GS2960AIBTE3
GS2960-IBE3; GS2960-IBTE3
GS2970AIBE3; GS2970AIBTE3
GS2970-IBE3; GS2970-IBTE3

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

Description, Purpose and Effect of Change:

The final test of GS2970 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 cease support from LTX by June 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.

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:

There will be no impact since form, function, and fit of the product is not changing - the existing test coverage was duplicated and qualified with the use of an external JBERT.

Implementation Date	Feb 18, 2021	Work Week	N/A
Last Time Ship (LTS) Of unchanged product	N/A	Affecting Lot No. / Serial No. (SN)	N/A



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Sample Availability	Available	Qualification Report Availability	Enclosed
Supporting Documents for Change Validation/Attachments: GS2970 family JBERT test solution qualification report and GRR report - PRODDOC023419			
Issuing Authority			
Semtech Business Unit:	Signal Integrity Products		
Semtech Contact Info:	Dusanka Hewlett QMS Manager, Quality Assurance Semtech Canada Corporation dhewlett@semtech.com		
FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support			

Ya 	Title:	GS2970 Family ASEM Qualification Report	Project Name:	GS2970 JBERT
	Security Level:	External / Customer	Document Status:	Active
	Division:	SIP Product Engineering	Revision Date:	11/18/2020
	Author(s):	YAP YON CHET	Page 1 of 8	



GS2970 Family

ASE(M) Final Test Qualification Report

Project: GS2970 JBERT
Status: Active
Author(s): YAP YON CHET

Revision Date: 11/18/2020
Revision: 1.0
Creation Date: 10/30/2020

Location: Semtech Penang

Ya 	Title:	GS2970 Family ASEM Qualification Report	Project Name:	GS2970 JBERT
	Security Level:	External / Customer	Document Status:	Active
	Division:	SIP Product Engineering	Revision Date:	11/18/2020
	Author(s):	YAP YON CHET	Page 2 of 8	

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Revision History

Status	Date	Rev. #	Reviser/Group	Description
Draft	10/30/2020	0.0	YAP YON CHET	Initial Draft
Active	11/18/2020	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 GS2970 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 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 GS2970 and GS2960A was selected as vehicle for the qualification.

1.2 Affected Products

Final Product
GS2970-IBE3
GS2970-IBTE3
GS1670-IBE3
GS1670-IBTE3
GS2960-IBE3
GS2960-IBTE3
GS1660-IBE3
GS1660-IBTE3
GS2970AIBE3
GS2970AIBTE3
GS1670AIBE3
GS1670AIBTE3
GS2960AIBE3
GS2960AIBTE3
GS1660AIBE3
GS1660AIBTE3

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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	50 units from 1 lot	35 passing units, 15 reject units
Bin Correlation	50 units from 1 lot	35 passing units, 15 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 GS2970 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.

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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 GS2970 product family.