PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000530

Date: July 10, 2019

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☐ Semtech Canada Corporation, 4281 Harvester Road, Burlington, Ontario L7L 5M4 Canada
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☐ Semtech Triune, 1101 Resource Drive, Suite 121, Plano TX 75074

Part Number(s) Affected:	**Customer Part Number(s) Affected:** ☒ N/A
NT20067-GRP6 NT20067-WP NT20R67-GRP6 NT20R67-DTF8S NT23L50-GRP6 NT23L50-WP NT24L50-GRP6 NT24L50-WP NT24L50-DTF8S NT25L50-GRP6 NT25L50-WP NT24L55-WP NT25L51-GRP6 NT25L51-WP GN25L53-GRP6 GN25L53-WP NT28L52-GRP6R NT28L52-WP GN25L53B-GRP6 GN25L53B-WP NT32012-DTF8S NT25L59-GRP6	

Description, Purpose and Effect of Change:

Test supplier KYEC intends to move all its Flex testers from Hsin-Chu to Chu-Nan. There is no change in test systems, test programs or test hardware used.

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 performance, characteristics or reliability is expected as a result of this change.

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Implementation Date	**Oct 10 2019**	**Work Week**	**N/A**
Last Time Ship (LTS) Of unchanged product	**N/A**	**Affecting Lot No. / Serial No. (SN)**	**N/A**
Sample Availability	**N/A**	**Qualification Report Availability**	**N/A**

Supporting Documents for Change Validation/Attachments

- **KYEC Chu-Nan site details**
- **Validation report PRODDOC020200**
  Please see following pages.

Issuing Authority		
Semtech Business Unit:	Signal Integrity Products (SIP)	
Semtech Contact Info:	Dusanka Hewlett QMS Engineer, Quality Assurance Semtech Canada Corporation 4281 Harvester Road Burlington, ON L7L 5M4 Canada 289-856-9272	

FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support

KYEC
The Testing Industry Benchmark

- Purpose:
  KYEC relocation plan of production testers from Hsin-Chu to Chu-Nan.

- Scope:
  All iFLEX series testers qualified to run Semtech products.

- Reason for the Change
  In Hsin-Chu site capacity is limited by available space. It is difficult to add new equipment and increase test capacity.

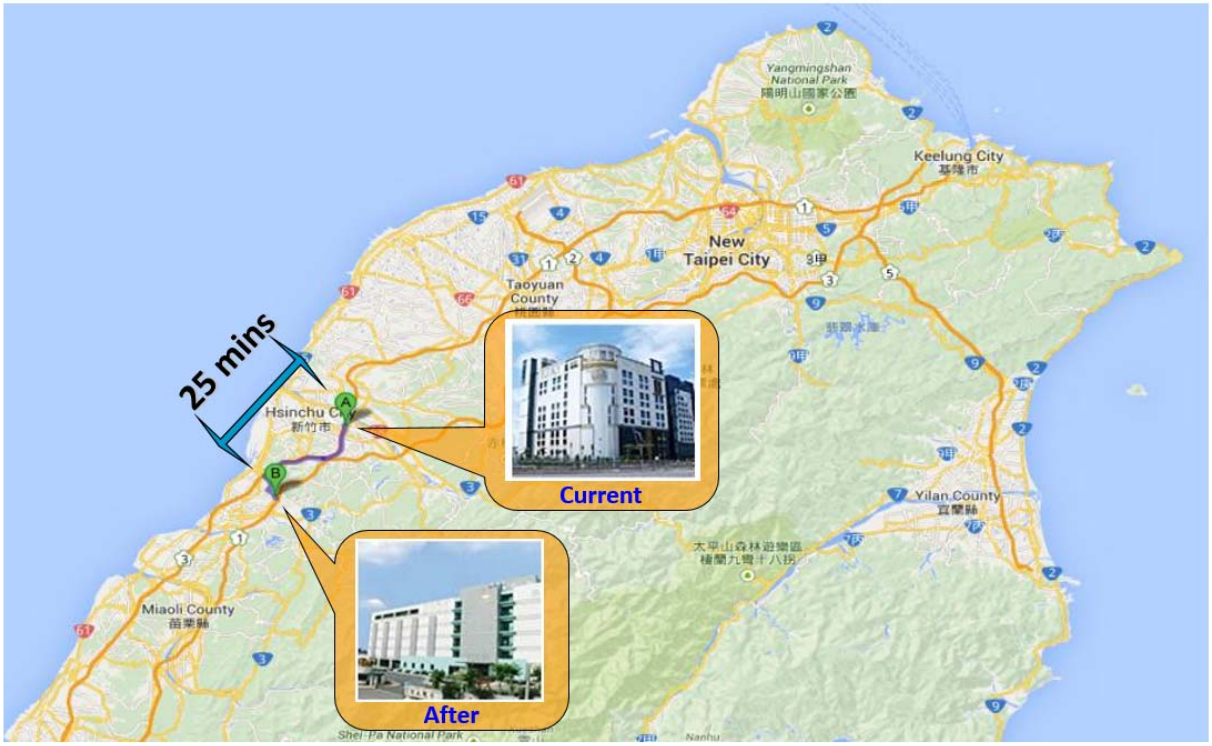
- Benefits:
  KYEC Chu-Nan can add new test equipment to meet increased customer capacity needs.

  Some products are assembled in KYEC Chu-Nan. This change will eliminate transfer time between two sites if wafer probe & assembly are both done in Chu-Nan site.

KYEC
The Testing Industry Benchmark

● Purpose:

KYEC test equipment re-location plan from Hsin-Chu to Chu-Nan



KYEC
The Testing Industry Benchmark

Chu-Nan site background

- Chu-Nan CH-2 factory has been in operation for about 13 years, since 2006.
- Number of employees: 625
- Certifications: ANSI/ESD S20.20, IECQ-QC080000, ISO 14064, IATF 16949:2016, TAF Lab ISO 17025, ISO 9001:2015, TL 9000(2015), OHSAS 18001:2007, ISO 14001:2004, etc.
- Risk assessment: Test results will be validated through correlation between current site and target site.
- Chu Nan site is already qualified site for wafer probing and final testing for over 100 Semtech products.

KYEC
The Testing Industry Benchmark

Test / Probe environmental controls

- Chunan & Hsin-Chu sites' environment are controlled by the same spec (PQ701: Clean Room Management Procedure)
- Centralized real-time temperature and humidity control system

Process	Clean Room (Area)	Temperature (℃)		Relative Humidity (%RH)	
		Control Limit	Specification	Control Limit	Specification
Probe	Class 1K	23 ±3	23 ±4	50 ±8	50 ±10

- Quality system of target site (Chu-nan site): The same quality system as in Hsin-Chu & Chu-nan site
  - CAR/ICAR
  - FMEA
  - NCMR

NT24L50 and NT28L52 KYEC Test Site Correlation

Revision History

Version	ECO	Date	Modifications / Changes
1.0	ECO-047117	4th Jun 2019	Initial Release

Contents

1 Process Changes

1.1 Process Change Summary

This report details the correlation analysis and process verification performed to qualify the move of iFlex Wafer Probe test by KYEC from the HSin Chu to the Chu Nan facility

The tester platforms, software and test coverage will remain the same.

1.2 Qualification Approach

1.2.1 SAMPLING

Sample of 50 die of each of the NT24L50 and NT28L52 devices are used for qualification.

1.2.2 PROCEDURE

1. The 50 serialized samples are loop tested on the Reference Test System at KYEC at Hsin-Chu with a production test board and test program.
2. Repeat items #1 and #3 above on the same Test System using the same device samples and sequence once moved to Chu Nan
3. The test data is then compared to ensure tester-to-tester correlation.
4. Large quantity devices are 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.

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 Reference Test System as it relates to the guard-banded test boundaries. The calculated value is as follows: $\frac{\left|\overline{X}_{NEW} - \overline{X}_{REF}\right|}{T_{high} - T_{low}} \leq 10\%$

2.1.1 RESULTS

Table 2.1: Mean Comparison Summary

NT24L50

Test Suite	Mean Within 10%
Continuity	Yes
DC Bias Voltages	Yes
Imon	Yes
Current Consumption	Yes
Output Termination	Yes
Test Points	Yes
Gain	Yes

NT28L52

Test Suite	Mean Within 10%
Continuity	Yes
DC Bias	Yes
Imon	Yes
Current Consumption	Yes
Output Termination	Yes
Test Points	Yes
Gain	Yes

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 Reference Test System as it relates to the guard-banded test boundaries. The calculated value is as follows: $\frac{|\sigma_{NEW} - \sigma_{REF}|}{T_{high} - T_{low}} \leq 10\%$

2.2.1 RESULTS

Table 2.2: Standard Deviation Comparison Summary

NT24L50

Test Suite	SD Within 10%
Continuity	Yes
DC Bias Voltages	Yes
Imon	Yes
Current Consumption	Yes
Output Termination	Yes
Test Points	Yes
Gain	Yes

NT28L52

Test Suite	SD Within 10%
Continuity	Yes
DC Bias	Yes
Imon	Yes
Current Consumption	Yes
Output Termination	Yes
Test Points	Yes
Gain	Yes

2.3 Large Sample

A larger sample of die from each device was also ran to verify that there were no issues that would appear in a production environment. The same devices were tested at both facilities. The Bin results and parametric comparisons are shown below

2.3.1 BIN RESULTS

Table 2.3: Bin Comparison

NT24L50 Bin Comparison

Bin	Hsin Chu	Chu Nan
1	1324	1320
5	1	1
6	0	2
9	0	1
15	1	1
Total	1326	1325

NT28L52 Bin Comparison

Bin	Hsin Chu	Chu Nan
1	1283	1281
6	0	2
8	1	1
15	1	1
Total	1285	1285

2.4 Results Discussion

Difference in binnings have been seen to be either continuity, termination resistance or marginal shifts in voltage measures. These are generally seen as contact issues with probe needles. Deltas are less than 0.5%.

3 Conclusion

Based on the analysis described in this document the correlation between the 2 facilities is acceptable.

Contact Information

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