

**You are reminded not to ship the product identified under this PCN until released by Semtech Corporation. A copy of their specific PCNs have been included with this notification.**

**Please take action pursuant to your customer agreements and JEDEC 46.**



# PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000373

Date: Apr 7, 2016

P1/2

<input type="checkbox"/>	Semtech Corporation, 200 Flynn Road, Camarillo CA 93012
<input checked="" type="checkbox"/>	Semtech Canada Corporation, 4281 Harvester Road, Burlington, Ontario L7L 5M4 Canada
<input type="checkbox"/>	Semtech Irvine, 5141 California Ave., Suite 100, Irvine CA 92617
<input type="checkbox"/>	Semtech Neuchatel Sarl, Route des Gouttes d'Or 40, CH-2000 Neuchatel Switzerland
<input type="checkbox"/>	Nanotech Semiconductor, Semtech Corporation, 2 West Point Court, Bristol, United Kingdom, BS32 4PY
<input type="checkbox"/>	Semtech Corpus Christi SA de CV, Carretera Matamorros Edificio 7, Reynosa, Tamaulipas, Mexico 88780
<input type="checkbox"/>	Semtech Triune, 1101 Resource Drive, Suite 121, Plano TX 75074
<input type="checkbox"/>	

### Change Details

<b>Part Number(s) Affected:</b> GN2104R2BINE3, GN2104R3BINE3,	<b>Customer Part Number(s) Affected:</b> <input checked="" type="checkbox"/> N/A
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**Description, Purpose and Effect of Change:**  
Semtech has implemented a metal layer revision to optimize yield as these products transition into high volume manufacturing.

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

**Impact to Performance, Characteristics or Reliability:**  
There will be no impact as fit, form, function, specification, and production test of the product is not changing.

<b>Implementation Date</b>	August 16, 2016	<b>Work Week</b>	34
<b>Last Time Ship (LTS)</b> Of unchanged product	N/A	<b>Affecting Lot No. / Serial No. (SN)</b>	N/A
<b>Sample Availability</b>	April 7, 2016	<b>Qualification Report Availability</b>	N/A

**Supporting Documents for Change Validation/Attachments:**

- GN2104 Characterization Summary Report



# PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000373

Date: Apr 7, 2016

P2/2

## Issuing Authority

Semtech Business Unit: Signal Integrity Products

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Title:	GN2104 Characterization Summary for minor PCN material	Project Name:	GN2104
Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 1 of 8	



# GN2104

## Characterization Summary for minor PCN material

**Project:** GN2104  
**Status:** Active  
**Author(s):** Ying Yi Wang  
**Revision Date:** 3/31/2016  
**Revision:** 0.2  
**Creation Date:** 3/30/2016  
**Location:** Semtech Burlington



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Author(s):	Ying Yi Wang	Page 2 of 8	

# Table of Contents

<b>1 Process Changes .....</b>	<b>4</b>
1.1 Process Change Summary .....	4
1.2 Affected Products .....	4
<b>2 Qualification Procedure .....</b>	<b>4</b>
2.1 Procedure .....	4
2.2 Qualification Devices .....	5
<b>3 ATE Analysis .....</b>	<b>5</b>
3.1 ATE Yield Comparison .....	5
3.2 ATE Means Comparison .....	5
3.3 ATE StdDev Comparison .....	6
<b>4 Bench.....</b>	<b>6</b>
<b>5 Reliability .....</b>	<b>7</b>
<b>6 Conclusion.....</b>	<b>8</b>



Title:	GN2104 Characterization Summary for minor PCN material	Project Name:	GN2104
Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 3 of 8	

## Revision History

Status	Date	Rev. #	Reviser/Group	Description
Draft	3/30/2016	0.0	Ying Yi Wang	Initial
Inactive	3/31/2016	0.1	Ying Yi Wang	Updated format and added more details
Active	3/31/2016	0.2	Ying Yi Wang	Add GN2904 in Affected Products



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Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 4 of 8	

# 1 Process Changes

## 1.1 Process Change Summary

Semtech looks to continually improve yield and performance aspects of our products. For GN2104 there were opportunities identified for yield improvement. These included metal changes to the GN2104 based on proven yield improvements, including JTOL performance, ported from our newer CDR products.

## 1.2 Affected Products

Final Product Name
GN2014R2
GN2104R3
GN2904

# 2 Qualification Procedure

## 2.1 Procedure

The new yield improved material was qualified at:

- 1) ATE
- 2) Bench
- 3) Reliability

On ATE, correlation was done on 1 GN2104 (new material) wafer and 1 GN2104 (current material) wafer from the same lot. This comparison was done at the wafer probe and final test levels where the test programs for both materials had the same test coverage.

On Bench, 3 devices from the GN2104 (new material) wafer were soldered on board and bench characterized over voltage and temperature (4 lanes per device).

At Reliability, 80 devices from the GN2104 (new material) wafer were put through 500 hrs HTOL.

Title:	GN2104 Characterization Summary for minor PCN material	Project Name:	GN2104
Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 5 of 8	

## 2.2 Qualification Devices

The sample size for each qualification level:

Qualification	Material
ATE	1 GN2104 (new material) wafer and 1 GN2104 (current material) wafer from the same lot
Bench	3 devices from the GN2104 (new material) wafer
Reliability	80 devices from the GN2104 (new material) wafer

## 3 ATE Analysis

The ATE comparison exercise consisted of several types of analysis to ensure improvement of the new material over the current material:

- Yield comparison were completed using 1 GN2104 (new material) wafer and 1 GN2104 (current material) wafer from the same lot
- Key parametric parameters were compared using various statistical methods including mean shift and standard deviation shift to ensure the results aligned between both materials

### 3.1 ATE Yield Comparison

Yield pareto of the new material and current material were compared and the new material shows fewer failing parameters and improved yield as expected for opportunities as identified

### 3.2 ATE Means Comparison

For the means comparison, correlation is achieved if the mean value of the new material is within 10% of the mean value of the current material as it relates to the test boundaries or within the tester accuracy of the measurement. The mean shift value was calculated as follows:

$$\frac{|\bar{X}_{NEW} - \bar{X}_{CUR}|}{T_{high} - T_{low}}$$

### Results

Test category	Acceptance Criteria	Result
Continuity/Power Shorts	<10%	Pass
Power	<10%	Pass
Input Current/Voltage	<10%	Pass
Leakage	<10%	Pass
Voltage Monitor	<10%	Pass





Title:	GN2104 Characterization Summary for minor PCN material	Project Name:	GN2104
Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 6 of 8	

Temperature Monitor	<10%	Pass
Termination Resistance	<10%	Pass
PRBS Gen/checker	<10%	Pass
Swing	<10%	Pass
Eye Scanner	<10%	Pass
Offset Correction	<10%	Pass
Loopback	<10%	Pass
SIJT	<10%	Pass
LOS	<10%	Pass

### 3.3 ATE StdDev Comparison

For the standard deviation comparison, correlation is achieved if the standard deviation of the new material is within 10% of the standard deviation of the current material as it relates to the test boundaries or within the tester accuracy of the measurement. The calculated value is as follows:

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

#### Results

Test category	Acceptance Criteria	Result
Continuity/Power Shorts	<10%	Pass
Power	<10%	Pass
Input Current/Voltage	<10%	Pass
Leakage	<10%	Pass
Voltage Monitor	<10%	Pass
Temperature Monitor	<10%	Pass
Termination Resistance	<10%	Pass
PRBS Gen/checker	<10%	Pass
Swing	<10%	Pass
Eye Scanner	<10%	Pass
Offset Correction	<10%	Pass
Loopback	<10%	Pass
SIJT	<10%	Pass
LOS	<10%	Pass

## 4 Bench

All the device parameters remained the same and only the expected improvements were observed



Title:	GN2104 Characterization Summary for minor PCN material	Project Name:	GN2104
Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 7 of 8	

## 5 Reliability

80 devices from the GN2104 (new material) wafer were put through 500 hrs HTOL and all passed

### Reliability Qualification Stress Results

Stress	Conditions	Duration	Qualification Vehicle	Sample Size	Results
High Temperature Operating Life	JESD22-A108, $T_j \geq 125^\circ\text{C}$ , $V_{cc} = 1.2V_{typ}$ , $V_{typ} = 1.7\text{ V}$	500 hours	GN2104 (new material)	80	Pass



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Security Level:	External / Customer	Document Status:	Active
Division:	R&D AMS Product Engineering	Revision Date:	3/31/2016
Author(s):	Ying Yi Wang	Page 8 of 8	

## 6 Conclusion

The GN2104 (new material) passed all testing and results are as expected. Based on the ATE, Bench and Reliability testing the GN2104 (new material), these devices meet Semtech's Reliability Standards and it is considered fit for customer use.