

# Product Change Notification (PCN)

<b>Device affected</b> (product name):	<b>Current Device version / Build Code:</b>
nRF2402G	C
nRF2401AG	B
nRF24AP1	B
nRF24E1G	B
nRF24E2G	B
nRF24L01	D
<b>Agreement reference</b> (number + version): NA	<b>PCN no.:</b> PCN-005
	<b>Date:</b> 2007-12-03
<b>Customers reference:</b> To whom in may concern	<b>Nordic Semiconductor reference:</b> Supply Chain Manager

**Description of change:**  
 This PCN affects the five above mentioned products assembled at Amkor Technology, Philippines. The change consists of a migration from Tech Nistan EP to the ST-380 matte Sn plating chemistry

**Impact:** Does the change affect product:

1. Form?  No  Yes – describe: \_\_\_\_\_

2. Fit?  No  Yes – describe: \_\_\_\_\_

3. Function?  No  Yes – describe: \_\_\_\_\_

4. Quality or Reliability?  No  Yes – describe: Improved solderability at low temperatures

Classification of change  Minor  Major

**Reason:**

Plating processes for matte Sn deposition have been experiencing increased development activities by chemistry suppliers over the past 4-5 years. There have been significant advances in organic additive systems to control deposit structure and bath stability. These advances translate to improved solderability at low temperatures and improved deposit appearance.

Amkor has been evaluating a number of the improved plating chemistries, and has made the decision that the benefits of the ST-380 process warrant a change within Amkor. This change will improve Amkor's ability to maintain an efficient plating process that meets or exceeds all quality requirements.

Nordic Semiconductor considers the migration to ST-380 to be sufficiently beneficial to justify the change in the above mentioned product portfolio.

**Consequences:**

A number of benefits and features are associated with this change:

- Alignment to industry standards (MSA-based chemistry)
- Improved solderability at low temperatures
- Low whisker propensity
- Consistent and stable surface morphology
- Improved cycle times in assembly production

Nordic Semiconductor can see no negative consequences of this change.

**Verification:**

Amkor has conducted extensive evaluations of the ST-380 plating process. In addition to standard qualification requirements for this type of process change, Amkor has conducted a number of tests to further evaluate the deposit performance. This was done to address some of the additional concerns with respect to Pb free plating, and specifically matte Sn deposits. In all cases, the new plating chemistry meets all established industry standards. A summary of the evaluations conducted is shown below.

- Engineering evaluations and process characterizations/optimizations
- Package level reliability: Moisture sensitivity at 260°C, HAST, PCT, HTS, Thermal Cycle Condition C
- Plating workmanship: Plating thickness, Deposit composition, Visual quality, Solderability
- Sn/Pb and Sn/Ag/Cu solders, at 215°C & 245°C
- Wetting balance: Ionic contamination
- Pre-production build of over 2 million units
- Whisker testing per published JEDEC test standards

Several billion units with ST-380 plating produced by Amkor Technology.

**Availability of samples and reports:**

Samples and reports upon request.

**Marking:**

Unchanged. Change identified by date code.

**Change active from (date):**  
2008-03-01

**Change active from (date code):**  
0810

**Last order date (optional):**  
NA

**Final shipment date (optional):**  
NA (Existing stock to be depleted)

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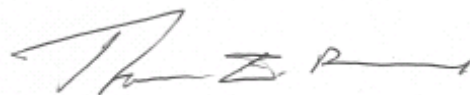
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**Authorization for Nordic Semiconductor**

Product Manager

Date: 2007-12-03

Sign:



Thomas Embla Bonnerud

Quality Director

Date: 2007-12-03

Sign:



Ebbe Rømcke