



# PRODUCT/PROCESS CHANGE NOTIFICATION

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PCN APG-ABD/13/8027  
Dated 08 Aug 2013

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**VIpower hosed in TO-220,DPAK,D2PK: AI Soft Wire Implementation**

**Table 1. Change Implementation Schedule**

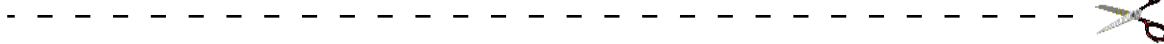
Forecasted implementation date for change	20-Oct-2013
Forecasted availability date of samples for customer	01-Aug-2013
Forecasted date for <b>STMicroelectronics</b> change Qualification Plan results availability	01-Aug-2013
Estimated date of changed product first shipment	25-Oct-2013

**Table 2. Change Identification**

Product Identification (Product Family/Commercial Product)	see enclosed
Type of change	Package assembly material change
Reason for change	To improve workability and optimization of assembly process
Description of the change	Please be informed that on VIPower products housed in TO-220, D2PAK, DPAK packages Al (Aluminum) soft wire will be implemented replacing the hard one.
Change Product Identification	DataCode
Manufacturing Location(s)	1]St Shenzhen -China

**Table 3. List of Attachments**

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt		PCN APG-ABD/13/8027
Please sign and return to STMicroelectronics Sales Office		Dated 08 Aug 2013
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved  <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved	Name: <hr style="border: none; border-top: 1px solid black;"/> Title: <hr style="border: none; border-top: 1px solid black;"/> Company: <hr style="border: none; border-top: 1px solid black;"/> Date: <hr style="border: none; border-top: 1px solid black;"/> Signature: <hr style="border: none; border-top: 1px solid black;"/>	
Remark ..... ..... ..... ..... ..... ..... ..... ..... ..... .....		

## DOCUMENT APPROVAL

Name	Function
Liporace, Nicola	Marketing Manager
Nicoloso, Riccardo	Product Manager
Minerva, Francesco	Q.A. Manager

### **VIpower housed in TO-220, DPAK, D2PAK: Al Soft Wire Implementation**

**INVOLVED P&L FAMILY: 30**

**WHAT:**

We are going to implement Al (Aluminum ) soft wire on VIpower products housed in TO-220, DPAK and D2PAK, replacing the hard one.

**WHY:**

To improve workability and optimization of assembly process.

**WHO:**

All the Customers that are using VIpower products housed in TO220,DPAK,D2PAK.

**WHEN:**

Tentative date of change is from October 2013 onward.  
Sample available on request  
Qualification report included to this communication.

**WHERE:**

ST Shenzhen (China) assembly Plant.

<p><b>Aluminum 10 and 15 mils soft wires</b>  <b>Package TO220, DPAK, D2PAK</b></p>
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General Informations	
<b>Commercial Product</b>	VNB14NV04-E VND14NV04-E VNP14NV04-E
<b>Product Line</b>	VN78
<b>Silicon process technology</b>	VIpower M03
<b>Package</b>	D2PAK DPAK TO220

Locations	
<b>Diffusion fab location</b>	ST CT6 Catania (Italy) ST AMK6 Ang Mo Kio (Singapore)
<b>Assembly plant location</b>	ST Shenzhen (China)
<b>Test plant location</b>	ST Shenzhen (China)
<b>Reliability lab location</b>	ST Shenzhen (China)

General Informations	
<b>Commercial Product</b>	VNP35N07-E
<b>Product Line</b>	VN19
<b>Silicon process technology</b>	VIpower M02
<b>Package</b>	TO220

Locations	
<b>Diffusion fab location</b>	ST CT6 Catania (Italy)
<b>Assembly plant location</b>	ST Shenzhen (China)
<b>Test plant location</b>	ST Shenzhen (China)
<b>Reliability lab location</b>	ST Shenzhen (China)

Revision history

REV.	Date of Release	Author	Changes description
0.1	July 11 <sup>th</sup> 2013	F.Ceraulo	Creation

<b>Table of contents</b>		
<b>Section</b>	<b>Pag</b>	<b>Content</b>
1	3	Reliability evaluations overview
1.1	3	Objectives
1.2	3	Results
2	3	Traceability
3	4	Reliability qualification plan and results – Summary table

## - 1. Reliability evaluations overview

### 1.1 Objectives

Aim of this report is to present the results of the reliability evaluations performed on some test vehicles to qualify the Aluminum 10mils and 15mils soft wires for the VIPower products designed in M03 and M02 technology assembled in packages DPAK, D2PAK, TO220.

The chosen test vehicles were the **VNx14NV04-E** (VN78 as ST internal silicon line) and the **VNP35N07-E** (VN19 as ST internal silicon line). The qualification lots were diffused both in ST CT6 Catania (Italy) and ST AMK6 Ang Mo Kio (Singapore) 6” wafer fabs.

The reliability evaluation was performed according to the **AEC\_Q100 Rev.G** specification for the package oriented test described in Group A (Accelerated Environment Stress) and Group C (Package Assembly Integrity) using lots with the new soft wires and lots with the hard wires as reference.

### 1.2 Results

All reliability tests have been completed with positive results, neither functional nor parametric rejects were detected at final electrical testing.

The Device Physical Analysis (DPA) performed on stressed units including the Wire Bond Pull/Shear tests (WBP, WBS) didn't pointed out neither abnormal break loads nor forbidden failure modes.

**Based on the overall positive results we consider the products qualified from a reliability point of view.**

## - 2. Traceability

Package	Device	Diffusion lot	Diffusion fab	Assembly lot		Wire diameter
				Soft wire	Hard wire	
DPAK	VN78	6213VYT	AMK6 (Singapore)	GK22611FZZ	GK22611F01	10 mils
D2PAK	VN78	3201173	CT6 (Catania)	GK22611CZZ	GK22611C01	10 mils
TO220	VN78	6213X01	AMK6 (Singapore)	GK2250KYZR	GK2250KY01	10 mils
	VN19	3214756	CT6 (Catania)	GK224072ZY	GK22407202	15 mils



### - 3. Reliability qualification plan and results

AEC #	Test Name	STM Test Conditions	Sample Size/ Lots	Results Fails/SS/Lots	Comments
A1	PC Pre Cond	- Preconditioning according to Jedec JESD22-A113F including 5 Temperature Cycling Ta=-40°C/+60°C - Reflow according to level 3 Jedec JSTD020D-1 - 100 Temperature Cycling Ta=-50°C/+150°C	Before AC, TC		
A3	AC Autoclave	<b>ENV. SEQ.</b> Enviromental Sequence <b>TC</b> (Ta=-65°C / +150°C for 100 cycles) + <b>AC</b> (Ta=121°C, Pa=2atm for 96 hours)	77/8	0/77/8	Each assy lot reported in traceability section
A4	TC Temp. Cycling	Ta=-65°C / +150°C for 500 cycles	77/8	0/77/8	Each assy lot reported in traceability section
A6	HTSL High Temp. Storage Life	Ta=150°C for 1000 hours.	77/8	0/77/8	Each assy lot reported in traceability section
C1	WBS Wire Bond Shear		30 bonds from minimum 5 of units from 1 lot	All measurement within spec limits	Each assy lot reported in traceability section
C2	WBP Wire Bond Pull		30 bonds from minimum 5 of units from 1 lot	All measurement within spec limits	Each assy lot reported in traceability section

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