



# PRODUCT/PROCESS CHANGE NOTIFICATION

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PCN APG/08/3781  
Notification Date 06/13/2008

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**LQFP 7X7 ASSY MUAR: LEADFREE BOM UPDATE: from Loctite  
QMI9507-2C2 to Loctite QMI9507-2A1**

**APG - APG**

**Table 1. Change Implementation Schedule**

Forecasted implementation date for change	01-Oct-2008
Forecasted availability date of samples for customer	31-Jul-2008
Forecasted date for <b>STMicroelectronics</b> change Qualification Plan results availability	08-Sep-2008
Estimated date of changed product first shipment	15-Oct-2008

**Table 2. Change Identification**

Product Identification (Product Family/Commercial Product)	ALL PRODUCTS IN 7X7 ASSEMBLED IN MUAR
Type of change	Package assembly material change
Reason for change	ASSEMBLY PROCESS OPTIMIZATION
Description of the change	This PCN replaces the previous one PCN APG/07/2403 and refers to glue die attach change from Loctite QMI9507-2C2 to Loctite QMI9507-2A1 in order to optimize spacer-size for workability.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	NO MARKING CHANGE / INTERNAL TRACEABILITY
Manufacturing Location(s)	1]St Muar - Malaysia

**Table 3. List of Attachments**

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt		PCN APG/08/3781
Please sign and return to STMicroelectronics Sales Office		Notification Date 06/13/2008
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved  <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved	Name:	
	Title:	
	Company:	
	Date:	
	Signature:	
Remark ..... ..... ..... ..... ..... ..... ..... ..... .....		

## DOCUMENT APPROVAL

<b>Name</b>	<b>Function</b>
Maggioni, Giampietro	Division Marketing Manager
Pengo, Tullio	Division Marketing Manager
Russo, Alfio	Division Marketing Manager
Cassani, Fabrizio	Division Product Manager
Conan-clement, Bertrand	Division Product Manager
Rivolta, Danilo	Division Product Manager
Amadeo, Matteo	Division Q.A. Manager
Mercandelli, Laura	Division Q.A. Manager
Parrino, Emanuele	Division Q.A. Manager



## **LQFP 7x7x1.4 ASSY MUAR: LEADFREE BOM UPDATE: from Loctite QMI9507-2C2 to Loctite QMI9507-2A1**

### **WHAT:**

Following previous PCN APG/07/2403 about the introduction of leadfree in LQFP 7x7 in Muar with the following materials:

- NiPdAu pre-plated lead-frame (“PPF”); (“e4” as per marking on the part).
- Loctite QMI9507-2C2 die-attach glue;
- Sumitomo G700L “green” molding compound (halogen free) compliant to IPC/JEDEC J-STD-020C, able to sustain 260°C as reflow temperature.

We are going to change the glue die attach to **Loctite QMI9507-2A1** that has a spacer (\*) size reduction from 2 mils to 1 mils still in line with ST specification driven by Quality & Reliability requirements.

Except for the spacer size difference, the glue composition and physical properties remain the same with no impact on electrical and thermal performance of the involved products.

(\*) Silver sphere added in the glue material to control the bondline thickness

### **WHY:**

This glue update is intended to improve process capability in terms of glue coverage and thickness.

### **HOW:**

The previous reliability reports related to QMI9507-2C2 inserted in PCN 2403 are also applicable to QMI9507-2A1 for most of the reliability aspects of the qualification, since the physical properties and chemical formulation of the two materials are the same.

**T.V. V341** / LQFP 48 leads - HCMOS8 report **ER001107AG6053**

**T.V. UR27** / LQFP 48 leads - BCD3s report **ER000707AG6053**

**T.V. US10** / LQFP 32 leads - BCD3s report **ER000407AG6053**

Anyway, we are running additional tests to exclude any possible reliability impact due to glue thickness change. Results available in September 08.



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**WHEN:**

We are ready to implement QMI9507-2A1 on leadfree production from Q4/08. Samples available, on customer's request, through our Sales offices.

We invite all the customers that have not yet switched to leadfree to do it as soon as possible.

# AVAILABLE ST DATA ON 1mil SPACERS -- ST Confidential --

Reference AEC-Q100 Rev F	UH30 LQ44 10sq MALTA 7.2sq pad 1 mil glue (1A1)	UN18 LQ64 10sq MALTA 7.2sq pad 1 mil glue (1A1)	UH30 LQ44 10sq MUAR 7.2sq pad 1 mil glue (2A1)	UR25 LQ80 14sq MUAR 10sq pad 1 mil glue (2A1)	UN03 LQ32 7sq MUAR 5.0sq pad 2 mil glue (2C2)	UN34 LQ64 10sq MUAR 7.2sq pad 1 mil glue (2A1)	UN38 LQ64 10sq MUAR 7.2sq pad 1 mil glue (2A1)
	BCD4 6.8X6.5 mm <sup>2</sup> SiON + PIX Lapped Si	BCD5S 6.7X 6.7mm <sup>2</sup> SiON+PIX Lapped Si	BCD4 6.8X6.5 mm <sup>2</sup> SiON + PIX Lapped Si	BCD3S 9.2x8.2mm <sup>2</sup> SiON+PIX Lapped Si	BCD5 3.8X4.0mm <sup>2</sup> SiON+PIX Lapped Si	BCD5 4.6X4.6mm <sup>2</sup> SiON+PIX Lapped Si	BCD5 6.7X5.3mm <sup>2</sup> SiON+PIX Lapped Si
TC (1000cy) -50/+150degC	81pcs/3 lots* No failure	90 pcs/2 lots * No failure	383pcs/5 lots * No failure	77pcs/1 lot * No failure	90pcs/2 lots* No failure	90pcs/2 lots * No failure	90pcs/2 lots * No failure
AC (96h) 2atm, 121degC	90pcs/3 lots* No failure	90 pcs/2 lots * No failure	231pcs/3 lots * No failure	77pcs/1 lot * No failure	90pcs/2 lots * No failure	90pcs/2 lots * No failure	90pcs/2 lots * No failure
THB (1000h) 85degC/85%	81pcs/3 lots* No failure	90 pcs/2 lots * No failure	-	26pcs/1 lot * No failure	90pcs/2 lots* No failure	90pcs/2 lots * No failure	90pcs/2 lots * No failure
HTOL (1000h) T <sub>j</sub> =150degC	80pcs/3 lots* No failure	90 pcs/2 lots No failure	-	-	90pcs/2 lots* No failure	90pcs/2 lots No failure	90pcs/2 lots No failure
HTSL (1000h) T <sub>A</sub> =150degC	90 pcs/3 lots No failure	45 pcs/1 lots No failure	150 pcs/3 lots No failure	50 pcs/1 lot No failure	90pcs/2 lots No failure	45pcs/1 lot No failure	45pcs/1 lot No failure

\* SMD preconditioning MSL3 according to J-STD-020C, PBT=260degC

# PROPOSED TEST MATRIX FOR 1mil GLUE -- ST Confidential --

Reference AEC-Q100 Rev F	843MHCA LQ32 7sq / Muar 5sq pad / 1mil glue	72C3ACM LQ64 14sq /Muar 7.2sq pad / 1mil glue
	CMOSM6D-H 2.9x2.7 / SiN / Si	CMOSM5SH 5.7x6.4 / SiN / Si
TC (1000cy) -50/+150degC	77 pcs*	77 pcs*
AC (96h) 2atm, 121degC	77 pcs*	-
THB (1000h) 85degC/85%	77 pcs*	-
HTOL (500h) T <sub>j</sub> =150degC	77 pcs	-
HTSL (1000h) T <sub>A</sub> =150degC	45 pcs	-

← TEMPORARY RELEASE  
AFTER 500 TC

\* SMD preconditioning MSL3  
according to J-STD-020C,  
PBT=260degC

## BASIC CONSIDERATIONS ON 1mil vs 2mil GLUE THICKNESS:

- AEC-Q100 data already available at ST on LQFP family with 1mil DAM.
- No change in DAM formulation and mechanical properties.
- No change in package / device thermal resistance (negligible decrease).
- Thinner DAM only needs thermo-mechanical assessment on involved product family (no concern expected due to lower die size than BCD).



# Loctite QMI 9507: 2C2 vs 2A1

-- ST Confidential --

(Typical Values)	2C2	2A1
Viscosity, 5 rpm @ 25°C, cP	18500	18500
Thixotropic Index (0.5/5 rpm)	4.8	4.8
Potlife @ 25°C, hours	24	24
Shelf life @ -40°C (months)	12	12
Specific gravity @ 25°C	4.1	4.1
Die Shear (300mm <sup>2</sup> die on Ag-Cu)		
Average kgf @25°C	57	57
Average kgf @245°C	21	21
Extractable Ion Content, ppm		
Na, K, Cl, F	<20	<20
Glass Transition (T <sub>g</sub> ), °C	3.3	3.3
Coefficient of Thermal Expansion (TMA)		
Below T <sub>g</sub> , ppm/°C	53	53
Above T <sub>g</sub> , ppm /°C	156	156
DMA modulus @ 25°C, GPa	3.37	3.37
Volume Resistivity	0.00004	0.00004
Spacers loading	1%	1.05%
Spacers diameter (mils)	2	1

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