


**PRODUCT / PROCESS CHANGE NOTIFICATION**

**1. PCN basic data**

<b>1.1 Company</b>		STMicroelectronics International N.V
<b>1.2 PCN No.</b>	IPD/15/9476	
<b>1.3 Title of PCN</b>	Introduction of Junction Capacity for L78 Standard Voltage Regulator Family in HBIP40 Technology	
<b>1.4 Product Category</b>	Standard Voltage Regulators	
<b>1.5 Issue date</b>	2015-11-05	

**2. PCN Team**

<b>2.1 Contact supplier</b>	
<b>2.1.1 Name</b>	SETTLES JEFF
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<b>2.2 Change responsibility</b>	
<b>2.2.1 Product Manager</b>	Lorenzo NASO
<b>2.1.2 Marketing Manager</b>	Antonio RIVIERA
<b>2.1.3 Quality Manager</b>	Paolo MORETTI

**3. Change**

<b>3.1 Category</b>	<b>3.2 Type of change</b>	<b>3.3 Manufacturing Location</b>
Die redesign	Active element design change with no product functionality or reliability impact	AMK Singapore

**4. Description of change**

	<b>Old</b>	<b>New</b>
<b>4.1 Description</b>	HBIP40 Technology	HBIP40 Technology with Junction Capacitor
<b>4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?</b>	Quality improvement. No changes of the Electrical Characteristics.	

**5. Reason / motivation for change**

<b>5.1 Motivation</b>	Following Divisional Commitments towards a continuous improvement philosophy, we have replaced the old Oxide Capacitor structure with the new integrated Junction Capacitor, as a consequence of an improved product quality.
<b>5.2 Customer Benefit</b>	QUALITY IMPROVEMENT

**6. Marking of parts / traceability of change**

<b>6.1 Description</b>	The traceability of the parts assembled in the new subcontractor will be ensured by different internal codification and QA number.
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**7. Timing / schedule**

<b>7.1 Date of qualification results</b>	2015-10-26
<b>7.2 Intended start of delivery</b>	2016-01-26
<b>7.3 Qualification sample available?</b>	Upon Request

**8. Qualification / Validation**

<b>8.1 Description</b>	REL-6088-79-W-15-LX0501-L7805CV-TO220.pdf		
<b>8.2 Qualification report and qualification results</b>	Available (see attachment)	<b>Issue Date</b>	2015-11-05

**9. Attachments (additional documentations)**

9476PpPrdtLst.pdf  
REL-6088-79-W-15-LX0501-L7805CV-TO220.pdf

**10. Affected parts**

<b>10. 1 Current</b>		<b>10.2 New (if applicable)</b>
<b>10.1.1 Customer Part No</b>	<b>10.1.2 Supplier Part No</b>	<b>10.1.2 Supplier Part No</b>
L7805ABD2T-TR	L7805ABD2T-TR	
L7805ABV	L7805ABV	
L7805ACD2T-TR	L7805ACD2T-TR	
L7805ACV	L7805ACV	
L7805CD2T-TR	L7805CD2T-TR	
	L7805CDT-TR	
L7805CP	L7805CP	
L7812ABV	L7812ABV	
L7812CD2T-TR	L7812CD2T-TR	
L7812CP	L7812CP	

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## Reliability Report

### QUALIFICATION PROCESS CHANGE FE

*New DIE IN HBIP40,  
Capacity Change from Oxide to junction*

**TV: LX0501 – L7805CV – TO220 SINGLE GAUGE**

General Information	
<b>Product Line</b>	LX0501
<b>Product Description</b>	Positive Voltage Regulator
<b>P/N</b>	lcs L7805CV
<b>Product Group</b>	IPD IPC
<b>Product division</b>	IND.& POWER CONV. Voltage Vregulator & Vref
<b>Package</b>	TO220 SG
<b>Silicon Process technology</b>	HBIP40

Locations	
<b>Wafer fab</b>	Ang Mo Kio (Singapore)
<b>Assembly plant</b>	ST Shenzhen
<b>Reliability Lab</b>	IPD Catania Reliability Lab
<b>Reliability assessment</b>	Pass

### DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	MAY-2015	7	Vito Gisabella Giuseppe Giacobello	Giovanni Presti	Final report

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.  
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## TABLE OF CONTENTS

<b>1</b>	<b>APPLICABLE AND REFERENCE DOCUMENTS .....</b>	<b>3</b>
<b>2</b>	<b>GLOSSARY.....</b>	<b>3</b>
<b>3</b>	<b>RELIABILITY EVALUATION OVERVIEW.....</b>	<b>4</b>
3.1	OBJECTIVES .....	4
3.2	CONCLUSION .....	4
<b>4</b>	<b>DEVICE CHARACTERISTICS.....</b>	<b>5</b>
4.1	DEVICE DESCRIPTION.....	5
4.1	CONSTRUCTION NOTE .....	5
<b>5</b>	<b>TESTS RESULTS SUMMARY.....</b>	<b>6</b>
5.1	TEST VEHICLE.....	6
5.2	TEST PLAN AND RESULTS SUMMARY .....	6
<b>6</b>	<b>ANNEXES .....</b>	<b>7</b>
6.1	TESTS DESCRIPTION.....	7

## **1 APPLICABLE AND REFERENCE DOCUMENTS**

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

## **2 GLOSSARY**

DUT	Device Under Test
SS	Sample Size

### **3 RELIABILITY EVALUATION OVERVIEW**

#### **3.1 Objectives**

Following Divisional Commitments towards a continuous improvement philosophy, we have replaced the old Oxide Capacitor structure with the new integrated Junction Capacitor, as a consequence of an improved product quality.

TV: L7805CV, TO220 SG, HBIP40 (new integrated Junction Capacitor).

#### **3.2 Conclusion**

Qualification Plan requirements have been fulfilled without exception. It is stressed that reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the ruggedness of the products and safe operation, which is consequently expected during their lifetime.

## **4 DEVICE CHARACTERISTICS**

### **4.1 Device description**

The L78xx series of three-terminal positive regulators is available in several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shutdown and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1 A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable

### **4.1 Construction note**

<b>L7805CV-LX0501</b>	
<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	Singapore Ang Mo Kio
Technology	HBIP40V
Die finishing back side	Cr/NiV/Au
Die size	1320, 1630 micron
Passivation type	P-Vapox/Nitride
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Ang Mo Kio EWS
Tester	ETS 300
<b>Assembly information</b>	
Assembly site	Shenzhen B/E
Package description	TO220 SG
Molding compound	Epoxy
Frame material	Bare copper
Die attach material	PREFORM
Wires bonding materials/diameters	WIRE Cu D2
<b>Final testing information</b>	
Testing location	Shenzhen B/E



## 5 TESTS RESULTS SUMMARY

### 5.1 Test vehicle

Lot #	Package	Product Line	Comments
1	TO220 SG	LX0501	

### 5.2 Test plan and results summary

Test	Std ref.	Conditions	SS	Steps	Failure/SS	Note
					1*LOTTO	
<b>Die Oriented Tests</b>						
HTOL	JESD22 A-108	Tj = 125°C Vcc= +35V		168 H	0/77	
				500 H	0/77	
				1000 H	0/77	
HTSL	JESD22 A-103	Ta = 150°C		168 H	0/45	Engineering Evaluation
				500 H	0/45	
				1000 H	0/45	
<b>Package Oriented Tests</b>						
AC	JESD22 A-102	Pa=2Atm / Ta=121°C		96 H	0/77	Engineering Evaluation
				168 H	0/77	
TC	JESD22 A-104	Ta = -65°C to 150°C		100 CY	0/77	
				200 CY	0/77	
				500 CY	0/77	
THB	JESD22 A-101	Ta = 85°C, RH = 85%, Vcc1= +24V		168 H	0/77	
				500 H	0/77	
				1000 H	0/77	
<b>Other Tests</b>						
ESD	ANSI/ESDA/JEDEC JS001	HBM +/- 2000V	3	Pass		
	ANSI/ESD S5.3.1	CDM 500V	3	Pass		

## 6 ANNEXES

### 6.1 Tests Description

Test name	Description	Purpose
<b>Die Oriented</b>		
<b>HTOL</b> High Temperature Bias	The device is stressed in static or dynamic configuration, approaching the operative max. absolute ratings in terms of junction temperature and bias condition.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. The typical failure modes are related to, silicon degradation, wire-bonds degradation, oxide faults.
<b>HTSL</b> High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
<b>Package Oriented</b>		
<b>AC</b> Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>THB</b> Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.
<b>Other Test</b>		
<b>ESD</b> Electro Static Discharge	The device is submitted to a high voltage peak on all his pins simulating ESD stress according to different simulation models. CDM: Charged Device Model HBM: Human Body Model	To classify the device according to his susceptibility to damage or degradation by exposure to electrostatic discharge.