



# PRODUCT/PROCESS CHANGE NOTIFICATION

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PCN IPG/14/8597  
Dated 17 Jul 2014

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**TO-220FP and DO-220FP Back-End line relocation from  
Longgang to Shenzhen (China)**

**Table 1. Change Implementation Schedule**

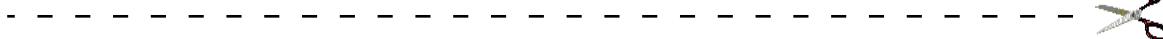
Forecasted implementation date for change	10-Jul-2014
Forecasted availability date of samples for customer	10-Jul-2014
Forecasted date for <b>STMicroelectronics</b> change Qualification Plan results availability	10-Jul-2014
Estimated date of changed product first shipment	16-Oct-2014

**Table 2. Change Identification**

Product Identification (Product Family/Commercial Product)	see attached list
Type of change	Package assembly location change, Testing location change
Reason for change	To improve service to ST Customers and standardize manufacturing processes
Description of the change	Following up on the plan already announced by our CEO over the consolidation of assembly and testing activities in Shenzhen (China), we're going to adopt Shenzhen (China) plant as main Assembly / Testing for TO-220FP and DO-220FP products. These packages have been produced for many years both in Longgang and Shenzhen plants with the same materials, equipment and processes, therefore products manufactured in Shenzhen (China) guarantee the same quality and electrical characteristics as reported in the relevant datasheets.
Change Product Identification	"GK" marked on the package
Manufacturing Location(s)	

**Table 3. List of Attachments**

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt		PCN IPG/14/8597
Please sign and return to STMicroelectronics Sales Office		Dated 17 Jul 2014
<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

Name	Function
Giuffrida, Antonino	Marketing Manager
Martelli, Nunzio	Product Manager
Vitali, Gian Luigi	Q.A. Manager

**WHAT:**

Following up on the plan already announced by our CEO over the consolidation of assembly and testing activities in Shenzhen (China), we're going to adopt Shenzhen (China) plant as main Assembly / Testing for TO-220FP and DO-220FP products.

These packages have been produced for many years both in Longgang and Shenzhen plants with the same materials, equipment and processes, therefore products manufactured in Shenzhen (China) guarantee the same quality and electrical characteristics as reported in the relevant datasheets.

For the complete list of the part numbers affected by this change, please refer to the attached Products List.

**Samples**, of the test vehicles manufactured in the ST plant of Shenzhen are available under 1 month upon request for customer qualification, while the full availability of products will be granted from wk 30 2014 onwards. Any other sample for granting customer's qualification will be supported upon request.

**WHY:**

To improve service to ST Customers and optimize manufacturing processes.

**HOW:**

By transferring the existing equipment from the Longgang ST plant, to the ST Shenzhen assembly and testing premises.

The change here reported will not affect the electrical, dimensional and thermal parameters. There is as well neither modification in the packing mode or in the standard delivery quantities.

**Qualification program and results:**

The qualification program consists in a full set of comparative electrical characterization and reliability tests. Please refer to Appendix 1 for all the details.

**WHEN:**

Production start and first shipments will occur as per the scheduling indicated in the tables below.

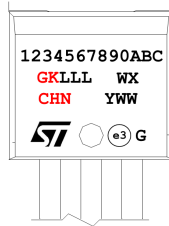
Affected Product Types	Samples	1 <sup>st</sup> Shipment
Power MOSFET	Wk 30	Wk 41
IGBT	Wk 30	Wk 41
Power Bipolar	Wk 30	Wk 41
Voltage Regulator	Wk 30	Wk 41
Thyristor	Wk 30	Wk 41
Rectifier	Wk 30	Wk 41

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## Marking and traceability:

Unless otherwise stated by customer specific requirement, the traceability of the parts produced in ST Shenzhen will be ensured by the Q.A. number and plant code identification “GK” marked on the package, as illustrated in the below picture:



Package marking example

## Reliability Report –

### ***INTERIM Results and PLAN***

TO-220FP and DO-220FP Back-End line relocation from  
 Longgang to Shenzhen (China).

General Information		Locations	
<b>Product Lines:</b>	VJ8L - EZ62 - MD87 - MQ6H - KV65+E03I - EVFE+D39B	<b>Wafer Diffusion Plants:</b>	<i>Ang Mo Kio (Singapore) Catania (Italy)</i>
<b>Product Families:</b>	Power MOSFET IGBT	<b>EWS Plants:</b>	<i>Ang Mo Kio (Singapore) Catania (Italy)</i>
<b>P/Ns:</b>	STF25N80K5 (VJ8L) STP4NK60ZFP (EZ62) STF11NM80 (MD87) STF24N60M2 (MQ6H) STGF19NC60KD (KV65+E03I) STGF20V60DF (EVFE+D39B)	<b>Assembly and testing plant:</b>	<i>ST Shenzhen (China)</i>
<b>Product Group:</b>	IPG	<b>Reliability Lab:</b>	<i>IPG-PTD Catania Reliability Lab.</i>
<b>Product division:</b>	Power Transistor Division		
<b>Package:</b>	TO-220FP		
<b>Silicon Process techn.:</b>	SuperMESH™K5 Power MOSFET MDmesh™ II Power MOSFET IGBT Trench		

### DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	July 2014	11	A. Settineri	C. Cappello	First issue

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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## **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
HF	Halogen Free

## **3 RELIABILITY EVALUATION OVERVIEW**

### **3.1 Objectives**

Reliability evaluation for assembling and testing TO-220FP and DO-220FP Back-End line relocation from Longgang to Shenzhen (China)

### **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

N-channel Power MOSFET  
 IGBT

### 4.2 Construction note

**D.U.T.: STF25N80K5**

**LINE: VJ8L**

**PACKAGE: TO-220FP**

Wafer/Die fab. Information	
Wafer fab manufacturing location	Catania (Italy)
Technology	SuperMESH™K5 Power MOSFET
Die finishing back side	Ti/Ni/Ag
Die size	6830 x 5060 μm <sup>2</sup>
Metal	AlCu
Passivation type	TEOS/Nitride

Wafer Testing (EWS) information	
Electrical testing manufacturing location	Catania (Italy)
Test program	WPIS

Assembly information	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Al Source
Lead finishing/bump solder material	Pure Tin

Final testing information	
Testing location	ST Shenzhen (China)
Tester	IPTEST

**D.U.T.: STP4NK60ZFP      LINE: EZ62      PACKAGE: TO-220FP**

<b>Wafer/Die fab. Information</b>	
Wafer fab manufacturing location	Ang Mo Kio (Singapore)
Technology	SuperMESH™K5 Power MOSFET
Die finishing back side	Ti/Ni/Ag
Die size	3186 x 2654 $\mu\text{m}^2$
Metal	Al/Si
Passivation type	Nitride

<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Ang Mo Kio (Singapore)
Test program	WPIS

<b>Assembly information</b>	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Cu Source
Lead finishing/bump solder material	Pure Tin

<b>Final testing information</b>	
Testing location	ST Shenzhen (China)
Tester	IPTTEST

**D.U.T.: STF11NM80    LINE: MD87    PACKAGE: TO-220FP**

Wafer/Die fab. Information	
Wafer fab manufacturing location	Catania (Italy)
Technology	MDmesh™ II Power MOSFET
Die finishing back side	Ti/Ni/Ag
Die size	5710 x 4610 $\mu\text{m}^2$
Metal	Al/Si
Passivation type	Nitride

Wafer Testing (EWS) information	
Electrical testing manufacturing location	Catania (Italy)
Test program	WPIS

Assembly information	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Al Source
Lead finishing/bump solder material	Pure Tin

Final testing information	
Testing location	ST Shenzhen (China)
Tester	IPTTEST

**D.U.T.: STF24N60M2**
**LINE: MQ6H**
**PACKAGE: TO-220FP**

Wafer/Die fab. Information	
Wafer fab manufacturing location	Ang Mo Kio (Singapore)
Technology	MDmesh™ II Power MOSFET
Die finishing back side	Ti/Ni/Ag
Die size	4400 x 3840 $\mu\text{m}^2$
Metal	Al/Si
Passivation type	Nitride

Wafer Testing (EWS) information	
Electrical testing manufacturing location	Ang Mo Kio (Singapore)
Test program	WPIS

Assembly information	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Al Source
Lead finishing/bump solder material	Pure Tin

Final testing information	
Testing location	ST Shenzhen (China)
Tester	IPTTEST

**D.U.T.: STGF19NC60KD    LINE: KV65    PACKAGE: TO-220FP**

<b>Wafer/Die fab. Information</b>	
Wafer fab manufacturing location	Ang Mo Kio (Singapore)
Technology	IGBT Trench
Die finishing back side	Chromium/Nickel/Silver
Die size	3520 x 4600 $\mu\text{m}^2$
Metal	Al/Si
Passivation type	Nitride

<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Ang Mo Kio (Singapore)
Test program	WPIS

<b>Assembly information</b>	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Al Source
Lead finishing/bump solder material	Pure Tin

<b>Final testing information</b>	
Testing location	ST Shenzhen (China)
Tester	IPTTEST

**D.U.T.: STGF20V60DF      LINE: EVFE      PACKAGE: TO-220FP**

<b>Wafer/Die fab. Information</b>	
Wafer fab manufacturing location	Catania (Italy)
Technology	IGBT Trench
Die finishing back side	Al/Ti/NiV/Ag
Die size	3520 x 3580 $\mu\text{m}^2$
Metal	AlCu/w
Passivation type	Nitride

<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Catania (Italy)
Test program	WPIS

<b>Assembly information</b>	
Assembly site	ST Shenzhen (China)
Package description	TO-220FP
Molding compound	HF Epoxy Resin
Frame material	Raw Copper
Die attach process	Soft Solder
Die attach material	Pb/Sn/Ag
Wire bonding process	Ultrasonic
Wires bonding materials	Al/Mg Gate – Al Source
Lead finishing/bump solder material	Pure Tin

<b>Final testing information</b>	
Testing location	ST Shenzhen (China)
Tester	IPTTEST

## 5 TESTS RESULTS SUMMARY

### 5.1 Test vehicle

Lot #	Process/ Package	Product Line	Comments
1	STF25N80K5	VJ8L	Power MOSFET
2	STP4NK60ZFP	EZ62	Power MOSFET
3	STF11NM80	MD87	Power MOSFET
4	STF24N60M2	MQ6H	Power MOSFET
5	STGF19NC60KD	KV65+E03I	IGBT
6	STGF20V60DF	EVFE+D39B	IGBT

### 5.2 Reliability test plan summary

Test	Std ref.	Conditions	SS	Steps	Failure/SS						
					LOT1	LOT2	LOT3	LOT4	LOT5	LOT6	
<b>Die Oriented Tests</b>											
HTRB	JESD22 A-108	TA = 150°C BIAS=500V	50 x 6 lots	168 H	0/50	0/50	wk28	wk28	0/50	0/50	
				500 H	run	run	run	run	run	run	
				1000 H	wk30	wk30	wk34	wk34	wk30	wk33	
HTGB	JESD22 A-108	TA = 150°C BIAS=20V	50 x 6 lots	168 H	0/50	0/50	wk28	wk28	0/50	0/50	
				500 H	run	run	run	run	run	run	
				1000 H	wk30	wk30	wk34	wk34	wk30	wk33	
<b>Package Oriented Tests</b>											
AC	JESD22 A-102	Pa=2Atm / TA=121°C	50 x 6 lots	96 H	0/50	0/50	wk28	wk28	0/50	0/50	
TC	JESD22 A-104	TA = -65°C/150°C	50 x 6 lots	100 cy	0/50	0/50	wk28	wk28	0/50	0/50	
				200 cy	run	run	run	run	run	run	
				500 cy	wk30	wk30	wk33	wk33	wk30	wk31	
TF/IOL	Mil-Std 750D Method 1037	ΔTC=105°C	25 x 6 lots	5Kcy	0/25	0/25	Wk28	Wk28	0/25	0/25	
				10Kcy	wk28	wk28	wk31	wk31	wk28	Wk29	
H3TRB	JESD22 A-101	TA=85°C, RH=85% BIAS=100V	50 x 6 lots	168 H	0/50	0/50	wk28	wk28	0/50	0/50	
				500 H	run	run	run	run	run	run	
				1000 H	wk30	wk30	wk34	wk34	wk30	wk33	



## 6 ANNEXES 6.0

### 6.1 Tests Description

Test name	Description	Purpose
<b>Die Oriented Tests</b>		
<b>HTRB</b> High Temperature Reverse Bias  <b>HTGB</b> High Temperature Forward (Gate) Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: <ul style="list-style-type: none"> <li>• low power dissipation;</li> <li>• max. supply voltage compatible with diffusion process and internal circuitry limitations;</li> </ul>	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.  To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
<b>Package Oriented Tests</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>TF / IOL</b> Thermal Fatigue / Intermittent Operating Life	The device is submitted to cycled temperature excursions generated by power cycles (ON/OFF) at T ambient.	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>H3TRB</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.



**Reliability Report**  
*Qualification of TO-220FP and DO-220FP Back-End  
 line relocation from Longgang to Shenzhen (China)*

General Information	
<b>Product Line</b>	<i>Rectifiers &amp; AC Switch-Thyristor</i>
<b>Product Description</b>	<i>Planar products</i>
<b>Product Group</b>	<i>IPG</i>
<b>Product division</b>	<i>ASD&amp;IPAD</i>
<b>Package</b>	<i>TO-220FP/ DO-220FP</i>
<b>Maturity level step</b>	<i>QUALIFIED</i>

Locations	
<b>Wafer fab</b>	<i>ST TOURS (FRANCE) ST ANG MO KIO (SINGAPORE)</i>
<b>Assembly plant</b>	<i>ST SHENZHEN (CHINA)</i>
<b>Reliability Lab</b>	<i>ST TOURS (FRANCE)</i>
<b>Reliability assessment</b>	<i>PASS</i>

**DOCUMENT INFORMATION**

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	04/07/2014	6	Aude DROMEL	Gilles DUTRANNOY	

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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## **1 APPLICABLE AND REFERENCE DOCUMENTS**

<b>Document reference</b>	<b>Short description</b>
<b>AEC-Q101</b>	Stress test qualification for automotive grade discrete semiconductors
<b>JESD47</b>	Stress-Test-Driven Qualification of Integrated Circuits
<b>JESD 94</b>	Application specific qualification using knowledge based test methodology
<b>JESD 22</b>	Reliability test methods for packaged devices

## **2 GLOSSARY**

<b>DUT</b>	Device Under Test
<b>SS</b>	Sample Size
<b>HTRB</b>	High Temperature Reverse Bias
<b>TC</b>	Temperature Cycling
<b>THB</b>	Temperature Humidity Bias
<b>IOLT</b>	Intermittent Operating Life Test
<b>PCT</b>	Pressure Cooker Test (Autoclave)

### **3 RELIABILITY EVALUATION OVERVIEW**

#### **3.1 Objectives**

The objective of this report is to qualify the assembly and testing activities in ST plant of Shenzhen for the rectifiers and AC Switch products in TO-220FP and DO-220FP packages. These packages have been produced for many years both in Longgang and Shenzhen plants with the same materials, equipment and processes, therefore products manufactured in Shenzhen (China) guarantee the same quality and electrical performances.

The reliability test methodology used follows the JESD47-H: « Stress Test Driven Qualification Methodology » and is package oriented.

The following reliability tests are:

- TC to ensure the mechanical robustness of the products.
- uHAST to check the robustness to corrosion and the good package hermeticity.

#### **3.2 Conclusion**

Qualification Plan requirements have been fulfilled without exception. 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 robustness of the products and safe operation, which is consequently expected during their lifetime.

## 4 DEVICE CHARACTERISTICS

### 4.1 Devices descriptions



TO-220FP



DO-220FP

### 4.2 Construction Note

Rectifiers and AC Switch in TO/DO-220FP	
<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	ST AMK – SINGAPORE & ST TOURS -FRANCE
Technology / Process family	PLANAR
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	ST AMK – SINGAPORE & ST TOURS -FRANCE
<b>Assembly information</b>	
Assembly site	ST SHENZHEN -CHINA
Package description	TO 220 ISOL FULL PACK & DO 220 ISOL FULL PACK
Molding compound	ECOPACK®2 (“Halogen-free”)
Lead finishing material	Tin 100%
<b>Final testing information</b>	
Testing location	ST SHENZHEN -CHINA

## Tests results SUMMARY

### 4.3 Test vehicle

Lot #	Part Number	Package	Technology family	Comments
L1	PS30H60CFP	TO-220FP	Power Schottky	Planar die technology in qualified package

Detailed results in below chapter will refer to these references.

### 4.4 Test plan and results summary

Test	Std ref.	Conditions	SS	Steps / duration	Failure/SS
					L1
TC	JESD22 A-104	-65 / +150°C 2 cycles/hour	75	500cy	0/75
uHAST	JESD22-A118	130°C 2.3bar 85% RH	25	96h	0/25

## ANNEXES: Tests description

Test name	Description	Purpose
<b>Package Oriented</b>		
<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>UHAST</b> Unbiased Highly Accelerated Stress Test	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.

## Reliability Evaluation Report

*TO-220FP Back-End line relocation from Longgang to Shenzhen (China).*

*TVs: L7805, LM317*

General Information		Locations	
<b>Product Line</b>	L317 LX05	<b>Wafer fab</b>	BIP (>6um) – AMK6 HBIP40 - AMK6
<b>Product Group</b>	IPG IPC	<b>Assembly plant</b>	ST SHENZHEN (CHINA)
<b>Product division</b>	Linear Voltage Regulators & Vref	<b>Reliability Lab</b>	IPG Catania Reliability Lab
<b>Package</b>	TO220FP Cu Wire		
<b>Silicon Process technology</b>	LM317 in BIP (>6um) L7805 in HBIP40		

### DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	July 2014	6	Cesario De Luca	Giovanni Presti	Preliminary report

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## **1 APPLICABLE AND REFERENCE DOCUMENTS**

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

## **2 RELIABILITY EVALUATION PLAN**

### **2.1 Objectives**

Relocation Plan from Longgang to Shenzhen (China) for the package TO220FP.

TV1: LM317 in BIP (>6um)

TV2: L7805 in HBIP40

### **2.2 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.

### **3 DEVICE CHARACTERISTICS**

#### **3.1 Device description**

LM317: ADJ. POS. VR @1.5A

L7805: POSITIVE VR 1.5A 5V

### **4 CONSTRUCTION NOTE**

#### **4.1 Construction note**

Lot 1		P/N: L7805CP\$5Z
<b>Wafer/Die fab. information</b>		
Wafer fab manufacturing location	AMK6	
Technology	HBIP40V	
Die finishing back side	CHROMIUM/NICKEL/GOLD	
Die finish front	P-VAPOX/NITRIDE	
Die size	1320 x 1630 micron	
<b>Assembly information</b>		
Assembly site	ST SHENZHEN	
Package description	TO 220 ISOL FULL PACK	
Molding Compound	HF Epoxy Resin	
Frame Material	Bare copper	
Die attach material	Pb/Ag/Sn	
Wire bonding	Cu D2	
<b>Final testing information</b>		
Testing location	ST SHENZHEN	
Tester	QT200	

Lots 2, 3		P/N: LM317P/4ZM
<b>Wafer/Die fab. information</b>		
Wafer fab manufacturing location	AMK6	
Technology	BIP (>6um)	
Die finishing back side	CHROMIUM/NICKEL/GOLD	
Die finish front	SiN (nitride)	
Die size	2410 x 1920 micron	
<b>Assembly information</b>		
Assembly site	ST SHENZHEN	
Package description	TO 220 ISOL FULL PACK	
Molding Compound	HF Epoxy Resin	
Frame Material	Bare copper	
Die attach material	Pb/Ag/Sn	
Wire bonding	Cu D2	
<b>Final testing information</b>		
Testing location	ST SHENZHEN	
Tester	QT200	

## 5 SUMMARY

### 5.1 Test vehicle

Lot #	Diffusion Lot	Assy Lot	Technology	Package	FG	Comments
1	63521HL	GK4190S804	HBIP40	TO 220 ISOL FULL PACK Cu wire	L7805CP\$5Z	
2	63330YV	GK41920301	BIP (>6um)		LM317P/4ZM	
3	6338NV1	GK41920401			LM317P/4ZM	

### 5.2 Test plan and Results

Test	Std ref.	Conditions	SS	Steps	Failure/SS			Note
					Lot 1	Lot 2	Lot 3	
					LX05	L317	L317	
<b>Die Oriented Tests</b>								
HTOL	JESD22 A-108	Tj = 125°C, BIAS= 35V		168 H	0/77		0/77	
				500 H	run		run	
				1000 H				
HTSL	JESD22 A-103	Ta = 150°C		168 H	0/25	0/25	0/25	
				500 H	run	run	run	
				1000 H				
<b>Package Oriented Tests</b>								
AC	JESD22 A-102	Pa=2Atm / Ta=121°C		96 H	0/25	0/25	0/25	
TC	JESD22 A-104	Ta = -65°C to 150°C		100 cy	0/25	0/25	0/25	
				200 cy	run	run	run	
				500 cy				
THB	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS= 24V		168 H	0/25	0/25	0/25	
				500 H	run	run	run	
				1000 H				
<b>Other Tests</b>								
ESD	ANSI/ESD S5.3.1	CDM		+/- 500V	0/3		0/3	

### 5.3 Tests Description

Test name	Description	Purpose
<b>Die Oriented</b>		
<b>HTOL</b> High Temperature Operating Life	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</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	To classify the device according to his susceptibility to damage or degradation by exposure to electrostatic discharge.

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## Public Products List

PCN Title : TO-220FP and DO-220FP Back-End line relocation from Longgang to Shenzhen (China)

PCN Reference : IPG/14/8597

PCN Created on : 10-JUL-2014

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change:

### ST COMMERCIAL PRODUCT

2STP535FP	ACS120-7SFP	ACST1010-7FP
ACST1035-7FP	ACST1035-8FP	ACST1235-8FP
ACST1635-8FP	ACST210-8FP	ACST410-8FP
ACST435-8FP	ACST610-8FP	ACST830-8FP
BDW93CFP	BDW94CFP	BUL1102EFP
BUL1203EFP	BUL742CFP	D45H11FP
L7805ABP	L7805ACP	L7805CP
L7809CP	L7812CP	L7815CP
L7824CP	L78M05CP	LD1085P
LF50ABP	LM317P	MD1803DFP
ST13007DFP	STF100N10F7	STF10N60M2
STF10N62K3	STF10N65K3	STF10N65K3(045Y)
STF10N95K5	STF10NM60N	STF10NM60ND
STF10NM65N	STF10P6F6	STF110N10F7
STF11N52K3	STF11N65M5	STF11NM50N
STF11NM60ND	STF11NM65N	STF11NM80
STF12N65M5	STF12NK60Z	STF12NK80Z
STF12NM50ND	STF130N10F3	STF13N60M2
STF13N80K5	STF13N95K3	STF13NK50Z
STF13NM60N	STF13NM60ND	STF140N8F7
STF14NM50N	STF150N10F7	STF15N65M5
STF15N80K5	STF15N95K5	STF15NM60ND
STF15NM65N	STF16N50U	STF16N65M5
STF16NF25	STF17NF25	STF18N60M2
STF18N60M2(045Y)	STF18N65M5	STF18NM60N
STF18NM60ND	STF18NM80	STF19NF20
STF19NM50N	STF1N105K3	STF20N65M5
STF20N95K5	STF20NF20	STF20NM65N
STF21N65M5	STF21N90K5	STF21NM60ND
STF22NM60N	STF23NM50N	STF23NM60ND
STF24N60DM2	STF24N60M2	STF24NM60N
STF24NM65N	STF25N10F7	STF25N80K5
STF25NM60ND	STF26NM60N	STF26NM60ND
STF28N60M2	STF28NM50N	STF28NM60ND
STF2HNK60Z	STF2LN60K3	STF2N62K3



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STF2N80K5	STF2N95K5	STF30N10F7
STF31N65M5	STF32NM50N	STF33N60M2
STF34N65M5	STF34NM60ND	STF38N65M5
STF3N62K3	STF3N80K5	STF3NK100Z
STF3NK80Z	STF40N60M2	STF40NF20
STF42N65M5	STF45N10F7	STF45N65M5
STF4N62K3	STF4N80K5	STF57N65M5
STF5N52K3	STF5N52U	STF5N60M2
STF5N62K3	STF5N95K3	STF5N95K5
STF5NK100Z	STF6N60M2	STF6N62K3
STF6N65K3	STF6N65K3(045Y)	STF6N80K5
STF6N95K5	STF7N52DK3	STF7N52K3
STF7N60M2	STF7N80K5	STF7N95K3
STF7NM60N	STF7NM80	STF80N10F7
STF8N65M5	STF8N80K5	STF8NK100Z
STF8NM50N	STF8NM60ND	STF9N60M2
STF9NK90Z	STF9NM60N	STF9NM60N(045Y)
STGF10H60DF	STGF10NB60SD	STGF10NC60HD
STGF10NC60KD	STGF14NC60KD	STGF15H60DF
STGF17NC60SD	STGF19NC60HD	STGF19NC60KD
STGF20H60DF	STGF20NB60S	STGF30H60DF
STGF3NC120HD	STGF6NC60HD	STGF7NB60SL
STGF7NC60HD	STGF8NC60KD	STP10NK60ZFP
STP10NK70ZFP	STP10NK80ZFP	STP11NK40ZFP
STP11NK50ZFP	STP11NM60FDFP	STP13NK60ZFP
STP14NF12FP	STP14NK50ZFP	STP17NK40ZFP
STP20NM60FP	STP3NK60ZFP	STP3NK90ZFP
STP4NK60ZFP	STP4NK80ZFP	STP55NF06FP
STP5NK50ZFP	STP5NK60ZFP	STP5NK80ZFP
STP60NF06FP	STP6NK60ZFP	STP6NK90ZFP
STP75NF75FP	STP7NK80ZFP	STP80NF10FP
STP80NF55-06FP	STP8NK80ZFP	STP9NK60ZFP
STP9NK65ZFP	STP9NK70ZFP	STPS10120CFP
STPS10150CFP	STPS1045FP	STPS10H100CFP
STPS10L60CFP	STPS10M80CFP	





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STPS10SM80CFP	STPS1545FP	STPS15M80CFP
STPS15SM80CFP	STPS20150CFP	STPS20170CFP
STPS20200CFP	STPS2045CFP	STPS20H100CFP
STPS20L120CFP	STPS20L45CFP	STPS20M100SFP
STPS20M80CFP	STPS20S100CFP	STPS20SM100SFP
STPS20SM80CFP	STPS30150CFP	STPS30H60CFP
STPS30L120CFP	STPS30L45CFP	STPS30M100SFP
STPS30M80CFP	STPS30SM100SFP	STPS30SM80CFP
STPS40SM80CFP	STPS745FP	STPS8H100FP
STTH1002CFP	STTH10LCD06CFP	STTH10LCD06FP
STTH12R06FP	STTH12S06FP	STTH1502FP
STTH15AC06CFP	STTH15AC06FP	STTH15L06FP
STTH15R06FP	STTH1602CFP	STTH16L06CFP
STTH2002CFP	STTH2003CFP	STTH20LCD06CFP
STTH20R04FP	STTH512FP	STTH5L06FP
STTH5R06FP	STTH802FP	STTH810FP
STTH812FP	STTH8L06FP	STTH8R06FP
STTH8S06FP	T1210T-8FP	T1235T-8FP
T1610T-8FP	T1635T-8FP	T435T-600FP
T610T-8FP	T635T-8FP	T810T-8FP
T830-8FP	T835T-8FP	TS820-600FP
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