PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MPA-PWR/06/2151
Notification Date 11/15/2006

New Assembly/Testing Location SOT89 package for Power Bipolar in CHANGJIANG Subcontractor

PWR - PWR BIP/ IGBT/ RF

Table 1. Change Identification

Product Identification (Product Family/Commercial Product)	see attached list
Type of change	Package assembly location change
Reason for change	Service improvement and production optimization
Description of the change	Power Bipolar Division has decided to set up a new location for SOT89 in Subcontractor CHANGJIANG. No process change and no characteristics change in devices. Samples are available for line used for Subcon qualification. The Div. Bipolar ensures the traceability of new Subcon. At lot level.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	Traceability is ensured at lot level
Manufacturing Location(s)	

Table 2. Change Implementation Schedule

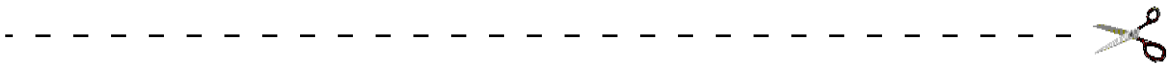
Forecasted implementation date for change	13-Jan-2007
Forecasted availabillity date of samples for customer	02-Nov-2006
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	02-Nov-2006
Estimated date of changed product first shipment	13-Jan-2007

Table 3. Change Responsibility

	Name	Signature	Date
Division Product Manager	Claudio Porto		Nov.07 ,06
Division Q.A. Manager	Giuseppe Falcone		Nov.07 ,06
Division Marketing Manager	Alfio Lanzafame		Nov.07 ,06

Table 4. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN MPA-PWR/06/2151**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 11/15/2006**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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RELIABILITY EVALUATION ON

SOT-89

MADE IN CHANGJIANG

Table of Contents

Introduction

This report aims at the internal qualification of the SOT-89 package made in CHANGJIANG.

The Qualification Reliability test trials have been performed in ST Catania Site.

The evaluation results meet ST products qualification targets, therefore the SOT-89 package made in CHANGJIANG is qualified.

Test Vehicles:

Product Lines Power Bipolar	Main Sales Types
BA06	2STF1360
G715	STF715
BC04	STF826

Failure Criteria :

A failed component is a device which becomes inoperative during the test or it fails on meeting the end limits foreseen in the device specification, for one or more than the parameters here below reported

Parameter Power BIPOLAR

Collector Leakage Current (Icbo or Iceo or Ices, etc...)
Emitter Leakage (Iebo)
$H_{FE,}$ Vcesat, Vbesat, Vf
Breakdown Voltage (BVcbo, BVceo,Vbces, Bvebo)

Reliability Evaluation Plan and results

D.U.T.: 2STF1360 LINE: BA06 PACKAGE: SOT89

Test	Conditions	S.S.	Requirement	Results
PRECONDITIONING OF SMD DEVICES BEFORE TC/THB/ENV. SEQ.	DRYNG 1H @ 125°C STORE 168H @ TA=85°C RH=85% IR @ Tp=260°C 3 times	204 x 1 Lot	Parameter deviation within spec. limits at end of preconditionings.	No parameter deviation at end of preconditionings.
H.T.S.	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
T.H.B.	D.U.T. SMD PRECONDITIONED TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
H.T.R.B.	T.A.= 150°C Vces = 64V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
PRESSURE POT	TA=121°C - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation at 96 hours.
THERMAL CYCLES AIR TO AIR	D.U.T. SMD PRECONDITIONED TA=-65°C TO 150°C 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation at 500 cy
ENVIRONMENTAL SEQUENCE	D.U.T. SMD PRECONDITIONED 100 THERMAL CYCLES + 96H PP	50 x 1 Lot	Parameter deviation within spec. limits at end of test.	No parameter deviation at end of test.

Reliability Evaluation Plan and results

D.U.T.: STF715 LINE: G715 PACKAGE: SOT-89

Test	Conditions	S.S.	Requirement	Results
PRECONDITIONING OF SMD DEVICES BEFORE TC/THB/ENV. SEQ.	DRYNG 1H @ 125°C STORE 168H @ TA=85°C RH=85% IR @ Tp=260°C 3 times	204 x 1 Lot	Parameter deviation within spec. limits at end of preconditionings.	No parameter deviation at end of preconditionings.
H.T.S.	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
T.H.B.	D.U.T. SMD PRECONDITIONED TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
H.T.R.B.	T.A.= 150°C Vces = 112V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
PRESSURE POT	TA=121°C - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation at 96 hours.
THERMAL CYCLES AIR TO AIR	D.U.T. SMD PRECONDITIONED TA=-65°C TO 150°C 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation at 500 cy
ENVIRONMENTAL SEQUENCE	D.U.T. SMD PRECONDITIONED 100 THERMAL CYCLES + 96H PP	50 x 1 Lot	Parameter deviation within spec. limits at end of test.	No parameter deviation at end of test.

Reliability Evaluation Plan and results

D.U.T.: STF826 LINE: BC04 PACKAGE: SOT-89

Test	Conditions	S.S.	Requirement	Results
PRECONDITIONING OF SMD DEVICES BEFORE TC/THB/ENV. SEQ.	DRYNG 1H @ 125°C STORE 168H @ TA=85°C RH=85% IR @ Tp=260°C 3 times	204 x 1 Lot	Parameter deviation within spec. limits at end of preconditionings.	No parameter deviation at end of preconditionings.
H.T.S.	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
T.H.B.	D.U.T. SMD PRECONDITIONED TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
H.T.R.B.	T.A.= 150°C Vces = 48V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
PRESSURE POT	TA=121°C - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation at 96 hours.
THERMAL CYCLES AIR TO AIR	D.U.T. SMD PRECONDITIONED TA=-65°C TO 150°C 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation at 500 cy
ENVIRONMENTAL SEQUENCE	D.U.T. SMD PRECONDITIONED 100 THERMAL CYCLES + 96H PP	50 x 1 Lot	Parameter deviation within spec. limits at end of test.	No parameter deviation at end of test.

Technological Characteristics

D.U.T.: 2STF1360 LINE: BA06 PACKAGE: SOT89

DIE	*Technology:* PB – HCD (Power Bipolar High Current Density) *Material:* Silicon *Passivation :* P-Vapox *Metallization – Front :* Al/Si *Dimensions :* 1620 x 1260 µm² *- Back :* AU/AsCr/Ni Au			
DIE ATTACH	Epoxy Die Attach	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	KFC Bare copper Bare copper with T-post silver plated
WIRE BOND	Thermosonic	**WIRE**	*Material :* *Diameter :*	Au 2 mils
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : Singapore
ASSEMBLY LOCATION : Changjiang
Q.A. LOCATION : Changjiang

Technological Characteristics

D.U.T.: STF715 LINE: G715 PACKAGE: SOT- 89

DIE	*Technology:* NPN Planar *Material:* Silicon		*Passivation :* P-VAPOX *Dimensions :* 1067 x 1067 µm^2	
	Metallization – Front : Al / Si *- Back :* Au/As/Cr/Ni/Au			
DIE ATTACH	Epoxy Die Attach	**FRAME**	*Frame and lead material:*	KFC
			Frame coating :	Bare copper
			Lead coating :	Bare copper with T-post silver plated
WIRE BOND	Thermosonic	**WIRE**	*Material :*	Au
			Diameter :	2 mils
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : Singapore
ASSEMBLY LOCATION : Changjiang
Q.A. LOCATION : Changjiang
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Technological Characteristics

D.U.T.: STF826 LINE: BC04 PACKAGE: SOT-89

DIE	*Technology:* PNP PLANAR *Material:* Silicon *Metallization – Front :* Al / Si *- Back :* Au/Cr/Ni/Au		*Passivation :* P-VAPOX *Dimensions :* 1067 x 1067 µm^2	
DIE ATTACH	Epoxy Die Attach	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	KFC Bare copper Bare copper with T-post silver plated
WIRE BOND	Thermosonic	**WIRE**	*Material :* *Diameter :*	Au 2 mils
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : Singapore
ASSEMBLY LOCATION : Changjiang
Q.A. LOCATION : Changjiang
:

Reliability Test Description

High Temperature Reverse Bias (HTRB)

This test is performed in order to demonstrate the quality and reliability of devices subjected to an elevated temperature and simultaneously reverse biased. The purpose of this test is to detect surface defects such as poor passivation, presence of contaminants, etc...

High Temperature Storage (HTS)

This stress test is performed to check the device life in a high temperature ambient. Specimens are put for a period of time inside a stove in free air. Detectable failure mechanisms are presence of contaminants and metal corrosion.

Thermal Cycles/Shocks

The purpose of this test is to determine the resistance of devices to exposure to extreme changes in temperature. Specimens are first placed in a suitable environment at a low temperature and then transferred to one at high temperature. Effects of thermal cycles/shocks include cracking of die, breaking of wire bonding, mechanical damage to the device case.

Reliability Test Description (continued)

Temperature Humidity Bias (THB)

This test is performed to check the device life in a high humidity ambient. Specimens are subjected to a permanent bias in a climatic chamber in the presence of steam. Detectable failure mechanisms are metal corrosion and moulding defects.

Pressure Pot

This test is performed in order to check device life in a high humidity ambient in an accelerated way. Specimens are subjected for a period of time inside an autoclave in the presence of steam and pressure. Detectable failure mechanism is metal corrosion.

Thermal Fatigue

This test is performed to demonstrate the quality and reliability of devices exposed to cyclic variation in electrical stress between "on" and "off" conditions and resultant cyclic variation in device and case temperatures (thermo-mechanical stress). The purpose of this test is to detect assembly defects : improper die-attach, bonding weakness and thermal mismatch among various components of the package.

Environmental Sequence

The purpose of this test is to study the influence of corrosion mechanism when the die/package system has already been stressed by temperature cycling.

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