PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-PWR/07/2994
Notification Date 10/16/2007

SILICON LINE CHANGE FOR BIPOLAR DEVICES - BA19 PRODUCT LINE

PWR - PWR BIP/ IGBT/ RF

Table 1. Change Identification

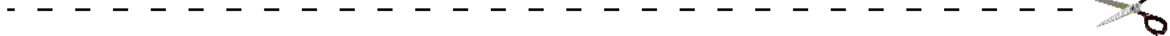
Product Identification (Product Family/Commercial Product)	BIPOLAR DEVICES
Type of change	Waferfab process change
Reason for change	Production Optimization
Description of the change	Planar Base Island technology is ready to replace the mature Epibase technology in order to align our products to the actual Market. The line BA19 will replace the old ones B500. Feature: Improved hFE linearity and Higher fT frequency benefit: Better performances in switching and linear application.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See "N" in additional info on P/N
Manufacturing Location(s)	

Table 2. Change Implementation Schedule

Forecasted implementation date for change	08-Jan-2008
Forecasted availabillity date of samples for customer	09-Oct-2007
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	09-Oct-2007
Estimated date of changed product first shipment	15-Jan-2008

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM-PWR/07/2994**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 10/16/2007**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Di falco, Luca	Division Marketing Manager
Porto, Michele Claudio	Division Product Manager
Falcone, Giuseppe	Division Q.A. Manager

Reliability evaluation

on

BA19 for silicon line change on

MJD3055T4 and MJE3055T sales type

Table of Contents

1. Introduction pg. 3

2. Test vehicles pg. 4

3. Failure Criteria pg. 5

4. Evaluation plan and results pg. 6

5. Appendixes

- Technological Characteristics pg. 8
- Reliability Test Description pg. 10

Introduction

This report is aimed to qualify the new line BA19 for line change on devices MJD3055T4 and MJE3055T.

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

The evaluation results meet ST products qualification targets, therefore the new line BA19 for silicon line change on MJD3055T4 and MJE3055T is qualified.

Test Vehicles :

Product Line	**Sales Type**	**Package**
BA19	MJD3055T4	DPAK
BA19	MJE3055T	TO-220

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 Main Parameters

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.: MJD3055T4 LINE: BA19 PACKAGE: DPAK

Test	Conditions	S.S.	Requirement	Results
PRECONDITIONING OF SMD DEVICES BEFORE TC/THB/ENV. SEQ.	DRYNG 1H @ 125℃ STORE 168H @ TA=85℃ RH=85% Oven Reflow @ Tp=260℃ 3 times	204 x 1 Lot	Parameter deviation within spec. limits at end of preconditionings.	*No parameter deviation out of spec. Limits at end of preconditionings.*
H.T.S.	TA=150℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
T.H.B.	*D.U.T. SMD PRECONDITIONED* TA=85℃ - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
H.T.R.B.	T.A.=150℃ ; Vbias=56 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
PRESSURE POT	TA=121℃ - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	*No parameter deviation out of spec. limits at 96 hours.*
THERMAL CYCLES AIR TO AIR	*D.U.T. SMD PRECONDITIONED* TA=-65℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	*No parameter deviation out of spec. limits at 500 cy.*
THERMAL FATIGUE	ΔTC=105℃ - Pd=2W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	*No parameter deviation out of spec. limits at 10 Kcy.*
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 out of spec. limits at end of test.*

Reliability Evaluation Plan and results

D.U.T.: MJE3055T LINE: BA19 PACKAGE: TO-220

Test	Conditions	S.S.	Requirement	Results
H.T.S.	TA=150℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
T.H.B.	TA=85℃ - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
H.T.R.B.	T.A.=150℃ ; Vbias=56 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	*No parameter deviation out of spec. limits at 1000 hours.*
PRESSURE POT	TA=121℃ - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	*No parameter deviation out of spec. limits at 96 hours.*
THERMAL CYCLES AIR TO AIR	TA=-65℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	*No parameter deviation out of spec. limits at 500 cy.*
THERMAL FATIGUE	ΔTC=105℃ - Pd=4.8W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	*No parameter deviation out of spec. limits at 10 Kcy.*
ENVIRONMENTAL SEQUENCE	100 THERMAL CYCLES + 96H PP	50 x 1 Lot	Parameter deviation within spec. limits at end of test.	*No parameter deviation out of spec. limits at end of test.*

Technological Characteristics

D.U.T.: MJD3055T4 LINE: BA19 PACKAGE: DPAK

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* AuAs/Cr/Ni/Au		*Passivation* : P-Vapox *Dimensions* : 2240 x 1940 um	
DIE ATTACH	Soft Solder	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Raw Cupper Select Ni/NiP + Cu on die pad Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Base Al Emitter 7 mils Base 10 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES: WAFER PROCESSING: SINGAPORE
ASSEMBLY LOCATION: AIN SEBAA; SHENZHEN
QA LOCATION: AIN SEBAA; SHENZHEN

Technological Characteristics

D.U.T.: MJE3055T LINE: BA19 PACKAGE: TO-220

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* AuAs/Cr/Ni/Au		*Passivation* : P-Vapox *Dimensions* : 2240 x 1940 um	
DIE ATTACH	Soft Solder	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Raw Cupper Full Ni/NiP Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Base Al Emitter 7 mils Base 10 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES: WAFER PROCESSING: SINGAPORE
ASSEMBLY LOCATION: AIN SEBAA; SHENZHEN
QA LOCATION: AIN SEBAA; SHENZHEN

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

This test is aimed at determining the resistance of the devices to the exposure to extreme changes in temperature. Specimen are first placed in a suitable chamber at a low temperature and then transferred to one at high temperature.
Effects of thermal cycles include cracking of the die, breaking of the wire bonding, mechanical damage to the device case.

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.

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