PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MPA-PWR/06/1943
Notification Date 07/24/2006

NEW FRONT END SUBCONTRACTOR LOCATION FOR POWER BIPOLAR TRANSISTORS

PWR - PWR BIP/ IGBT/ RF

Table 1. Change Identification

Product Identification (Product Family/Commercial Product)	See attached file
Type of change	Waferfab location change
Reason for change	Service improvement and Front End capacity extension
Description of the change	Power Bipolar, IGBT & RF Division has decided to set up a new Front End location in BCD foundry (Shanghai China) for PLANAR NPN technology in 6". The new wafer fab location will increase production capacity in order to satisfy our Customers demand. No change in Electrical & mechanical characteristics. No change in assembly and testing locations. Samples are available for lines used for foundry qualification, if needed.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See "4" in additional info field
Manufacturing Location(s)	

Table 2. Change Implementation Schedule

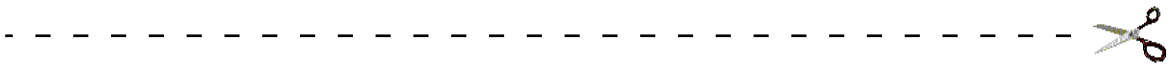
Forecasted implementation date for change	17-Oct-2006
Forecasted availabillity date of samples for customer	17-Jul-2006
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	17-Jul-2006
Estimated date of changed product first shipment	24-Oct-2006

Table 3. Change Responsibility

	Name	Signature	Date
Division Product Manager	Claudio Porto		Jul.17 ,06
Division Q.A. Manager	Giuseppe Falcone		Jul.17 ,06
Division Marketing Manager	Alfio Lanzafame		Jul.17 ,06

Table 4. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN MPA-PWR/06/1943**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 07/24/2006**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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RELIABILITY EVALUATION

ON

PLANAR TECHNOLOGY made in BCD

Table of Contents

Introduction

This report aims at the qualification of the Front End location BCD foundry (Shanghai China) for Planar NPN technology in 6"

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

The evaluation results meet ST products qualification targets, therefore the Front End location BCD for Planar NPN technology is qualified.

Test Vehicles:

Product Lines	Main Sales Types
BV22 – TO220	BUL128
BV23 – DPAK	BULD128DT4
BV32 – SOT32	ST13003

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. : BUL128 LINE: BV22 PACKAGE: TO220

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= 100V	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℃ Vces=560V	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=4.75W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	No parameter deviation out of spec. limits at 10Kcy.

Reliability Evaluation Plan and results

D.U.T. : BULD128DT4 LINE: BV23 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 pre-conditionings.	*No parameter deviation out of spec. limits at end of pre-conditionings.*
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= 100V	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℃; Vdd=560V	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	TC=105℃ - Pd=2W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	*No parameter deviation out of spec. limits at 10Kcy.*
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. : ST13003 LINE: BV32 PACKAGE: SOT32

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= 100V	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℃ Vces=560V	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=3W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	No parameter deviation out of spec. limits at 10Kcy.

Technological Characteristics

D.U.T. : BUL128 LINE: BV22 PACKAGE: TO220

DIE	*Technology:* Multi Epitaxial Planar NPN *Material:* Silicon *Passivation :* P-Vapox *Metallization – Front :* Al/Si *Dimensions :* 96 x 97 mils² *- Back :* Ti/Ni/Au			
DIE ATTACH	Soft Solder Pb / Ag / Sn	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	CUPROFOR Ni/NiP Ni/NiP
WIRE BOND	Ultrasonics	**WIRE**	*Material :* *Diameter :*	Al/Mg Base Al/Mg Emitter 5 mils Base 5 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : BCD
ASSEMBLY LOCATION : Ain Sebaa (Morocco)
Shenzhen (China)
P.S.I. (Laguna)
Q.A. LOCATION : Ain Sebaa (Morocco)
Shenzhen (China)
P.S.I. (Laguna)

Technological Characteristics

D.U.T. : BULD128DT4 LINE: BV23 PACKAGE: DPAK

DIE	*Technology:* Multi Epitaxial Planar NPN *Material:* Silicon		*Passivation :*	P-Vapox
	Metallization – Front : Al / Si *- Back :* Ti / Ni / Au		*Dimensions :*	97 x 98 mils^2
DIE ATTACH	Soft Solder Pb / Ag / Sn	**FRAME**	*Frame and lead material:*	Cu
			Frame coating :	Ni/NiP
			Lead coating :	Ni/NiP
WIRE BOND	Ultrasonics	**WIRE**	*Material :*	Al/Mg Base Al/Mg Emitter
			Diameter :	5 mils Base 5 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : BCD
ASSEMBLY LOCATION : Ain Sebaa (Morocco)
Shenzhen (China)
Q.A. LOCATION : Ain Sebaa (Morocco)
Shenzhen (China)

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Technological Characteristics

D.U.T. : ST13003 LINE: BV32 PACKAGE: SOT32

DIE	*Technology:* Multi Epitaxial Planar NPN *Material:* Silicon		*Passivation :*	P-Vapox
	Metallization – Front : Al/Si *- Back :* Ti/Ni/Au		*Dimensions :*	58 x 61 milsq
DIE ATTACH	Soft Solder Pb / Ag / Sn	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	CUPROFOR with Sel Ag on D/A and W/B Ni Ni
WIRE BOND	Thermosonic	**WIRE**	*Material :* *Diameter :*	Au Base Au Emitter 1.5 mils Base 1.5 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : BCD
ASSEMBLY LOCATION : C.D.I.L. (India)
Q.A. LOCATION : C.D.I.L. (India)

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 Forward Bias (HTFB)

This test is performed in order to demonstrate the quality and reliability of devices subjected to an elevated temperature and simultaneously forward gate biased. The purpose of this test is to detect surface and gate oxide defects.

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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