PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-PWR/08/3867
Notification Date 07/21/2008

SILICON LINE CHANGE FOR BIPOLAR DEVICES - BA22 PRODUCT LINE

Table 1. Change Implementation Schedule

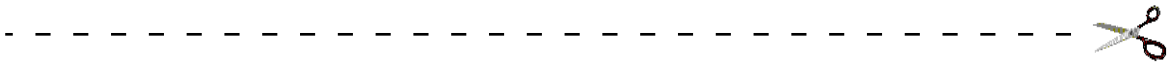
Forecasted implementation date for change	09-Oct-2008
Forecasted availabillity date of samples for customer	14-Jul-2008
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	14-Jul-2008
Estimated date of changed product first shipment	20-Oct-2008

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	See attached list
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 BA22 will replace the old ones F500. 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
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM-PWR/08/3867**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 07/21/2008**

☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Saya, Francesco	Division Marketing Manager
Aleo, Mario-Antonio	Division Product Manager
Falcone, Giuseppe	Division Q.A. Manager

Reliability evaluation

on

BA22 for silicon line change

Table of Contents

Introduction

This report is aimed to qualify the new line BA22 for line change on device TIP3055 and 2N3055

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

The evaluation results meet ST products qualification targets, therefore the new line BA22 is qualified.

Test Vehicles :

Product Line	Sales Type	Package
BA22	TIP3055	TO-247
BA22	2N3055	TO-3

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 Parameter

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.: TIP3055 LINE: BA22 PACKAGE: TO-247

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℃ Vdd=80V	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=70℃ - Pd=24W	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.: 2N3055 LINE: BA22 PACKAGE: TO-3

Test	Conditions	S.S.	Requirement	Results
H.T.R.B.	T.A.=150℃ Vdd=80V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
H.T.S.	TA=200℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
THERMAL FATIGUE	ΔTC=70℃ - Pd=40W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	No parameter deviation out of spec. limits at 10Kcy.
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

Technological Characteristics

D.U.T.: TIP3055 LINE: BA22 PACKAGE: TO-247

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* AuAs/Cr/Ni/Au		*Passivation :* *Dimensions :*	P-Vapox 2450 x 2180 um^2
DIE ATTACH	Soft Solder	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Raw Copper Selective Ni/NiP (Cu on Die Pad Area) Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Base Al Emitter 5 mils Base 10 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES: WAFER PROCESSING: Ang Mokio (Singapore)
ASSEMBLY LOCATION: AIN SEBAA. (Morocco)
QA LOCATION: AIN SEBAA. (Morocco)

Technological Characteristics

D.U.T.: 2N3055 LINE: BA22 PACKAGE: TO-3

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* AuAs/Cr/Ni/Au		*Passivation :* *Dimensions :*	P-Vapox 2450 x 2180 um^2
DIE ATTACH	Soft Solder	**PACKAGE**	*Header material:* *Cap material:* *Header and cap coating :* *Lead material:* *Lead coating :*	Raw Copper Nickeled steel Full Ni Fe/Ni Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Base Al Emitter 7 mils Base 10 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Metal can

PRODUCTION PLACES: WAFER PROCESSING: Ang Mokio (Singapore)
ASSEMBLY LOCATION: OMEGA (Malaysia)
QA LOCATION: OMEGA (Malaysia)

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.

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 molding 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.

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