PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MPA-PMT/06/2194
Notification Date 12/06/2006

M5 Wafer Fab, Catania (Italy). FRONT-END CAPACITY EXTENSION FOR Low Voltage Power MOSFET Devices

PMT - POWER MOSFET

Table 1. Change Identification

Product Identification (Product Family/Commercial Product)	MPA, Power MOSFET Division / Low Voltage devices
Type of change	Waferfab location change
Reason for change	Capacity Extension
Description of the change	Low Voltage Power MOSFET devices will be manufactured also in M5 Wafer fab Catania (Italy).
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See"15" as Diffusion plant code in box label
Manufacturing Location(s)	

Table 2. Change Implementation Schedule

Forecasted implementation date for change	27-Feb-2007
Forecasted availabillity date of samples for customer	27-Nov-2006
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	27-Nov-2006
Estimated date of changed product first shipment	27-Feb-2007

Table 3. Change Responsibility

	Name	Signature	Date
Division Product Manager	Ian Wilson		Nov.27 ,06
Division Q.A. Manager	Giuseppe Falcone		Nov.27 ,06
Division Marketing Manager	Maurizio Giudice		Nov.27 ,06

Table 4. List of Attachments

Customer Part numbers list	
Qualification Plan results	

- -

Customer Acknowledgement of Receipt	**PCN MPA-PMT/06/2194**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 12/06/2006**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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RELIABILITY EVALUATION

ON

M5 Wafer Fab, Catania (Italy).
FRONT-END CAPACITY EXTENSION FOR
Low Voltage Power MOSFET Devices

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Introduction

This report is aimed to qualify the M5 Wafer Fab, Catania (Italy) for Low Voltage Power MOSFET Devices FRONT-END CAPACITY EXTENSION

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

The evaluation results meet ST products qualification targets, therefore the M5 Wafer Fab, Catania (Italy) for Low Voltage Power MOSFET Devices FRONT-END CAPACITY EXTENSION is qualified.

Test Vehicles :

Product Line	Sales Type	Package
432C	STD55NH2LL-1-E	IPAK
4L2F	STD95NH02LT4	DPAK
433C	STL8NH3LL	PowerFLAT™

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

Power MOSFET Main Parameter

Drain Leakage Current (Idss)
Gate Leakage Current (Igss)
Threshold Voltage (Vgs(th)
Forward On Voltage (Vsd)
Drain Source On Voltage (Vds(on))
Drain Source Breakdown Voltage (Bvdss)

Reliability Evaluation Plan and results

D.U.T.: STD55NH2LL-1-E LINE: 432C PACKAGE: IPAK

Test	Conditions	S.S.	Requirement	Results
H.T.S.	TA=175℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours.
T.H.B.	TA=85℃ - RH=85% Vbias= 20V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours
H.T.R.B.	T.A.= 175℃ Vdd = 20V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours
H.T.F.B.	TA=150℃ Vgss=16V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours
PRESSURE POT	TA=121℃ - 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	TA=-65℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation at 500 cy
THERMAL FATIGUE	ΔTC=105℃ - Pd=2W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	No parameter deviation at 10Kcy.
ENVIRONMENTAL SEQUENCE	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.: STD95NH02LT4 LINE: 4L2F PACKAGE: DPAK

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% Reflow @ 260°C 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=175℃	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℃ - RH=85% Vbias= 20V	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℃ Vdd = 20V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours
H.T.F.B.	TA=150℃ Vgss=20V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation at 1000 hours
PRESSURE POT	TA=121℃ - 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℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation at 500 cy
THERMAL FATIGUE	ΔTC=105℃ - Pd=2W	77 x 1 Lot	Parameter deviation within spec. limits at 10k cycles.	No parameter deviation 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 at end of test.

Reliability Evaluation Plan and results

D.U.T.: STL8NH3LL LINE: 433C PACKAGE: PowerFLAT™

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% Reflow @ 260°C 3 times	154 x 1 Lot	*Parameter deviation within spec. limits at end of pre-conditionings.*	*No parameter deviation out of spec. Limits 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 out of spec. limits at 1000 hours.*
T.H.B.	*D.U.T. SMD PRECONDITIONED* TA=85°C - RH=85% Vbias= 24V	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°C Vdd = 24V	77 x 1 Lot	*Parameter deviation within spec. limits at 1000 hours.*	*No parameter deviation out of spec. limits at 1000 hours.*
H.T.F.B.	TA=150°C Vgss=16V	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°C - 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=-55°C TO 150°C 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. : STD55NH2LL-1-E LINE: 432C PACKAGE: IPAK

DIE	*Technology:* STripFET™ Power MOSFET *Material:* Silicon *Metallization – Front :* Al/Si/Cu *- Back :* Ti/Ni/Au		*Passivation :* *Dimensions :*	None 2500x1760 um^2
DIE ATTACH	Solder Past	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Row copper Ni-NiP Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Gate Al Source 5mils Gate 15mils Source
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : M5 – Catania
ASSEMBLY LOCATION : Shenzhen
Q.A. LOCATION : Shenzhen

Technological Characteristics

D.U.T. : STD95NH02LT4 LINE: 4L2F PACKAGE: DPAK

DIE	*Technology:* STripFET™ II Power MOSFET *Material:* Silicon *Passivation :* None *Metallization – Front :* Al/Si/Cu *Dimensions :* 3550x2890 um^2 *- Back :* Ti/Ni/Au			
DIE ATTACH	Solder Past	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Row copper Sel-Ni-NiP Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Al/Mg Gate Al Source 5mils Gate 15mils Source
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : M5 – Catania
ASSEMBLY LOCATION : Shenzhen
Q.A. LOCATION : Shenzhen

Technological Characteristics

D.U.T. : STL8NH3LL LINE: 433C PACKAGE: Power FLAT™

DIE	*Technology:* STripFET™ Power MOSFET *Material:* Silicon *Passivation :* None *Metallization – Front :* Al/Si/Cu *Dimensions :* 2500x1760 um^2 *- Back :* Ti/Ni/Au			
DIE ATTACH	Glue	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Row copper Ag spot None Sn 100%
WIRE BOND	Thermosonic	**WIRE**	*Material :* *Diameter :*	Au Gate Au Source 2mils Gate 2mils Source
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES : WAFER PROCESSING : M5 – Catania
ASSEMBLY LOCATION : Malaysia
Q.A. LOCATION : 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 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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