PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MPA/06/2103
Notification Date 11/28/2006

WIRE DIAMETER RATIONALIZATION FOR SO (Small Outline) packages

MPA - MPA

Table 1. Change Identification

Product Identification (Product Family/Commercial Product)	see attached list
Type of change	Package assembly material change
Reason for change	Material rationalization.
Description of the change	In order to have a standard process including new technology with small wire bonding pad, MPA group are qualifying a new gold wire with 0.8 mils diameter. This change will impact on Small Outline Packages.
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

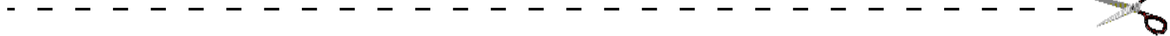
Forecasted implementation date for change	24-Feb-2007
Forecasted availabillity date of samples for customer	24-Nov-2006
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	24-Nov-2006
Estimated date of changed product first shipment	24-Feb-2007

Table 3. Change Responsibility

	Name	Signature	Date
Division Product Manager	Francesco Caizzone		Nov.24 ,06
Division Q.A. Manager	Consolato Versace		Nov.24 ,06
Division Marketing Manager	Carlo Marino		Nov.24 ,06

Table 4. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt Please sign and return to STMicroelectronics Sales Office	**PCN MPA/06/2103** **Notification Date 11/28/2006**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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MPA Group (Micro, Power, Analog)

QUALIFICATION REPORT

Gold wire diameter reduction to 0.8mils

SOP (Small Outline Packages) housed components

Rev. A – Sep. 2006

STMicroelectronics

REVISION TRACKING

Revision	Date	Description of revision	Name
A	25/09/06	Creation	A. Zuccaro

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PURPOSE

MPA is using a wide range of diffusion technologies for die encapsulated in SOP package. While gold continues to increase in cost, our advanced technologies allow us to reduce die size and therefore use smaller bond pad openings. The small pad products can take advantage of 0.8mils wire diameter. To optimize our production tools we will utilize this smaller wire diameter on all products when electrical properties are not affected.

In addition it is ST policy to reduce our environmental impact by way of reducing our material consumption. This reduction in wire diameter allows us to reduce our gold consumption.

This change will be implemented on all the lines equipped with wire bonders compatible with 0.8 mil Gold wire. ST will continue with the progressive upgrade of lines not yet capable of utilizing this smaller wire diameter.

The purpose of this document is to provide description and results of qualification tests performed.

This qualification report specially focuses on:

1. Reliability test performed to ensure same performance of our products
2. The guarantee that electrical parameters are not affected by this change

LIST OF PACKAGES AFFECTED BY THE CHANGE

SO-8

SO-14 / SO-16

TSSOP14 /TSSOP16/ TSSOP20

SO-20 / SO-24 / SO-28

SO-28 Battery/ SO-44 Battery

SO-34 SHRINK

QUALIFICATION PLAN: GUIDELINES AND DESCRIPTION

- Applicable documents:
  - General procedure SOP2610 (STMicroelectronics)
  - Internal change management procedure SOP262

- Guidelines: a product or a family of products is considered qualified when it fulfils the requirements of a qualification plan which covers the various aspects of development, reliability and manufacturing.

QUALIFICATION PROGRAM

TEST DESCRIPTION	NBR OF LOTS	SAMPLE SIZE	ACCEPTANCE CRITERIA
CHARACTERIZATION	1(SO-8) 2 (SO-14, SO-16, TSSOP20) 1(SO-8, SO-14)	30 30x1lot 1500	Datasheet Datasheet Datasheet
RELIABILITY	1(SO-8) 1 (SO-14, SO-16, TSSOP20) 1(SO-8, SO-14)	77(SO-8) 308(SO-14,SO-16,TSSOP20) 234(SO-8, SO-14)	0 failure
CONSTRUCTION ANALYSIS	Covered by In-process control (SHEAR TEST results PULL TEST results) (SO-8)		0 failure

TEST VEHICLES USED FOR QUALIFICATION

Package	Business Unit	Assembly Location	Part Number
SO-8	Advanced Analog	Morocco	M41T56
SO-8	ASD & IPAD, Std Linear	Morocco	DALC112S1, TS4871IDT
SO-8	Stdlin	Malaysia	TL431DT
SO-14	AAL	Malaysia	HCF4011MTR
SO-14	AAL, Stdlin	Morocco	HCF4011MTR, LM339D
SO-20	AAL	Malaysia	74AC574MTR
TSSOP16	AAL	Morocco	HCF4053BTTR
SO-16	VR&I	Malaysia	ST202 – ST232
SO-28	Advanced Analog	Malaysia	M48T58MH
SO-44	Advanced Analog	Malaysia	M48T37MH

DIVISIONAL CHARACTERIZATION RESULTS
ASD & IPAD[1]

COMPATIBILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
-Leakage current	Vr=15V 25°C	S0-8 (DALC112S1)	0/30
-Breakdown voltage (per diode)	25°C, Ir=1mA	S0-8 (DALC112S1)	0/30
Compliance with IEC1000-4-2 level 3 8KV (air discharge 6KV (Contact discharge)	ESD contact discharge C=150pF, R=330Ohm	S0-8 (DALC112S1)	0/30
Ipp	8/20µs	SO-8 (DALC112S1)	0/30
VF	Ipp onde @ 8/20	SO-8 (DALC112S1)	0/30

(1) MPA: Micro, Power, Analog - ASD: Application Specific Device - IPAD: Integrated Passive and Active Devices

DIVISIONAL CHARACTERIZATION RESULTS
Voltage Regulators & Interface

COMPATIBILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
Output Short Circuit Current Vcc Power Supply Current ISUPPLY Power Supply Over Voltage VOH-IOH VOL-IOL Threshold Voltage Logic Pull-Up Current Transmitter Output Resistance RS-232 Input Resistance	No Load; IOUT = -1mA IOUT = 3.2mA TIN = 0V to VCC VCC = V+ = V-= 0V VOUT = ± 2V	SO-16	Based on electrical evaluation the change does not impact on performance and capability of product parameters for both devices (ST202 – ST232)

DIVISIONAL CHARACTERIZATION RESULTS
Standard linear IC's

COMPATIBILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
Datalog analysis on 500 units compare to current process	Ambiant test 25°C	SO-8/SO-14	OK on 1500 units

RELIABILITY RESULTS - AAL[1] and ASD & IPAD Divisions

RELIABILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
High Temperature Bias (HTB)	Tamb=125C, Vdd=Vddmax 1000 hrs	SO-14, SO-20, TSSOP16	0/308
Temperature Humidity Bias (THB)	Tamb=85C, RH=85%, Bias, 1000 hrs	SO-14, SO-20, TSSOP16	0/308
High Temperature Storage (HTS)	Tamb=150C, No Bias, 1000 hrs	SO-14, SO-20, TSSOP16	0/308
Pressure Pot (PPT)	Tamb=121C, Pa=2atm, 168 hrs	SO-14, SO-20, TSSOP16	0/308
Temperature Cycles (TCT)	Tmax=150C, Tmin=-65C, 500 cy	SO-14, SO-20, TSSOP16	0/308
Thermal Cycling (TC) JESD 22A-104	-55C+150C/ 1000 cycles / 77 parts	SO-8 (DALC112S1)	0/77 (results available in wk 01-2007)

(1) AAL: Advanced Analog and Logic

RELIABILITY TEST RESULTS Standard linear IC's

RELIABILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
High Temperature Bias (HTB)	#Tamb=125C, Vs=absolute max rating 1000 hrs	SO-8, SO-14	0/234
Temperature Humidity Bias (THB)	Tamb=85C, RH=85%, Bias, 1000 hrs	SO-8, SO-14	0/234
Pressure Pot (PPT)	Tamb=121C, Pa=2atm, 168 hrs	SO-8, SO-14	0/234
Temperature Cycles (TCT)	Tmax=150C, Tmin=-65C, 1000 cy Air to air	SO-8, SO-14	0/234
Environmental sequence	100 TMC + 96h PPT	SO-8, SO-14	0/234
Thermal shock	Ta=-65/+150C 500shks (liquid to liquid)	SO-8, SO-14	0/234

CONSTRUCTION ANALYSIS RESULTS ASD & IPAD

RELIABILITY TEST	TEST CONDITIONS	PACKAGE	ACCEPTANCE CRITERIA
PULL TEST MIL STD883 METHOD 2011.7	Bond breaking force measurement	S0-8 (DALC112S1)	CPK > 1.66

CONSTRUCTION ANALYSIS RESULTS Standard linear IC's

RELIABILITY TEST	TEST CONDITIONS	PACKAGE	CUMULATIVE RESULTS
SHEAR TEST	Spec# 0018726	SO-8	20 wires CPk 2.43
PULL TEST	Pull test conditions	SO-8	20 wires CPk 1.61
Wire loop	Loop height: 150-250µm	SO-8	All results within specification
Ball shape	Ball height	SO-8	All results within specification
Wire sweeping	<20%	SO-8	Maximum 9.05%

ASSESSMENT

Qualification plan requirements have been fulfilled without exception.

Completion date	Location	Department	Name
		MPA Quality Department	**C.Versace** **MPA Q&R Director** **E-mail :consolato.versace@ st.com**
		MPA Marketing Department	**C.Marino** **MPA Central & Regional Prod. Marketing Senior Director** **E-mail :carlo.marino@ st.com**

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