# PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MPA-SLI/06/2067
Notification Date 09/29/2006

**TSSOP8 package new assembly line qualification for**

**Standard Linear ICs in ST Bouskoura (Morocco)**

**SLI - LINEAR & INTERFACE**

**Table 1. Change Identification**

| | |
|---|---|
| Product Identification (Product Family/Commercial Product) | See attached list |
| Type of change | Package assembly location change |
| Reason for change | Increase of capacity |
| Description of the change | TSSOP8 package new assembly line qualification for Standard Linear ICs in ST Bouskoura (Morocco). Samples available from week 643. |
| Product Line(s) and/or Part Number(s) | See attached |
| Description of the Qualification Plan | See attached |
| Change Product Identification | 1st digit of Trace code becomes Z. |
| Manufacturing Location(s) | |

**Table 2. Change Implementation Schedule**

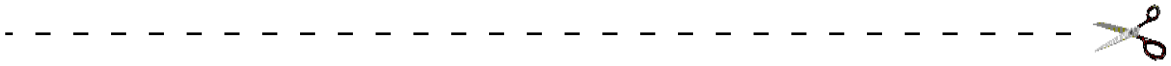
| | |
|---|---|
| Forecasted implementation date for change | 06-Nov-2006 |
| Forecasted availabillity date of samples for customer | 23-Oct-2006 |
| Forecasted date for **STMicroelectronics** change Qualification Plan results availability | 27-Sep-2006 |
| Estimated date of changed product first shipment | 27-Dec-2006 |

**Table 3. Change Responsibility**

| | Name | Signature | Date |
|---|---|---|---|
| Division Product Manager | J.C. KAIRE | | Sep.27 ,06 |
| Division Q.A. Manager | F. PACCARD | | Sep.27 ,06 |
| Division Marketing Manager | M. A. ALEO | | Sep.27 ,06 |

**Table 4. List of Attachments**

| | |
|---|---|
| Customer Part numbers list | |
| Qualification Plan results | |



| Customer Acknowledgement of Receipt | **PCN MPA-SLI/06/2067** |
|---|---|
| Please sign and return to STMicroelectronics Sales Office | **Notification Date 09/29/2006** |

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

Remark

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# BACK-END
# PROCESS CHANGE
# QUALIFICATION REPORT

***Report n°:*** QATSSOD3

***Qualification Type:*** New assembly line for standard linear IC's

PCN MPA-SLI/06/2067

***Assembly site:*** ST BOUSKOURA (MOROCCO)

***Package Type:*** TSSOP8

***Date of issue:*** September, 19th 2006

## *Reference documents:*

| | |
|---|---|
| - SOP 2.5.9 | Process critical and key parameters |
| - 0076604 | Process Qualification and release to production (SOP2.6.2) |
| - 0078588 | Reliability requirements for product qualification (SOP 2.6.14) |
| - 0061050 | Back-end qualification procedure |
| - 0091984 | Constructional analysis (SOP 2.6.15) |
| - 0037709 | Package construction analysis |
| - 7006451 | Management of manufacturing source change ( SOP 2.6.17) |
| - 0033689 | Process flow chart |
| - 0046008 | Process control plan |
| - 0060531 | FMEA procedure |

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**Issued by:** JM BUGNARD / ASSEMBLY SUPPORT ENGINEER MPA GRENOBLE

**Approved by** : F. PACCARD / QUALITY MANAGER MPA GRENOBLE

Date: September 19th, 2006

# 1. PROCESS MAIN SPECIFICATION CHANGE

## 1.1 Process change description.

1.1.1 Nature of Change: New assembly line for standard linear IC's (already used by Power MOSFET division in ST microelectronics). TSSOP14 line already used by standard linear IC's in Bouskoura

1.1.2 Reason for Change: additional capacity

1.1.3 Affected process: TSSOP8 packages

1.1.4 Affected products: Standard Linear devices in TSSOP8

1.1.5 Implementation date: September 2006

## 1.2 DETAILLED DESCRIPTION OF CHANGE

| | **Process** | |
|---|---|---|
| | New Process | Current Process |
| **Assembly site** | ST Bouskoura | Amkor Philippines |
| **Assembly flow + Control Plan** | 7578958 | 7066191 |
| **Frame (material)** | Copper matrix | Copper matrix |
| **Die attach material** | Ablebond 8390 | Ablestick 8290 |
| **Wire material**<br>**Wire diameter** | Gold<br>1 MIL | Gold<br>1 MIL |
| **Mold compound** | KMC 184-3 | Sumitomo G700A |
| **Wire bond method** | Thermosonic | Thermosonic |
| **Lead finishing** | Preplated NiPdAu | Sn plating |

## 1.3 MAJOR EFFECTS OF CHANGE ON QUALITY, PARAMETRIC, ELECTRICAL OR RELIABILITY DATA

- No major effect expected. TSSOP8 line use similar equipment to TSSOP14 line already under production for standard linear IC's products.

# 2. QUALIFICATION PLAN

## 2.1 Test vehicle description

| | TV1 | TV2 | TV3 |
|---|---|---|---|
| Line | 0358 | 0393 | 0922 |
| Sales Type | LM2904WPT | LM2903PT | TS922IPT |
| FE process | Bipolar | Bipolar | HF2CMOS |
| Package | TSSOP8 | TSSOP8 | TSSOP8 |
| Number of bump/lead | 8 | 8 | 8 |
| Die size (µm) | 1280 x 1210 | 950 x 870 | 1720 x 1190 |
| Die thickness (µm) | 280 | 280 | 280 |
| Metallisation | AlSiCu | AlSiCu | AlSiCu |
| Passivation | Nitride | Nitride | Nitride + Pvapox |
| Back side | Raw silicon | Raw silicon | Raw silicon |

## 2.2 Process qualification requirements.

| | TV1 | TV2 | TV3 | Comments |
|---|---|---|---|---|
| Flow Chart comparison | **X** | **X** | **X** | |
| Control Plan comparison | **X** | **X** | **X** | |
| FMEA study | **X** | **X** | **X** | |
| Construction analysis | | | **X** | |
| Quantity of qualification lots | **1** | **1** | **1** | |
| Critical T84 parameters Cpk | | | | |
| Non critical T84 param mean | | | | |

Note: in **bold** minimum data required before sending the PCN

## 2.3 Assembly, Final Test and Finishing qualification requirements

| | TV1 | TV2 | TV3 | Comment |
|---|---|---|---|---|
| Quantity of qualification lot | 1 | 1 | 1 | |
| Package type | TSSOP8 | TSSOP8 | TSSOP8 | |
| Assembly report | **X** | **X** | **X** | |
| Lot average yield | **X** | **X** | **X** | |
| Parameters distribution | **X** | **X** | **X** | |
| List of parameters | | | | |
| Drift versus EWS analysis | | | | |
| Test capability | | | | |
| Packing qualification | | | | Already tested and packed in Bouskoura |

Note: in **bold** minimum data required before sending the PCN

### 2.4 ESD and Reliability qualification requirements. N/A

| Tests | Conditions | Step | TV1 | TV2 | TV3 | Comments |
|---|---|---|---|---|---|---|
| ESD | HBM | | | | | N/A |
| ESD | CDM | | | | | N/A |
| ESD | MM | | | | | N/A |
| HTB | **Tamb=150°C for TV1 and TV2**<br>**Tamb=125°C for TV3**<br>Vs=absolute max rating | 168h<br>1000h | **78**<br>**78** | **78**<br>**78** | **78**<br>**78** | Room temperature and hot test at beginning and end of the test |
| OLT | Tj=150C<br>Vs=Max operating | | | | | N/A |
| THB | Ta=85C RH=85%<br>Vs=nominal | 168h<br>1000h | **78**<br>**78** | **78**<br>**78** | **78**<br>**78** | Room temperature and hot test at beginning and end of the test |
| TMC | Ta=-65/+150C | 100Cy<br>500 Cy<br>1000 Cy | **78**<br>**78**<br>**78** | **78**<br>**78**<br>**78** | **78**<br>**78**<br>**78** | Hot test at beginning and end of the test |
| PPT | Ta=121C P=2atm | 168h<br>240h | **78**<br>**78** | **78**<br>**78** | **78**<br>**78** | |
| Jedec Level | Jedec1=168H THB + 3 IR reflow soldering | | **15** | **15** | **15** | Precon J1, 260°C |

Note: in **bold** minimum data required before sending the PCN
o Drift analysis [X] yes [] no
o Reliability monitoring change [] yes [x] no

## 3. QUALIFICATION RESULTS

### 3.1 Process qualification results

| | TV1 | TV2 | TV3 | Comments |
|---|---|---|---|---|
| Flow Chart comparison | **7578958** | | | |
| Control Plan comparison | **7578958** | | | |
| FMEA study | **Wafer mounting: 7202148**<br>**Sawing: 7202244**<br>**Die attach: 7202246**<br>**Wire bonding: 7202248**<br>**Molding: 7202042**<br>**Crop: 7202135** | | | |
| Construction analysis | | | **TSSOP8 – 38_06** | Conform to assembly specification |

## 3.2 Assembly and FT qualification results

| | TV1 | TV2 | TV3 | Comment |
|---|---|---|---|---|
| Package type | TSSOP8 | TSSOP8 | TSSOP8 | |
| Assembly report | CZ61907N01 | CZ6190670A | CZ60705501 | Conform to ST specification |
| Lot average yield | 99.05% | 98.04% | 98.52% | |
| Parameter distribution | Done on 78u | Done on 78u | Done on 78u | Conform to datasheet specification |

## 3.3 ESD and Reliability qualification results

| Tests | Conditions | Step | TV1 | TV2 | TV3 | Comments |
|---|---|---|---|---|---|---|
| | | | 0358 | 0393 | 0922 | |
| HTB | **Tamb=150°C for TV1 and TV2**<br>**Tamb=125°C for TV3**<br>Vs=absolute max rating | 168h<br>1000h | **0/78**<br>**0/78** | **0/78**<br>**0/78** | **0/78**<br>**0/78** | Room temperature and hot test at beginning and end of the test |
| OLT | Tj=150C<br>Vs=Max operating | | | | | Not applicable |
| *THB | Ta=85C RH=85%<br>Vs=nominal | 168h<br>1000h | **0/78**<br>**0/78** | **0/78**<br>**0/78** | **0/78**<br>**0/78** | Room temperature and hot test at beginning and end of the test |
| *TMC | Ta=-65/+150C | 100Cy<br>500 Cy<br>1000 Cy | **0/78**<br>**0/78**<br>**0/78** | **0/78**<br>**0/78**<br>**0/78** | **0/78**<br>**0/78**<br>**0/78** | Hot test at beginning and end of the test |
| *PPT | Ta=121C P=2atm | 168h<br>240h | **0/78**<br>**0/78** | **0/78**<br>**0/78** | **0/78**<br>**0/78** | |
| Jedec Level | Jedec1=168H THB + 3 IR reflow soldering | | **0/15** | **0/15** | **0/15** | Precon J1, 260°C |

* preconditioning Jedec level 1 performed prior to test

Drift analysis

| | HTB | | THB | |
|---|---|---|---|---|
| | 168h | 1000h | 168h | 1000h |
| TV1 Vio drift in mV | 0.108 | 0.101 | 0.123 | 0.159 |
| TV2 Vio drift in mV | 0.449 | 0.454 | 0.182 | 0.267 |
| TV3 Vio drift in mV | 0.046 | 0.106 | 0.199 | 0.031 |

Maximum limit specification 0.5 mV for operational amplifier (0358 and 0922) and 0.8mV for comparator (0393).

# Conclusion

All results are conforming to ST specification.
The TSSOP 8 assembly line in ST Bouskoura plant is qualified for standard linear IC's

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