PRODUCT/PROCESS CHANGE NOTIFICATION

PCN DSG/03/288

DSG - Discretes & Standard ICs Group
SOD, SOT housed components
Lead-Free Connections

	PCN DSG/03/288	
Product Family /Commercial Product	All SOD, SOT housed components	
Type Of Change	Package assembly material change	
Reason For Change	Lead-Free market requirements and ROHS directive	
Description of the change	ECOPACK specification for Lead-Free connections	
Forecasted date of change	02-Jan-2004	
Forecasted date of samples for customer	12-Sep-2003	
Forecasted date for **STMicroelectronics** change qualification report availability	12-Sep-2003	
Marking to identify changed product	Date code + letter "E" marking whenever possible	
Description of qualification program	See Attached Qualification Plan	
Product Line(s) and/or Part Number(s)	See Attached List	
Manufacturing Location(s)		
Estimated Date of first shipment	09-Jan-2004	
Division Product Manager	C. NOPPER	Date: Sep.12 ,03
Division Q.A. Manager	A. BESSON	Date: Sep.12 ,03

Customer Acknowledgement of Receipt — PCN DSG/03/288

Please sign and return to STMicroelectronics Sales Office

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

Remark

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PRODUCT/PROCESS
CHANGE NOTIFICATION

PCN DSG/03/288

DSG – Discretes & Standard ICs Group

SOD, SOT housed surface mount components :

Lead-Free Component Connections

WHY THIS CHANGE?

The purpose of this change is to meet the **LEAD-FREE** requirements of the market and the ROHS (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment) directive.

LEAD-FREE components are defined by STMicroelectronics as **ECOPACK®** components and the implementation of the ECOPACK specification includes the suppression of Lead (Pb) metal in the alloys used for the components lead finish.

Besides the change of lead finish, a change in materials (frame, glue or moulding compound) may occur in several cases in order to meet the higher soldering temperature constraints required for lead-free soldering using in particular IPC/JEDEC STD-020B standard as reference. Should it be the case, the description of such a change in materials is given below.

WHAT IS THE CHANGE?

The connections coating used for SOD/SOT housed components meeting the ECOPACK specification will be **Tin (Sn)** post assembly plating.

ECOPACK components can be assembled with both **current SnPb** and **SnAgCu lead-free** PCB assembly processes.

Besides the change of lead finish, **no change in materials** will be made for the SOD/SOT housed components to meet the ECOPACK specification.

Moisture sensitivity testing of test vehicle devices indicates **no negative impact** to moisture performance with a peak reflow temperature of 250°C according to IPC/JEDEC JSTD-020B.

No negative impact to moisture performance was detected with the additional reflow profile with peak temperature of **260°C** introduced by ST, Philips and Infineon for testing MSL of small devices.

Except for lead finishing, **same test and assembly processes** will continue to be implemented, with no impact on the mechanical, thermal and electrical parameters of the products with reference to the product datasheet.

The identification of ECOPACK products will be achieved through **specific labelling** on component boxes. There will be no change in the product code, in the packing modes and the standard delivery quantities.

HOW AND WHEN?

Qualification and test results:

The **reliability tests plan** supporting the qualification program for the announced change is provided in the appendix 1 attached to this document. The **reliability test report** of the qualification program is available on request.

Sampling:

Samples of the devices used as **test vehicle** are available on request according to the list provided in the appendix 2 of the present document.

<u>Change implementation schedule:</u>

The **production start** and **first shipments** will be implemented as indicated in the roadmap table below, depending on our work in progress and materials availability. All given dates are subject to variation depending on our test results and assembly capabilities.

<u>Marking and traceability</u>:

Whenever possible, the letter "**E**" will be added in the marking pattern beside the ST logo on the package body. The traceability for the ECOPACK devices will also be ensured by the **date code,** by the **"ECOPACK" indication** on the boxes labelling and by the **Q.A. number**.

<u>Roadmap table</u>:

<table>
<tr><th>Package</th><th>Assembly Locations</th><th>Pb-free coating material</th><th>Samples Availability</th><th>Production Start</th><th>1st Shipments (*)</th></tr>
<tr><td>SOD-123</td><td>CHINA</td><td rowspan="11">Tin</td><td rowspan="11">See appendix 2</td><td rowspan="11">Wk 01-04</td><td rowspan="11">Wk 02-04</td></tr>
<tr><td>SOD-323</td><td>MALAYSIA</td></tr>
<tr><td>SOT-223</td><td>MALAYSIA
PHILIPPINES</td></tr>
<tr><td>SOT-23</td><td>CHINA
MALAYSIA
PHILIPPINES</td></tr>
<tr><td>SOT23-5L</td><td>MALAYSIA</td></tr>
<tr><td>SOT23-6L</td><td>MALAYSIA</td></tr>
<tr><td>SOT23-8L</td><td>MALAYSIA</td></tr>
<tr><td>SOT-323</td><td>CHINA
MALAYSIA</td></tr>
<tr><td>SOT323-5L</td><td>CHINA
MALAYSIA</td></tr>
<tr><td>SOT323-6L</td><td>CHINA
MALAYSIA</td></tr>
<tr><td>SOT-89</td><td>THAILAND</td></tr>
</table>

(*) Delivery of current product versions will continue while stocks last.

Appendix 1: Reliability tests for qualification program
Appendix 2: List of available sample parts by package.

SOD, SOT housed surface mount components: Lead-Free Component Connections

Reliability & Lead-free compatibility tests plan for QUALIFICATION PROGRAM

LEAD-FREE COMPATIBILITY TESTS				
TEST	**CONDITIONS**	**DURATION**	**NBR OF LOTS**	**SAMPLE SIZE**
SOLDERABILITY IN SnPb BATH	Dry Aging 155°C – Dipping 220°C Wet Aging 100°C – Dipping 220°C Wet Aging 100°C – Dipping 260°C	16Hrs - 3s 8Hrs - 3s 8Hrs - 3s	3	22 pcs / lot
SOLDERABILITY IN SnAgCu BATH	Dry Aging 155°C – Dipping 245°C Wet Aging 100°C – Dipping 245°C Wet Aging 100°C – Dipping 260°C	16Hrs - 3s 8Hrs - 3s 8Hrs - 3s	3	22 pcs / lot
WETTING BALANCE TEST	SnPb bath - 235°C SnAgCu bath - 245°C	15s	3	10 pcs / lot
Whiskers inspection reject criteria: no whisker > 50µm length	- At to - After 500 Hrs (85°C 85%RH) - After 2, 4 and 6 months at 55°C - After thermal cycling (-35 / +125°C – 500 cycles)	-	1	10 pcs / lot

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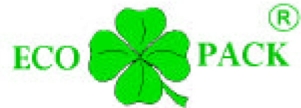

SOD, SOT housed surface mount components: Lead-Free Component Connections

List of available samples

Samples available	Package
-	**SOD-123**
BAT60JFILM	**SOD-323**
LD1117, STN3PF06, STN715, X0202MN 5BA4, Z0103MN 5AA4, Z0107SN 5AA4, Z0109MN 5AA4, Z0109SN 5AA4	**SOT-223**
BC547C	**SOT-23**
ESDA14V2SC5, ESDA6V1SC5, LD2980, TS951ILT, TS321ILT	**SOT23-5L**
DALC208SC6, ESDA17SC6, ESDA5V3SC6, ESDA6V1-5SC6, ESDA6V1BC6, ESDA6V1SC6, KBMF01SC6, STT818B	**SOT23-6L**
-	**SOT23-8L**
BC847CW	**SOT-323**
74V1G32CTR , ESDA6V1W5, EMIF01-10005W5	**SOT323-5L**
ESDA6V1-5W6, USBUF01W6	**SOT323-6L**
L78L05	**SOT-89**

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