



**PRODUCT/PROCESS
CHANGE NOTIFICATION**

PCN DSG/03/380

**DSG-DISCRETES & STANDARD IC s- LEADFREE
PLATING FOR SOP, TSSOP, SSOP, QSOP
PACKAGES.**

PCN DSG/03/380		
Product Family /Commercial Product	All products in SOP, TSSOP, SSOP, QSOP PACKAGES.	
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 connection	
Forecasted date of change	24-Feb-2004	
Forecasted date of samples for customer	28-Nov-2003	
Forecasted date for STMicroelectronics change qualification report availability	28-Nov-2003	
Marking to identify changed product	Letter E on package body	
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	24-Feb-2004	
Division Product Manager	JC KAIRE	Date: Nov.28 ,03
Division Q.A. Manager	F PACCARD	Date: Nov.28 ,03



PCN DSG/03/380	
Customer Acknowledgement of Receipt	
Please sign and return to STMicroelectronics Sales Office	
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved Remark	Name:
	Title:
	Company:
	Date:
	Signature:
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**PRODUCT/PROCESS
CHANGE NOTIFICATION**

PCN DSG/03/380

DSG – Discretes & Standard ICs Group

Products in SOP, TSSOP, SSOP & QSOP packages:

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 components in SOP, TSSOP, SSOP & QSOP meeting the ECOPACK specification will be **Tin (Sn)** post assembly plating with bake or pre-plated **NiPdAu**.

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

Besides the change of lead finish, some material changes (Glue and molding compound) will be made for the components in SO Narrow and Wide, TSSOP, SSOP & QSOP 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 temperature of **260°C** introduced by ST, Philips and Infineon for testing MSL of small devices. Moreover, we have noticed an improvement for some package.

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.

Although several lead-free solutions may be implemented for one package, a unique lead-free solution will be used for each given product.

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 this qualification program is available on request.

Sampling:

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



Change implementation schedule:

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.

Marking and traceability:

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 by the "**ECOPACK**" **indication** on the boxes labelling and by the **Q.A. number**.

Roadmap table:

Package	Assembly Locations	Pb-free coating material	Material set change	Samples Availability	Production Start	1st Shipments (*)
QSOP28	Philippines	Sn	None	See appendix 2	Wk 4-08	Wk 4-09
SSOP20	Philippines	Sn	None		Wk 4-08 (**)	Wk 4-09 (**)
SO-8	China Malaysia Morocco	NiPdAu	Glue Hitachi 4900ST		Wk 4-08 (***)	Wk 4-09 (***)
SO-8 power	Malaysia Morocco	Sn	None			
SO-14	Malaysia Morocco	NiPdAu	Glue Hitachi 4900ST			
SO-16	Malaysia	NiPdAu	Glue Hitachi 4900ST			
SO-8 Wide	China	Sn	Yes			
SO-20	Malaysia	NiPdAu	Glue Hitachi 4900ST Resin Sum itomo 7026			
	Korea Philippines	Sn	None		Wk 4-08	Wk 4-09
MiniSO8	Malaysia	Sn	None			
TSSOP8 TSSOP14/16 TSSOP20 TSSOP28	Malaysia Morocco	NiPdAu	None			
	Korea	Sn	None			
	Philippines	Sn	Glue Ablebond 8390 Resin Sum itomo G700			

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

(**) Already in production for standard linear ICs (PCN DSG-COM/03/145)

(***) So-8 per power product

Appendix 1: Reliability tests for qualification program

Appendix 2: List of available sample parts by package.





SOP, QSOP, SSOP, TSSOP housed 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 150°C – Dipping 220°C Wet Aging 85°C/8 5%RH – Dipping 220°C	8Hrs*** - 5s** 8Hrs*** - 5s**	1 lot min per package / line	10 pcs / lot min
SOLDERABILITY IN SnAgCu BATH	Dry Aging 150°C – Dipping 245°C Wet Aging 85°C/85%RH – Dipping 245°C	8Hrs - 3s 8Hrs - 3s	1 lot min per package / line	10 pcs / lot min
WETTING BALANCE TEST	SnPb bath - 235°C SnAgCu bath - 245°C	10s	1 lot min per package / line	10 pcs / lot
Whiskers inspection (*) reject criteria: no whisker with length > 50µm	- 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 lot min per package / line	10 pcs / lot

(*) Only for Sn plating (**) 10s for preplated NiPdAu leadframe (***)16hrs for solder coated units

QUALITY RELIABILITY TESTS (*)				
TEST	CONDITIONS	DURATION	NBR OF LOTS	SAMPLE SIZE
MSL assessment	Reflow profile with max peak at 260 +/-5°C for small packages, at 245 +/-5°C for large packages	-	3	15 pcs / lot
Temperature Humidity Bias (THB) JESD22-A101	Tamb = 85°C RH = 85%	1000 hours	3	77 pcs / lot
Pressure Cooker Test (PCT) JESD22-A102	Tamb = 121°C 2 atm. 100%RH	96 Hours	3	77 pcs / lot
Thermal Cycling (TC) JESD 22A-104	-55°C/+150°C - Air/Air	1000 cycles	3	77 pcs / lot
HTRB JESD22-A108	Tj = Tjmax	1000 hours	3	40 pcs / lot

(*) Test performed on SMDs when beside the change of connection coating, a change in materials (frame, glue or molding compound) is made to meet the higher soldering temperature constraints required for lead-free soldering according to IPC/JEDEC JSTD020B standard.

NOTE: A preconditioning sequence is systematically performed as per JESD-020B standard before THB, PCT and TC tests.



SOP, QSOP, SSOP, TSSOP housed components: Lead-Free Component Connections

List of available samples

Samples availables	Package
ST1284-01A8	QSOP28
ESDA6V1Q6-18RL, ESDA6V2S6RL	SSOP20
ACS102-5T1-TR, CLP190ERL, KF25BD-TR, LCP1511DRL, LD1117D33-TR, LM258DT, LM358DT, LM2904DT, LM293DT, LM393DT, LM2903DT, MC34063ABD, STS3DNF30L, STS5DNE30L, TL431CDT, TL082CDT, TPN3021RL, TSM103WIDT, TS4990ID, TL1431CD, VIPer12AS, ,	SO-8
LM324DT, LM339DT, M74HC14RM13TR, TL084CDT	SO-14
ESDA6V1B5RL, TSM104WAID, TSM104WID	SO-16
LCP02-150B1RL	SO-8 Wide
ACS302-5T3-TR, ESDA6V1S3RL, ESDA6V2HPRL, ST75185CDR	SO-20
TS4890IST	MiniSO8 (TSSOP8 body3mm)
STC5NF30V, STC6NF30V, TS462IPT	TSSOP8
74LCX74TTR, LM224PT, LM2901PT	TSSOP14
TS925IPT	TSSOP16
ST75185CPR	TSSOP20

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