



PRODUCT/PROCESS CHANGE NOTIFICATION

PCN DSG/03/368

**"Discrete and Standard ICs Group":Products
in Through-Hole packages:Lead Free
component connections**

PCN DSG/03/368		
Product Family /Commercial Product	All product in Through Hole 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 connections.	
Forecasted date of change	10-Feb-2004	
Forecasted date of samples for customer	27-Nov-2003	
Forecasted date for STMicroelectronics change qualification report availability	27-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	17-Feb-2004	
Division Product Manager	DSG Product MGRs	Date: Nov.27 ,03
Division Q.A. Manager	DSG QA MGRs	Date: Nov.27 ,03



Customer Acknowledgement of Receipt		PCN DSG/03/368
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:	



DSG – Discretes & Standard ICs Group

Products in Through-Hole 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 Harmful Substances) directive.

While a wide variety of electronic parts used in electronic equipment contain lead, worldwide directives stipulate that lead contained in packaging must be reduced. Lead is classified as a harmful substance as it may cause health problems if ingested. Because of these considerations, the conversion to making lead-free products is underway on a global scale.

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

WHAT IS THE CHANGE?

Nature of Change: Lead-free connections coating

Affected process: Tin plating and Tin dipping processes related to through-hole devices

Affected products: All Power and Signal BIP & Mosfet, Vipower, STD ICs, STD linear, Thyristors, Rectifiers and Protection devices

Detailed description of change:

Component Material	Current Process	New Process	Involved Assembly sites
Die attach material	Pb/Sn/Ag soft solder Au (eutectic) Glue		China India Korea Malaysia
Lead finishing	Tin plating (SnPb85/15) Tin dipping (SnPb60/40)	Matte Tin plating(*) Matte Tin dipping (Sn or SnAgCu)	Morocco Philippines Singapore

(*) With bake

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 these components to meet the ECOPACK specification (see roadmap table). No negative impact on **mechanical, thermal and electrical parameters** of the products, with reference to the product datasheet, has been detected. 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 programme 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** or **dummy samples** will be available on request according to the schedule provided in the roadmap table below.

Change implementation schedule:

The **production changes** 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 quality results and test and assembly capabilities.

Marking and traceability:

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 be ensured by the **date code**, by the “**ECOPACK**” **indication** on the boxes labelling and by the **Q.A. number**.

Roadmap table:

Package	Assembly location	Pb-free material	Samples Available	Production Start	1st Shipments (*)
DIP-14	China	Tin	See appendix 2	Wk 07-04	Wk 08-04
DIP-14	Malaysia	Tin			
DIP-16	Malaysia	Tin			
DIP-20	Philippines	Tin			
DIP-8 / MiniDIP	China	Tin			
DIP-8 / MiniDIP	Philippines	Tin			
DOP3/TOP3	Philippines	Tin			
Heptawatt	Morocco	Tin			
I ² PAK	China	Tin			
I ² PAK	Morocco	Tin			
IPAK	China	Tin			
IPAK	Morocco	Tin			
IPPAK	China	Tin			
ISOWATT218	Korea	Tin			
ISOWATT218	Morocco	Tin			
ISOWATT220	Morocco	Tin			
Max220	Morocco	Tin			
Max247	Morocco	Tin			
Multiwatt	Singapore	Tin			
Pentawatt HV	Morocco	Tin			
Pentawatt HV2	Morocco	Tin			
Pentawatt HV2	Philippines	Tin			
PPAK	China	Tin			
SOD/SOT-93	Morocco	Tin			
SOD/SOT-93	Philippines	Tin			
SOT-32	India	Tin			
SOT-32	Morocco	Tin			
SOT-82	Morocco	Tin			
TO18	Malaysia	Tin			
TO202-1	Philippines	Tin			
TO202-3	Philippines	Tin			
TO-220	China	Tin			
TO-220	Korea	Tin			
TO-220	Malaysia	Tin			
TO-220	Morocco	Tin			
TO-220 triacs	Morocco	Tin			
TO-220	Philippines	Tin			
TO-220FP	China	Tin			
TO-220FP	Morocco	Tin			
TO-220FP	Philippines	Tin			
TO-247	Malaysia	Tin			
TO-247	Morocco	Tin			
TO-247	Philippines	Tin			
TO3	Malaysia	Tin			
TO39	Malaysia	Tin			
TO5	Malaysia	Tin			
TO-92	China	Tin			
TO-92	India	Tin			
TO-92	Korea	SnAgCu			
TO-92	Malaysia	Tin			
TO-92	Philippines	Tin			

(*) 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.



Products in Through-Hole packages: 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	Wet Aging 100°C – Dipping 245°C	8Hrs - 5s	1 lot min per package / line	10 pcs / lot min
SOLDERABILITY IN SnAgCu BATH	Wet Aging 100°C – Dipping 245°C	8Hrs - 5s	1 lot min per package / line	10 pcs / lot min
WETTING BALANCE TEST	SnPb bath - 235°C SnAgCu bath - 245°C	15s	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

(1) Only for Sn plating



Products in Through-Hole packages: Lead-Free Component Connections

List of available samples

Samples available	Package
LM393N	DIP-8
M74HC14B1R, LM324N	DIP-14
-	DIP-16
-	DIP-20
BTA26-600B	DOP3/TOP3
-	Heptawatt
BULB128-1	I ² PAK
BULD118D-1	IPAK
-	IPPAK
ST2001HI, ST1803DHI, ST2009DHI, ST2310DHI	ISOWATT218
STTA512F	ISOWATT220
-	Max220
-	Max247
-	MiniDIP
-	Multiwatt
-	Pentawatt HV
STIL04-P5	Pentawatt HV2
-	PPAK
TIP36C	SOD/SOT-93
BD135, BD438, BD678, BD680, BULT118	SOT-32
BULK128	SOT-82
2N2222A	TO18
-	TO202-1
-	TO202-3
BDX53B, BTA12-800CW, BTB24-800B, BTB24-600BRG, BUL742C, L7805CV, LD1085V36, LF50CDT-TR, TIP122, STPS20H100CT, TYN410	TO-220
BD242BFP, BUL312FP, L78M05CP, STP14NF12FP, STP6NC60, STTH12R06FP, STTH15R06FP	TO-220FP
BUW1215, STPS3045CW, STW20NB50	TO-247
2N3055	TO3
2N3440	TO39
2N4033	TO5
ACS108-5SA, L78L05ACZ-AP, PN2222A, STQ1NC454R-AP, STQ1NK60ZR-AP, STX13003, STX790A, STX715, STX817, TL431CZ, X00602MA 1AA2	TO-92

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