



PRODUCT/PROCESS CHANGE NOTIFICATION

PCN IPG-IPC/14/8653
Dated 18 Aug 2014

ST1CC40 : Metal mask change

Table 1. Change Implementation Schedule

Forecasted implementation date for change	01-Nov-2014
Forecasted availability date of samples for customer	15-Oct-2014
Forecasted date for STMicroelectronics change Qualification Plan results availability	11-Aug-2014
Estimated date of changed product first shipment	01-Jan-2015

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	ST1CC40DR and ST1CC40PUR
Type of change	Product design change
Reason for change	Yield improvement
Description of the change	We have introduced a metal mask modification on the product line UI94 in order to improve the yield. This change will not affect any conditions related to form, fit, function, quality and reliability of this product.
Change Product Identification	By a new Finished Goods code
Manufacturing Location(s)	

DOCUMENT APPROVAL

Name	Function
Merisio, Massimiliano	Marketing Manager
Merisio, Massimiliano	Product Manager
Moretti, Paolo	Q.A. Manager



ATTACHMENT TO PCN IPG-IPC/14/8653

WHAT:

We have introduced a metal mask modification on product line UI94.

The involved products are ST1CC40DR and ST1CC40PUR.

This change will not affect any conditions related to form, fit, function, quality and reliability of these products.

WHY:

In order to improve the yield.

HOW:

The new revision has been qualified by extension on the former version, see attached Product Reliability Certificate.

A new internal part number (Finished Goods code) will identify the change.

WHEN:

The change should be implemented starting November 2014, based on material availability and relevant version phase out and phase in.

Samples can be delivered upon request, in 6/8 weeks A.R.O.



Reliability Report

New Product

ST1S40P-UA27Y1P

VFDFPN 4X4X1.0 8L PITCH 0.8 package

General Information

Product Line	<i>UA27X1P</i>
Product Description	<i>4A, 900KHz, MONOLITHIC SYNCHRONOUS STEP- DOWN REGULATOR</i>
P/N	<i>ST1S40IPUR</i>
Product Group	<i>MSH-IPC</i>
Product division	<i>LINEAR & INTERFACE</i>
Package	<i>VFDFPN 4X4X1.0 8L PITCH 0,8</i>
Silicon Process technology	<i>BCD6S</i>
Production mask set rev	<i>AY19A</i>

Locations

Wafer fab	<i>CATANIA</i>
Assembly plant	<i>Carsem S</i>
Reliability Lab	<i>Catania Site</i>
Reliability assessment	<i>Pass</i>

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.1	21-Sept-2010	7	Angelo Donzuso Giuseppe Giacopello	Giovanni Presti	Second issue

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.

This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.



TABLE OF CONTENTS

1	APPLICABLE AND REFERENCE DOCUMENTS	3
2	GLOSSARY	3
3	RELIABILITY EVALUATION OVERVIEW	3
3.1	OBJECTIVES	3
3.2	CONCLUSION	3
4	DEVICE CHARACTERISTICS	4
4.1	DEVICE DESCRIPTION	4
4.2	CONSTRUCTION NOTE	4
5	TESTS RESULTS SUMMARY	5
5.1	TEST VEHICLE	5
5.2	TEST PLAN AND RESULTS SUMMARY	5
6	ANNEXES	6
6.1	DEVICE DETAILS	6
6.2	TESTS DESCRIPTION	7
6.3	DRIFT ANALYSIS	7



1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

2 GLOSSARY

DUT	Device Under Test
SS	Sample Size

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

ST1S40-UA27X1P in VFDFPN 4X4X1.0 8L (New Product Qualification)

3.2 Conclusion

Final reliability results are positive.

Present evaluation is valid for ST1S40I, ST1CC40 and ST1S41 versions



4 DEVICE CHARACTERISTICS

4.1 Device description

[ST1S40 V13 Datasheet](#)

The ST1S40 is a step-down high-efficiency PWM current mode switching regulator able to provide up to 4A of output current. The device operates with an input supply range from 4V to 18V and provide an adjustable output voltage from 0.8V (VFB) to $0.85 \cdot V_{IN_SW}$ [$V_{out} = V_{FB} \cdot (1 + R1/R2)$]. It either operates with 800KHz fixed frequency. The high switching frequency allows the use of tiny SMD external components, while the integrated synchronous rectifier saves the use of the schottky diode. The ST1S40 provides excellent transient response. The device is protected against thermal overheating, switching over current and output short circuit. The ST1S40 is the ideal choice for Point of Load regulators or for LDO pre-regulation.

4.2 Construction note

P/N ST1S40IPUR	
Wafer/Die fab. information	
Wafer fab manufacturing location	CATANIA
Technology	BCD6S
Process family	BCD6S-3M_AB
Die finishing back side	Cr/NiV/Au
Die size	1725 X 1840 UM
Bond pad metallization layers	3
Passivation type	P-VAPOX/NITRIDE/POLYIMIDE(PIQ)
Poly silicon layers	3
Assembly information	
Assembly site	CARSEM S
Package description	VDFDPN 4X4X1.0 8L PITCH 0.8
Molding compound	Sumitomo G770H
Die attach material	Loctite QMI519
Die pad size	91x91 UM
Wire bonding process	n.a.
Wires bonding materials/diameters	Au 1.3mils
Final testing information	
Testing location	CATANIA
Tester	ASL3K
Test program	UA27_FT



5 TESTS RESULTS SUMMARY

5.1 Test vehicle

Lot #	Diffusion Lot	Assy Lot	Trace Code	Package	Product Line	Comments
1	P9204XHA	S314611991	MY3I*UA27X1P	VFDFPN 4X4X1.0 8L PITCH 0.8	UA27	946

5.2 Test plan and results summary

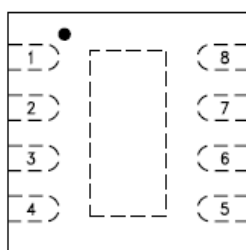
P/N **ST1S40IPUR**

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS	Note
						Lot 1	
Die Oriented Tests							
HTOL	N	JESD22 A-108	Ta = 125°C, BIAS: Vin =+20V VFB = +2,5V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	
HTSL	N	JESD22 A-103	Ta = 150°C	45	168 H	0/45	
					500 H	0/45	
					1000 H	0/45	
Package Oriented Tests							
PC		JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Over Reflow @ Tpeak=260°C 3 times	232	Final	Pass	No die delamination
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	77	96 H	0/77	
					168 H	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	77	100 cy	0/77	
					200 cy	0/77	
					500 cy	0/77	
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS: Vin =+20V VFB = +2,5V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	

6 ANNEXES

6.1 Device details

6.1.1 Pin connection

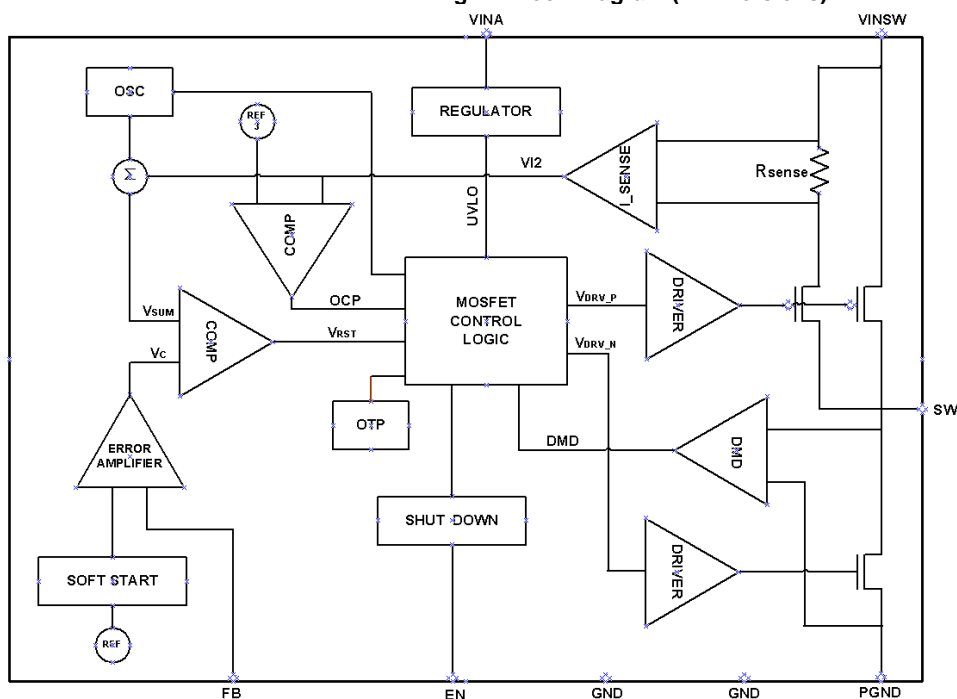


PIN DESCRIPTION

Symbol	Pin Number		Function
	SO8-EP MLP-8L	SO8-BW	
SW	7	1	Switching node to be connected to the inductor
PGND	8	2	Power Ground
VIN_A	1	3	Analog Input Supply Voltage to be tied to VIN power supply source
PG/INH	2	4	Power Good/Inhibit pin active low. Connect to VIN_A if not used
V _{FB}	3	5	Feedback Voltage to be connected to external voltage divider to set the V _{out} from 0.8V up to 0.85*VIN_SW
AGND	4	6	Analog Ground
GND		7	Ground
VIN_SW	6	8	Power Input Supply Voltage to be tied to VIN power supply source
NC	5		No Connected
GND	Epad	---	Ground

6.1.2 Block diagram

Fig. 2: Block Diagram (INH Versions)





6.2 Tests Description

Test name	Description	Purpose
Die Oriented		
HTOL High Temperature Operating Life	The device is stressed in static or dynamic configuration, approaching the operative max. absolute ratings in terms of junction temperature and bias condition.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. The typical failure modes are related to, silicon degradation, wire-bonds degradation, oxide faults.
HTSL High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
Package Oriented		
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
AC Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
TC Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
THB Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.

6.3 Drift Analysis

No parameter deviation.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

RESTRICTIONS OF USE AND CONFIDENTIALITY OBLIGATIONS:

THIS DOCUMENT AND ITS ANNEXES CONTAIN ST PROPRIETARY AND CONFIDENTIAL INFORMATION. THE DISCLOSURE, DISTRIBUTION, PUBLICATION OF WHATSOEVER NATURE OR USE FOR ANY OTHER PURPOSE THAN PROVIDED IN THIS DOCUMENT OF ANY INFORMATION CONTAINED IN THIS DOCUMENT AND ITS ANNEXES IS SUBMITTED TO ST PRIOR EXPRESS AUTHORIZATION. ANY UNAUTHORIZED REVIEW, USE, DISCLOSURE OR DISTRIBUTION OF SUCH INFORMATION IS EXPRESSLY PROHIBITED.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

© 2014 STMicroelectronics - All rights reserved.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

