



PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-SLI/09/4923
Notification Date 09/11/2009

**Assembly and Test capacity conversion to copper wires
at ASE- WEIHAI for Voltage Regulator products, housed in D2PAK package**

Table 1. Change Implementation Schedule

Forecasted implementation date for change	09-Nov-2009
Forecasted availability date of samples for customer	04-Sep-2009
Forecasted date for STMicroelectronics change Qualification Plan results availability	04-Sep-2009
Estimated date of changed product first shipment	11-Dec-2009

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	See attached list
Type of change	Package assembly material change
Reason for change	To increase productivity, improve service to Customers
Description of the change	Following Divisional commitment towards a continuous improvement philosophy we're converting our manufacturing capabilities in the ASE-WEIHAI plant for Voltage Regulators products housed in D2PAK package, to copper wires. No change in electrical and Quality performances.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	The full traceability of the parts will be ensured by the date-code and Q.A. number
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt		PCN APM-SLI/09/4923
Please sign and return to STMicroelectronics Sales Office		Notification Date 09/11/2009
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved	Name:	
	Title:	
	Company:	
	Date:	
	Signature:	
Remark		

DOCUMENT APPROVAL

Name	Function
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**PRODUCT/PROCESS
CHANGE NOTIFICATION**

Analog, Power and MEMS Group

**Assembly and Test capacity conversion to copper wires at ASE- WEIHAI
for Voltage Regulator products, housed in D2PAK package.**



WHAT:

Please be informed that we're converting our manufacturing capabilities in the ASE-WEIHAI plant for Voltage Regulators products housed in D2PAK package, to be able to deliver parts using copper wires.

The involved product series and the relevant change hereby communicated are listed in the table below:

Product Family Code	Product Family Description	Commercial Product / Series	Copper Wires
32	VOLTAGE REGULATOR	L4940/41D2T	yes
		L78xxCD2T	yes
		L79xxCD2T	yes
		KD1084D2Txx	yes
		LD1085D2Mxx	yes
		LD1086D2Mxx	yes
		LD1580P2T	yes
		LD29150P2xx	yes
		LD29300D2Txx	yes
		LD29300P2Mxx	yes
		LM2/317D2T	yes

Any other Product related to the above series manufactured in the ASE plant, even if not expressly included or partially mentioned in the attached table, are affected by these changes.

WHY:

To increase productivity, improve service to Customers.

HOW:

By converting production in the ST's already approved site of ASE-WEIHAI.

These changes will not impact the electrical, thermal and dimensional parameters for ST's products, maintaining unchanged current information published in the relevant datasheets.

There are as well neither changes in the packing modes nor in the standard delivery quantities.

WHEN:

The conversion of the production lines and the ramp up will be finalized within week 46 2009.

Qualification program and results availability:

The reliability tests report and the qualification results are provided in appendix 1 to this document.

Samples availability:

Samples of the test vehicle device will be available on request starting from PCN emission date while any other sample request will be processed and scheduled according to cycle time.

Product Family Code	Product Family Description	Part Number - Test Vehicle
32	Voltage REGULATOR	L4940D2M5R-TR/SA

Change implementation schedule:

The production start and first shipments will be implemented according to our work in progress and materials availability:

Product Family	Production Start	1st Shipments
Voltage Regulator	From Week 46 2009	From Week 48-2009

Lack of acknowledgement of the PCN within 30 days will constitute acceptance of the change. After acknowledgement, lack of additional response within the 90 day period will constitute acceptance of the change (Jedec Standard No. 46-C). In any case, first shipments may start earlier with customer's written agreement.

Marking and traceability:

Unless otherwise stated by customer specific requirement, the affected parts assembled in the ASE-WEIHAI plant, will maintain unaltered current marking.

The full traceability of the parts will be ensured by the date-code, Q.A. number and dedicated codification (new F/G).

Please note that ST Team is doing all the best for providing you full visibility about these announced changes and to minimize any negative impact it may occur.

While our Marketing and Sales teams are available for additional information when required, we are looking forward to your renewed confidence in STMicroelectronics as the strategic partner of your choice.

Sincerely Yours.



Reliability Evaluation Report
New BE Material
ASE WEIHAI D2PAK Cu wire

General Information	
Product Line	<i>L568</i>
Product Description	<i>Very low drop 1.5 A regulator</i>
P/N	<i>L4940D2M5R/SA</i>
Product division	<i>Voltage Regulator</i>
Package	<i>D2PAK</i>
Silicon Process technology	<i>AMK 5" BIPOLAR</i>
Production mask set rev.	<i>22330</i>

Locations	
Wafer fab	<i>AMK 5"</i>
Assembly plant	<i>ASE WEIHAI, 994X</i>
Reliability Lab	<i>IMS-APM Catania Reliability Lab</i>
Reliability assessment	<i>Pass.</i>

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	07-Nov-2008	8	A.Riciputo	G.Presti	First 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.
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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
	DEVICE CHARACTERISTICS	4
3.3	DEVICE DESCRIPTION	4
3.4	CONSTRUCTION NOTE	4
4	TESTS RESULTS SUMMARY.....	5
4.1	TEST VEHICLE.....	5
4.2	TEST PLAN AND RESULTS SUMMARY	5
5	ANNEXES.....	6
5.1	DEVICE DETAILS.....	6
5.2	TESTS DESCRIPTION.....	8
5.3	TEST AND RELIABILITY BOARD SCHEMATICS.....	8



1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q100	Stress test qualification for automotive grade integrated circuits
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

2 GLOSSARY

DUT	Device Under Test
SS	Sample Size

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

To qualify VR D2PAK with Cu wire bonding process in ASE WEIHAI,

3.2 Conclusion

Final reliability results are positive.



DEVICE CHARACTERISTICS

3.3 Device description

Very low drop 1.5 A regulator with several fixed output voltages, making it useful in a wide range of industrial and consumer applications.

3.4 Construction note

L4940D2M5R/SA			
Wafer/Die fab. information			
Diffusion Lot	W847NV7		
Wafer fab manufacturing location	AMK 5"		
Technology	BIPOLAR		
Die finishing back side	CHROMIUM/NICKEL/GOLD		
Die size	100 , 116 MI		
Bond pad metallization layers	2		
Passivation type	SiN		
Wafer Testing (EWS) information			
Electrical testing manufacturing location	AMK 5"		
Tester	QT200		
Test program	0019658		
Assembly information			
Assembly Lot	847NV701	847NV707	847NV710
Data Code	907	909	910
Assembly site	ASE WEIHAI, 994X		
Package description	D2PAK		
Molding compound	EME6650RL2L		
Frame material	Bare copper		
Die attach process	Soft solder		
Die attach material	Pb95.5Sn2Ag2.5		
Wire bonding process	Thermosonic Bonding		
Wires bonding materials/diameters	2.0mils Cu wire		
Final testing information			
Testing location	ASE WEIHAI 994X		
Tester	STATEC AZ400		
Test program	8034396		



4 TESTS RESULTS SUMMARY

4.1 Test vehicle

Lot #	Diffusion Lot	Assy Lot	Trace Code	Package	Product Line	Comments
1		847NV701	RWDO*L568FW1	D2PACK	L568	VR18
2	W847NV7	847NV707	RWDO*L568FW1	D2PACK	L568	VR21
3		847NV710	RWDO*L568FW1	D2PACK	L568	VR24

Detailed results in below chapter will refer to P/N and Lot #.

4.2 Test plan and results summary

L4940D2M5R/SA

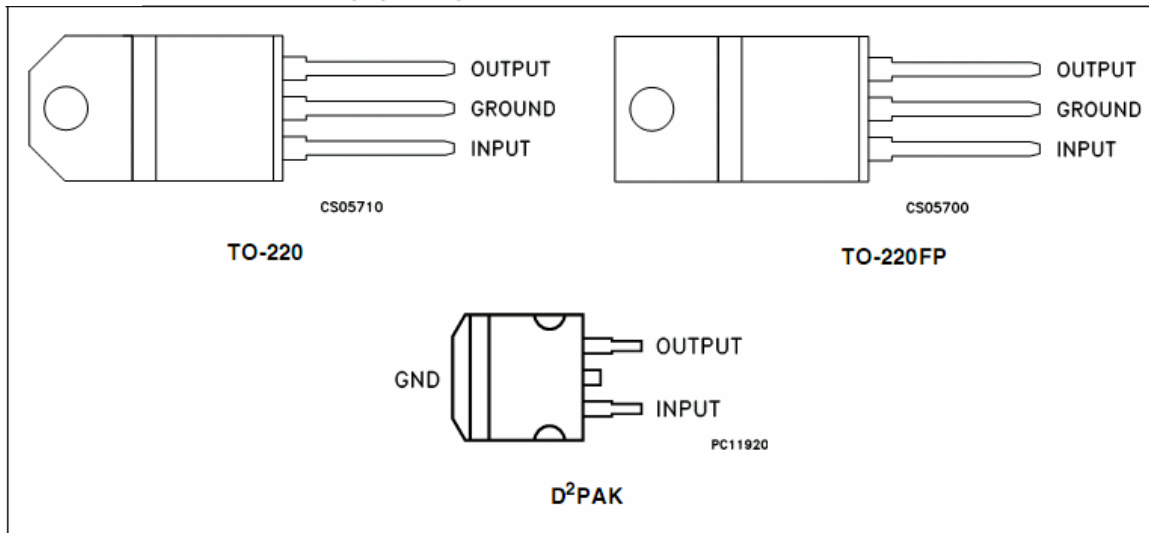
Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS			Note
						Lot 1	Lot 2	Lot 3	
Die Oriented Tests									
HTSL	N	JESD22 A-103	Ta = 175°C	135	168 H 500 H 1000 H	0/45 0/45 0/45	0/45 0/45 0/45	0/45 0/45 0/45	Engineering evaluation
HTSL	N	JESD22 A-103	Ta = 150°C	135	168 H 500 H 1000 H	0/45 0/45 0/45	0/45 0/45 0/45	0/45 0/45 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		Final	Pass	Pass	Pass	
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	231	168 H	0/77	0/77	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	231	100 cy 200 cy 500 cy	0/77 0/77 0/77	0/77 0/77 0/77	0/77 0/77 0/77	
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, Vbias= +24V	231	168 H 500 H 1000 H	0/77 0/77 0/77	0/77 0/77 0/77	0/77 0/77 0/77	

5 ANNEXES

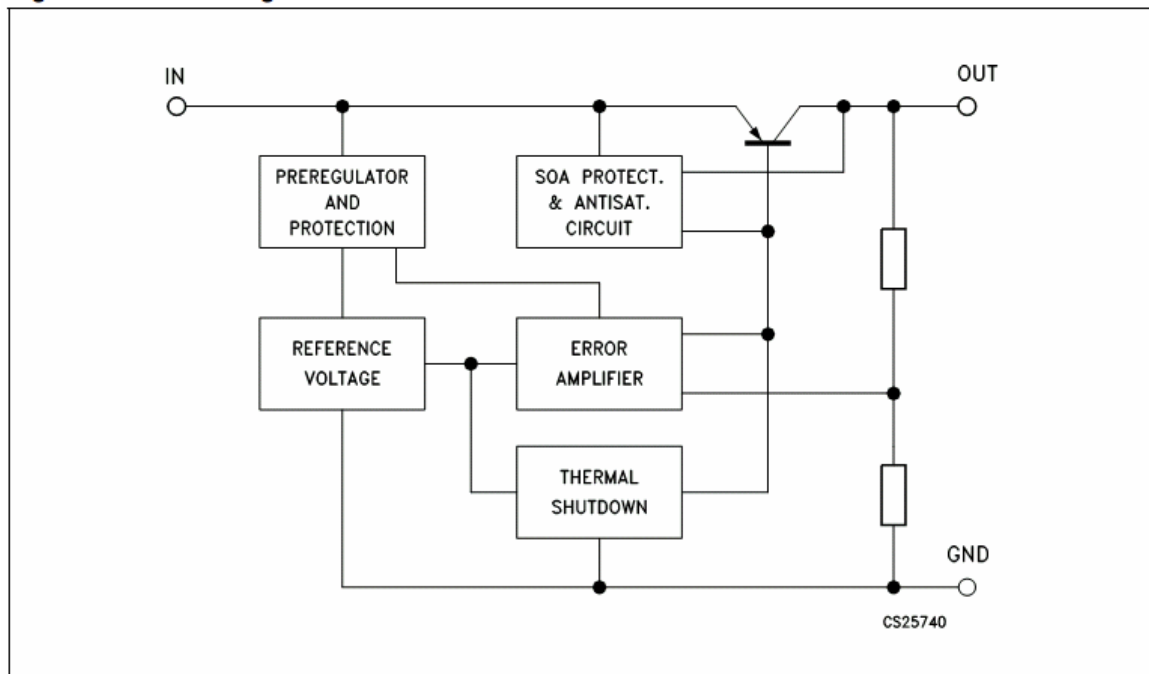
5.1 Device details

5.1.1 Pin connection

Pin connections (top view)

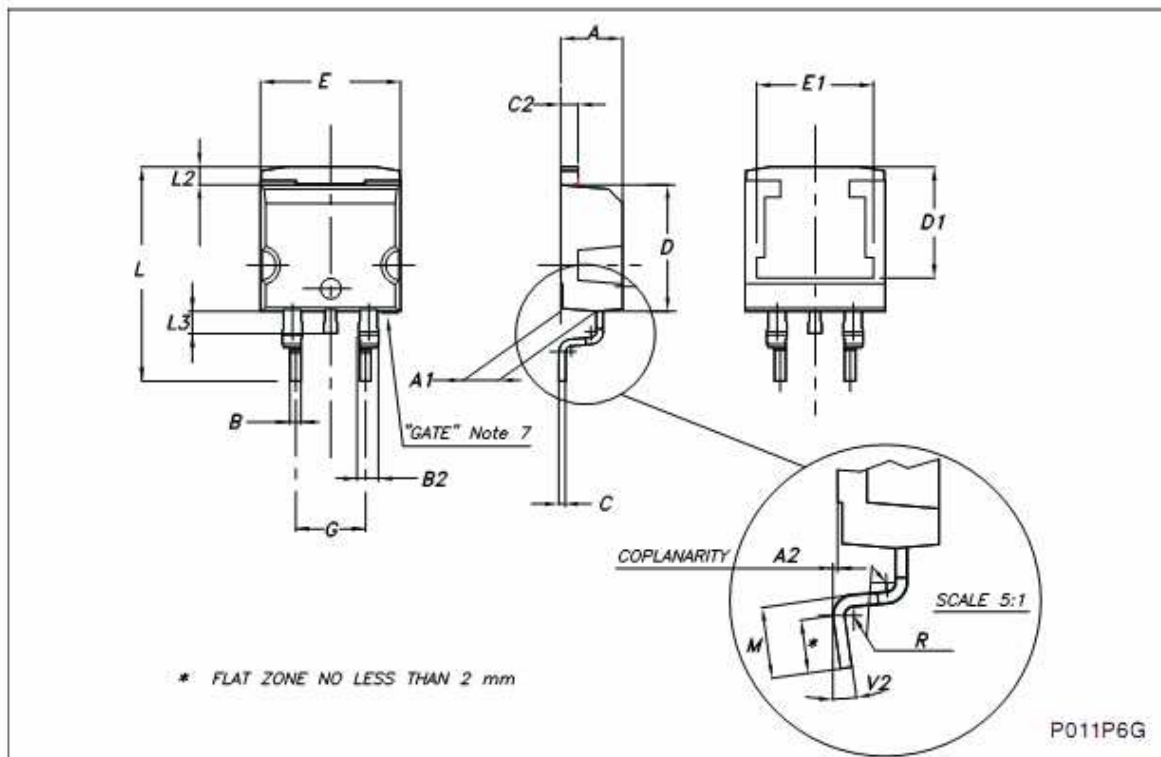


5.1.2 Block diagram



5.1.3 Package outline/Mechanical data

D ² PAK mechanical data						
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		0.409
E1		8.5			0.335	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°





5.2 Tests Description

Test name	Description	Purpose
Die Oriented		
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.

5.3 Test and reliability board Schematics

Testing information for Devices under test	
Tester	QT200
Test Program	I49xx.rp3
JIG	L78xx

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