RELIABILITY EVALUATION REPORT
for
SD4933MR RF DMOS Medium Voltage Technology Transfer in ST Ang Mo Kio (Singapore) Fab

General Information	
Commercial Product	: SD4933MR
Product Line (Test Vehicle)	: 4926
Product Description	: DMOS MEDIUM VOLTAGE
Package	: M177MR
Silicon Technology	_:_ DMOS
Division	_: Power Transistor Division_

Traceability	
Diffusion Plant	_:_ ST 6” (Singapore)
Assembly Plant	_: BOUSKOURA (Morocco)_

Reliability Assessment	
Passed	☒
Failed	☐

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REVISION HISTORY

Version	Date	Author	Changes description
1.0	21 January 2019	A.SETTINIERI	Final Report

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1. RELIABILITY EVALUATION OVERVIEW

1.1 Objective

Reliability evaluation for RF DMOS Medium Voltage technology manufactured in Ang Mo Kio SG6" (Singapore).

1.2 Reliability Test Plan

Reliability tests performed on this device are in agreement with JEDEC and internal spec 0061692 specification and are listed in the Test Plan.
For details on test conditions, generic data used and spec reference see test results summary at Par.3

#	Stress	Abrv	Reference	Test Flag	Comments
1	Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	Y	
2	External Visual	EV	JESD22B-101	Y	
3	High Temperature Storage Life	HTSL	JESD22B-101	Y	
4	High Temperature Gate Bias	HTGB	JESD22A-108	Y	
5	High Temperature Reverse Bias	HTRB	JESD22A-108	Y	
6	Temperature Cycling	TC	JESD22A-104	Y	

1.3 Conclusion

All reliability preliminary tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.
Parameter drift analysis performed on samples submitted to die and package oriented test showed a good stability of the main electrical monitored parameters.

On the basis of the overall results obtained, we can give a positive judgment on the reliability evaluation of the SD4933MR product in RF DMOS MV technology manufactured in Ang Mo Kio SG6" in agreement with JESD047 and ST internal spec 0061692.

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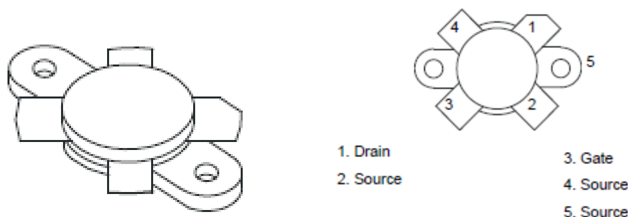
2. DEVICE/TEST VEHICLE CHARACTERISTICS

2.1 Generalities

RF DMOS MEDIUM VOLTAGE.

2.2 Pin connection



2.3 Traceability

Reference “Product Baseline” document if existing, else provide following chapters/information:

Wafer fab information	
Wafer fab manufacturing location	SG6
Wafer diameter (inches)	6”
Silicon process technology	DMOS Medium Voltage
Die finishing front side (passivation)	SiN (nitride)
Die finishing back side	Au/As
Die area (Stepping die size)	6220 x 3420 µm
Metal levels/Materials	1 / AlCu --> AlSiCu

Assembly Information	
Assembly plant location	BOUSKOURA 2 – (Morocco)
Package code description	M177
Leadframe	HEADER D500 4L --> HEADER D550 4L NHP FlMo
Die attach material	Au eutectic
Wires bonding materials/diameters	Al-Si / 1.5 mils
Encapsulation	CAP CERAMIC

Reliability Testing Information	
Reliability laboratory location	Catania (Italy)
Electrical testing location	Catania (Italy)

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3. TESTS RESULTS SUMMARY

3.1 Lot Information

Lot #	Commercial Product	Product lines	Package	Wafer Fab	Assembly plant	Note
	SD4933MR	4926	M177	SG 6”	BOUSKOURA (Morocco)	
Technology/Product Family data						
1	STAC3932F1	4925 double die	STAC244F	SG 6”	BOUSKOURA (Morocco)	
2	SD3931-10	4925	M174			
3						
4						

3.2 Test results summary

#	Stress (Abrv)	PC	Std ref.	Conditions	Sample Size (S.S)	Steps	Failure/SS			
							Lot 1 *(Double Die)*	Lot 2	Lot 3	Lot 4
							Technology/Product Family data			
1	**TEST**		User specification	All qualification parts tested per the requirements of the appropriate device specification.			320	235	235	235
2	**External visual**		JESD22 B-101	All devices submitted for testing			320	235	235	235
Silicon Oriented Tests										
3	**HTRB**	N	JESD22 A-108	Tj=150°C ; BIAS= 200V	225	1000H	0/90	0/45	0/45	0/45
4	**HTGB**	N	JESD22 A-108	Tj=150°C ; BIAS= 20V	225	1000H	0/90	0/45	0/45	0/45
5	**HTSL**	N	JESD22 A-101	Ta= 150°C	225	1000H	0/90	0/45	0/45	0/45
Package Oriented Tests										
6	**TC**	N	JESD22 A-103	Ta= –65°C / +150°C (1h cycle - 30min at extreme temp.)	125	500Cy	0/50	0/25	0/25	0/25

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Automotive Discrete Group (ADG)
Power Transistor Division

Process Change Notification

DMOS MV Technology - 4926 Line Transfer in ST's Ang Mo Kio (Singapore) FAB

Dear Customer,

Following the continuous improvement of our service and in order to increase productivity, we announce that *DMOS MV technology - 4926 Line* wafers, currently manufactured in Catania will be performed in ST's Ang Mo Kio (Singapore) FAB.
Wafers produced in Ang Mo Kio (Singapore) FAB, guarantee the same quality and electrical characteristics as per current production.

In the next pages, we are reporting the qualification plan to reach full maturity.

The change has been classified as **Class 1** according to the ST internal rules.

	Assessment of impact on Supply Chain regarding following aspects - contractual agreements - technical interface of processability / manufacturability of customer - form, fit, function, quality performance, reliability	**Remaining risks on Supply Chain?**	
ID	**Type of change**	**No**	**Yes**
SEM-PW-13	Move of all or part of wafer fab to a different location/site/subcontractor	P	-

P=PCN

The qualification of the change is completed according the qualification plan reported in the following pages; the results are reported in the attached file

Sincerely Yours!

Tech name **Technology Transfer in ST's Ang Mo Kio (Singapore) FAB**	
ST Part number:	ST PNs: *DMOS MV4926 Line* Package: **All the Packages**
Reason and background of the change	To increase flexibility and increase Capacity
Detailed description of change(s), including affected type of changes	The Diffusion Process and Wafer Testing for *DMOS MV4926 Line* technology will be performed in ST's Ang Mo Kio (Singapore) FAB.
Impact on form, fit, function, or reliability.	No Impact - No Change
Datasheet	No Impact - No Change
Benefit of the change	Capacity and flexibility increase.
Qualification Plan and Implementation date for change	3 Diff. lots – Test vehicle SD4933MR and family data of STAC3932F1 and SD3931-10 The qualification is completed in agreement with JEDEC and internal spec 0061692 specification (See attached RELIABILITY EVALUATION REPORT)
Traceability Information	By QA Number
PPAP Update	NA