IGBT Discrete and IPM Front-end Line relocation to Ang Mo Kio (Singapore) INDUSTRIAL

General Information	
Commercial Product	: STGIPQ3H60T-HZS STGP15NH100
Product Line	: RZ61N1 - GHJ7H1
Product Description	: IGBT
Package	: N2DIP-26L TO-220
Silicon Technology	: IGBTs Planar
Division	:*Power Transistor Division*

Traceability	
Diffusion Plant	: SG 6" (Singapore)
Assembly Plant	: *Tongfu Microelectronics (China)* *Shenzhen (China)*
Reliability Lab	: Catania (Italy)

Reliability Assessment	
Passed	☒
Failed	☐

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REVISION HISTORY

Version	Date	Author	Changes description
1.0	24 January 2018	A.SETTINIERI	FINAL REPORT

APPROVED BY:

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1. RELIABILITY EVALUATION OVERVIEW

1.1 Objective

Reliability evaluation on IGBT Planar Technology is manufactured in the 6” wafer line of Ang Mo Kio (Singapore)

1.2 Reliability Test Plan

Reliability tests performed on this device are in agreement with 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 .

TABLE 2#	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	ESD Characterization	ESD (HBM, CDM)	ESDA-JEDEC JES-001 and AINSI-ESD S5.3.1	Y	
7	Temperature Cycling	TC	JESD22A-104	Y	
9	Autoclave	AC	JESD22A-102	Y	
10	High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	Y	
11	Intermittent Operational Life / Thermal Fatigue	IOL / TF	MIL-STD-750 Method 1037	Y	

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1.3 Conclusion

All reliability 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.
Package oriented tests have not put in evidence any criticality.
ESD is accordance with ST spec.

On the basis of the overall results obtained, we can give a positive judgment on the reliability evaluation on IGBT Planar Technology manufactured in the 6” wafer line of Ang Mo Kio (Singapore) in agreement with ST internal spec 0061692.

2. DEVICE/TEST VEHICLE CHARACTERISTICS

2.1 Generalities

IGBT Planar

2.2 Traceability

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

D.U.T.: STGIPQ3H60T-HZS **PACKAGE: N2DIP-26L**

Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG 6” (Singapore)
Wafer diameter (inches)	6”
Silicon process technology	IGBT Planar
Die finishing front side (passivation)	IGBT: Nitride // DIODE: Probimide // DRIVER: Nitride
Die finishing back side	IGBT: Cr/Ni/Ag // DIODE: Ti/Ni/Au // DRIVER: Cr/Ni/Au
Die area (Stepping die size)	IGBT: 1670x1760 µm2 // DIODE: 1100 x 1100 µm2 // DRIVER: 2390 x 1950 µm2
Metal levels/Materials	IGBT: AlSi // DIODE: Al // DRIVER AlSiCu

Assembly information

Assembly Information	
Assembly plant location	*Tongfu Microelectronics (China)*
Package code description	N2DIP-26L
Leadframe/Substrate	FRAME N2DIP 26L IPM
Die attach material	PREFORM // Conductive GLUE
Wires bonding materials/diameters	Au
Molding compound	HF Molding compound

Reliability testing information

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

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D.U.T.: STGP15NH100 PACKAGE: TO-220

Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG 6” (Singapore)
Wafer diameter (inches)	6”
Silicon process technology	IGBT Planar
Die finishing front side (passivation)	Nitride
Die finishing back side	Cr/Ni/Au
Die area (Stepping die size)	5630 x 4530 µm2
Metal levels/Materials	AlCu

Assembly information

Assembly Information	
Assembly plant location	*Shenzhen (China)*
Package code description	TO-220
Leadframe/Substrate	FRAME TO-220
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate: Al/Mg Source: Al
Molding compound	HF Molding compound

Reliability testing information

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

3. TESTS RESULTS SUMMARY

3.1 Lot Information

Lot #	Commercial Product	Product lines	Package	Wafer Fab	Assembly plant	Note
1	STGIPQ3H60T-HZS	RZ61N1	N2DIP-26L	SG 6”	*Tongfu Microelectronics (China)*	
2	STGP15NH100	GHJ7H1	TO-220		Shenzhen (China)	
3						
4						

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3.2 Test results summary

Test plan results are summarized in the following template.

#	Stress (Abrv)	PC	Std ref.	Conditions	Sample Size (S.S)	Steps	Failure/SS			
							Lot 1	Lot 2	Lot 3	Lot 4
1	**TEST**		User specification	All qualification parts tested per the requirements of the appropriate device specification.			50	190	190	190
2	**External visual**		JESD22 B-101	All devices submitted for testing			50	190	190	190
Silicon Oriented Tests										
3	**HTSL**	N	JESD22 A-103	TA=125°C	10	1000H	0/10			
4	**HTRB**	N	JESD22 A-108	Tj=125°C ; BIAS= 360V	145	1000H	0/10			
				Tj=150°C ; BIAS= 960V				0/45	0/45	0/45
5	**HTGB**	N	JESD22 A-108	Tj=150°C ; BIAS= 20V	135	1000H		0/45	0/45	0/45
Die Oriented Tests										
6	**TC**	N	JESD22 A-104	TA=-40°C TO 125°C 1 HOURS / CYCLE	85	100cy	0/10			
				TA=-65°C TO 150°C 1 HOURS / CYCLE		500cy		0/25	0/25	0/25
7	**AC**	N	JESD22 A-102	TA=121°C ; PA=2ATM	85	96H	0/10	0/25	0/25	0/25
8	**H3TRB**	N	JESD22 A-101	TA=85°C ; RH=85% BIAS= 100V	85	1000H	0/10	0/25	0/25	0/25
9	**IOL**	N	MIL-STD-750 Method 1037	∆TC=105°C	75	8.6Kcy		0/25	0/25	0/25
10	**ESD**		ESDA–JEDEC JES–001 ANSI – ESD S5.3.1	CDM / HBM	6			0/3 0/3		

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Dear Customer,

Following the continuous improvement of our service and in order to increase productivity, this document is announcing that due to the restructuring of Catania 6” wafer FAB, we are going to move the production of IGBT Planar Discrete and IPM Industrial to Ang Mo Kio (Singapore) FAB.

Production of IGBT Planar Discrete and IPM Industrial done in Ang Mo Kio (Singapore) FAB, guarantees the same quality and electrical characteristics as per current Catania production.

The involved product series and affected packages are listed in the table below:

Product Family	Technology	Part Number
IGBT	IGBT Planar	See involved product list

Any other Product related to the above series, even if not expressly included or partially mentioned in the attached table, is affected by this change.

Qualification program and results availability:

The reliability test report is provided in attachment to this document.

Samples availability:

Samples of the test vehicle devices will be available on request starting from week 08-2018.
Any other sample request will be processed and scheduled by Power Transistor Division upon request.

Product Family	Part Number - Test Vehicle
IGBT	STGIPQ3H60T-HZS STGP15NH100

Change implementation schedule:

The production start and first shipments will be implemented after week 21 of 2018.

Marking and traceability:

Traceability of products involved in this PCN will be ensured by the digit 6 as front-end code, internal code (Finished Good) and Q.A. number.

Yours faithfully.