

PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	ADG/19/11667	
1.3 Title of PCN	TO-3P new molding compound - SP Semiconductor (Korea)	
1.4 Product Category	IGBTs / Power BIPOLAR	
1.5 Issue date	2019-07-11	

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Angelo RAO
2.1.2 Marketing Manager	Natale Sandro D'ANGELO
2.1.3 Quality Manager	Vincenzo MILITANO

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Lead frame base material	SP Semiconductor (Korea)

4. Description of change

	Old	New
4.1 Description	TO-3P of Subcontractor SP Semiconductor (Korea) are manufactured with SI-7200DX2 molding compound.	TO-3P of Subcontractor SP Semiconductor (Korea) will be manufactured with KTMC-1050GR molding compound.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no impact	

5. Reason / motivation for change

5.1 Motivation	Samsung SDI production discontinuation
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change

6.1 Description	by FG code and Q.A. number
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7. Timing / schedule

7.1 Date of qualification results	2019-07-05
7.2 Intended start of delivery	2019-10-05
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	11667 Rel15-2019.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2019-07-11

9. Attachments (additional documentations)		
11667 Public product.pdf 11667 TO-3P New Molding compound - SP Semi (Korea).pdf 11667 Rel15-2019.pdf		
10. Affected parts		
10. 1 Current		10.2 New (if applicable)
10.1.1 Customer Part No	10.1.2 Supplier Part No	10.1.2 Supplier Part No
	2SD1047	
	STGWT20H60DF	
	STGWT20H65FB	
	STGWT20HP65FB	
	STGWT20IH125DF	
	STGWT20V60DF	
	STGWT20V60F	
	STGWT28IH125DF	
	STGWT30H60DFB	
	STGWT30H65FB	
	STGWT30V60DF	
	STGWT30V60F	
	STGWT40HP65FB	
	STGWT40V60DF	
	STGWT60H65DFB	
	STGWT60V60DF	
	STGWT80H65DFB	
	STGWT80H65FB	
	STGWT80V60DF	
	STGWT80V60F	
	TIP35CP	

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Public Products List

Public Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

PCN Title : TO-3P new molding compound - SP Semiconductor (Korea)

PCN Reference : ADG/19/11667

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

STGWT30HP65FB	STGWT30H60DFB	STGWT80H65FB
STGWT60H65FB	STGWT28IH125DF	STGWT20HP65FB
STGWT40HP65FB	STGWT30V60DF	STGWT40V60DF
2SD1047	STGWT60H60DLFB	STGWT40H65DFB
STGWT20IH125DF	STGWT15H60F	STGWT20H65FB
STGWT80V60DF	STGWT20V60DF	STGWT20H60DF
STGWT30H65FB	STGWT60H65DFB	TIP35CP
STGWT80H65DFB	STGWT30V60F	STGWT20V60F
STGWT60V60DF	STGWT80V60F	



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Reliability evaluation for

*New Molding Compound on TO-3P manufactured
in SP Semi (Korea)- subcontractor*

Industrial

Process change

General Information		Traceability	
Commercial Product	: STGWT28IH125DF STGWT40HP65FB STGWT60V60DF STGWT80H65DFB	Diffusion Plant	: CT8" Catania (Italy)
Product Line	: IHJ701 – EWF601 – EVF701- EWFR	Assembly Plant	: SP Semiconductor (Korea) (Subcontractor)
Product Description	: Power MOSFET	Reliability Lab	: Catania (Italy)
Package	: TO-3P	Reliability Assessment	
Silicon Technology	: IGBT Trench	Passed	☒
Division	:Power Transistor Division		

Disclaimer: this report is a summary of the qualification plan results performed in good faith by STMicroelectronics to evaluate the electronic devices conformance to its specific mission profile. This report and its contents shall not be disclosed to a third party, except in full, without previous written agreement by STMicroelectronics or under the approval of the author (see below)

REVISION HISTORY

Version	Date	Author	Changes description
1.0	03 July 2019	A.SETTINIERI	FINAL REPORT

APPROVED BY:

Corrado CAPPELLO
 ADG Q&R department - Catania
 STMicroelectronics

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1. RELIABILITY EVALUATION OVERVIEW

1.1 Objective

Reliability evaluation for New Molding Compound on TO-3P manufactured in SP Semi (Korea)

1.2 Reliability Test Plan

Reliability tests performed on this device are in agreement with JESD47 and 0061692 internal spec Guidelines 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	
7	Autoclave	AC	JESD22A-102	Y	
8	High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	Y	
9	Intermittent Operational Life / Thermal Fatigue	IOL / TF	MIL-STD-750 Method 1037	Y	
10	ESD Characterization	ESD (HBM, CDM)	ESDA-JEDEC JES-001 and AINSI-ESD S5.3.1	Y	

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.

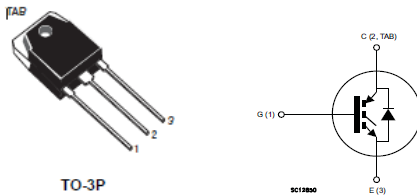
On the basis of the overall results obtained, we can give a positive judgment on the reliability evaluation for New Molding Compound on TO-3P manufactured in SP Semiconductor (Korea), in agreement with JESD47 and 0061692 internal spec.

2. DEVICE/TEST VEHICLE CHARACTERISTICS

2.1 Generalities

IGBT Trench

2.2 Pin Connection



2.3 Traceability

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

D.U.T.: STGWT28IH125DF

PACKAGE: TO-3P

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	IGBT Trench
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	IGBT:Al/Ti/NiV/Ag – DIODE:Ti/Ni/Ag
Die area (Stepping die size)	IGBT:6000 x 4590 μm^2 – DIODE: 2590 x 2620 μm^2
Metal levels/Materials	1 / AlCu-W

Assembly Information	
Assembly plant location	SP Semiconductor – (Korea)
Package code description	TO3P-3L
Lead frame/Substrate	FRAME TO3P L/F SPD-7005/03 TYPE1
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils- Source: Al 15mils
Molding compound	Halogen free

D.U.T.: STGWT40HP65FB
PACKAGE: TO-3P

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	IGBT Trench
Die finishing front side (passivation)	IGBT: SiN (Nitride) DIODE: Al+PROBIMIDE
Die finishing back side	IGBT:Al/Ti/NiV/Ag – DIODE:Ti/Ni/Au
Die area (Stepping die size)	IGBT:5440 x 4000 μm^2 – DIODE:1200 x 1100 μm^2
Metal levels/Materials	1 / AlCu-W

Assembly Information	
Assembly plant location	SP Semiconductor – (Korea)
Package code description	TO3P-3L
Lead frame/Substrate	FRAME TO3P L/F SPD-7005/03 TYPE1
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils- Source: Al 15mils
Molding compound	Halogen free

D.U.T.: STGWT60V60DF
PACKAGE: TO-3P

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	IGBT Trench
Die finishing front side (passivation)	IGBT: SiN (Nitride) DIODE: Al+PROBIMIDE
Die finishing back side	IGBT:Al/Ti/NiV/Ag – DIODE:Ti/Ni/Au
Die area (Stepping die size)	IGBT:6320 x 4900 μm^2 – DIODE:5000 x 2500 μm^2
Metal levels/Materials	1 / AlCu-W

Assembly Information	
Assembly plant location	SP Semiconductor – (Korea)
Package code description	TO3P-3L
Lead frame/Substrate	FRAME TO3P L/F SPD-7005/03 TYPE1
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils- Source: Al 15mils
Molding compound	Halogen free

D.U.T.: STGWT80H65DFB
PACKAGE: TO-3P

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	IGBT Trench
Die finishing front side (passivation)	IGBT: SiN (Nitride) DIODE: DURIMIDE
Die finishing back side	IGBT:Al/Ti/NiV/Ag – DIODE:Ti/Ni/Au
Die area (Stepping die size)	IGBT:6500 x 6300 μm^2 – DIODE:6800 x 3400 μm^2
Metal levels/Materials	1 / AlCu-W

Assembly Information	
Assembly plant location	SP Semiconductor – (Korea)
Package code description	TO3P-3L
Lead frame/Substrate	FRAME TO3P L/F SPD-7005/03 TYPE1
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils- Source: Al 15mils
Molding compound	Halogen free

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

3. TESTS RESULTS SUMMARY

3.1 Lot Information

Lot #	Commercial Product	Silicon line	Package	Wafer Fab	Assembly plant	Note
1	STGWT28IH125DF	IHJ7	TO-3P	CT8" Catania (Italy)	SP Semiconductor (Korea)	
2	STGWT40HP65FB	EW66				
3	STGWT60V60DF	EVF7				
4	STGWT80H65DFB	EWFR				

3.2 Test results summary

Test	Std ref.	Conditions	SS	Steps	Failure/SS			
					Lot 1	Lot 2	Lot 3	Lot 4
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			235	235	235	235
External visual	JESD22 B-101	All devices submitted for testing			235	235	235	235
Silicon oriented Tests								
HTSL	JESD22B 101	TA = 175°C	135	1000 h	0/45	0/45	0/45	0/45
HTRB	JESD22 A-108	Tj = 150°C, BIAS = 1000V	45	1000 h	0/45			
		Tj = 150°C, BIAS = 520V	90			0/45		0/45
		Tj = 150°C, BIAS = 480V	45				0/45	
HTGB	JESD22 A-108	Tj = 175°C, BIAS = 20V	135	1000 h	0/45	0/45	0/45	
Package oriented Tests								
TC	JESD22 A-104	TA=-65°C TO 150°C	100	500cy	0/25	0/25	0/25	0/25
AC	JESD22 A-102	TA=121°C ; PA=2ATM	100	96h	0/25	0/25	0/25	
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 100V	100	1000 h	0/25	0/25	0/25	
IOL	MIL-STD-750 Method 1037	ΔTj ≥100°C	100	10Kcy	0/25	0/25	0/25	
ESD	ESDA-JEDEC JES-001 ANSI – ESD S5.3.1	CDM / HBM	18		0/3 0/3	0/3 0/3	0/3 0/3	

Automotive Discrete Group (ADG)
Power Transistor Macro-Division
High Voltage Business Unit
Process Change Notification

**TO-3P new molding compound - SP Semi (Korea)
INDUSTRIAL**

Dear Customer,

Following Samsung SDI production discontinuation announcement, followed by ST Corporate Advance Notification **PCI CRP/19/11478**, sent in week 15-2019, this document is announcing the new molding compound for TO-3P package, manufactured in our subcontractor SP Semi (Korea).

The new molding compound KTMC-1050GR, guarantees the same quality and electrical characteristics as per current production, products is in full compliance with the ST ECOPACK®2 grade (Halogen Free).

The involved product series are listed in the table below:

Product Family	Package	Part Number	Test Vehicle
IGBTs Power BIPOLAR Transistors	TO-3P	See involved product list	STGWT28IH125DF STGWT40HP65FB STGWT60V60DF STGWT80H65DFB

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 24-2019.
Any other sample request will be processed and scheduled by Power Transistor Division upon request.

Change implementation schedule:

The production start and first shipments will be implemented after week 37 of 2019, after stock depletion.

Marking and traceability:

Unless otherwise stated by customer specific requirement, traceability product assembled in TO-3P with new molding compound, will be ensured by Q.A. number.

Yours faithfully.