PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/23/14174
1.3 Title of PCN	Capacity extension with 8 inches conversion production line for STTH60RQ06WY
1.4 Product Category	STTH60RQ06WY
1.5 Issue date	2023-08-25

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	Stephane CHAMARD
2.1.2 Marketing Manager	Philippe LEGER
2.1.3 Quality Manager	Jean-Paul REBRASSE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
General	Wafer diameter modification	ST Microelectronics Tours (France)

4. Description of change		
	Old	New
4.1 Description	6 inches wafer fab line	8 inches wafer fab line
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no	

5. Reason / motivation for change	
5.1 Motivation	STMicroelectronics has decided to expand the manufacturing capacity of ultrafast diodes.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	Traceability of the change will be ensured by Finished Good/Type print on carton labels. The second to last digit will be $ for 8 inches Finished Good code.

7. Timing / schedule	
7.1 Date of qualification results	2023-08-18
7.2 Intended start of delivery	2023-09-29
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14174 23011QRP Rev1.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-08-25

9. Attachments (additional documentations)
14174 Public product.pdf 14174 PCN STTH60RQ06WY 8 inches conversion.pdf 14174 23011QRP Rev1.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
	STTH60RQ06WY	

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Qualification Report

Qualification of conversion 8 inches for STTH60RQ06WY in packages DO-247

General Information	
Product Line	*Rectifiers*
Product Description	*Automotive turbo 2 ultrafast high voltage rectifier*
Product Perimeter	*STTH60RQ06WY*
Product Group	*ADG*
Product Division	*Discrete & Filter*
Packages	*DO-247*
Maturity level step	*QUALIFIED*

Locations	
Wafer Fab	*ST Tours – FRANCE*
Assembly Plant	*ST Shenzhen – CHINA* *Subcontractor 998G – CHINA*
Reliability Lab	*ST Tours – FRANCE*
Reliability Assessment	*PASS*

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	Aug 24, 2023	16	Henri VIVANT		PCN : ADG / 22 / 14174

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
JESD 22	Reliability test methods for packaged devices
MIL-STD-750C	Test method for semiconductor devices

2 GLOSSARY

GD	Generic Data
HTRB	High Temperature Reverse Bias
PD	Physical Dimensions
PV	Parametric Verification
SS	Sample Size
TC	Temperature Cycling

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify **STTH60RQ06WY** product, 600 V, 60 A ultrafast high voltage rectifier embedded in DO-247 package.

The involved products are listed in the table here below:

Commercial Product	Description	Package	Assembly location
STTH60RQ06WY	Ultrafast Diode	DO-247	ST Shenzhen - CHINA

The reliability test methodology used follows the JESD47: « Stress Test riven Qualification Methodology ». Quality plan have been conducted following ZVEI application.

Table 3: Process Change Guidelines for the Selection of Tests

Note: A letter or "●" indicates that performance of that stress test should be ***considered*** for the appropriate process change

Table 2 Test #	A2 /alt	A3 /alt	A4	A4/a /alt	A5 /alt	B1 /a/b	B2	C1	C2	C3	C4	C5	C6	C7	C8	C9	C 10	C 11	C 12	C 13	C 14	C 15	D1	E0	E2	E3 E4	E5	E6	
(previous) Rev D Test #	9 alt/a	8/ alt	7	7ab	10/ alt	5/ abc	6	12	13	23	24	25	14	15	20	22	21		16	17	18	19	27	3	4	11	26	28	
Test Name / Change	HAST / HTRB	UHAST / Autoclave	Temperature Cycle	TC Hot / TC Delam	IOL / PTC	HTRB / ACBV / SSOP	High Temp. Gate Bias	Destruct. Phys. Anal.	Physical Dimensions	Wire Bond Strength	Wire Bond Shear	Die Shear	Terminal Strength	Resist to Solvents	Resist. to Solder Heat	Thermal Resistance	Solderability	Whisker Growth	Constant Accel.	Vibration	Mechanical Shock	Hermeticity	Dielectric Integrity	External Visual	Parametric Verification	ESD Char.	Unclamp. Induct. Switch	Short Circuit Characterization	NOTES
DESIGN																													
Wafer Thickness			●	●	●	●		●		●	●				x	●									●				F
Wafer Diameter						●	●																		●				
Die Size			●		●	●		●				●			●	●									●	E	M	●	F
Layout			3		●	●	●	3																	●	E	M	●	
Field Termination	●	●	●			●		●																	●	E	M		

The following reliability tests ensuing are:

- TC to ensure the mechanical robustness of the products.
- HTRB to evaluate the risk of contamination from the resin and the assembly process versus the die layout sensitivity.

For some tests, similarity methodology is used. See 5.1 “comments” for more details about similarities.

3.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.

4 DEVICE CHARACTERISTICS

4.1 Device description

Refer to ST specification.

life.augmented

STTH60RQ06-Y

Datasheet

Automotive turbo 2 ultrafast high voltage rectifier

DO-247

Features

- AEC-Q101 qualified
- High junction temperature capability
- Ultrafast with soft recovery behavior
- Low reverse current
- Low thermal resistance
- Reduced switching and conduction losses
- PPAP capable

Description

The STTH60RQ06-Y has been developed for applications requiring a high-voltage secondary rectification for LLC full bridge topology.

Also it is ideal for switching power supplies, industrial and automotive applications, as rectification, freewheeling and clamping diode.

Product status link	
STTH60RQ06-Y	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	60 A
V_{RRM}	600 V
$V_{F(max)}$	1.45 V
$t_{rr\ (max)}$	35 ns
T_j	-40 to +175 °C

4.2 Construction Note

	STTH60RQ06WY
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - FRANCE
Technology / Process family	Ultrafast diode
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - FRANCE
Assembly information	
Assembly site	ST Shenzhen - CHINA
Package description	DO-247
Molding compound	ECOPACK®2
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	ST Shenzhen - CHINA

5 TESTS PLAN AND RESULTS SUMMARY

5.1 Test vehicles

Lot #	Part Number	Package	Comments
L1	STTH60RQ06WY	TO-247	1st Qualification lot
L2	STTH60RQ06WY	TO-247	2nd Qualification lot
L3	STTH60RQ06WY	TO-247	3rd Qualification lot
GD1	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test
GD2	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test
GD3	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test

GD: Test vehicles used for similarity (As it is the same BOM, same line, same techno, and same voltage range, data collected during the STTH30RQ06LY 8-inch wafer qualification can be used for this project.)
Detailed results in below chapter will refer to these references.

5.2 Test plan

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	All qualification parts tested per the requirements of the appropriate device specification.			
Pre-conditioning	PC	J-STD-020 JESD22-A113	All qualification parts tested per the requirements of the appropriate device specification.		As per targeted MSL Not applicable for PTH and WLCSP without coating	
MSL research	MSL	J-STD-020	-	-	Not applicable for PTH and WLCSP without coating	
External Visual	EV	JESD22B-101	All qualification parts tested per the requirements of the appropriate device specification.		Done during Assembly → Test & Finish inspection	
Parametric Verification	PV	User specification	-	-		
High Temperature Reverse Bias	HTRB	MIL-STD-750-1 M1038 Method A (for diodes, rectifiers and Zeners) M1039 Method A (for transistors)	GD1 GD2 GD3	77 77 77	WBI after HTRB applicable only for dissimilar metal (wire/meta) in case of no Cu wire	X
AC blocking voltage	ACBV	MIL-STD-750-1 M1040 Test condition A	-	-	Required for Thyristor only. Alternative to HTRB	
High Temperature Forward Bias	HTFB	JESD22 A-108	-	-	Not required, applicable only to LEDS Alternative to HTRB	
High Temperature Operating Life	HTOL		-	-	Covered by HTRB or ACBV	
Steady State Operational	SSOP	MIL-STD-750-1 M1038 Test condition B	-	-	Required for Voltage Regulator (Zener) only.	
High Temperature Gate Bias	HTGB	JESD 22A-108	-	-	Required for Power MOSFET – IGBT only.	
High Temperature Storage Life	HTSL	JESD22 A-103	-	-	Covered by HTRB	
Temperature Humidity Storage	THS	JESD22 A-118	-	-	Covered by H3TRB	
Temperature Cycling	TC	JESD22A-104	L1 L2 L3	77 77 77		X
Temperature Cycling Hot Test	TCHT	JESD22A-104	-	-	Required for Power MOSFET – IGBT only.	
Temperature Cycling Delamination Test	TCDT	JESD22A-104 J-STD-035	-	-	Required for Power MOSFET – IGBT only. Alternative to TCHT	
Wire Bond Integrity	WBI	MIL-STD-750 Method 2037	-	-	For dissimilar metal bonding systems only	
Unbiased Highly Accelerated Stress Test	UHAST	JESD22A-118 or A101	-	-	Required for SCR/TRIAC RECTIFIER and Protection devices	
Autoclave	AC	JESD22A-102	-	-	Alternative to UHAST	
Highly Accelerated Stress Test	HAST	JESD22A-110	-	-	Covered by H3TRB (same failure mechanisms activation).	
High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	-	-	Alternative to HAST	
High Temperature High Humidity Bias	HTHHB	JED22A-101	-	-	Not required, LED only	
Intermittent Operational Life / Thermal Fatigue	IOL	MIL-STD-750 Method 1037	-	-	For power devices. Not required for Transient Voltage Suppressor (TVS) parts	
Power and Temperature Cycle	PTC	JED22A-105	-	-	For power devices. Not required for Transient Voltage Suppressor	

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
					(TVS) parts. Perform PTC if ΔTj>100°C cannot be achieved with IOL Alternative to IOL	
ESD Characterization	ESD HBM	AEC Q101-001 and 005	-	-		
ESD Characterization	ESD CDM	AEC Q101-001 and 005	-	-		
Destructive Physical Analysis	DPA	AEC-Q101-004 Section 4	-	-	After H3TRB and TC	
Physical Dimension	PD	JESD22B-100	-	-		
Terminal Strength	TS	MIL-STD-750 Method 2036	-	-	Required for leaded parts only	
Resistance to Solvents	RTS	JESD22B-107	-	-	Not applicable for Laser Marking	
Constant Acceleration	CA	MIL-STD-750 Method 2006	-	-	Required for hermetic packaged parts only.	
Vibration Variable Frequency	VVF	JESD22B-103	-	-	Required for hermetic packaged parts only.	
Mechanical Shock	MS	JESD22 B-104	-	-	Required for hermetic packaged parts only.	
Hermeticity	HER	JESD22A-109	-	-	Required for hermetic packaged parts only.	
Resistance to Solder Heat	RSH	JESD22 A-111 (SMD) B-106 (PTH)	-	-	Not applicable for SMD pitch < 0.5mm, package size > 5.5*12.5mm and die paddle > 2.5*3.5mm	
Solderability	SD	J-STD-002 JESD22B102	-	-		
Dead Bug Test	DBT	ST Internal specification	-	-	Mandatory for SMD package Data collection for PTH package	
Thermal Resistance	TR	JESD24-3, 24-4, 24-6 as appropriate	-	-	Required in case of process change.Not applicable to protection device as no limit specified in the datasheet	
Wire Bond Strength	WBS	MIL-STD-750 Method 2037	-	-	Covered during workability trials	
Bond Shear	BS	AEC-Q101-003	-	-	Covered during workability trials	
Die Shear	DS	MIL-STD-750 Method 2017	-	-	Not Applicable to parts with solder paste die attach	
Unclamped Inductive Switching	UIS	AEC-Q101-004 section 2	-	-	Required for Power MOS and internally clamped IGBTs only	
Dielectric Integrity	DI	AEC-Q101-004 section 3	-	-	Required for Power MOSFET – IGBT only.	
Short Circuit Reliability Characterization	SCR	AEC-Q101-006	-	-	Required for smart power parts only	
Whisker Growth Evaluation	WG	AEC-Q005 JESD201	-	-		
Early Life Failure Rate	ELFR	JESD74	-	-	Recommended for new techno development in case of identified failure mechanism	
Functional Test (in rush, di/dt,…)	FT	Internal specification	-	-		
Repetitive Surge	RS	Internal specification	-	-	Required for protection devices only.	

Low Temperature Storage	LTS	JESD-22 A119: 209	-	-	AQG324 test for Modules	
Thermal shock test	TST	JESD22-A104	-	-	AQG324 test for Modules	
Power Cycling (seconds)	PC sec	MIL-STD750-1 Method1037	-	-	AQG324 test for Modules	
Power Cycling (minutes)	PC min	MIL-STD750-1 Method1037	-	-	AQG324 test for Modules	
Mechanical shock	MS	IEC 600068-2-27	-	-	AQG324 test for Modules	
Vibration	V	IEC60068-2-6	-	-	AQG324 test for Modules	

5.3 Results summary

Test	PC	Std ref.	Conditions	Steps / Duration	SS	Failure / SS					
						L1	L2	L3	GD1	GD2	GD3
HTRB	N	MIL-STD-750-1 M1038 Method A	Junction Tj=150°C Tj=155°C Voltage= 600V	1Krs	231 (3*77)	-	-	-	0/77	0/77	0/77
TC	N	JESD22 A-104	65/+150°C 2cy/h	1Kcy	231 (3*77)	0/77	0/77	0/77	-	-	-

Note 1: These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers."

6 ANNEXES

6.1 Parametric Verification

Ref: 22768A

Result on STTH60RQ06WY lot 1

TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	717,1	741,3	1,848	2,269	1,142	1,459	0,065	193,3
Max	727,7	754,4	1,927	2,382	1,176	1,510	0,135	222,4
Moy.	724,12	747,5	1,887	2,324	1,160	1,485	0,086	209,5

Result on STTH60RQ06WY lot 2

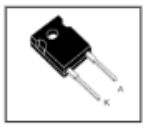
TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	721,3	745,8	1,87	2,304	1,156	1,48	0,073	199,7
Max	734,9	757,3	1,957	2,426	1,190	1,53	0,815	215,4
Moy.	730,6	752,5	1,916	2,369	1,174	1,50	0,111	209,7

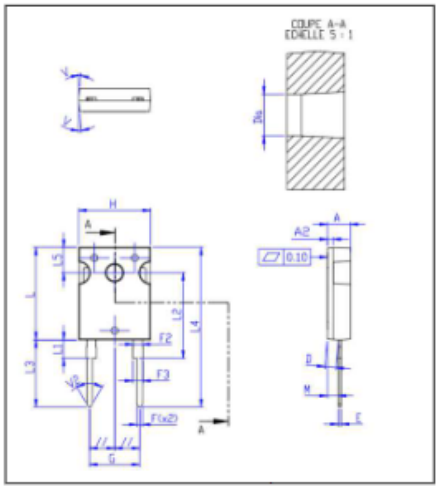
Result on STTH60RQ06WY lot 3

TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	711,2	735	1,821	2,233	1,141	1,457	0,082	200,4
Max	723,3	748,5	1,901	2,347	1,171	1,5	0,146	233,7
Moy.	715,7	739,06	1,870	2,302	1,1576	1,481	0,096	220,1

6.2 Physical Dimensions

Dimensional report for DO-247 package at ST Shenzhen plant





Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90		5.10	0.1920		0.2010
A2	1.17		1.37	0.0460		0.0540
D	2.2		2.6	0.0866		0.1023
E	0.4		0.8	0.0157		0.0314
F	1		1.4	0.0393		0.0551
F2		2			0.0787	
F3	2		2.4	0.0787		0.0944
G		10.9			0.4291	
H	15.45		15.75	0.6082		0.6200
L	19.85		20.15	0.7814		0.7933
L1	3.7		4.3	0.1456		0.1692
L2		18.5			0.7283	
L3	14.2		14.8	0.5590		0.5826
L4		34.6			1.3622	
L5		5.5			0.2165	
M	2		3	0.0787		0.1181
V		5°			5°	
V2		60°			60°	
Diam.	3.55		3.65	0.1397		0.1437

	A	A2	D	E	F	F3	G	H	L	L1	L2	L3	L4	L5	M	Diam R
1	4,984	1,25	2,448	0,468	1,215	2,101	10,901	15,615	19,948	4,059	18,561	14,513	34,516	5,475	2,329	3,618
2	4,991	1,235	2,578	0,470	1,217	2,099	10,903	15,601	19,965	4,064	18,542	14,512	34,490	5,473	2,325	3,599
3	4,998	1,255	2,435	0,477	1,213	2,101	10,906	15,615	19,953	4,068	18,525	14,520	34,469	5,471	2,324	3,599
4	4,997	1,237	2,488	0,475	1,217	2,092	10,906	15,617	19,955	4,063	18,543	14,499	34,442	5,479	2,330	3,611
5	4,995	1,255	2,484	0,473	1,215	2,098	10,908	15,616	19,967	4,061	18,491	14,497	34,508	5,484	2,329	3,611
6	5,001	1,252	2,482	0,469	1,220	2,096	10,898	15,619	19,959	4,054	18,560	14,481	34,485	5,489	2,331	3,600
7	5,000	1,238	2,493	0,472	1,210	2,104	10,903	15,599	19,964	4,043	18,550	14,514	34,529	5,511	2,320	3,593
8	4,998	1,252	2,500	0,467	1,218	2,105	10,899	15,601	19,975	4,036	18,541	14,574	34,590	5,504	2,324	3,608
9	4,998	1,233	2,497	0,461	1,214	2,092	10,898	15,606	19,973	4,063	18,553	14,493	34,469	5,496	2,329	3,589
10	4,985	1,222	2,491	0,472	1,211	2,091	10,901	15,602	19,959	4,061	18,554	14,493	34,453	5,497	2,323	3,591
11	4,984	1,23	2,499	0,460	1,221	2,100	10,900	15,606	19,974	4,059	18,546	14,496	34,482	5,503	2,325	3,598
12	4,992	1,254	2,488	0,474	1,216	2,081	10,901	15,613	19,961	4,057	18,551	14,494	34,473	5,503	2,326	3,596
13	4,987	1,265	2,427	0,462	1,213	2,102	10,904	15,608	19,991	4,057	18,560	14,590	34,531	5,492	2,329	3,599
14	4,991	1,25	2,591	0,474	1,213	2,093	10,906	15,613	19,958	4,055	18,556	14,496	34,481	5,499	2,331	3,596
15	4,981	1,231	2,422	0,463	1,211	2,096	10,902	15,604	20,020	4,054	18,553	14,498	34,504	5,503	2,321	3,606
16	4,991	1,268	2,445	0,464	1,216	2,084	10,899	15,606	19,964	4,050	18,553	14,508	34,517	5,498	2,330	3,606
17	4,994	1,252	2,518	0,467	1,214	2,107	10,904	15,596	19,971	4,058	18,547	14,499	34,493	5,502	2,331	3,598
18	4,993	1,255	2,502	0,475	1,210	2,092	10,911	15,600	19,963	4,061	18,550	14,504	34,488	5,495	2,335	3,598
19	4,99	1,262	2,508	0,466	1,213	2,092	10,909	15,596	19,973	4,056	18,540	14,501	34,468	5,509	2,339	3,591
20	4,985	1,255	2,497	0,470	1,215	2,091	10,910	15,600	19,968	4,054	18,541	14,495	34,467	5,504	2,331	3,600
21	4,991	1,261	2,495	0,478	1,215	2,099	10,902	15,598	19,968	4,048	18,532	14,490	34,475	5,498	2,321	3,603
22	4,991	1,254	2,510	0,466	1,213	2,096	10,907	15,605	19,983	4,066	18,574	14,498	34,508	5,498	2,333	3,605
23	4,992	1,255	2,384	0,458	1,216	2,103	10,907	15,611	19,979	4,054	18,567	14,505	34,507	5,486	2,330	3,614
24	4,994	1,256	2,425	0,467	1,211	2,093	10,908	15,612	19,948	4,050	18,533	14,505	34,496	5,505	2,333	3,609
25	4,987	1,267	2,377	0,475	1,213	2,089	10,902	15,603	19,964	4,064	18,536	14,509	34,493	5,497	2,330	3,612
26	4,987	1,25	2,378	0,466	1,212	2,089	10,904	15,614	19,953	4,064	18,535	14,496	34,458	5,497	2,328	3,603
27	4,986	1,249	2,375	0,463	1,218	2,099	10,910	15,606	19,957	4,052	18,542	14,478	34,469	5,495	2,330	3,604
28	4,984	1,257	2,383	0,462	1,211	2,084	10,890	15,614	19,968	4,065	18,534	14,511	34,473	5,494	2,326	3,603
29	4,986	1,244	2,45	0,473	1,218	2,098	10,901	15,618	19,945	4,051	18,544	14,528	34,527	5,492	2,332	3,611
30	4,970	1,248	2,362	0,474	1,211	2,092	10,906	15,616	19,953	4,038	18,521	14,483	34,576	5,493	2,321	3,602
LSL	**4,9**	**1,17**	**2,2**	**0,4**	**1**	**2**		**15,45**	**19,85**	**3,7**		**14,2**			**2**	**3,55**
TYP							**10,9**				**18,5**		**34,6**	**5,5**		
USL	**5,1**	**1,37**	**2,6**	**0,8**	**1,4**	**2,4**		**15,75**	**20,15**	**4,3**		**14,8**			**3**	**3,65**
min	4,97	1,22	2,36	0,46	1,21	2,08	10,89	15,60	19,95	4,04	18,49	14,48	34,44	5,47	2,32	3,59
max	5,00	1,27	2,59	0,48	1,22	2,11	10,91	15,62	20,02	4,07	18,57	14,59	34,59	5,51	2,34	3,62
average	4,99	1,25	2,46	0,47	1,21	2,10	10,90	15,61	19,97	4,06	18,54	14,51	34,49	5,49	2,33	3,60

6.3 Tests description

Test name	Description	Purpose
Die Oriented		
HTRB High Temperature Reverse Bias / **HTFB** High Temperature Forward Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: - Low power dissipation - Max. supply voltage compatible with diffusion process and internal circuitry limitations. Forward: device is forward biased with a current fixed and adjusted to reach the targeted junction temperature	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. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects. To assess active area and contacts integrity
Package Oriented		
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.

(1) ADG: Automotive and Discrete Group

PCN
Product/Process Change Notification

Capacity extension with 8 inches conversion production line for STTH60RQ06WY

Notification number:	ADG/22/14174	**Issue Date**	25-Aug-2023
Issued by	Sophie DA SILVA		
Product series affected by the change		STTH60RQ06WY	
Type of change		Front-End realization	

Description of the change

STMicroelectronics is extending capacity production for STTH60RQ06WY through existing 8 inches (200mm) wafer diameter production line.

Reason for change

STMicroelectronics has decided to expand the manufacturing capacity of ultrafast diodes.

The 8 inches wafer fab line (located in the current existing plant in ST Tours – France) is already qualified since H2-2018.

This production upgrade is the result of the constant investments made by STMicroelectronics in the technology and the evolution of discrete devices. It illustrates the commitment of the Company to reinforce its leading position in the Power Rectifiers market. With these 8 inches wafer line investment, STMicroelectronics will increase its production capacity to better serve its customers through service improvement and lead time reduction, especially as volumes grow.

Former versus changed product:	The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the products datasheets. The Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged. The footprint recommended by ST remains the same. There is no change in the packing modes and the standard delivery quantities either. The products remain in full compliance with the ST ECOPACK®2 grade (so called “halogen-free”).

(1) ADG: Automotive and Discrete Group

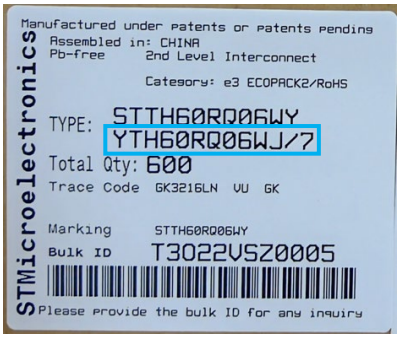
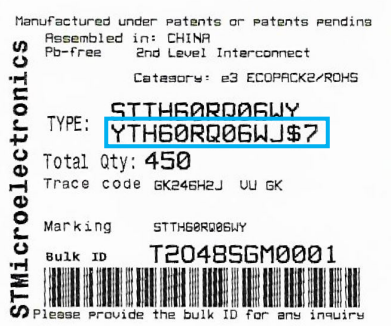
Disposition of former products

As the purpose is a manufacturing capacity extension, shipments will be supported using the two production lines.

Marking and traceability

Traceability of the change will be ensured by Finished Good/Type print on carton labels.
The second to last digit will be **$** for 8 inches Finished Good code.

Commercial part number/Order code	Former Finished Good/Type	New Finished Good/Type
STTH60RQ06WY	YTH60RQ06WJ/7	YTH60RQ06WJ$7

Former Label	New Label
	

Qualification completion date	18-Aug-2023

Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Rectifiers	Ultrafast	STTH60RQ06WY	Available

For sample(s) request, please inform FSE (Field Sales Engineer) in order to insert corresponding **Non-Standard Samples Order** (a single Commercial Product for each request) with **PCN reference** as additional information.

Change implementation schedule

Sales-types	Estimated production start	Estimated first shipments
All (STTH60RQ06WY)	**Week 35-2023**	**Week 39-2023**

Comments:	With early PCN acceptance, possible shipment starting W36-2023.

Customer's feedback

Please contact your local ST sales representative or quality contact for requests concerning this change notification.
Absence of acknowledgement of this PCN within 30 days of receipt will constitute acceptance of the change
Absence of additional response within 90 days of receipt of this PCN will constitute acceptance of the change

Qualification program and results	23011QRP Attached

Qualification Report

Qualification of conversion 8 inches for STTH60RQ06WY in packages DO-247

General Information	
Product Line	*Rectifiers*
Product Description	*Automotive turbo 2 ultrafast high voltage rectifier*
Product Perimeter	*STTH60RQ06WY*
Product Group	*ADG*
Product Division	*Discrete & Filter*
Packages	*DO-247*
Maturity level step	*QUALIFIED*

Locations	
Wafer Fab	*ST Tours – FRANCE*
Assembly Plant	*ST Shenzhen – CHINA* *Subcontractor 998G – CHINA*
Reliability Lab	*ST Tours – FRANCE*
Reliability Assessment	*PASS*

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	Aug 24, 2023	16	Henri VIVANT	Christophe Goin Digitally signed by Christophe Goin Date: 2023.08.24 16:12:33 +02'00'	PCN : ADG / 22 / 14174

Note: This report is a summary of the qualification trials performed in good faith by STMicroelectronics in order to evaluate the potential 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

Document reference	Short description
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
JESD 22	Reliability test methods for packaged devices
MIL-STD-750C	Test method for semiconductor devices

2 GLOSSARY

GD	Generic Data
HTRB	High Temperature Reverse Bias
PD	Physical Dimensions
PV	Parametric Verification
SS	Sample Size
TC	Temperature Cycling

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify **STTH60RQ06WY** product, 600 V, 60 A ultrafast high voltage rectifier embedded in DO-247 package.

The involved products are listed in the table here below:

Commercial Product	Description	Package	Assembly location
STTH60RQ06WY	Ultrafast Diode	DO-247	ST Shenzhen - CHINA

The reliability test methodology used follows the JESD47: « Stress Test riven Qualification Methodology ». Quality plan have been conducted following ZVEI application.

Table 3: Process Change Guidelines for the Selection of Tests

Note: A letter or "●" indicates that performance of that stress test should be ***considered*** for the appropriate process change

Table 2 Test #	A2 /alt	A3 /alt	A4	A4/a /alt	A5 /alt	B1 /a/b	B2	C1	C2	C3	C4	C5	C6	C7	C8	C9	C 10	C 11	C 12	C 13	C 14	C 15	D1	E0	E2	E3 E4	E5	E6	
(previous) Rev D Test #	9 alt/a	8/ alt	7	7ab	10/ alt	5/ abc	6	12	13	23	24	25	14	15	20	22	21		16	17	18	19	27	3	4	11	26	28	
Test Name / Change	HAST / HTRB	UHAST / Autoclave	Temperature Cycle	TC Hot / TC Delam	IOL / PTC	HTRB / ACBV / SSOP	High Temp. Gate Bias	Destruct. Phys. Anal.	Physical Dimensions	Wire Bond Strength	Wire Bond Shear	Die Shear	Terminal Strength	Resist to Solvents	Resist. to Solder Heat	Thermal Resistance	Solderability	Whisker Growth	Constant Accel.	Vibration	Mechanical Shock	Hermeticity	Dielectric Integrity	External Visual	Parametric Verification	ESD Char.	Unclamp. Induct. Switch	Short Circuit Characterization	NOTES
DESIGN																													
Wafer Thickness			●	●	●	●		●		●	●				x	●									●				F
Wafer Diameter						●	●																		●				
Die Size			●		●	●		●				●			●	●									●	E	M	●	F
Layout			3		●	●	●	3																	●	E	M	●	
Field Termination	●	●	●			●		●																	●	E	M		

The following reliability tests ensuing are:

- TC to ensure the mechanical robustness of the products.
- HTRB to evaluate the risk of contamination from the resin and the assembly process versus the die layout sensitivity.

For some tests, similarity methodology is used. See 5.1 “comments” for more details about similarities.

3.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.

4 DEVICE CHARACTERISTICS

4.1 Device description

Refer to ST specification.

life.augmented

STTH60RQ06-Y

Datasheet

Automotive turbo 2 ultrafast high voltage rectifier

DO-247

Features

- AEC-Q101 qualified
- High junction temperature capability
- Ultrafast with soft recovery behavior
- Low reverse current
- Low thermal resistance
- Reduced switching and conduction losses
- PPAP capable

Description

The STTH60RQ06-Y has been developed for applications requiring a high-voltage secondary rectification for LLC full bridge topology.

Also it is ideal for switching power supplies, industrial and automotive applications, as rectification, freewheeling and clamping diode.

Product status link	
STTH60RQ06-Y	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	60 A
V_{RRM}	600 V
$V_{F(max)}$	1.45 V
$t_{rr\ (max)}$	35 ns
T_j	-40 to +175 °C

4.2 Construction Note

	STTH60RQ06WY
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - FRANCE
Technology / Process family	Ultrafast diode
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - FRANCE
Assembly information	
Assembly site	ST Shenzhen - CHINA
Package description	DO-247
Molding compound	ECOPACK®2
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	ST Shenzhen - CHINA

5 TESTS PLAN AND RESULTS SUMMARY

5.1 Test vehicles

Lot #	Part Number	Package	Comments
L1	STTH60RQ06WY	TO-247	1st Qualification lot
L2	STTH60RQ06WY	TO-247	2nd Qualification lot
L3	STTH60RQ06WY	TO-247	3rd Qualification lot
GD1	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test
GD2	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test
GD3	STTH30RQ06LY-TR	T²PAK	Generic data for HTRB test

GD: Test vehicles used for similarity (As it is the same BOM, same line, same techno, and same voltage range, data collected during the STTH30RQ06LY 8-inch wafer qualification can be used for this project.)
Detailed results in below chapter will refer to these references.

5.2 Test plan

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	All qualification parts tested per the requirements of the appropriate device specification.			
Pre-conditioning	PC	J-STD-020 JESD22-A113	All qualification parts tested per the requirements of the appropriate device specification.		As per targeted MSL Not applicable for PTH and WLCSP without coating	
MSL research	MSL	J-STD-020	-	-	Not applicable for PTH and WLCSP without coating	
External Visual	EV	JESD22B-101	All qualification parts tested per the requirements of the appropriate device specification.		Done during Assembly → Test & Finish inspection	
Parametric Verification	PV	User specification	-	-		
High Temperature Reverse Bias	HTRB	MIL-STD-750-1 M1038 Method A (for diodes, rectifiers and Zeners) M1039 Method A (for transistors)	GD1 GD2 GD3	77 77 77	WBI after HTRB applicable only for dissimilar metal (wire/meta) in case of no Cu wire	X
AC blocking voltage	ACBV	MIL-STD-750-1 M1040 Test condition A	-	-	Required for Thyristor only. Alternative to HTRB	
High Temperature Forward Bias	HTFB	JESD22 A-108	-	-	Not required, applicable only to LEDS Alternative to HTRB	
High Temperature Operating Life	HTOL		-	-	Covered by HTRB or ACBV	
Steady State Operational	SSOP	MIL-STD-750-1 M1038 Test condition B	-	-	Required for Voltage Regulator (Zener) only.	
High Temperature Gate Bias	HTGB	JESD 22A-108	-	-	Required for Power MOSFET – IGBT only.	
High Temperature Storage Life	HTSL	JESD22 A-103	-	-	Covered by HTRB	
Temperature Humidity Storage	THS	JESD22 A-118	-	-	Covered by H3TRB	
Temperature Cycling	TC	JESD22A-104	L1 L2 L3	77 77 77		X
Temperature Cycling Hot Test	TCHT	JESD22A-104	-	-	Required for Power MOSFET – IGBT only.	
Temperature Cycling Delamination Test	TCDT	JESD22A-104 J-STD-035	-	-	Required for Power MOSFET – IGBT only. Alternative to TCHT	
Wire Bond Integrity	WBI	MIL-STD-750 Method 2037	-	-	For dissimilar metal bonding systems only	
Unbiased Highly Accelerated Stress Test	UHAST	JESD22A-118 or A101	-	-	Required for SCR/TRIAC RECTIFIER and Protection devices	
Autoclave	AC	JESD22A-102	-	-	Alternative to UHAST	
Highly Accelerated Stress Test	HAST	JESD22A-110	-	-	Covered by H3TRB (same failure mechanisms activation).	
High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	-	-	Alternative to HAST	
High Temperature High Humidity Bias	HTHHB	JED22A-101	-	-	Not required, LED only	
Intermittent Operational Life / Thermal Fatigue	IOL	MIL-STD-750 Method 1037	-	-	For power devices. Not required for Transient Voltage Suppressor (TVS) parts	
Power and Temperature Cycle	PTC	JED22A-105	-	-	For power devices. Not required for Transient Voltage Suppressor	

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
					(TVS) parts. Perform PTC if ΔTj>100°C cannot be achieved with IOL Alternative to IOL	
ESD Characterization	ESD HBM	AEC Q101-001 and 005	-	-		
ESD Characterization	ESD CDM	AEC Q101-001 and 005	-	-		
Destructive Physical Analysis	DPA	AEC-Q101-004 Section 4	-	-	After H3TRB and TC	
Physical Dimension	PD	JESD22B-100	-	-		
Terminal Strength	TS	MIL-STD-750 Method 2036	-	-	Required for leaded parts only	
Resistance to Solvents	RTS	JESD22B-107	-	-	Not applicable for Laser Marking	
Constant Acceleration	CA	MIL-STD-750 Method 2006	-	-	Required for hermetic packaged parts only.	
Vibration Variable Frequency	VVF	JESD22B-103	-	-	Required for hermetic packaged parts only.	
Mechanical Shock	MS	JESD22 B-104	-	-	Required for hermetic packaged parts only.	
Hermeticity	HER	JESD22A-109	-	-	Required for hermetic packaged parts only.	
Resistance to Solder Heat	RSH	JESD22 A-111 (SMD) B-106 (PTH)	-	-	Not applicable for SMD pitch < 0.5mm, package size > 5.5*12.5mm and die paddle > 2.5*3.5mm	
Solderability	SD	J-STD-002 JESD22B102	-	-		
Dead Bug Test	DBT	ST Internal specification	-	-	Mandatory for SMD package Data collection for PTH package	
Thermal Resistance	TR	JESD24-3, 24-4, 24-6 as appropriate	-	-	Required in case of process change.Not applicable to protection device as no limit specified in the datasheet	
Wire Bond Strength	WBS	MIL-STD-750 Method 2037	-	-	Covered during workability trials	
Bond Shear	BS	AEC-Q101-003	-	-	Covered during workability trials	
Die Shear	DS	MIL-STD-750 Method 2017	-	-	Not Applicable to parts with solder paste die attach	
Unclamped Inductive Switching	UIS	AEC-Q101-004 section 2	-	-	Required for Power MOS and internally clamped IGBTs only	
Dielectric Integrity	DI	AEC-Q101-004 section 3	-	-	Required for Power MOSFET – IGBT only.	
Short Circuit Reliability Characterization	SCR	AEC-Q101-006	-	-	Required for smart power parts only	
Whisker Growth Evaluation	WG	AEC-Q005 JESD201	-	-		
Early Life Failure Rate	ELFR	JESD74	-	-	Recommended for new techno development in case of identified failure mechanism	
Functional Test (in rush, di/dt,…)	FT	Internal specification	-	-		
Repetitive Surge	RS	Internal specification	-	-	Required for protection devices only.	

Low Temperature Storage	LTS	JESD-22 A119: 209	-	-	AQG324 test for Modules	
Thermal shock test	TST	JESD22-A104	-	-	AQG324 test for Modules	
Power Cycling (seconds)	PC sec	MIL-STD750-1 Method1037	-	-	AQG324 test for Modules	
Power Cycling (minutes)	PC min	MIL-STD750-1 Method1037	-	-	AQG324 test for Modules	
Mechanical shock	MS	IEC 600068-2-27	-	-	AQG324 test for Modules	
Vibration	V	IEC60068-2-6	-	-	AQG324 test for Modules	

5.3 Results summary

Test	PC	Std ref.	Conditions	Steps / Duration	SS	Failure / SS					
						L1	L2	L3	GD1	GD2	GD3
HTRB	N	MIL-STD-750-1 M1038 Method A	Junction Tj=150°C Tj=155°C Voltage= 600V	1Krs	231 (3*77)	-	-	-	0/77	0/77	0/77
TC	N	JESD22 A-104	65/+150°C 2cy/h	1Kcy	231 (3*77)	0/77	0/77	0/77	-	-	-

Note 1: These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers.”

6 ANNEXES

6.1 Parametric Verification

Ref: 22768A

Result on STTH60RQ06WY lot 1

TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	717,1	741,3	1,848	2,269	1,142	1,459	0,065	193,3
Max	727,7	754,4	1,927	2,382	1,176	1,510	0,135	222,4
Moy.	724,12	747,5	1,887	2,324	1,160	1,485	0,086	209,5

Result on STTH60RQ06WY lot 2

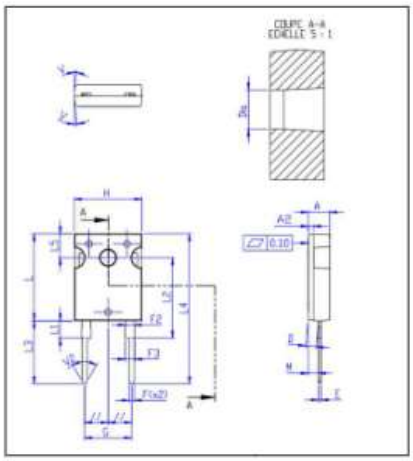
TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	721,3	745,8	1,87	2,304	1,156	1,48	0,073	199,7
Max	734,9	757,3	1,957	2,426	1,190	1,53	0,815	215,4
Moy.	730,6	752,5	1,916	2,369	1,174	1,50	0,111	209,7

Result on STTH60RQ06WY lot 3

TEST	VR	VR	VF	VF	VF	VF	IR	IR
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	150°C	25°C	25°C	150°C	150°C	25°C	150°C
Condition 2	IAK=1mA	IAK=1mA	IF=30A	IF=60A	IF=30A	IF=60A	VR=600V	VR=600V
Min. Datasheet	*600V*	*600V*						
Typ. Datasheet					*1.15V*	*1.45V*		*160µA*
Max. Datasheet			*2.45V*	*2.95V*	*1.45V*	*1.85V*	*80µA*	*1600µA*
UNIT	V	V	V	V	V	V	µA	µA
N	30	30	30	30	30	30	30	30
Min	711,2	735	1,821	2,233	1,141	1,457	0,082	200,4
Max	723,3	748,5	1,901	2,347	1,171	1,5	0,146	233,7
Moy.	715,7	739,06	1,870	2,302	1,1576	1,481	0,096	220,1

6.2 Physical Dimensions

Dimensional report for DO-247 package at ST Shenzhen plant



Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90		5.10	0.1929		0.2010
A2	1.17		1.37	0.0460		0.0540
D	2.2		2.6	0.0866		0.1023
E	0.4		0.8	0.0157		0.0314
F	1		1.4	0.0393		0.0551
F2		2			0.0787	
F3	2		2.4	0.0787		0.0944
G		10.9			0.4291	
H	15.45		15.75	0.6082		0.6200
L	19.85		20.15	0.7814		0.7933
L1	3.7		4.3	0.1456		0.1692
L2		18.5			0.7283	
L3	14.2		14.6	0.5590		0.5826
L4		34.6			1.3622	
L5		5.5			0.2165	
M	2		3	0.0787		0.1181
V		5°			5°	
V2		60°			60°	
Diam.	3.55		3.65	0.1397		0.1437

	A	A2	D	E	F	F3	G	H	L	L1	L2	L3	L4	L5	M	Diam R
1	4,984	1,25	2,448	0,468	1,215	2,101	10,901	15,615	19,948	4,059	18,561	14,513	34,516	5,475	2,329	3,618
2	4,991	1,235	2,578	0,470	1,217	2,099	10,903	15,601	19,965	4,064	18,542	14,512	34,490	5,473	2,325	3,599
3	4,998	1,255	2,435	0,477	1,213	2,101	10,906	15,615	19,953	4,068	18,525	14,520	34,469	5,471	2,324	3,599
4	4,997	1,237	2,488	0,475	1,217	2,092	10,906	15,617	19,955	4,063	18,543	14,499	34,442	5,479	2,330	3,611
5	4,995	1,255	2,484	0,473	1,215	2,098	10,908	15,616	19,967	4,061	18,491	14,497	34,508	5,484	2,329	3,611
6	5,001	1,252	2,482	0,469	1,220	2,096	10,898	15,619	19,959	4,054	18,560	14,481	34,485	5,489	2,331	3,600
7	5,000	1,238	2,493	0,472	1,210	2,104	10,903	15,599	19,964	4,043	18,550	14,514	34,529	5,511	2,320	3,593
8	4,998	1,252	2,500	0,467	1,218	2,105	10,899	15,601	19,975	4,036	18,541	14,574	34,590	5,504	2,324	3,608
9	4,998	1,233	2,497	0,461	1,214	2,092	10,898	15,606	19,973	4,063	18,553	14,493	34,469	5,496	2,329	3,589
10	4,985	1,222	2,491	0,472	1,211	2,091	10,901	15,602	19,959	4,061	18,554	14,493	34,453	5,497	2,323	3,591
11	4,984	1,23	2,499	0,460	1,221	2,100	10,900	15,606	19,974	4,059	18,546	14,496	34,482	5,503	2,325	3,598
12	4,992	1,254	2,488	0,474	1,216	2,081	10,901	15,613	19,961	4,057	18,551	14,494	34,473	5,503	2,326	3,596
13	4,987	1,265	2,427	0,462	1,213	2,102	10,904	15,608	19,991	4,057	18,560	14,590	34,531	5,492	2,329	3,599
14	4,991	1,25	2,591	0,474	1,213	2,093	10,906	15,613	19,958	4,055	18,556	14,496	34,481	5,499	2,331	3,596
15	4,981	1,231	2,422	0,463	1,211	2,096	10,902	15,604	20,020	4,054	18,553	14,498	34,504	5,503	2,321	3,606
16	4,991	1,268	2,445	0,464	1,216	2,084	10,899	15,606	19,964	4,050	18,553	14,508	34,517	5,498	2,330	3,606
17	4,994	1,252	2,518	0,467	1,214	2,107	10,904	15,596	19,971	4,058	18,547	14,499	34,493	5,502	2,331	3,598
18	4,993	1,255	2,502	0,475	1,210	2,092	10,911	15,600	19,963	4,061	18,550	14,504	34,488	5,495	2,335	3,598
19	4,99	1,262	2,508	0,466	1,213	2,092	10,909	15,596	19,973	4,056	18,540	14,501	34,468	5,509	2,339	3,591
20	4,985	1,255	2,497	0,470	1,215	2,091	10,910	15,600	19,968	4,054	18,541	14,495	34,467	5,504	2,331	3,600
21	4,991	1,261	2,495	0,478	1,215	2,099	10,902	15,598	19,968	4,048	18,532	14,490	34,475	5,498	2,321	3,603
22	4,991	1,254	2,510	0,466	1,213	2,096	10,907	15,605	19,983	4,066	18,574	14,498	34,508	5,498	2,333	3,605
23	4,992	1,255	2,384	0,458	1,216	2,103	10,907	15,611	19,979	4,054	18,567	14,505	34,507	5,486	2,330	3,614
24	4,994	1,256	2,425	0,467	1,211	2,093	10,908	15,612	19,948	4,050	18,533	14,505	34,496	5,505	2,333	3,609
25	4,987	1,267	2,377	0,475	1,213	2,089	10,902	15,603	19,964	4,064	18,536	14,509	34,493	5,497	2,330	3,612
26	4,987	1,25	2,378	0,466	1,212	2,089	10,904	15,614	19,953	4,064	18,535	14,496	34,458	5,497	2,328	3,603
27	4,986	1,249	2,375	0,463	1,218	2,099	10,910	15,606	19,957	4,052	18,542	14,478	34,469	5,495	2,330	3,604
28	4,984	1,257	2,383	0,462	1,211	2,084	10,890	15,614	19,968	4,065	18,534	14,511	34,473	5,494	2,326	3,603
29	4,986	1,244	2,45	0,473	1,218	2,098	10,901	15,618	19,945	4,051	18,544	14,528	34,527	5,492	2,332	3,611
30	4,970	1,248	2,362	0,474	1,211	2,092	10,906	15,616	19,953	4,038	18,521	14,483	34,576	5,493	2,321	3,602
LSL	**4,9**	**1,17**	**2,2**	**0,4**	**1**	**2**		**15,45**	**19,85**	**3,7**		**14,2**			**2**	**3,55**
TYP							**10,9**				**18,5**		**34,6**	**5,5**		
USL	**5,1**	**1,37**	**2,6**	**0,8**	**1,4**	**2,4**		**15,75**	**20,15**	**4,3**		**14,8**			**3**	**3,65**
min	4,97	1,22	2,36	0,46	1,21	2,08	10,89	15,60	19,95	4,04	18,49	14,48	34,44	5,47	2,32	3,59
max	5,00	1,27	2,59	0,48	1,22	2,11	10,91	15,62	20,02	4,07	18,57	14,59	34,59	5,51	2,34	3,62
average	4,99	1,25	2,46	0,47	1,21	2,10	10,90	15,61	19,97	4,06	18,54	14,51	34,49	5,49	2,33	3,60

6.3 Tests description

Test name	Description	Purpose
Die Oriented		
HTRB High Temperature Reverse Bias / **HTFB** High Temperature Forward Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: - Low power dissipation - Max. supply voltage compatible with diffusion process and internal circuitry limitations. Forward: device is forward biased with a current fixed and adjusted to reach the targeted junction temperature	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. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects. To assess active area and contacts integrity
Package Oriented		
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.

Public Products List

Publict 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 : Capacity extension with 8 inches conversion production line for STTH60RQ06WY

PCN Reference : ADG/23/14174

Subject : Public Products List

Dear Customer,

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

STTH60RQ06WY		

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