PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/21/12707
1.3 Title of PCN	New Assembly and Test location for STPSC6H12B-TR1 in existing line in ST plant in China
1.4 Product Category	STPSC6H12B-TR1
1.5 Issue date	2021-03-30

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
Transfer	Product transfer from one site to another site, even if test or process line is qualified	Subcontractor in Philippines and ST Shenzhen China

4. Description of change		
	Old	New
4.1 Description	Assembly and Test at Subcontractor in Philippines	Assembly and Test at ST Shenzhen (China)
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No	

5. Reason / motivation for change	
5.1 Motivation	In the frame of the activity closure at current subcontractor in Philippines, ST has initiated the transfer of STPSC6H12B-TR1 to DPAK HV line in ST Shenzhen (China).
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Finished Good, device top marking and trace code

7. Timing / schedule	
7.1 Date of qualification results	2021-03-30
7.2 Intended start of delivery	2021-05-07
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description			
8.2 Qualification report and qualification results	In progress	Issue Date	

9. Attachments (additional documentations)

12707 Public product.pdf
12707 STPSC6H12B-TR1 at ST plant in China.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
	STPSC6H12B-TR1	

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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 : New Assembly and Test location for STPSC6H12B-TR1
in existing line in ST plant in China
PCN Reference : ADG/21/12707

Subject : Public Products List

Dear Customer,

There is no Standard Public Products impacted by the change

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PCN
Product/Process Change Notification

New Assembly and Test location for STPSC6H12B-TR1

in existing line in ST plant in China

Notification number:	ADG/21/12707	**Issue Date**	30-Mar-2021
Issued by	Isabelle Ballon		
Product series affected by the change		STPSC6H12B-TR1	
Type of change		Transfer	

Description of the change

STMicroelectronics is changing the Assembly and Test site for STPSC6H12B-TR1 from the current subcontractor (Philippines) to the existing DPAK HV line in ST Shenzhen (China).
ST Shenzhen (China) is already a major production site for ST products housed in DPAK HV, including SiC diodes technologies.

Reason for change

In the frame of the activity closure at current subcontractor in Philippines, ST has initiated the transfer of STPSC6H12B-TR1 to DPAK HV line in ST Shenzhen (China).
Former subcontractor line closure in Philippines is scheduled in 30-Sep-2021.

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

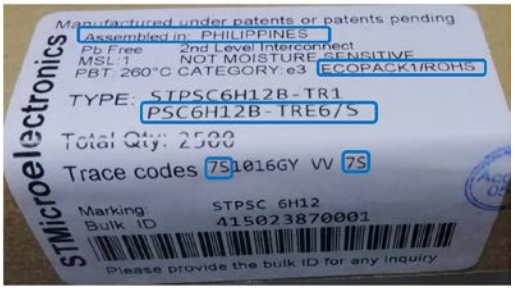
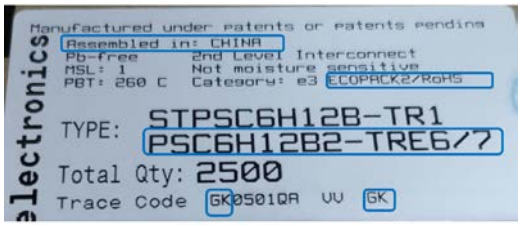
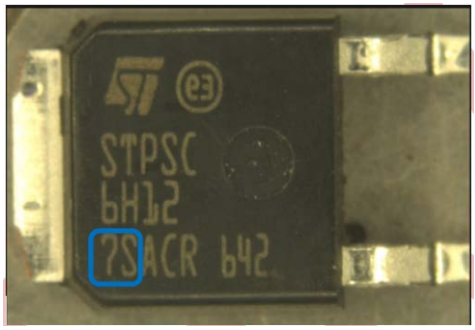
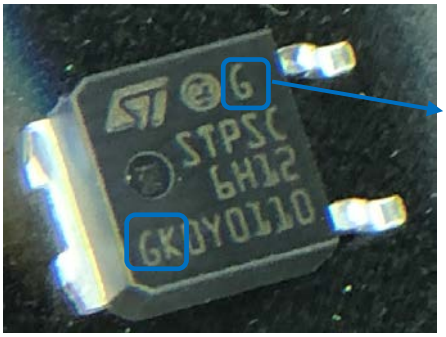
Disposition of former products

Deliveries of current product manufactured in former subcontractor will be done until stock depletion.

Marking and traceability

Traceability of the Back-End plant will be ensured by an **internal codification (Finished Good)** and by the **trace code** (printed on device top side and on the carton box label). The first two digits of the trace code indicate the back-end plant origin.

Finished Good (print on carton box label) and trace code (print on carton box label and product):

Finish Good Subcontractor in Philippines	Finish Good ST Shenzhen - China
PSC6H12B-TRE6/S	**PSC6H12B2-TRE6/7**
	
Trace code: First 2 digits Subcontractor in Philippines	**Trace code: First 2 digits ST Shenzhen - China**
7S	**GK**
	

Qualification complete date	30-Mar-2021

Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Rectifiers	SiC	STPSC6H12B-TR1	Week 13-2021

Change implementation schedule

Sales type	Estimated production start	Estimated first shipments
STPSC6H12B-TR1	**Week 13-2021**	**Week 18-2021**

Comments:	

(1) ADG: Automotive and Discrete Group

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	21013QRP Attached

Qualification Report

New Assembly and Test location for STPSC6H12B-TR in existing line in ST plant in China

General Information	
Product Line	*Rectifiers*
Product Description	*1200 V silicon carbide power Schottky diode*
Product Perimeter	*STPSC6H12B-TR1*
Product Group	*ADG*
Product Division	*Discrete & Filter*
Packages	*DPAK HV*
Maturity level step	*QUALIFIED*

Locations	
Wafer Fab	*ST CATANIA – ITALY*
Assembly Plant	*ST SHENZHEN – CHINA*
Reliability Lab	*ST TOURS – FRANCE*
Reliability Assessment	*PASS*

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	15-Mar-2021	11	Sara BHALLI	Aude DROMEL	Initial release: STPSC6H12B-TR1 qualification in ST Shenzhen

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q005	Pb-Free Test Requirements
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

DBT	Dead Bug Test
EV	External Visual
GD	Generic Data
H3TRB	High Humidity High Temperature Reverse Bias
HTRB	High Temperature Reverse Bias
IOLT	Intermittent Operating Life Test
PC	Preconditioning
RSH	Resistance to Solder Heat
SD	Solderability test
SS	Sample Size
TC	Temperature Cycling
TW/WG	Tin Whiskers / Whiskers Growth
UHAST	Unbiased Highly Accelerated Stress Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify STPSC6H12B-TR1, 1200 V silicon carbide power Schottky diodes embedded in DPAK HV package in a new assembly and test location, ST Shenzhen – China

The reliability test methodology used follows the JESD47: « Stress Test driven Qualification Methodology. »

The reliability tests ensuing are:

- TC and IOLT 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.
- H3TRB, UHAST to check the robustness to corrosion and the good package hermeticity.
- RSH, Solderability and DBT to check compatibility of package with customer assembly.
- TW/WG to check lead-finishing quality.

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

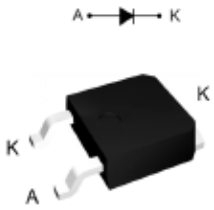
4.1 Device description

life.augmented

STPSC6H12

Datasheet

1200 V, 6 A power Schottky silicon carbide diode



DPAK HV 2L

STPOWER

Product label
SUSTAINABLE TECHNOLOGY
Product status link
STPSC6H12

Product summary	
$I_{F(AV)}$	6 A
V_{RRM}	1200 V
T_j (max.)	175 °C
V_F (typ.)	1.55 V
C_j (typ.)	30 pF

Features

- No or negligible reverse recovery
- High forward surge capability
- Operating T_j from -40 °C to 175 °C
- Creepage distance of 3 mm as per IEC 60664-1
- ECOPACK2 compliant on demand component

Applications

- Bootstrap function of SiC MOS-FETS
- Snubber diode
- Switching diode
- PFC boost diode

Description

The SiC diode is an ultra high performance power Schottky diode. It is manufactured using a silicon carbide substrate. The wide band gap material allows the design of a Schottky diode structure with a 1200 V rating. Due to the Schottky construction, no recovery is shown at turn-off and ringing patterns are negligible. The minimal capacitive turn-off behavior is independent of temperature.

Especially suited for use in boot strap, snubber circuits, or clamping functions of SiC MOS-FETs, the STPSC6H12 diode will help designers getting the best possible performance of their controlled switches in all conditions. This rectifier will enhance the performance of the targeted application.

Its improved creepage distance ensures the compatibility with industrial and automotive creepage standards.

4.2 Construction Note

	STPSC6H12B-TR1
Wafer/Die fab. information	
Wafer fab manufacturing location	ST CATANIA – ITALY
Technology / Process family	Silicon carbide power Schottky 1200V
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST CATANIA – ITALY
Assembly information	
Assembly site	ST SHENZHEN – CHINA
Package description	DPAK HV 2L
Molding compound	ECOPACK®2 (“Halogen-free”) molding compound
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	Wafer fab location	Assy plant Location	Comments
L1	STPSC6H12B-TR1	DPAK HV	ST Catania	ST Shenzhen	Qualification lot
GD1	STPSC10H065BY-TR	DPAK			Generic data for H3TRB/uHAST/IOLT/DBT test Same die technology in different package, Package similarity: same plant, same resin, same die-attach, same plating
GD2	STPSC2H12B2-TR	DPAK HV			Generic data for HTRB test for STPSC6H12B-TR1 Same die technology in same package
GD3	STPSC10H065BY-TR	DPAK			Generic data for RSH test Similar package
GD4	STTH30RQ06R7Y	H2PAK 7L	ST Tours		Same plant, same plating line.
GD5	Dummy part	H2PAK 7L	Not Applicable		Same plant, same plating line

GD: Test vehicles used for similarity.

Detailed results in below chapter will refer to these references.

5.2 Results summary

Test	PC	Std ref.	Conditions	Steps / Duration	SS	Failure/SS					
						L1	GD1	GD2	GD3	GD4	GD5
Pre- and Post-Electrical Test		ST datasheet	Ir, Vf,parameters following product datasheet	-	415	0/415					
PC		JESD22 A-113	Drying 24hrs; 125°C Storage 168hrs; 85°C;85%RH IR reflow 3 times	-	308	77	231	-	-	-	-
External Visual		JESD22B-101	All qualification parts submitted for testing passed External & Visual inspection during manufacturing process								
Parametric Verification		ST datasheet	Over part temperature range		30	Refer to paragraph 6.1 in Annexes					
HTRB	N	MIL-STD-750-1 M1038 Method A	Tj=175°C Ta=170°C VR=100% VRRM=1200V	1Khrs	77	-	-	0/77	-	-	-
TC	Y	JESD22A-104	-65/+150°C 2cy/h	500cy	77	0/77	-	-	-	-	-
UHAST	Y	JESD22A-118	130°C; 85% RH 2.3bar	96hrs	77	-	0/77	-	-	-	-
H3TRB	Y	JESD22A-101	85°C; 85% RH VR=80% VRRM (with 100V max.)	1Khrs	77	-	0/77	-	-	-	-
IOLT	Y	MIL-STD 750 Method 1037	ΔTj=100°C Ton=Toff=120s	15Kcy	77	-	0/77	-	-	-	-
PD		JESD22B-100	-	-	30	Refer to paragraph 6.2 in Annexes					
RSH	N	JESD22A-111	THS 85%RH / 85°C 168hrs Dipping 260°C-10s	-	30	-	-	-	0/30	-	-
SD	N	J-STD-002 JESD22B-102	Wet ageing SnPb bath 220°C	-	10	-	-	-	-	0/10	-
			Dry ageing SnPb bath 220°C	-	10	-	-	-	-	0/10	-
			Wet ageing SnAgCu bath 245°C	-	10	-	-	-	-	0/10	-
			Dry ageing SnAgCu bath 245°C	-	10	-	-	-	-	0/10	-
DBT	N	DM00112629 (ST internal)	IR reflow after flux deposition	-	30	-	0/30	-	-	-	-
WG	N	AEC-Q005 JESD201	No reflow 30°C/60%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		No reflow 55°C/85%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		No reflow -40°C/85°C	3Kcy	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow SnPb 215°C 30°C/60%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow SnPb 215°C 55°C/85%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow SnPb 215°C -40°C/85°C	3Kcy	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow Pb Free 245°C 30°C/60%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow Pb Free 245°C 55°C/85%RH	4Khrs	18	-	-	-	-	-	0/6 (3 lots)
	N		Reflow Pb Free 245°C -40°C/85°C	3Kcy	18	-	-	-	-	-	0/6 (3 lots)

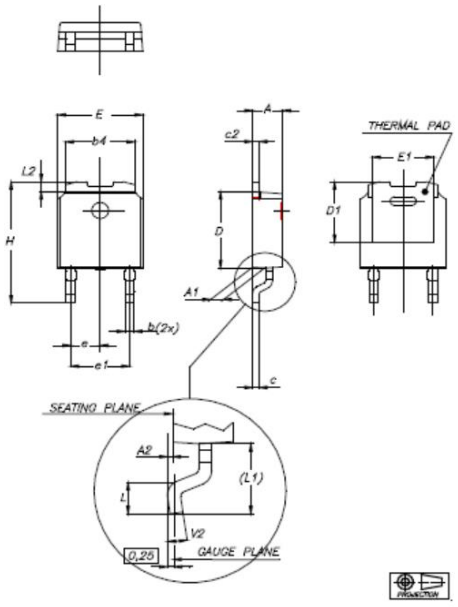
Note 1: These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested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

6 ANNEXES

6.1 Parametric Verification

			DPAK-HV Subcontractor in Philippines	DPAK-HV STS St Shenzhen	Datasheet ST
		PN	STPSC6H12B-TR	STPSC6H12B-TR	
VBR	Vbr (V) @1mA 25°C	N	30	30	
		Min	1325.0	1419.0	**1200**
		Max	1545.0	1533.0	
		Avg	1479.5	1488.1	
Ir	Ir (µA) (@1200V 25°C	N	30	30	
		Min	0.83	0.80	
		Max	16.13	10.02	**400**
		Avg	2.68	2.02	
	Ir (µA) @1200V 150°C	N	30	30	
		Min	6.96	6.80	
		Max	58.90	20.85	**1500**
		Avg	13.84	10.79	
Vf 25°C	Vf (V) @ 6A	N	30	30	
		Min	1.421	1.439	
		Max	1.524	1.481	**1.900**
		Avg	1.475	1.464	
Vf 150°C	Vf (V) @ 6A	N	30	30	
		Min	1.739	1.867	
		Max	2.009	1.969	**2.600**
		Avg	1.927	1.919	
Thermal	Rth(j-c) °C/W	N	5	5	
		Min	0.958	0.911	
		Max	1.061	0.950	**1.900**
		Avg	1.001	0.935	
	IFSM (A) 10µs carré 25°C	N	10	10	
		Min	143.0	143.0	**100**
		Max	248.0	234.0	
		Avg	196.8	190.0	
	IFSM (A) 10ms sinus 25°C	N	10	10	
		Min	47.4	49.8	**36**
		Max	57.8	56.2	
		Avg	52.1	52.4	
	IFSM (A) 10ms sinus 150°C	N	10	10	
		Min	42.6	45.8	**30**
		Max	53.8	55.0	
		Avg	49.0	50.4	
ESD	ESD (KV) IEC	N	5	5	
		Min	2.00	2.00	
		Max	2.50	2.50	

6.2 Physical Dimensions



Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.16	2.29	2.40	0.085	0.090	0.095
A1	0.90		1.10	0.035		0.044
A2	0.03	0.08	0.23	0.001	0.003	0.010
b	0.64	0.76	1.07	0.025	0.030	0.043
b4	5.004	5.10	5.40	0.197	0.201	0.213
c	0.45	0.51	0.60	0.017	0.020	0.024
c2	0.48	0.81	0.86	0.018	0.032	0.034
D	5.97	6.10	6.22	0.235	0.240	0.245
D1	4.60		5.74	0.181		0.226
E	6.40		6.73	0.251		0.265
E1	4.95		5.25	0.194		0.207
e	2.16		2.40	0.085		0.095
e1	4.40		4.60	0.173		0.182
H	9.35		10.10	0.368		0.398
L	1.00	1.14	1.50	0.039	0.045	0.060
L2	0.65		1.14	0.025		0.045
V2	0°		8°	0°		8°

Cote	A	A1	A2	b	b4	c	c2	D	D1	E	E1	e1	H	L	L1	L2	V2
MIN	2.16	0.9	0.03	0.64	5.004	0.45	0.48	5.97	4.6	6.4	4.95	4.4	9.35	1	2.6	0.65	0°C
TYP																	
MAX	2.4	1.1	0.23	1.07	5.4	0.6	0.86	6.22	5.74	6.73	5.25	4.6	10.1	1.5	3	1.14	8°C
1	2.29	0.98	0.17	0.72	5.28	0.52	0.51	6.17	4.71	6.50	5.09	4.49	9.67	1.18	2.73	0.80	2.62
2	2.33	0.98	0.16	0.79	5.33	0.53	0.52	6.21	4.78	6.50	5.10	4.50	9.70	1.19	2.73	0.86	1.94
3	2.33	0.98	0.17	0.75	5.33	0.50	0.51	6.13	4.70	6.49	5.10	4.49	9.70	1.19	2.71	0.86	2.25
4	2.33	0.99	0.18	0.76	5.33	0.53	0.51	6.20	4.70	6.51	5.09	4.51	9.69	1.20	2.73	0.84	3.05
5	2.32	0.98	0.17	0.76	5.34	0.51	0.52	6.20	4.72	6.49	5.08	4.48	9.61	1.15	2.69	0.78	3.69
6	2.33	0.97	0.18	0.73	5.32	0.53	0.52	6.12	4.72	6.48	5.10	4.50	9.60	1.14	2.70	0.77	0.09
7	2.32	0.97	0.18	0.76	5.32	0.52	0.51	6.16	4.71	6.50	5.09	4.48	9.61	1.15	2.72	0.78	1.56
8	2.33	0.98	0.18	0.75	5.32	0.53	0.52	6.12	4.71	6.48	5.09	4.50	9.60	1.14	2.69	0.86	2.78
9	2.33	0.97	0.19	0.74	5.33	0.52	0.50	6.14	4.70	6.50	5.09	4.47	9.63	1.14	2.69	0.78	1.49
10	2.32	0.98	0.17	0.74	5.33	0.51	0.52	6.20	4.71	6.49	5.09	4.50	9.63	1.15	2.69	0.78	1.64
11	2.31	0.98	0.18	0.75	5.34	0.50	0.51	6.20	4.71	6.48	5.09	4.48	9.62	1.16	2.70	0.80	2.48
12	2.31	0.98	0.18	0.71	5.34	0.50	0.51	6.14	4.72	6.48	5.07	4.51	9.63	1.16	2.72	0.80	3.74
13	2.33	0.99	0.17	0.76	5.33	0.54	0.51	6.18	4.70	6.50	5.09	4.49	9.66	1.18	2.69	0.85	5.52
14	2.34	0.97	0.16	0.76	5.32	0.52	0.52	6.19	4.71	6.50	5.09	4.50	9.70	1.19	2.75	0.86	3.97
15	2.34	0.99	0.17	0.76	5.31	0.50	0.51	6.19	4.70	6.50	5.09	4.50	9.70	1.19	2.77	0.86	4.55
16	2.33	0.98	0.18	0.77	5.33	0.51	0.52	6.19	4.70	6.50	5.09	4.47	9.70	1.19	2.73	0.84	4.00
17	2.34	1.00	0.16	0.76	5.31	0.52	0.52	6.17	4.71	6.50	5.08	4.49	9.70	1.18	2.71	0.85	3.39
18	2.34	0.99	0.16	0.77	5.31	0.52	0.52	6.16	4.72	6.50	5.09	4.48	9.70	1.20	2.71	0.87	4.33
19	2.35	0.98	0.17	0.77	5.31	0.52	0.52	6.19	4.70	6.51	5.09	4.50	9.69	1.18	2.72	0.87	3.61
20	2.33	0.97	0.17	0.76	5.34	0.54	0.51	6.09	4.73	6.50	5.10	4.50	9.62	1.16	2.72	0.78	2.69
21	2.33	0.98	0.18	0.75	5.32	0.51	0.51	6.17	4.71	6.49	5.10	4.50	9.62	1.14	2.72	0.80	2.13
22	2.33	0.97	0.17	0.77	5.33	0.51	0.52	6.21	4.72	6.50	5.08	4.50	9.62	1.16	2.72	0.78	3.45
23	2.32	0.98	0.17	0.75	5.32	0.53	0.53	6.19	4.71	6.48	5.08	4.49	9.61	1.14	2.72	0.77	1.23
24	2.32	0.97	0.18	0.75	5.34	0.51	0.51	6.13	4.71	6.53	5.09	4.51	9.60	1.16	2.70	0.78	3.64
25	2.32	0.98	0.18	0.75	5.34	0.51	0.51	6.22	4.72	6.49	5.09	4.50	9.60	1.15	2.63	0.82	3.06
26	2.33	0.98	0.18	0.71	5.33	0.52	0.52	6.23	4.71	6.50	5.10	4.50	9.59	1.13	2.71	0.77	0.94
27	2.33	0.98	0.18	0.74	5.33	0.53	0.50	6.17	4.71	6.51	5.09	4.49	9.59	1.14	2.71	0.82	3.18
28	2.32	0.98	0.18	0.75	5.31	0.50	0.51	6.10	4.71	6.50	5.09	4.50	9.59	1.14	2.69	0.79	0.18
29	2.33	0.97	0.17	0.74	5.32	0.50	0.51	6.15	4.71	6.49	5.08	4.50	9.60	1.15	2.69	0.78	2.00
30	2.33	0.98	0.17	0.76	5.34	0.51	0.51	6.22	4.71	6.50	5.10	4.50	9.59	1.15	2.69	0.77	1.42
MIN	2.29	0.97	0.16	0.71	5.28	0.50	0.50	6.09	4.70	6.48	5.07	4.47	9.59	1.13	2.63	0.77	0.09
MAX	2.35	1.00	0.19	0.79	5.34	0.54	0.53	6.23	4.78	6.53	5.10	4.51	9.70	1.20	2.77	0.87	5.52
Average	2.327	0.979	0.174	0.751	5.325	0.517	0.514	6.171	4.713	6.497	5.090	4.494	9.639	1.163	2.709	0.812	2.687

6.3 Tests description

Test name	Description	Purpose
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
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.
H3TRB High Humidity High Temperature Reverse 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.
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.
UHAST Unbiased Highly Accelerated Stress Test	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.
IOLT Intermittent Operating Life Test	All test samples shall be subjected to the specified number of cycles. When stabilized after initial warm-up cycles, a cycle shall consist of an "on" period, when power is applied suddenly, not gradually, to the device for the time necessary to achieve a delta case temperature followed by an “off” period, when the power is suddenly removed, for cooling the case through a similar delta temperature.	The purpose of this test is to determine compliance with the specified numbers of cycles for devices subjected to the specified conditions. It accelerates the stresses on all bonds and interfaces between the chip and mounting face of devices subjected to repeated turn on and off of equipment and is therefore most appropriate for case mount style (e.g., stud, flange, and disc) devices.
SD Solderability	The purpose of this test method is to provide a referee condition for the evaluation of the solderability of terminations (including leads up to 0.125 inch in diameter) that will be assembled using tin lead eutectic solder.	This evaluation is made on the basis of the ability of these terminations to be wetted and to produce a suitable fillet when coated by tin lead eutectic solder. These procedures will test whether the packaging materials and processes used during the manufacturing operations process produce a component that can be successfully soldered to the next level assembly using tin lead eutectic solder. A preconditioning test is included in this test method, which degrades the termination finish to provide a guard band against marginal finish.

Test name	Description	Purpose
DBT Dead Bug Test	To evaluate the wettability of the package leads. Good indicator to determine the bad solderability behavior	Components are glued up-side down on a substrate. Pins are wetted with a moderately activated flux. Then run once through the reflow oven with leadfree temperature profile. Visual inspection is performed with suitable tool.
TW/WG Whiskers Growth	Forced growing of Tin Whiskers by various kind of environmental stress: temperature, moisture and temperature cycling.	To ensure no risk of electrical short due to Tin Whisker growth.
RSH Resistance to Solder Heat	Package is dipped by the leads in a solder bath after initial wet ageing (for SMDs only). Assessment by electrical test + no external crack	To simulate wave soldering process and verify that package will not be thermally damaged during this step.