Product Change Notification CN-202209020F

Issue date: 10 Oct 2022

Effective date: 22 Jan 2023

For more details please contact your respective Nexperia CSR/AM.

Change of die, lead frame and mold compound for schottky diodes in SOD123W Q-portfolio

Change Category

[X] Wafer Fab Process [X] Wafer Fab Materials [X] Assembly Materials [X] Design

Details of this change

- New clip type with optimized geometry
- No silver spot on lead frame surface anymore
- Change of mold compound
- Shrinkage of die size from 960 µm x 960 µm to 910 µm x 910 µm and from 1290 µm x 1290 µm to 1220 µm x 1220 µm
- New die design
- Datasheet parameter IFSM "non-repetitive peak forward current" is measured with half sine wave pulses instead of square wave pulses

PCN-FORM-Nexperia_CN-202209020F.xlsm: https://qcm.nexperia.com/Document/DOC-544542/PCN-FORM-Nexperia_CN-202209020F.xlsm

SQR_SOD123W_automotive.pdf: https://qcm.nexperia.com/Document/DOC-544541/SQR_SOD123W_automotive.pdf

PCN-202209020F_Change_overview-DeQuMa.pdf: https://qcm.nexperia.com/Document/DOC-544488/PCN-202209020F_Change_overview-DeQuMa.pdf

PCN-Delta-Qualification-Matrix-CN-202209020F.xlsm: https://qcm.nexperia.com/Document/DOC-544489/PCN-Delta-Qualification-Matrix-CN-202209020F.xlsm

Why do we implement this change?

- Improvement of robustness and inline control during assembly process
- Adaption of lead frame surface to new die design
- Improvement of robustness against delamination of mold compound
- Increase of production capacity
- Alignment with Nexperia and world technology standards

Identification of affected products

Top Side Marking

Changed product can be identified by date code after implementation.

Product availability

Production

Planned first shipment: 19-Jan-2023

Existing inventory will be shipped until depleted.

Sample information

Samples are available upon request

Impact

No impact to the product's functionality anticipated

Data sheet revision

A new datasheet will be issued

Feedback

Your acknowledgement of this change, conform JEDEC J-STD-046, is expected till 09 Nov 2022. Lack of acknowledgement of the PCN constitutes acceptance of the change.

Contact and support

For all Quality Notification content inquiries, please contact your local Nexperia Sales Support Team.

For specific questions on this notice or the products affected please contact our specialist directly: pcn@nexperia.com

In case of distribution, please contact you distribution partner.

About Nexperia B.V.

We at Nexperia are the efficiency semiconductor company. We deliver over 90 billion products a year and as such service thousands of global customers, both directly and through our extensive network of channel partners. We are at the heart of billions of electronic devices in the Automotive, Mobile, Industrial, Consumer, Computing, and Communication Infrastructure segments.

CN-202209020F

Change of die and lead frame for Schottky diodes in SOD123W Q-portfolio

Revision: 30 September 2022 **Self Qualification Report**

Document Information

Information	Content
Author	Alex Sabelfeld
Supplier	Nexperia
Document Number	CN-202209020F

Revision History

Revision Date	Description
30 September 2022	New document

Contact Information

For more information, please contact: pcn@nexperia.com

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1. Subject

This Self Qualification Report gives background information about the changes of the die and lead frame design as well as new assembly materials in automotive (Q-portfolio) Schottky diodes in SOD123W package in Table 7. It shows details of the qualification strategy, and selected tests to confirm the zero hour and reliability performance of the changed products. For the non-Q parts the same changes were announced in PCN 202206012F "Change of die and lead frame for Schottky diodes in SOD123W".

2. Introduction

The following changes will be implemented in Schottky diodes in SOD123W package listed in Table 7 and described in this PCN:

Changed item	Link to detailed description
Clip type	See 3.1
Lead frame	See 3.2
Mold compound	See 3.3
Die pitch size	See 3.4
Die design	See 3.5
Datasheet: IFSM measurement condition	See 3.6

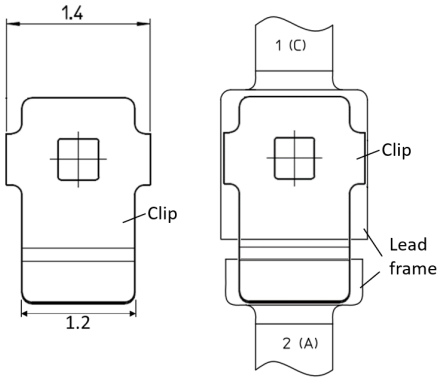
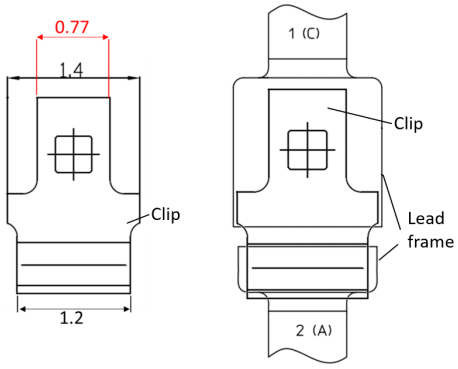
All changes in this PCN have no influence on outer package dimensions and the surface of the leads outside of the plastic package.

3. Material and process details

3.1 Clip geometry

The clip geometry will be changed as illustrated in Table 1. The thickness, raw material and supplier of the clip remain unchanged as well as the outer package dimensions.

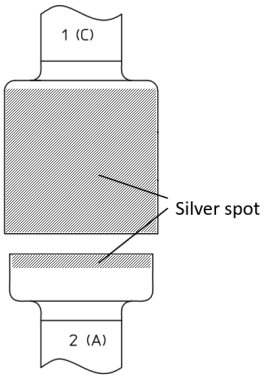
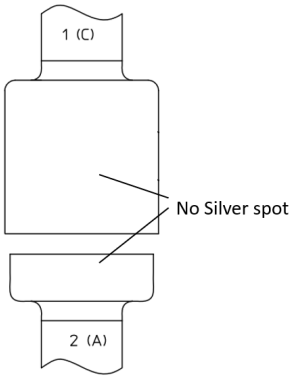
Table 1: Drawings of the current and changed clip geometry; major changes of the dimensions are highlighted in red

Current clip and lead frame combination	Changed clip and lead frame combination
 (dimensions in mm)	 (dimensions in mm)

3.2 Lead frame

The changed lead frame will not have a silver spot on the die bond area of the lead frame anymore. The lead frame thickness, material, geometry and supplier remain the same.

Table 2: Comparison of current and changed lead frame

Current lead frame	Changed lead frame
	

3.3 Mold compound

Table 3: Current and changed mold compound

	Current mold compound	Changed mold compound
Mold compound supplier & ID	Panasonic 3400FPG	Sumitomo EME-G700KJ

3.4 Die size

Table 4: Current and changed die sizes in affected products

Products		Current die pitch size	Changed die pitch size
PMEG2010BER-Q	PMEG6010ETR-Q	960 µm x 960 µm	910 µm x 910 µm
PMEG3010BER-Q	PMEG6020ELR-Q		
PMEG3020BER-Q	PMEG6020ELR-Q/S400		
PMEG4010ER-Q	PMEG10010ELR-Q		
PMEG4010ETR-Q	PMEG10010ELR-Q/S400		
PMEG6010ELR-Q	PMEG10020ELR-Q		
PMEG6010ELR-Q/S400	PMEG10020ELR-Q/S320		
PMEG6010ER-Q	PMEG10020ELR-Q/S400		
PMEG6010ER-Q/S400			
PMEG4020ER-Q	PMEG6020ER-Q	1290 µm x 1290 µm	1220 µm x 1220 µm
PMEG4020ER-Q/S320	PMEG6020ER-Q/S400		
PMEG4020ER-Q/S400	PMEG6020ETR-Q		
PMEG4020ETR-Q	PMEG6020ETR-Q/S400		
PMEG4030ER-Q	PMEG10020AELR-Q		
PMEG4030ETR-Q	PMEG10020AELR-Q/S400		
PMEG6020AELR-Q			

3.5 Die design

Die design is changed. Detailed information can only be provided on dedicated customer request.

3.6 Datasheet change: I_{FSM} parameter measurement conditions

The measurement of the datasheet parameter "non-repetitive peak forward current" (I_{FSM}) is changed regarding the pulse conditions from square wave pulsed (8 ms) to half sine wave pulsed (8.3 ms). The half sine pulsed mode is common industry standard and is about to be implemented in Nexperia's product datasheets under section "Limiting Values" as shown in Table 5. The values measured with square wave pulse conditions will not be published anymore. This change has no impact on the I_{FSM} specification.

Table 5: Datasheet change on I_{FSM} measurement conditions

I_{FSM} changes in datasheet

Current datasheet entry

Symbol	Parameter	Conditions		Min	Max	Unit
I_{FSM}	non-repetitive peak forward current	t_p = 8 ms; $T_{j(init)}$ = 25 °C; square wave		-	50	A

Changed datasheet entry

Symbol	Parameter	Conditions		Min	Max	Unit
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; half sine wave; $T_{j(init)}$ = 25 °C		-	50	A

4. Test program

In line with AEC-Q101 and Nexperia General Quality Specification, the product types to be changed have been combined to generic leader type families due to their structural similarity. To validate the assembly quality and reliability performance an extensive qualification program has been performed.

4.1 Qualification strategy

The qualification plan has been developed based on FMEA risk assessment. Potential failures have been identified and addressed in qualification.

4.2 Test vehicles

Eight leader types (see Table 6) have been selected based on structural similarity to represent the qualification family and the die technologies for all changes described in Chapter 3. In total fifteen lots have been used for the qualification program.

5. Constructional details of test vehicles

Table 6: The representative leader types for the qualification family

Package type: SOD123W **Technology:** Schottky barrier rectifier						
Product	**Material used for qualification**					
	Lots	**Clip**	**Lead frame**	**Mold compound**	**Die pitch size [µm]**	**Die Design**
PMEG10020AELR-Q	3	new geometry	without Ag spot	Sumitomo EME-G700KJ	1220 x 1220	new
PMEG10020ELR-Q	4	new geometry	without Ag spot	Sumitomo EME-G700KJ	910 x 910	new
PMEG3020BER-Q	1	new geometry	without Ag spot	Sumitomo EME-G700KJ	910 x 910	new
PMEG4010ETR-Q	1	new geometry	without Ag spot	Sumitomo EME-G700KJ	910 x 910	new
PMEG4030ETR-Q	1	new geometry	without Ag spot	Sumitomo EME-G700KJ	1220 x 1220	new
PMEG6010ER-Q	1	new geometry	without Ag spot	Sumitomo EME-G700KJ	910 x 910	New
PMEG6020AELR-Q	2	new geometry	without Ag spot	Sumitomo EME-G700KJ	1220 x 1220	new
PMEG6020ELR-Q	1	new geometry	without Ag spot	Sumitomo EME-G700KJ	910 x 910	new
PMEG6020ETR-Q	2	new geometry	without Ag spot	Sumitomo EME-G700KJ	1220 x 1220	new

6. Qualification family

All product types to be released with this PCN are listed in Table 7.

Table 7: Qualification family of affected product types

Product	**12NC**	**Package**	**Die size**
PMEG10010ELR-Q	934662915115	SOD123W	910 µm x 910 µm
PMEG10010ELR-Q/S400	934665262115	SOD123W	910 µm x 910 µm
PMEG10020AELR-Q	934662914115	SOD123W	1220 µm x 1220 µm
PMEG10020AELR-Q/S400	934665222115	SOD123W	1220 µm x 1220 µm
PMEG10020ELR-Q	934662913115	SOD123W	910 µm x 910 µm
PMEG10020ELR-Q/S320	934665061115	SOD123W	910 µm x 910 µm
PMEG10020ELR-Q/S400	934663805115	SOD123W	910 µm x 910 µm
PMEG2010BER-Q	934662912115	SOD123W	910 µm x 910 µm
PMEG3010BER-Q	934662911115	SOD123W	910 µm x 910 µm

PMEG3020BER-Q	934662910115	SOD123W	910 µm x 910 µm
PMEG4010ER-Q	934662909115	SOD123W	910 µm x 910 µm
PMEG4010ETR-Q	934662908115	SOD123W	910 µm x 910 µm
PMEG4020ER-Q	934662906115	SOD123W	1220 µm x 1220 µm
PMEG4020ER-Q/S320	934665063115	SOD123W	1220 µm x 1220 µm
PMEG4020ER-Q/S400	934665045115	SOD123W	1220 µm x 1220 µm
PMEG4020ETR-Q	934662905115	SOD123W	1220 µm x 1220 µm
PMEG4030ER-Q	934662904115	SOD123W	1220 µm x 1220 µm
PMEG4030ETR-Q	934662965115	SOD123W	1220 µm x 1220 µm
PMEG6010ELR-Q	934662903115	SOD123W	910 µm x 910 µm
PMEG6010ELR-Q/S400	934663856115	SOD123W	910 µm x 910 µm
PMEG6010ER-Q	934662891115	SOD123W	910 µm x 910 µm
PMEG6010ER-Q/S400	934665206115	SOD123W	910 µm x 910 µm
PMEG6010ETR-Q	934662890115	SOD123W	910 µm x 910 µm
PMEG6020AELR-Q	934662889115	SOD123W	1220 µm x 1220 µm
PMEG6020ELR-Q	934662888115	SOD123W	910 µm x 910 µm
PMEG6020ELR-Q/S400	934665207115	SOD123W	910 µm x 910 µm
PMEG6020ER-Q	934662887115	SOD123W	1220 µm x 1220 µm
PMEG6020ER-Q/S400	934665046115	SOD123W	1220 µm x 1220 µm
PMEG6020ETR-Q	934662886115	SOD123W	1220 µm x 1220 µm
PMEG6020ETR-Q/S400	934665209115	SOD123W	1220 µm x 1220 µm

7. Qualification results

The qualification as reported in the summary below have been carried out to release all product types mentioned in this PCN.

Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG10020AELR-Q, PMEG10020ELR-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 100V PtNi Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group A - Accelerated Environment Stress Tests					
A1	Preconditioning (PC)	JEDEC/IPC J-STD-020, JESD22-A113, TEST before and after PC, MSL level 1	all[1)]	all[1)]	0
A2	Highly Accelerated Stress Test (HAST)	JEDEC JESD22-A110, T=130°C, 85% RH, t=96 hrs, reverse biased at 80% of rated voltage	-[2)]	-	-
A2 alt	High Humidity High Temperature Reverse Bias (H3TRB)	JEDEC JESD22-A101, T=85°C, 85% RH, reverse biased at 80% of rated breakdown voltage, t=1000 hrs.	3	80	0
A3	Unbiased Highly Accelerated Stress Test (UHAST)	JEDEC JESD22-A118, T=130°C, 85% RH, t=192 hrs	3	80	0
A3 alt	Autoclave (AC)	JEDEC JESD22-A102, T=121°C, p=15psig, 100% RH, t=96 hrs	-[2)]	-	-
A4	Temperature Cycling (TC)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles,	3	80	0
A4a	Temperature Cycling Hot Test (TCHT)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles, followed by wire pull on 5 parts	-[3)]	-	-
A4a alt	Temperature Cycling Delamination Test (TCDT)	JEDEC JESD22-A104, J-STD-035, T=-65°C to 150°C, 1000 cycles, followed by C-SAM inspection and wire pull	-[2) 3)]	-	-
A5	Intermittent Operational Life (IOL)	MIL-STD-750-1 Method 1037, T=25°C, ΔTj ≥ 100°C, ton=toff=2 min, t=1000 hrs,	3	80	0
A5 alt	Power and Temperature Cycle (PTC)	JEDEC JESD22-A105, T=-40°C to x°C to obtain ΔTj ≥ 100°C, ton=toff=2 min, t=1000 hrs	-[2) 4)]	-	-
Test Group B - Accelerated Lifetime Simulation Tests					
B1	High Temperature Reverse Bias (HTRB)	MIL-STD-750-1 M1038/M1039 Condition A, T=175°C, reverse biased at max. rated breakdown voltage[5)], t=1000 hrs	3	80	0
B1a	AC blocking voltage (ACBV)	MIL-STD-750-1 M1040 Condition A	-[6)]	-	-
B1c	Steady State Operational (SSOP)	MIL-STD-750-1 M1038 Condition B (Zeners)	-[7)]	-	-
B2	High Temperature Gate Bias (HTGB)	JEDEC JESD22-A108, T=175°C, VGS=VGSmax, t=1000 hrs	-[3)]	-	-
	High Temperature Negative Gate Bias (HTNGB)	JEDEC JESD22-A108, T=175°C, VSG=VSGmax, t=1000 hrs	-[3)]	-	-

Project name: BL252_FlatPower	**Reason for Qualification:**	**Compiled by:**
Trial-number: SOD123W part 1	Change of EMC, die and lead frame	A. Tonitzki
Batch/Lot-number: HD2006-2012		
Fab/Assembly: DHAM / ATSN		**Date:** 21-Sep-2022

Notes:

1. All SMD qualification parts prior to TC/TCHT/TCDT, AC/UHAST, IOL/PTC, H3TRB/HAST, RSH
2. Omitted in lieu of alternative test
3. Required for MOSFET parts with internal bond wire sizes 5 mil diameter and less.
4. Not required for Transient Voltage Suppressors (TVS)
5. The physical limitations of Schottky diodes have to be considered (thermal runaway)
6. Required for Thyristors only
7. Required for Voltage Regulators (Zener diodes) only

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG10020AELR-Q, PMEG10020ELR-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 100V PtNi Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group C - Package Assembly Integrity Tests					
C1	Destructive Physical Analysis (DPA)	AEC-Q101-004 Section 4 (after H3TRB or HAST, and TC)	3	2+2	0
C2	Physical Dimensions (PD)	JEDEC JESD22-B100	-[19)]	-	-
C3	Wire Bond Pull Strength (WBP)	MIL-STD-750-2 Method 2037 / AEC-Q006 (for Cu-wire), 10 bonds from min of 5 parts	-[8)]	-	-
C4	Wire Bond Shear Strength (WBS)	AEC-Q101-003, JEDEC JESD22-B116 10 bonds from min of 5 parts	-[8)]	-	-
C5	Die Shear (DS)	MIL-STD-750-2 Method 2017	-[8)]	-	-
C6	Terminal Strength (TS)	MIL-STD-750-2 Method 2036	-[9)]	-	-
C7	Resistance to Solvents (RTS)	JEDEC JESD22-B107, verify marking permanency	-[10)]	-	-
C8	Resistance to Solder Heat (RSH)	JEDEC JESD22-A111, SMD parts shall be fully submerged during test	3	30	0
C9	Thermal Resistance (TR)	JEDEC JESD24-3, 24-4, 24-6 as appropriate	3	10	0
C10	Solderability (SD)	JEDEC J-STD-002	-[19)]	-	-
C11	Whisker Growth Evaluation (WG)	AEC-Q005	-[19)]	-	-
C12	Constant Acceleration (CA)	MIL-STD-750-2 Method 2006	-[11)]	-	-
C13	Vibration Variable Frequency (VVF)	JEDEC JESD22-B103	-[11)]	-	-
C14	Mechanical Shock (MS)	JEDEC JESD22-B104	-[11)]	-	-
C15	Hermeticity (HER)	JEDEC JESD22-A109	-[11)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 1** **Batch/Lot-number: HD2006-2012** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

8. Not applicable for soft soldered and clip bonded parts
9. Evaluate lead integrity of through-hole leaded parts only.
10. Not required for laser etched parts or parts with no marking
11. Required for hermetic packaged parts only
19. Based on structural similarity (generic family data)

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG10020AELR-Q, PMEG10020ELR-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 100V PtNi Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group D - Die Fabrication Reliability Tests					
D1	Dielectric Integrity (DI)	AEC-Q101-004 Section 3	-[12)]	-	-
Test Group E - Electrical Verification Tests					
E0	External Visual (EV)	JEDEC JESD22-B101, inspect part construction, marking and w orkmanship	all[13)]	all[13)]	0
E1	Pre and Post Stress Test (TEST)	Electrical test as specified in the applicable stress reference at room temperature	all[14)]	all[14)]	0
E2	Parametric Verification (PV)	T=-55°C, T=25°C, and T=175°C	3	25	0
E3	ESD - Human Body Model (ESDH)	AEC-Q101-001	3	30	0
E4	ESD - Charged Dev. Model (ESDC)	AEC-Q101-005	-[16)]	-	-
E5	Unclamped Inductive Switching (UIS)	AEC-Q101-004 Section 2	-[12)]	-	-
E6	Short Circuit Characterization (SC)	AEC-Q101-006	-[17)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 1** **Batch/Lot-number: HD2006-2012** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

12. Required for MOS and IGBT parts only
13. All qualification parts according part specification
14. All qualification parts submitted for testing
15. Test passed at initial product release. Not required according Process Change Guidelines for this change
16. Small SMD packages not able to hold enough charge. See AEC-Q101 Section 4.2
17. Required for smart pow er parts only

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG6020AELR-Q, PMEG6020ELR-Q, 2x PMEG6020ETR-Q, PMEG6010ER-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 60V PtNi and NiFe Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group A - Accelerated Environment Stress Tests					
A1	Preconditioning (PC)	JEDEC/IPC J-STD-020, JESD22-A113, TEST before and after PC, MSL level 1	all[1)]	all[1)]	0
A2	Highly Accelerated Stress Test (HAST)	JEDEC JESD22-A110, T=130°C, 85% RH, t=96 hrs, reverse biased at 80% of rated voltage	-[2)]	-	-
A2 alt	High Humidity High Temperature Reverse Bias (H3TRB)	JEDEC JESD22-A101, T=85°C, 85% RH, reverse biased at 80% of rated breakdown voltage, t=1000 hrs.	6	80	0
A3	Unbiased Highly Accelerated Stress Test (UHAST)	JEDEC JESD22-A118, T=130°C, 85% RH, t=192 hrs	6	80	0
A3 alt	Autoclave (AC)	JEDEC JESD22-A102, T=121°C, p=15psig, 100% RH, t=96 hrs	-[2)]	-	-
A4	Temperature Cycling (TC)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles,	6	80	0
A4a	Temperature Cycling Hot Test (TCHT)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles, followed by wire pull on 5 parts	-[3)]	-	-
A4a alt	Temperature Cycling Delamination Test (TCDT)	JEDEC JESD22-A104, J-STD-035, T=-65°C to 150°C, 1000 cycles, followed by C-SAM inspection and wire pull	-[2) 3)]	-	-
A5	Intermittent Operational Life (IOL)	MIL-STD-750-1 Method 1037, T=25°C, ΔTj 100°C, ton=toff=2 min, t=1000 hrs,	6	80	0
A5 alt	Power and Temperature Cycle (PTC)	JEDEC JESD22-A105, T=-40°C to x°C to obtain ΔTj 100°C, ton=toff=2 min, t=1000 hrs	-[2) 4)]	-	-
Test Group B - Accelerated Lifetime Simulation Tests					
B1	High Temperature Reverse Bias (HTRB)	MIL-STD-750-1 M1038/M1039 Condition A, T=175°C, reverse biased at max. rated breakdown voltage[5], t=1000 hrs	5	80	0
B1a	AC blocking voltage (ACBV)	MIL-STD-750-1 M1040 Condition A	-[6)]	-	-
B1c	Steady State Operational (SSOP)	MIL-STD-750-1 M1038 Condition B (Zeners)	-[7)]	-	-
B2	High Temperature Gate Bias (HTGB)	JEDEC JESD22-A108, T=175°C, VGS=VGSmax, t=1000 hrs	-[3)]	-	-
	High Temperature Negative Gate Bias (HTNGB)	JEDEC JESD22-A108, T=175°C, VSG=VSGmax, t=1000 hrs	-[3)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 2** **Batch/Lot-number: HD2013-2018** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

1. All SMD qualification parts prior to TC/TCHT/TCDT, AC/UHAST, IOL/PTC, H3TRB/HAST, RSH
2. Omitted in lieu of alternative test
3. Required for MOSFET parts with internal bond wire sizes 5 mil diameter and less.
4. Not required for Transient Voltage Suppressors (TVS)
5. The physical limitations of Schottky diodes have to be considered (thermal runaway)
6. Required for Thyristors only
7. Required for Voltage Regulators (Zener diodes) only

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG6020AELR-Q, PMEG6020ELR-Q, 2x PMEG6020ETR-Q, PMEG6010ER-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 60V PtNi and NiFe Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group C - Package Assembly Integrity Tests					
C1	Destructive Physical Analysis (DPA)	AEC-Q101-004 Section 4 (after H3TRB or HAST, and TC)	6	2+2	0
C2	Physical Dimensions (PD)	JEDEC JESD22-B100	-[19)]	-	-
C3	Wire Bond Pull Strength (WBP)	MIL-STD-750-2 Method 2037 / AEC-Q006 (for Cu-wire), 10 bonds from min of 5 parts	-[8)]	-	-
C4	Wire Bond Shear Strength (WBS)	AEC-Q101-003, JEDEC JESD22-B116 10 bonds from min of 5 parts	-[8)]	-	-
C5	Die Shear (DS)	MIL-STD-750-2 Method 2017	-[8)]	-	-
C6	Terminal Strength (TS)	MIL-STD-750-2 Method 2036	-[9)]	-	-
C7	Resistance to Solvents (RTS)	JEDEC JESD22-B107, verify marking permanency	-[10)]	-	-
C8	Resistance to Solder Heat (RSH)	JEDEC JESD22-A111, SMD parts shall be fully submerged during test	6	30	0
C9	Thermal Resistance (TR)	JEDEC JESD24-3, 24-4, 24-6 as appropriate	4	10	0
C10	Solderability (SD)	JEDEC J-STD-002	-[19)]	-	-
C11	Whisker Growth Evaluation (WG)	AEC-Q005	-[19)]	-	-
C12	Constant Acceleration (CA)	MIL-STD-750-2 Method 2006	-[11)]	-	-
C13	Vibration Variable Frequency (VVF)	JEDEC JESD22-B103	-[11)]	-	-
C14	Mechanical Shock (MS)	JEDEC JESD22-B104	-[11)]	-	-
C15	Hermeticity (HER)	JEDEC JESD22-A109	-[11)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 2** **Batch/Lot-number: HD2013-2018** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

8. Not applicable for soft soldered and clip bonded parts
9. Evaluate lead integrity of through-hole leaded parts only.
10. Not required for laser etched parts or parts with no marking
11. Required for hermetic packaged parts only
19. Based on structural similarity (generic family data)

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	2x PMEG6020AELR-Q, PMEG6020ELR-Q, 2x PMEG6020ETR-Q, PMEG6010ER-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 60V PtNi and NiFe Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group D - Die Fabrication Reliability Tests					
D1	Dielectric Integrity (DI)	AEC-Q101-004 Section 3	-[12)]	-	-
Test Group E - Electrical Verification Tests					
E0	External Visual (EV)	JEDEC JESD22-B101, inspect part construction, marking and w orkmanship	all[13)]	all[13)]	0
E1	Pre and Post Stress Test (TEST)	Electrical test as specified in the applicable stress reference at room temperature	all[14)]	all[14)]	0
E2	Parametric Verification (PV)	T=-55°C, T=25°C, and T=175°C	6	25	0
E3	ESD - Human Body Model (ESDH)	AEC-Q101-001	6	30	0
E4	ESD - Charged Dev. Model (ESDC)	AEC-Q101-005	-[16)]	-	-
E5	Unclamped Inductive Switching (UIS)	AEC-Q101-004 Section 2	-[12)]	-	-
E6	Short Circuit Characterization (SC)	AEC-Q101-006	-[17)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 2** **Batch/Lot-number: HD2013-2018** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

12. Required for MOS and IGBT parts only
13. All qualification parts according part specification
14. All qualification parts submitted for testing
15. Test passed at initial product release. Not required according Process Change Guidelines for this change
16. Small SMD packages not able to hold enough charge. See AEC-Q101 Section 4.2
17. Required for smart pow er parts only

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	PMEG4030ETR-Q, PMEG4010ETR-Q, PMEG3020BER-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 40V and 30V NiFe Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group A - Accelerated Environment Stress Tests					
A1	Preconditioning (PC)	JEDEC/IPC J-STD-020, JESD22-A113, TEST before and after PC, MSL level 1	all[1)]	all[1)]	0
A2	Highly Accelerated Stress Test (HAST)	JEDEC JESD22-A110, T=130°C, 85% RH, t=96 hrs, reverse biased at 80% of rated voltage	-[2)]	-	-
A2 alt	High Humidity High Temperature Reverse Bias (H3TRB)	JEDEC JESD22-A101, T=85°C, 85% RH, reverse biased at 80% of rated breakdown voltage, t=1000 hrs.	3	80	0
A3	Unbiased Highly Accelerated Stress Test (UHAST)	JEDEC JESD22-A118, T=130°C, 85% RH, t=192 hrs	3	80	0
A3 alt	Autoclave (AC)	JEDEC JESD22-A102, T=121°C, p=15psig, 100% RH, t=96 hrs	-[2)]	-	-
A4	Temperature Cycling (TC)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles,	3	80	0
A4a	Temperature Cycling Hot Test (TCHT)	JEDEC JESD22-A104, T=-65°C to 150°C, 1000 cycles, followed by wire pull on 5 parts	-[3)]	-	-
A4a alt	Temperature Cycling Delamination Test (TCDT)	JEDEC JESD22-A104, J-STD-035, T=-65°C to 150°C, 1000 cycles, followed by C-SAM inspection and wire pull	-[2) 3)]	-	-
A5	Intermittent Operational Life (IOL)	MIL-STD-750-1 Method 1037, T=25°C, ΔTj 100°C, ton=toff=2 min, t=1000 hrs,	3	80	0
A5 alt	Power and Temperature Cycle (PTC)	JEDEC JESD22-A105, T=-40°C to x°C to obtain ΔTj 100°C, ton=toff=2 min, t=1000 hrs	-[2) 4)]	-	-
Test Group B - Accelerated Lifetime Simulation Tests					
B1	High Temperature Reverse Bias (HTRB)	MIL-STD-750-1 M1038/M1039 Condition A, T=175°C, reverse biased at max. rated breakdown voltage[5], t=1000 hrs	3	80	0
B1a	AC blocking voltage (ACBV)	MIL-STD-750-1 M1040 Condition A	-[6)]	-	-
B1c	Steady State Operational (SSOP)	MIL-STD-750-1 M1038 Condition B (Zeners)	-[7)]	-	-
B2	High Temperature Gate Bias (HTGB)	JEDEC JESD22-A108, T=175°C, VGS=VGSmax, t=1000 hrs	-[3)]	-	-
	High Temperature Negative Gate Bias (HTNGB)	JEDEC JESD22-A108, T=175°C, VSG=VSGmax, t=1000 hrs	-[3)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 3** **Batch/Lot-number: HD2019-2021** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

1. All SMD qualification parts prior to TC/TCHT/TCDT, AC/UHAST, IOL/PTC, H3TRB/HAST, RSH
2. Omitted in lieu of alternative test
3. Required for MOSFET parts with internal bond wire sizes 5 mil diameter and less.
4. Not required for Transient Voltage Suppressors (TVS)
5. The physical limitations of Schottky diodes have to be considered (thermal runaway)
6. Required for Thyristors only
7. Required for Voltage Regulators (Zener diodes) only

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Production Part Approval - Environmental Test Summary

(according to AEC-Q101-Rev-E)

Supplier	User Part Number
Nexperia	PMEG4030ETR-Q, PMEG4010ETR-Q, PMEG3020BER-Q
Name of Laboratory	**Part Description**
Quality Hamburg	Planar 40V and 30V NiFe Schottky Diode

Test #	Test Description	Test Conditions	# Lots	# Tested	# Failed
Test Group C - Package Assembly Integrity Tests					
C1	Destructive Physical Analysis (DPA)	AEC-Q101-004 Section 4 (after H3TRB or HAST, and TC)	3	2+2	0
C2	Physical Dimensions (PD)	JEDEC JESD22-B100	-[20]	-	-
C3	Wire Bond Pull Strength (WBP)	MIL-STD-750-2 Method 2037 / AEC-Q006 (for Cu-wire), 10 bonds from min of 5 parts	-[8]	-	-
C4	Wire Bond Shear Strength (WBS)	AEC-Q101-003, JEDEC JESD22-B116 10 bonds from min of 5 parts	-[8]	-	-
C5	Die Shear (DS)	MIL-STD-750-2 Method 2017	-[8]	-	-
C6	Terminal Strength (TS)	MIL-STD-750-2 Method 2036	-[9]	-	-
C7	Resistance to Solvents (RTS)	JEDEC JESD22-B107, verify marking permanency	-[10]	-	-
C8	Resistance to Solder Heat (RSH)	JEDEC JESD22-A111, SMD parts shall be fully submerged during test	3	30	0
C9	Thermal Resistance (TR)	JEDEC JESD24-3, 24-4, 24-6 as appropriate	3	10	0
C10	Solderability (SD)	JEDEC J-STD-002	-[20]	-	-
C11	Whisker Growth Evaluation (WG)	AEC-Q005	-[20]	-	-
C12	Constant Acceleration (CA)	MIL-STD-750-2 Method 2006	-[11]	-	-
C13	Vibration Variable Frequency (VVF)	JEDEC JESD22-B103	-[11]	-	-
C14	Mechanical Shock (MS)	JEDEC JESD22-B104	-[11]	-	-
C15	Hermeticity (HER)	JEDEC JESD22-A109	-[11]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 3** **Batch/Lot-number: HD2019-2021** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

Notes:

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D1	Dielectric Integrity (DI)	AEC-Q101-004 Section 3	-[12)]	-	-
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E0	External Visual (EV)	JEDEC JESD22-B101, inspect part construction, marking and w orkmanship	all[13)]	all[13)]	0
E1	Pre and Post Stress Test (TEST)	Electrical test as specified in the applicable stress reference at room temperature	all[14)]	all[14)]	0
E2	Parametric Verification (PV)	T=-55°C, T=25°C, and T=175°C	3	25	0
E3	ESD - Human Body Model (ESDH)	AEC-Q101-001	3	30	0
E4	ESD - Charged Dev. Model (ESDC)	AEC-Q101-005	-[16)]	-	-
E5	Unclamped Inductive Switching (UIS)	AEC-Q101-004 Section 2	-[12)]	-	-
E6	Short Circuit Characterization (SC)	AEC-Q101-006	-[17)]	-	-

Project name: BL252_FlatPower **Trial-number: SOD123W part 3** **Batch/Lot-number: HD2019-2021** **Fab/Assembly: DHAM / ATSN**	**Reason for Qualification:** Change of EMC, die and lead frame	**Compiled by:** A. Tonitzki **Date:** 21-Sep-2022

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8. Conclusion

The products will not change functionally. Nexperia does not anticipate any negative impact on fit, form, function, and reliability.

9. Legal Disclaimer