Product Change Notification / MFOL-15DGRL818

Date:

09-May-2023

Product Category:

Power Discrete Components

PCN Type:

Manufacturing Change

Notification Subject:

CCB 5277 Final Notice: Qualification of Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for 700V and 1200V Silicon Carbide (SiC) Schottky Barrier Diodes (SBDs) products of MSC0xxSDA070xx, MSC0xxSDA120xx, MSC2X10xSDA070x, MSC2X10xSDA120x, MSC2X21DC120J, MSC2XxxSDA070x, MSC2XxxSDA120x, and MSC2X61DC120J device families available in die sales products, 2L TO-268, 2L TO-220, 2L TO-247, and 4L SOT-227 packages.

Affected CPNs:

MFOL-15DGRL818_Affected_CPN_05092023.pdf
MFOL-15DGRL818_Affected_CPN_05092023.csv

Notification Text:

PCN Status: Final Notification

PCN Type: Manufacturing Change

Microchip Parts Affected: Please open one of the files found in the Affected CPNs section.
Note: For your convenience Microchip includes identical files in two formats (.pdf and .xls)

Description of Change: Qualification of Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for 700V and 1200V SiC Schottky Barrier Diode (SBD) products of MSC010SDA070xx, MSC010SDA120xx, MSC015SDA120xx, MSC020SDA120xx, MSC030SDA070xx, MSC030SDA120xx, MSC030SDB070B, MSC050SDA070xx, MSC050SDA120xx, MSC2X1xxSDA070J, MSC2X1xxSDA120J, MSC2X21DC120J, MSC2X3xSDA070J, MSC2X3xSDA120J, MSC2X5xSDA070J, MSC2X5xSDA120J,

MSC2X61DC120J device families available in die sales products, 2L TO-268, 2L TO-220, 2L TO-247, and 4L SOT-227 packages.

Pre and Post Change Summary:

	Pre Change	**Post Change**	
Fabrication Site	X-Fab Silicon Foundries (XFTX)	X-Fab Silicon Foundries (XFTX)	Microchip Technology Colorado – Fab 5 (MCSO)
Certification	IATF16949	IATF16949	ISO9001/ ISO41001/ IATF16949

Impacts to Data Sheet: None

Change Impact None

Reason for Change: To improve on-time delivery performances by qualifying MSCO as an additional fab site.

Change Implementation Status: In Progress

Estimated First Ship Date: May 30, 2023

Note: Please be advised that after the estimated first ship date customers may receive pre and post change parts.

Time Table Summary:

	September 2022					**>**	**May 2023**				
Workweek	36	37	38	39	40		18	19	20	21	22
Initial PCN Issue Date				x							
Qual Report Availability								X			
Final PCN Issue Date								X			
Estimated Implementation Date											X

Method to Identify Change: Traceability code

Qualification Report: Please open the attachments included with this PCN labeled as PCN_#_Qual_Report.

Revision History: September 22, 2022: Issued initial notification.
May 9, 2023: Issued final notice. Attached the qualification report and included the estimated first ship date on May 30, 2023.

The change described in this PCN does not alter Microchip's current regulatory compliance regarding the material content of the applicable products.

Attachments:

PCN_MFOL-15DGRL818_Qual_Report.pdf

Please contact your local Microchip sales office with questions or concerns regarding this notification.

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If you wish to change your PCN profile, including opt out, please go to the PCN home page select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

QUALIFICATION REPORT SUMMARY

PCN #: MFOL-15DGRL818

Date:
March 23, 2023

Qualification of Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for 700V and 1200V Silicon Carbide (SiC) Schottky Barrier Diodes (SBDs) products of MSC0xxSDA070xx, MSC0xxSDA120xx, MSC2X10xSDA070x, MSC2X10xSDA120x, MSC2X21DC120J, MSC2XxxSDA070x, MSC2XxxSDA120x, and MSC2X61DC120J device families available in die sales products, 2L TO-268, 2L TO-220, 2L TO-247, and 4L SOT-227 packages.

Purpose: Qualification of Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for 700V and 1200V Silicon Carbide (SiC) Schottky Barrier Diodes (SBDs) products of MSC0xxSDA070xx, MSC0xxSDA120xx, MSC2X10xSDA070x, MSC2X10xSDA120x, MSC2X21DC120J, MSC2XxxSDA070x, MSC2XxxSDA120x, and MSC2X61DC120J device families available in die sales products, 2L TO-268, 2L TO-220, 2L TO-247, and 4L SOT-227 packages.

CCB No.: 5277

AEC-Q101 Item	Test	Reference	Test Spec/Voltage Class	No. of Lots	Test Class	Min Sample Size/Lot	Comments	Result
2	Pre-Conditioning	JESD22 A-113	1200V, SMT Package: 1. TC, 5 Cycles: 40C to 60C 2. Bake, 125C, 24 Hours 3. Soak, 85C/85%RH, 168 Hours 4. IR Conv. 3 Cycles, 235C	1	Auto	24+2	Electrical tests: Pre and Post pre-conditioning test.	Passed
5	High Temperature Reverse Bias	Mil-Std 750 M1038 Cond A	700V: Vbais=700V @ Ta=175°C, 1k Hrs. 1200V: Vbais=1200V @ Ta=175°C, 1k Hrs.	1 4	Auto Auto	24+2 24+2	Largest die-Lowest voltage: B Pkg Largest die-Highest voltage: B(2x), S Pkg. + Smallest die-Highest voltage: K Pkg.	Passed
7	Temperature Cycle	JESD22 A-104	Ta=-55°C to 175°C, 400 Cycles	5	Auto	24+2	Largest die-Highest voltage, Largest die-Lowest voltage: B(2x), K and S pkg.	Passed
8	Unbiased Highly Accelerated Stress Test	JESD22 A-110	Ta=130°C, RH=85%, 96 Hrs.	5	Auto	24+2	Largest die-Highest voltage, Largest die-Lowest voltage: B(2x), K and S pkg.	Passed
9	Highly Accelerated Stress Test	JESD22 A-110	Vbias=42V, Ta=130°C, RH=85%, 96 Hrs.	5	Auto	24+2	Largest die-Highest voltage, Largest die-Lowest voltage: B(2x), K and S pkg.	Passed
10(alt).	Intermittent Operating Life	Mil-Std 750 M1037	Delta Tj=100°C, 10k Cycles. RthJC testing at pre and 10k Cycle	5	Auto	24+2	Largest die-Highest voltage, Largest die-Lowest voltage: B(2x), K and S pkg.	Passed
23	Wire Bond Strength	Mil-Std 750 M2037		2	Auto	5	Min. 10 bonds from each lot.	Passed
24	Bond Shear	AEC-Q101-003		2	Auto	5	Min. 10 bonds from each lot.	Passed
25	Die Shear	Mil-Std 750 M2017		2	Auto	5	5 die from each lot	Passed

I. Summary:

In keeping with guidelines established in Microchip specification QCI-39000, "Worldwide Quality Conformance Requirements" based on Commercial Plan, 3 lots of MSCxxxSDAxxx will be used for qualification testing of the S2B1xxx mask. This memo summarizes the activities and results completed for S2B1xxx.

II. Conclusion:

Based on the current results, the S2B1xxx mask for 700V, 1200V, and 1700V has met the reliability guidelines implemented in the commercial qualification plan.

III. Device Description:

Device	Next Gen 700 V, 1200V, and 1700 V SiC SBD in TO-220, TO-247, SOT-227
Mask	S2B1xxx
Process	FAB 5 SiC
MSL	MSL 3546 for 700V, MSL 3661 for 1200V, and MSL 3659 for 1700V
Product	MSCxxSBAxxx
Document Revision	A
CCB#	5277 and 6144

IV. Qualification Material:

Test Lot	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
DEVICE	MSC50SDA170B	MSC2X51SAD170J	MSC050SDA120B	MSC050SDA120B	MSC050SDA070B
MASK, REV	TBD	TBD	TBD	TBD	TBD
WAFER LOT	SIC205001	SC1151	SC0312	SC1251	SIC200601
ASSEMBLY LOT	MP2126CC02	MP2207CC02	MP2124CC08	MP2201CC05	MP2124CC02
PACKAGE	TO-247	SOT-227	TO-247	TO-247	TO-247
ASSEMBLY SITE	Fastech	Fastech	Fastech	Fastech	Fastech
FINAL TEST	Bend, Oregon and Ennis, Ireland	Bend, Oregon and Ennis, Ireland	Bend, Oregon and Ennis, Ireland	Bend, Oregon and Ennis, Ireland	Bend, Oregon and Ennis, Ireland
QUAL #	--	--	--	--	--
QUAL TESTS	HTRB, TC, HAST, UHAST, IOL	HTRB, TC, HAST, UHAST, IOL	HTRB, TC, HAST, UHAST, IOL	HTRB, TC, HAST, UHAST, IOL	HTRB, TC, HAST, UHAST, IOL

Test Lot	Lot 6	Lot 7
DEVICE	MSC050SDA120S	MSC010SDA120K
MASK, REV	TBD	TBD
WAFER LOT	SIC4002	SC0331
ASSEMBLY LOT	MP2124CC06	MP2124CC04
PACKAGE	TO-268	TO-220
ASSEMBLY SITE	Fastech	Fastech
FINAL TEST	Bend, Oregon and Ennis, Ireland	Bend, Oregon and Ennis, Ireland
QUAL #	--	--
QUAL TESTS	HTRB, HAST, UHAST, IOL	HTRB, TC, HAST, UHAST, IOL

V. Qualification Data:

Temperature Cycling (TC)

Test Method	JESD22-A-104 Appendix Six
Test Condition	Temp Range: -55°C to 175°C, Cycle Readpoint: 400 cycles
Sample Size	(Fail/Pass)
Lot 1	0 / 26
Lot 2	0 / 26
Lot 3	0 / 26
Lot 4	0 / 26
Lot 5	0 / 26
Lot 7	0 / 26

Pre & Post Testing was done @ +25°C

Intermittent Operating Life (IOL)

Test Method	MIL-STD-750 Method 1037
Test Condition	ΔTj: 100°C, 6000 Cycles
Sample Size (30)	(Fail/Pass)
Lot 1	0 / 26
Lot 2	0 / 26
Lot 3	0 / 26

Lot 4	0 / 26
Lot 5	0 / 26
Lot 6	0 / 26
Lot 7	0 / 26

Pre & Post Testing was done @ +25°C

High Temperature Reverse Bias (HTRB)

Test Method	MIL-STD-750-1 M1038 Method A
Test Condition	80% Vds, 175°C, 1000 Hours
Sample Size (25)	(Fail/Pass)
Lot 1	0 / 26
Lot 2	0 / 26
Lot 3	0 / 26
Lot 4	0 / 26
Lot 5	0 / 26
Lot 6	0 / 26
Lot 7	0 / 26

Pre & Post Testing was done @ +25°C

Highly Accelerated Stress Test (HAST)

Test Method	JESD22-A-110
Test Condition	Time: 96 Hours, Vds:42V, Ta:130°C, RH:85 %
Sample Size (30)	(Fail/Pass)
Lot 1, 2, 3, 4, 5, 6, and 7	0 / 182

Pre & Post Testing was done @ +25°

Unbiased Highly Accelerated Stress Test (UHAST)

Test Method	JESD22-A-102
Test Condition	Time: 96 Hours, Ta:130°C, RH:85%

Sample Size (30)	(Fail/Pass)
Lot 1, 2, 3, 4, 5, 6, and 7	0 / 182

Pre & Post Testing was done @ +25°

Package Qualification Data

1.0 Build Details

Package	TO268
Device	MSC050SDA120D/S

2.0 Yield and Cycle Time Summary

Cycle Time	Result
10 days	Passed

3.0 Quality Data and Results

Cycle Time	Description	Interface	Requirement	Result
Die Attach Wirebond	Solder Void	LF-DIE	5.00%	Passed
	Wire Pull Test (15 mils)	Diode - Leadframe	350 g	Passed
	Bond Shear Test (15 mils)	Diode	700 g	Passed
		Leadframe	700 g	Passed
	Crater Test	N/A	No evidence of cratering	Passed
	Loop Height	N/A	No wire should touch the loop height limit of the jig	Passed

Conclusion and Recommendation

No major issue encountered.
Note that no final test reject sent for FA since final test yield is 99%.
It is recommended that the next build of this device should be treated as PRODUCTION BUILD.
This also verifies that all the materials used in this build are considered qualified.

MFOL-15DGRL818 - MSC0xxSD MSC2X10x MSC2X10x MSC2X21D MSC2XxxS MSC2XxxS and MSC2X 2L TO-268

Affected Catalog Part Numbers(CPN)

MSC010SDA120D/S
MSC010SDA120B
MSC010SDA120K
MSC050SDA120D/S
MSC050SDA120B
MSC050SDA120S
MSC050SDA070D/S
MSC050SDA070B
MSC050SDA070S
MSC010SDA070D/S
MSC010SDA070B
MSC010SDA070K
MSC010SDA070S
MSC030SDA120D/S
MSC030SDA120B
MSC030SDA120K
MSC030SDA120S
MSC015SDA120D/S
MSC015SDA120B
MSC015SDA120K
MSC030SDA070D/S
MSC030SDA070B
MSC030SDA070K
MSC030SDA070S
MSC020SDA120D/S
MSC020SDA120B
MSC020SDA120K
MSC020SDA120S
MSC050SDA120BCT
MSC050SDA070BCT
MSC010SDA070BCT
MSC030SDA120BCT
MSC030SDA070BCT
MSC2X50SDA120J
MSC2X51SDA120J
MSC2X50SDA070J
MSC2X51SDA070J
MSC2X30SDA120J
MSC2X31SDA120J
MSC2X30SDA070J
MSC2X31SDA070J
MSC2X100SDA070J

MSC2X101SDA070J
MSC2X100SDA120J
MSC2X101SDA120J