Product Change Notification / CENO-11DVIL347

Date:

12-May-2023

Product Category:

Power Discrete Components

PCN Type:

Manufacturing Change

Notification Subject:

CCB 6196 Initial Notice: Qualification Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for selected 700V, 1200V and 1700V SiC MOSFET products of MSCxxxSMA070xx, MSCxxxSMA120xx, MSCxxxSMA170xx device families available in die sales products, 2L TO-268, 4L SOT-227, 3L/4L TO-247 and 7L TO-263.

Affected CPNs:

CENO-11DVIL347_Affected_CPN_05122023.pdf
CENO-11DVIL347_Affected_CPN_05122023.csv

Notification Text:

PCN Status: Initial 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 Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for selected 700V, 1200V and 1700V SiC MOSFET products of MSCxxxSMA070xx, MSCxxxSMA120xx, MSCxxxSMA170xx device families available in die sales products, 2L TO-268, 4L SOT-227, 3L/4L TO-247 and 7L TO-263.

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	ISO 9001	ISO 9001	ISO9001/ ISO41001/ IATF16949

Impacts to Data Sheet: None

Change Impact None

Reason for Change: To improve productivity and on-time delivery performance by qualifying MCSO as an additional fabrication site.

Change Implementation Status: In Progress

Estimated Qualification Completion Date: September 2023

Note: Please be advised the qualification completion times may be extended because of unforeseen business conditions however implementation will not occur until after qualification has completed and a final PCN has been issued. The final PCN will include the qualification report and estimated first ship date. Also note that after the estimated first ship date guided in the final PCN customers may receive pre and post change parts.

Time Table Summary:

	May 2023					**>**	**September 2023**				
Workweek	18	19	20	21	22		35	36	37	38	39
Initial PCN Issue Date		x									
Qual Report Availability											x
Final PCN Issue Date											x

Method to Identify Change: Traceability code

Qualification Plan: Please open the attachments included with this PCN labeled as PCN_#_Qual_Plan.

Revision History: May 12, 2023: Issued initial notification.

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

Attachments:

PCN_CENO-11DVIL347_Qual Plan.pdf

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

Terms and Conditions:

If you wish to receive Microchip PCNs via email please register for our PCN email service at our PCN home page select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the PCN FAQ section.

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QUALIFICATION PLAN SUMMARY

PCN #: CENO-11DVIL347

Date:
March 11, 2023

Qualification Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for selected 700V, 1200V and 1700V SiC MOSFET products of MSCxxxSMA070xx, MSCxxxSMA120xx, MSCxxxSMA170xx device families available in die sales products, 2L TO-268, 4L SOT-227, 3L/4L TO-247 and 7L TO-263.

Purpose : Qualification Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for selected 700V, 1200V and 1700V SiC MOSFET products of MSCxxxSMA070xx, MSCxxxSMA120xx, MSCxxxSMA170xx device families available in die sales products, 2L TO-268, 4L SOT-227, 3L/4L TO-247 and 7L TO-263.

CCB No. : 6196

Test Group B: Accelerated lifetime Simulation Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot	Read Points/Notes
B1	HTRB [High Temp Reverse Bias]	MIL-STD-750-1 M1039.4 2.2.1 Condition A	Vds: 100% Rated Tj: 175°C Duration: 1000 hours Bias must be maintained until Ta is 35°C DC ET must occur within 24 hours of bias removal	3x84	DC ET at: ●Pre ●1000 Hours
B2	Positive HTGB [High Temp Gate Bias]	JESD22-A-108	Vgs: 23V Tj: 175°C Duration: 1000 hours Bias must be maintained until Ta is 55°C DC ET must occur within 96 hours of bias removal	3x84	DC ET at: ●Pre ●1000 Hours
B2	Negative HTGB [Negative High Temp Gate Bias]	JESD22-A-108	Vgs: -10 V Tj: 175°C Duration: 1000 hours Bias must be maintained until Ta is 55°C DC ET must occur within 96 hours of bias removal	3x84	DC ET at: ●Pre ●1000 Hours

Test Group D: Die Fabrication Reliability Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot
D	DI [Dielectric Integrity]	AEC-Q101-004 Section Three	All parts must exceed gate breakdown voltage minimum (Power MOS & IGBT only).	1x30

Test Group E: Electrical Verification Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot	Read Points/Notes
E0	EV [External Visual]	JEDEC JESD22-B101	All qualification parts submitted for testing		Will use traveler as proof
E1	TEST [Pre and Post Electrical TEST]				All parts from stresses
E2	PV [Parametric Verification]		Test all parameters according to user specification over the part temperature range to ensure specification compliance.		All devices
E3	ESDH [ESD HBM Characterization]	AEC-Q101-001	Human Body Model (HBM)	1x50	One Lot per Die-Volt DC ET Pre and Post
E4	ESDC [ESD CDM Characterization]	AEC-Q101-005	Charge Device Model (CDM)	1x60	One Lot per Die-Volt DC ET Pre and Post
E5	UIS [Unclamped Inductive Switching]	AEC-Q101-004 Section 2	Test-to-fail	1x5	One lot per die-Volt

Device Reliability: Additional Parametric shift Requirements

- Parts not remaining within ±20% of the initial reading of each test after completion of environmental testing. For leakages below 100nA, tester accuracy may prevent a post stress analysis to initial reading.
- For IOL, PTC and TC tests on products with RDSon≤ 2.5 mOhm max, the allowed value for the shift of RDSonis ≤ 0.5 mOhm.
- For breakdown voltage only, a shift of >20% of the initial measured value is a failure only if the final reading is within 20% of the datasheet maximum value.
- The allowed leakage limits which are not to exceed 10 times the initial value for moisture tests and 5 times the initial value for all others.
- For MOSFETs only, for 0h test values <10nA (IGSS and IDSS), the allowed value after stressing is 100nA for moisture tests and50nA for other tests.

Purpose: Qualification Microchip Technology Colorado – Fab 5 (MCSO) as an additional fabrication site for selected 700V, 1200V and 1700V SiC MOSFET products of MSCxxxSMA070xx, MSCxxxSMA120xx, MSCxxxSMA170xx device families available in die sales products, 2L TO-268, 4L SOT-227, 3L/4L TO-247 and 7L TO-263.

CCB No. : 6196 and 6198

Package:

Type: ________________ 3L TO-247 and 4L TO-247

Width or Size:__________ 12 mm x 14 mm

Leadframe:

Part Number: __________ 1-01-0011-0009 (3L) 1-01-0011-0010 (4L)

Paddle Size: ___________ 0.74168 cm x 1.25 cm

Material: ______________ Cu

Pad Plating: ___________ Bare Cu

Process: ______________ Stamped

Lead-lock (Y/N): ________ Groove

Lead Finish: ___________ Matte Tin

LF Thickness: _________ 0.4953 cm

Wire:

Material/Supplier:_______ 99.99% Aluminum

Die Attach Epoxy:

Part Number/Supplier:___ 1-06-9999-0001

Conductive: ___________ Yes

Mold Compound/Supplier: G780C

Reliability Test plan: ______ Q101 Rev E Reliability Test plan:

Test Group A: Accelerated Environment Stress Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot	Read Points/Notes
A2	HAST [Highly Accelerated Stress Test]	JESD22-A-110	Time: 96 Hours Ta: 130 °C, Rhumidity: 85%, P: 33.3 PSIA Vds: 42 V DC ET must Occur within 96 Hours	3x80	DC ET at: Pre and Post
A3	UHAST [Unbiased HAST]	JESD22-A-102	Time: 96 Hours Ta: 130 °C Rhumidity: 85% P: 33.3 PSIA DC ET must Occur within 96 Hours	3x80	DC ET at: Pre and Post
A4	TC [Temperature Cycle]	JESD22-A-104 Appendix Six	Number of Cycles: 400 Ta Range: -55°C to 175°C Ramp: 16°C/Min	3x80	DC ET at: Pre and Post
A4a	TCHT [Temperature Cycling Hot Test	JESD22-A-104 Appendix Six J-STD-035	125°C Test after TC followed by de-cap Wire pull on all wires from five devices	3x80	
A5	IOL [Intermittent Operational Life]	MIL-STD-750 Method 1037.2	Number of Cycles: 4650 Duty Cycle: 180 s Powered, 210 s Cooling ΔTj: 125°C DC ET must Occur within 96 Hours	3x80	DC ET at: Pre and Post

Test Group B: Accelerated lifetime Simulation Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot	Read Points/Notes
B1	HTRB [High Temp Reverse Bias]	MIL-STD-750-1 M1039.4 2.2.1 Condition A	Vds: 100% Rated Tj: 175°C Duration: 1000 hours Bias must be maintained until Ta is 35°C DC ET must occur within 24 hours of bias removal	3x84	DC ET at: ● Pre ● 1000 Hours

Test Group C: Package Assembly Integrity Tests

Test	Stress Name	Spec Reference	Conditions	Devices Per Lot	Read Points/Notes
C1	DPA [Destructive Physical Analysis]	AEC-Q101-004 Section Four	Random sample of parts that have successfully completed HAST, and TC		2 Per Stress Per package
C2	PD [Physical Dimensions]	JESD22-B-100		30 per package	All parts from stresses
C3	WBPS [Wire Bond Pull Strength]	MIL-STD-750 Method 2037	Condition C or D	10 Bonds, from a min of 5 parts	One Lot Per Package
C4	WBSS [Wire Bond Shear Strength]	AEC Q101-003 JESD22 B116		10 Bonds, from a min of 5 parts	One Lot Per Package
C5	DS [Die Shear]	MIL-STD-750 Method 2017		5 Per Package	One Lot Per Subcon
C6	TS [Terminal Strength]	MIL-STD-750-2 Method 2037	Evaluate lead integrity of through-hole leaded parts only.	30 per package	One Lot Per Subcon
C8	RSH [Resistance to Solder Heat]	JESD22-A-11 JESD22-B-106			
C9	TR [Thermal Resistance]	JESD24-3 JESD24-4 JESD24-6	Pre/Post Process Change	10	One Lot Per Subcon per package
C10	SD [Solderability]	STD-002 JESD22-B-102	Magnification 50X Method A for through-hole Method B and D For SMD	10	One Lot Per Subcon per package
C11	WG [Whisker Growth Evaluation]	AEC-Q005	For whisker requirements. Test to be done on a family basis		Already Completed by Fastech

Device Reliability: Additional Parametric shift Requirements

- Parts not remaining within ± 20% of the initial reading of each test after completion of environmental testing. For leakages below 100nA, tester accuracy may prevent a post stress analysis to initial reading.
- For IOL, PTC and TC tests on products with RDSon ≤ 2.5 mOhm max, the allowed value for the shift of RDSon is ≤ 0.5 mOhm.
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- The allowed leakage limits which are not to exceed 10 times the initial value for moisture tests and 5 times the initial value for all others.
- For MOSFETs only, for 0h test values <10nA (IGSS and IDSS), the allowed value after stressing is 100nA for moisture tests and 50nA for other tests.

Primary Qual Stress Allocation

MSL and Voltage	Part Number	Lot Number	IOL	TC	HAST	UHAST
MSL: 3681 1700 V	MSC035SMA170 Lot 1	SC2311	80	80	80	80
	MSC035SMA170 Lot 2	SC2331	80	80	80	80
	MSC035SMA170 Lot 3	SC2332	80	80	80	80

Affected Catalog Part Numbers(CPN)

MSC035SMA070B
MSC035SMA070B4
MSC035SMA070S
MSC017SMA120B
MSC017SMA120B4
MSC017SMA120S
MSC017SMA120J
MSC040SMA120B
MSC040SMA120B4
MSC040SMA120S
MSC040SMA120J
MSC040SMA120S/TR
MSC035SMA170B
MSC035SMA170B4
MSC035SMA170S
MSC015SMA070B
MSC015SMA070B4
MSC015SMA070S
MSC180SMA120B
MSC180SMA120S
MSC180SMA120SA
MSC360SMA120B
MSC360SMA120S
MSC360SMA120SA
MSC025SMA120B
MSC025SMA120B4
MSC025SMA120S
MSC025SMA120J
MSC080SMA120B
MSC080SMA120B4
MSC080SMA120S
MSC080SMA120J
MSC750SMA170B
MSC750SMA170B4
MSC750SMA170S
MSC750SMA170SA
MSC090SMA070B
MSC090SMA070S
MSC090SMA070SA
MSC060SMA070B
MSC060SMA070B4
MSC060SMA070S