# Product Change Notification / LIAL-25WABT393

## Date:

09-May-2023

## Product Category:

Power Discrete Components

## PCN Type:

Manufacturing Change

## Notification Subject:

CCB 6225 Initial Notice: Implementation of Die Overcoat material with Polyimide layer selected Microsemi SIC MOSFET product of MSCxxxSMA070, MSCxxxSMA120, and MSCxxxSMA170 device families in DICE, SOT-227, TO-247, TO-263 and TO-268 packages.

## Affected CPNs:

LIAL-25WABT393_Affected_CPN_05092023.pdf
LIAL-25WABT393_Affected_CPN_05092023.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:**Implementation of Die Overcoat material with Polyimide layer selected Microsemi SIC MOSFET product of MSCxxxSMA070, MSCxxxSMA120, and MSCxxxSMA170 device families in DICE, SOT-227, TO-247, TO-263 and TO-268 packages.

**Pre and Post Change Summary:**

| | Pre Change | Post Change |
|---|---|---|
| Fabrication Site | Microchip Fabrication site, X-FAB, Lubbock, TX, USA / (XFTX) | Microchip Fabrication site, X-FAB, Lubbock, TX, USA/ (XFTX) |
| Die Overcoat Material | Without polyimide layer | With or Without Polyimide layer |

**Impacts to Data Sheet:**None

**Change Impact**None

**Reason for Change:**To improve productivity by implementing Die Overcoat (polyimide layer)

**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 09, 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_LIAL-25WABT393 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.

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.

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# QUALIFICATION PLAN SUMMARY

## PCN #: LIAL-25WABT393

**Date:**
**March 23, 2023**

**Implementation of Die Overcoat material with Polyimide layer for selected Microsemi SIC MOSFET product of MSCxxxSMA070, MSCxxxSMA120, and MSCxxxSMA170 device families in DICE, SOT-227, TO-247, TO-263 and TO-268 packages.**

**Purpose:** Implementation of Die Overcoat material with Polyimide layer selected Microsemi SIC MOSFET product of MSCxxxSMA070, MSCxxxSMA120, and MSCxxxSMA170 device families in DICE, SOT-227, TO-247, TO-263 and TO-268 packages.

**CCB No.** 6225

| **Test Name** | **Conditions** | **Reliability Stress Read Point** | **Pre & Post Reliability Stress Test Temperature** | **Sample Size** | **Min. Qty of Spares per Lot (should be properly marked)** | **Qty of Lots** | **Total Units** | **Fail Accept Qty** | **Est. Dur. Days** | **Special Instructions** |
|---|---|---|---|---|---|---|---|---|---|---|
| MOSFET, IGBT,Transistors, Diodes, Zener diodes, Thyristors, LED | Tests we included in our qual plan templates will need to convert to MCHP formating for CCB | Unless other wise specified the electrical ambient test temperature will be -40C to +125C equivalent to Q100 Grade 1. | | ***** New Process Qualification Requires 3 Lots | | | | 0 | | Discrete products delivered as stand alone, bare die or in wafer form are still qualified to Q101 using appropriate carriers or surrogate packages. |
| Assembly Data Requirements | MCHP Spec. FRM-39000-001 | | | | | | | | | Use form FRM-39000-001 for assembly data collection. |
| Preconditioning - Required for surface mount devices | J-STD-020<br>JESD22-A113<br><br>+150°C Bake for 24 hours, moisture loading requirements per MSL level + 3X reflow at peak reflow temperature per Jedec-STD-020 for package type. | | +25°C | 231 | 15 | 3<br><br>from Assembly | 738 | 0 | 15 | Spares should be properly identified. TEST before and after PC. |

| Test Name | Conditions | Reliability Stress Read Point | Pre & Post Reliability Stress Test Temperature | Sample Size | Min. Qty of Spares per Lot (should be properly marked) | Qty of Lots | Total Units | Fail Accept Qty | Est. Dur. Days | Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|
| External Visual | JESD22-B101 | | | All devices prior to submission for qualification testing | 0 | 3<br><br>from Wafer | ALL | 0 | 5 | Inspect part construction, marking and workmanship. |
| Parametric Verification (Characterization) | Individual AEC user specification. Must be performed on the specific part. | | | 25 | 5 | 3<br><br>from Wafer | 90 | 0 | | Spares should be properly identified. |
| High Temperature Reverse Bias | MIL-STD-750 TM1038, test cond A, for diodes MIL-STD-750-1 M1039.4.2.2.1, test cond A for MOSFET or IGBT transistors<br><br>Vdss: 100% of Device Rated<br>Tj: xxx<br>Duration: 1000 hours | 1st Readpoint: 1000 hrs | +25°C | 77 | 5 | 3<br><br>from Wafer | 246 | 0 | 42 - 84 | Spares should be properly identified. |
| High Temperature Gate Bias | JESD22A-108 | 1st Readpoint: 1000 hrs | +25°C | 77 | 5 | 3<br><br>from Wafer | 246 | 0 | 42 - 84 | Spares should be properly identified. |
| Negative High Temperature Gate Bias<br><br>(Required for SiC only) | JESD22-A-108<br>t = 1000 Hours @ Tj=xxx°C, Rated VRRM,<br>Vgss: 100% Of Device Rated<br>Can reduce duration to 500 hours by increasing Tj by 25°C | 1000hrs | +25°C | 77 | 5 | 3<br><br>from Wafer | 246 | 0 | | |

| Test Name | Conditions | Reliability Stress Read Point | Pre & Post Reliability Stress Test Temperature | Sample Size | Min. Qty of Spares per Lot (should be properly marked) | Qty of Lots | Total Units | Fail Accept Qty | Est. Dur. Days | Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|
| Temp Cycle<br><br>With Pre-conditioning | JESD22-A104 and Appendix 6<br>or MIL-STD-750 TM 1051 cond TBD by device specififcation. | [SiC devices]<br>1st Readpoint:<br>400 cycles (-55ºC to +175°C) per AEC-Q101 requirements | +25°C | 77 | 5 | 3<br><br>from Assembly | 246 | 0 | 15 - 120 | Spares should be properly identified. PC before TC for surface mount devices. |
| uHAST<br><br>With Pre-conditioning | JESD22-A118<br><br>+130°C/85% RH for 96 hrs<br>Vds: 0 V | 96 hrs | +25°C | 77 | 5 | 3<br><br>from Assembly | 246 | 0 | 10 | Spares should be properly identified. PC before uHAST for surface mount devices. TEST before and after uHAST. |
| HAST<br><br>With Pre-conditioning | JESD22-A110<br><br>+130°C/85% RH for 96 hrs or<br>+110°C/85%RH for 264 hrs | 1st Readpoint:<br>96 hrs (+130°C/85% RH) or 264 hrs (+110°C/85%RH) | +25°C | 77 | 5 | 3<br><br>from Assembly | 246 | 0 | 10 - 22 | Spares should be properly identified. PC before HAST for surface mount devices. |

| Test Name | Conditions | Reliability Stress Read Point | Pre & Post Reliability Stress Test Temperature | Sample Size | Min. Qty of Spares per Lot (should be properly marked) | Qty of Lots | Total Units | Fail Accept Qty | Est. Dur. Days | Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|
| Intermittent Operational Life<br><br>With Pre-conditioning | MIL-STD-750 Method 1037 [hermetic discrete products] or MIL-STD-750 TM1042, test cond D for MOSFET or IGBT transistors<br><br>Number of Cycles: 10,000 Cycles (Extra 5k Minutes with 10k cycles, only actually need 9,230)<br>Duty Cycle: 180 s Powered, 210 s Cooling , ΔTj: 100°C<br><br>With this duty cycle, could Reduce to 5k Cycles (4615) with ΔTj: 125° | | +25°C | 77 | 5 | 3<br><br>from Assembly | 246 | 0 | | Spares should be properly identified. PC before IOL for surface mount devices. |
| ESD Characterization | HBM per AEC Q101-001, and CDM per Q101-005 (must be performed on the specific part) | | | 30 each HBM / CDM | 0 | 1<br>from Wafer | 30 each HBM / CDM | 0 | | |
| Destructive Physical Analysis | AEC-Q101-004 Section 4 | | | 2 | 0 | 1<br>from Assembly | 2 | 0 | | |
| Physical Dimensions | JESD22-B100 | | | 30 | 0 | 1<br>from Assembly | 30 | 0 | | |

| Test Name | Conditions | Reliability Stress Read Point | Pre & Post Reliability Stress Test Temperature | Sample Size | Min. Qty of Spares per Lot (should be properly marked) | Qty of Lots | Total Units | Fail Accept Qty | Est. Dur. Days | Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|
| Terminal Strength | MIL-STD-750 Test Method 2036, cond D | | | 30 | 0 | 1 from Assembly | 30 | 0 | | |
| Resistance to Solder Heat<br><br>With Pre-conditioning | JESD22-A111 (SMD) JESD22-B106 (PTH) | | | 30 | 0 | 1 from Assembly | 30 | 0 | | |
| Solderability | J-STD-002 JESD22B102 | | | 10 | 0 | 1 from Assembly | 10 | 0 | | |
| Whisker Growth Evaluation | AEC-Q005 | | | | | Assembly | | | | |
| Thermal Resistance | JESD24-3, 24-4, 24-6 as appropriate | | | 10 each, pre- & post-change | 0 | 1 from Assembly | 10 each, pre- & post-change | 0 | | |
| Wire Bond Strength | MIL-STD-750 Method 2037 | | | 10 bonds from min of 5 parts | 0 | 1 from Assembly | 10 bonds from min of 5 parts | 0 | | |
| Bond Shear | AEC-Q101-003 | | | 10 bonds from min of 5 parts | 0 | 1 from Assembly | 10 bonds from min of 5 parts | 0 | | |
| Die Shear | MIL-STD-750 Method 2017 | | | 5 | 0 | 1 from Assembly | 5 | 0 | | |

| Test Name | Conditions | Reliability Stress Read Point | Pre & Post Reliability Stress Test Temperature | Sample Size | Min. Qty of Spares per Lot (should be properly marked) | Qty of Lots | Total Units | Fail Accept Qty | Est. Dur. Days | Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|
| Unclamped Inductive Switching | AEC-Q101-004 Section 2 Running to Datasheet Characterization | | | 5 | 0 | 1 from Assembly | 5 | 0 | | |
| Dielectric Integrity<br><br>(Power MOSFET and IGBTs) | AEC-Q101-004 Section 3 | | | 5 | 0 | 1 from Wafer | 5 | 0 | | |
| Short Circuit Reliability Characterization | AEC-Q101-006 | | | 10 | 0 | 3 from Wafer | 30 | 0 | | |

LIAL-25WABT393 - CCB 6: MSCxxxSM and MSCx› SOT-227 TO-247 TO-263 and TO-268 packages.

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

MSC035SMA070D/S
MSC017SMA120D/S
MSC017SMA120D/SVAO
MSC040SMA120D/S
MSC040SMA120D/SVAO
MSC035SMA170D/S
MSC015SMA070D/S
MSC180SMA120D/S
MSC180SMA120D/SVAO
MSC360SMA120D/S
MSC360SMA120D/SVAO
MSC025SMA120D/S
MSC025SMA120D/SVAO
MSC080SMA120D/S
MSC080SMA120D/SVAO
MSC750SMA170D/S
MSC090SMA070D/S
MSC060SMA070D/S