

|   |  |  |                  |
|---|--|--|------------------|
| <b>PCN Number:</b>                        | 20230426001.2  | <b>PCN Date:</b>                       | April 28, 2023   |
| <b>Title:</b>                             | Qualification of new Fab sites (MIHO8 & AIZU) using qualified Process Technology, Datasheet update and TI Malaysia as additional Assembly/Test site for select devices |  |                  |
| <b>Customer Contact:</b>                  | <a href="#">PCN Manager</a>  | <b>Dept:</b>                           | Quality Services |
| <b>Proposed 1<sup>st</sup> Ship Date:</b> | Oct 28, 2023   | <b>Sample Requests accepted until:</b> | May 28, 2023*    |

\*Sample requests received after May 28, 2023 will not be supported.

|                                     |                 |                                     |                           |                                     |                          |
|-------------------------------------|-----------------|-------------------------------------|---------------------------|-------------------------------------|--------------------------|
| <b>Change Type:</b>                 |                 |                                     |                           |                                     |                          |
| <input checked="" type="checkbox"/> | Assembly Site   | <input checked="" type="checkbox"/> | Assembly Process          | <input checked="" type="checkbox"/> | Assembly Materials       |
| <input type="checkbox"/>            | Design          | <input checked="" type="checkbox"/> | Electrical Specification  | <input type="checkbox"/>            | Mechanical Specification |
| <input checked="" type="checkbox"/> | Test Site       | <input checked="" type="checkbox"/> | Packing/Shipping/Labeling | <input type="checkbox"/>            | Test Process             |
| <input type="checkbox"/>            | Wafer Bump Site | <input type="checkbox"/>            | Wafer Bump Material       | <input type="checkbox"/>            | Wafer Bump Process       |
| <input checked="" type="checkbox"/> | Wafer Fab Site  | <input type="checkbox"/>            | Wafer Fab Materials       | <input type="checkbox"/>            | Wafer Fab Process        |
|                                     |                 | <input type="checkbox"/>            | Part number change        |                                     |                          |

### PCN Details

#### Description of Change:



Texas Instruments is pleased to announce the qualification of a new fab site (MH8 & Aizu) and TI Malaysia as additional Assembly and Test Site for selected devices as listed below in the product affected section. Additionally, LBC8LVISO has been qualified as an additional process technology.

| Current Fab Site |           |                | Additional Fab Site |           |                |
|------------------|-----------|----------------|---------------------|-----------|----------------|
| Current Fab Site | Process   | Wafer Diameter | Additional Fab Site | Process   | Wafer Diameter |
| D MOS5           | HPA07     | 200 mm         | Aizu                | HPA07     | 200 mm         |
| D MOS5           | HPA07ISOS | 200mm          | MH8                 | LBC8LVISO | 200mm          |

#### Construction Differences are noted below:

|           | TAI          | MLA  |
|-----------|--------------|--|
| Wire type | Au, 0.96 mil | 1mil Cu (Die to LF)<br>0.96mil Au (Die to Die) |

#### Marking Differences:

|         | Current Device Symbolization  | New Device Symbolization  |
|---------|---|---|
| **ECAT  | Include Value   | Remove  |
| TI Bug  | Include   | Replace with "TI" text  |
| Example |  |  |

\*\* - Not all devices necessarily have ECAT information included in the symbolization, but for the ones that do, this information will be removed.

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ

**Changes from March 13, 2023 to April 24, 2023 (from Revision A (April 2017) to Revision B (April 2023))**

**Page**

|  |    |
|--|----|
| • Changed document title.....  | 1  |
| • Changed <i>Features</i> section: Changed, deleted, and reorganized bullets.....  | 1  |
| • Added <i>Functional-Safety-Capable</i> bullet to <i>Features</i> section.....  | 1  |
| • Changed isolation standard from DIN VDE V 0884-11 (VDE V 0884-10) to DIN EN IEC 60747-17 (VDE 0884-17) and updated the <i>Insulation Specifications</i> and <i>Safety-Related Certifications</i> tables accordingly..... | 1  |
| • Changed the <i>Description</i> section to include common-mode decoupling capacitors as a known best practice..   | 1  |
| • Changed pin names VINP to INP, VINN to INN, VOUTP to OUTP, and VOUTN to OUTN throughout document.....  | 4  |
| • Changed <i>Description</i> column and added footnotes to <i>Pin Functions</i> table.....   | 4  |
| • Changed PD from 81.4 mW to 99 mW.....  | 6  |
| • Changed PD1 (VDD1 = 3.3 V) from 24.85 mW to 31 mW.....   | 6  |
| • Changed PD1 (VDD1 = 5.5 V) from 45.65 mW to 54 mW.....   | 6  |
| • Changed PD2 (VDD2 = 3.3 V) from 20.16 mW to 26 mW.....   | 6  |
| • Changed PD2 (VDD2 = 5.5 V) from 35.75 mW to 45 mW.....   | 6  |
| • Changed DTI from $\geq 0.027$ mm to $\geq 0.021$ mm in <i>Insulation Specifications</i> table.....   | 7  |
| • Changed $I_{IB}$ parameter specification and conditions.....   | 9  |
| • Changed IDD1 ( $3.0\text{ V} \leq \text{VDD1} \leq 3.6\text{ V}$ ) from 5.0 mA (typ) / 6.9 mA (max) to 6.3 mA (typ) / 8.5 mA (max).....  | 9  |
| • Changed IDD1 ( $4.5\text{ V} \leq \text{VDD1} \leq 5.5\text{ V}$ ) from 5.9 mA (typ) / 8.3 mA (max) to 7.2 mA (typ) / 9.8 mA (max).....  | 9  |
| • Changed IDD2 ( $3.0\text{ V} \leq \text{VDD2} \leq 3.6\text{ V}$ ) from 4.4 mA (typ) / 5.6 mA (max) to 5.3 mA (typ) / 7.2 mA (max).....  | 9  |
| • Changed IDD2 ( $4.5\text{ V} \leq \text{VDD2} \leq 5.5\text{ V}$ ) from 4.8 mA (typ) / 6.5 mA (max) to 5.9 mA (typ) / 8.1 mA (max).....  | 9  |
| • Changed <i>Timing Diagram</i> section.....   | 10 |
| • Changed <i>Input Bias Current vs Common-Mode Input Voltage</i> figure to align with new test condition.....  | 12 |
| • Changed <i>Input Bias Current vs High-Side Supply Voltage</i> figure to align with new test condition.....   | 12 |
| • Changed <i>Input Bias Current vs Temperature</i> figure to align with new test condition.....  | 12 |
| • Changed legend of <i>Output Voltage vs Input Voltage</i> figure, $V_{OUTP}$ is now red and $V_{OUTN}$ is now black .....   | 12 |
| • Changed <i>Overview</i> section.....   | 19 |
| • Changed <i>Functional Block Diagram</i> image.....   | 19 |
| • Changed the <i>Analog Input</i> section.....   | 19 |
| • Added the <i>Isolation Channel Signal Transmission</i> section.....  | 20 |
| • Added <i>Analog Output</i> section, deleted <i>Fail-Safe Output</i> section.....   | 21 |
| • Changed <i>Device Functional Modes</i> section.....  | 21 |
| • Changed <i>Application Information</i> section.....  | 22 |
| • Changed <i>Typical Application</i> section.....  | 22 |
| • Changed <i>Best Design Practices</i> section.....  | 25 |
| • Changed <i>Power Supply Recommendations</i> section.....   | 25 |
| • Changed the <i>Recommended Layout of the AMC1301-Q1</i> figure.....  | 26 |
| • Added a link to the <i>Isolated Voltage-Measurement Circuit</i> in the <i>Related Documentation</i> section.....   | 27 |

The datasheet number will be changing.

| Device Family | Change From: | Change To: | URL   |
|---------------|--------------|------------|---|
| AMC1301-Q1    | SBAS792A     | SBAS792B   | <a href="http://www.ti.com/product/AMC1301-Q1">http://www.ti.com/product/AMC1301-Q1</a> |

**Reason for Change:**

Continuity of supply.

- 1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties
- 2) Maximize flexibility within our Assembly/Test production sites.
- 3) Cu is easier to obtain and stock

**Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):**

None

**Impact on Environmental Ratings**

Checked boxes indicate the status of environmental ratings following implementation of this change. If below boxes are checked, there are no changes to the associated environmental ratings.

|   |   |   |   |
|---|---|---|---|
| <b>RoHS</b>                                   | <b>REACH</b>                                  | <b>Green Status</b>                           | <b>IEC 62474</b>                              |
| <input checked="" type="checkbox"/> No Change | <input checked="" type="checkbox"/> No Change | <input checked="" type="checkbox"/> No Change | <input checked="" type="checkbox"/> No Change |

**Changes to product identification resulting from this PCN:**

**Fab Site Information:**

| Chip Site    | Chip Site Origin Code (20L) | Chip Site Country Code (21L) | Chip Site City           |
|--------------|-----------------------------|------------------------------|--------------------------|
| DMOS5        | DM5                         | USA                          | Dallas                   |
| <b>MIH08</b> | <b>MH8</b>                  | <b>JPN</b>                   | <b>Ibaraki</b>           |
| <b>AIZU</b>  | <b>CU2</b>                  | <b>JPN</b>                   | <b>Aizuwakamatsu-shi</b> |

**Assembly Site Information:**

| Assembly Site | Assembly Site Origin (22L) | Assembly Country Code (23L) | Assembly City             |
|---------------|----------------------------|-----------------------------|---------------------------|
| TAI           | TAI                        | TWN                         | Chung Ho, New Taipei City |
| <b>MLA</b>    | <b>MLA</b>                 | <b>MYS</b>                  | <b>Kuala Lumpur</b>       |

Sample product shipping label (not actual product label)

**Group 1 Product Affected: (Fab site, Data Sheet & MLA A/T)**

AMC1301QDWVRQ1

**Group 2 Product Affected: (Fab site, Data Sheet)**

AMC1301QDWVQ1

**Automotive New Product Qualification Summary  
(As per AEC-Q100 and JEDEC Guidelines)**

Approved 06-April-2023

**Product Attributes**

| Attributes               | Qual Device:<br>AMC1301QDWVRQ1<br>(TAI) | Qual Device:<br>AMC1301QDWVRQ1<br>(MLA) | QBS Process<br>Reference:<br>INA215AQDCKRQ1 | QBS Process<br>Reference:<br>AMC1305M25QDWRQ1 | QBS Package<br>Reference:<br>AMC1336DWV | QBS Product<br>Reference:<br>AMC1300BQDWVRQ1 | QBS Product<br>Reference:<br>AMC1300BQDWVRQ1 | QBS Product<br>Reference:<br>AMC1300BQDWVRQ1 | QBS Product<br>Reference:<br>AMC1311CQDWVRQ1 |
|--------------------------|---|---|---|---|---|--|--|--|--|
| Automotive Grade Level   | Grade 1                                 | Grade 1                                 | Grade 1                                     | Grade 1                                       | Grade 1                                 | Grade 1                                      | Grade 1                                      | Grade 1                                      | Grade 1                                      |
| Operating Temp Range (C) | -40 to 125                              | -40 to 125                              | -40 to 125                                  | -40 to 125                                    | -40 to 125                              | -40 to 125                                   | -40 to 125                                   | -40 to 125                                   | -40 to 125                                   |
| Product Function         | Signal Chain                            | Signal Chain                            | Signal Chain                                | Signal Chain                                  | Signal Chain                            | Signal Chain                                 | Signal Chain                                 | Signal Chain                                 | Signal Chain                                 |
| Wafer Fab Supplier       | AIZU, AIZU, MH8, MH8                    | AIZU, AIZU, MH8, MH8                    | AIZU  | AIZU, MH8, MH8                                | AIZU, AIZU, MH8, MH8                    | DP1DM5, DP1DM5, AIZU                         | MH8, MH8, AIZU, AIZU                         | MH8, MH8, AIZU, AIZU                         | MH8, MH8, AIZU, AIZU                         |
| Assembly Site            | TAI                                     | MLA                                     | TFME  | TAI   | TAI                                     | TAI  | TAI  | MLA  | MLA  |
| Package Group            | SOIC                                    | SOIC                                    | SOT   | SOIC  | SOIC                                    | SOIC   | SOIC   | SOIC   | SOIC   |
| Package Designator       | DWV                                     | DWV                                     | DCK   | DWV   | DWV                                     | DW   | DWV  | DWV  | DWV  |
| Pin Count                | 8                                       | 8                                       | 6   | 8   | 8                                       | 16   | 8  | 8  | 8  |

QBS: Qual By Similarity

Qual Device AMC1301QDWVRQ1 is qualified at MSL3 260C

Qual Device AMC1301QDWVRQ1 is qualified at MSL3 260C

## Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

| Type  | #  | Test Spec                           | Min Lot Qty | SS / Lot | Test Name                     | Condition                               | Duration   | Qual Device:                                  | Qual Device:                                  | QBS Process Reference:                        | QBS Process Reference:                        | QBS Package Reference:                        | QBS Product Reference:                        | QBS Product Reference:                        |
|---|----|-------------------------------------|-------------|----------|-------------------------------|---|------------|---|---|---|---|---|---|---|
|   |    |                                     |             |          |                               |   |            | AMC1301QDWVRQ1 (TAI)                          | AMC1301QDWVRQ1 (MLA)                          | INA215AQPCKRQ1                                | AMC1305M25QDWVRQ1                             | AMC1335DWV                                    | AMC1300BQDWVRQ1                               | AMC1300BQDWVRQ1                               |
| <b>Test Group A - Accelerated Environment Stress Tests</b>  |    |                                     |             |          |                               |   |            |   |   |   |   |   |   |   |
| PC  | A1 | JEDEC J-STD-020 JESD22-A113         | 3           | 77       | Preconditioning               | MSL3 260C                               | 1 Step     | -   | -   | -   | -   | 3/0/0   | 1/0/0   | -   |
| HAST  | A2 | JEDEC JESD22-A110                   | 3           | 77       | Biased HAST                   | 130C/85%RH                              | 96 Hours   | -   | -   | -   | -   | 3/231/0                                       | 1/77/0  | -   |
| AC/UHAST  | A3 | JEDEC JESD22-A102/JEDEC JESD22-A118 | 3           | 77       | Autoclave                     | 121C/15psig                             | 96 Hours   | -   | -   | -   | -   | 3/231/0                                       | 1/77/0  | -   |
| AC/UHAST  | A3 | JEDEC JESD22-A102/JEDEC JESD22-A118 | 3           | 77       | Unbiased HAST                 | 130C/85%RH                              | 96 Hours   | -   | -   | -   | -   | -   | -   | -   |
| TC  | A4 | JEDEC JESD22-A104 and Appendix 3    | 3           | 77       | Temperature Cycle             | -65C/150C                               | 500 Cycles | -   | -   | -   | -   | 3/231/0                                       | 1/77/0  | -   |
| TC-BP   | A4 | MIL-STD883 Method 2011              | 1           | 5        | Post Temp Cycle Bond Pull     | -                                       | -          | -   | -   | -   | -   | 1/5/0   | 1/5/0   | -   |
| HTSL  | A6 | JEDEC JESD22-A103                   | 1           | 45       | High Temperature Storage Life | 175C                                    | 500 Hours  | -   | -   | -   | -   | 1/45/0  | 1/45/0  | -   |
| <b>Test Group B - Accelerated Lifetime Simulation Tests</b> |    |                                     |             |          |                               |   |            |   |   |   |   |   |   |   |
| HTOL  | B1 | JEDEC JESD22-A108                   | 1           | 77       | Life Test                     | 140C                                    | 480 Hours  | -   | -   | -   | -   | -   | 1/77/0  | -   |
| HTOL  | B1 | JEDEC JESD22-A108                   | 1           | 77       | Life Test                     | 150C                                    | 408 Hours  | -   | -   | -   | -   | -   | -   | -   |
| ELFR  | B2 | AEC Q100-008                        | 1           | 77       | Early Life Failure Rate       | 125C                                    | 48 Hours   | -   | -   | 3/2400/0                                      | -   | -   | -   | -   |
| ELFR  | B2 | AEC Q100-008                        | 1           | 77       | Early Life Failure Rate       | 150C                                    | 24 Hours   | -   | -   | -   | 3/2400/0                                      | -   | -   | -   |
| <b>Test Group C - Package Assembly Integrity Tests</b>      |    |                                     |             |          |                               |   |            |   |   |   |   |   |   |   |
| WBS   | C1 | AEC Q100-001                        | 1           | 30       | Wire Bond Shear               | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires      | -   | -   | -   | -   | 3/90/0  | 1/30/0  | 1/30/0  |
| WBP   | C2 | MIL-STD883 Method 2011              | 1           | 30       | Wire Bond Pull                | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires      | -   | -   | -   | -   | 3/90/0  | 1/30/0  | 1/30/0  |
| SD  | C3 | JEDEC J-STD-002                     | 1           | 15       | PB Solderability              | >95% Lead Coverage                      | -          | -   | -   | -   | -   | 1/150 (1)                                     | -   | -   |
| SD  | C3 | JEDEC J-STD-002                     | 1           | 15       | PB-Free Solderability         | >95% Lead Coverage                      | -          | -   | -   | -   | -   | 1/150 (1)                                     | -   | -   |
| PD  | C4 | JEDEC JESD22-B100 and B108          | 1           | 10       | Physical Dimensions           | Cpk>1.67                                | -          | -   | -   | -   | -   | 3/100 (2)                                     | -   | -   |
| <b>Test Group D - Die Fabrication Reliability Tests</b>     |    |                                     |             |          |                               |   |            |   |   |   |   |   |   |   |
| EM  | D1 | JESD61                              | -           | -        | Electromigration              | -                                       | -          | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |

| Type  | #  | Test Spec    | Min Lot Qty | SS / Lot | Test Name                             | Condition                    | Duration   | Qual Device:                                  | Qual Device:                                  | QBS Process Reference:                        | QBS Process Reference:                        | QBS Package Reference:                        | QBS Product Reference:                        | QBS Product Reference:                        |
|---|----|--------------|-------------|----------|---------------------------------------|------------------------------|------------|---|---|---|---|---|---|---|
|   |    |              |             |          |                                       |                              |            | AMC1301QDWWVRQ1 (IAI)                         | AMC1301QDWWVRQ1 (MLA)                         | INA215AQDCKRQ1                                | AMC1305M25QDWWVRQ1                            | AMC1336DWW                                    | AMC1300BQDWWVRQ1                              | AMC1300BQDWWVRQ1                              |
| TDD8  | D2 | JESD35       | -           | -        | Time Dependent Dielectric Breakdown   | -                            | -          | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| HC1   | D3 | JESD60 & 28  | -           | -        | Hot Carrier Injection                 | -                            | -          | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| NBT1  | D4 | -            | -           | -        | Negative Bias Temperature Instability | -                            | -          | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| SM  | D5 | -            | -           | -        | Stress Migration                      | -                            | -          | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| <b>Test Group E - Electrical Verification Tests</b> |    |              |             |          |                                       |                              |            |   |   |   |   |   |   |   |
| ESD   | E2 | AEC Q100-002 | 1           | 3        | ESD HBM                               | -                            | 2000 Volts | -   | -   | -   | -   | -   | -   | 1/3/0   |
| ESD   | E2 | AEC Q100-002 | 1           | 3        | ESD HBM                               | -                            | 4000 Volts | -   | -   | -   | -   | -   | 1/3/0   | -   |
| ESD   | E3 | AEC Q100-011 | 1           | 3        | ESD CDM                               | -                            | 1500 Volts | -   | -   | -   | -   | -   | 1/3/0   | -   |
| ESD   | E3 | AEC Q100-011 | 1           | 3        | ESD CDM                               | -                            | 750 Volts  | -   | -   | -   | -   | -   | -   | 1/3/0   |
| LU  | E4 | AEC Q100-004 | 1           | 6        | Latch-Up                              | Per AEC Q100-004             | -          | -   | -   | -   | -   | -   | 1/6/0   | 1/6/0   |
| ED  | E5 | AEC Q100-009 | 3           | 30       | Electrical Distributions              | Cpk>1.67 Room, hot, and cold | -          | -   | -   | -   | -   | -   | 3/9/0   | 1/30/0  |

Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours

The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours

The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

**Ambient Operating Temperature by Automotive Grade Level:**

Grade 0 (or E): -40C to +150C

Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C

Grade 3 (or I) : -40C to +85C

**E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):**

Room/Hot/Cold : HTOL, ED

Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room : AC/uHAST

Note (1): Pb & Pb-Free Solderability data from MSPREL.12.UCD8220.04001

Note (2): Physical Dimensions data from QID 20171030-123810

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Automotive New Product Qualification Summary**  
**(As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)**

Approve Date 06-Apr-2023

**Qualification Results**

Data Displayed as: Number of lots / Total sample size / Total failed

| Type   | #      | Test Spec                   | Min Lot Qty | SS / Lot | Test Name                             | Condition                 | Duration  | Qual Device:<br>AMC1301QDWWVRQ1 (MLA) | QBS Reference:<br>AMC1311CQDWWVRQ1 |
|--|--------|-----------------------------|-------------|----------|---------------------------------------|---------------------------|-----------|---------------------------------------|------------------------------------|
| <b>Test Group A - Accelerated Environment Stress Tests</b> |        |                             |             |          |                                       |                           |           |                                       |                                    |
| PC   | A1     | JEDEC J-STD-020 JESD22-A113 | 3           | 77       | Preconditioning                       | MSL3 260C                 | 1 Step    | -                                     | 3/0/0                              |
| PC   | A1.1   | -                           | 3           | 22       | SAM Precon Pre                        | Review for delamination   | 1 Step    | -                                     | 3/66/0                             |
| PC   | A1.2   | -                           | 3           | 22       | SAM Precon Post                       | Review for delamination   | 1 Step    | -                                     | 3/66/0                             |
| HAST   | A2.1   | JEDEC JESD22-A110           | 3           | 77       | Biased HAST                           | 130C/85%RH                | 96 Hours  | -                                     | 3/231/0                            |
| HAST   | A2.1.2 | -                           | 3           | 1        | Cross Section, post bHAST, 1X         | Post stress cross section | Completed | -                                     | 3/3/0                              |
| HAST   | A2.1.3 | -                           | 3           | 30       | Wire Bond Shear, post bHAST, 1X       | Post stress               | Wires     | -                                     | 3/9/0                              |
| HAST   | A2.1.4 | -                           | 3           | 30       | Bond Pull over Stitch, post bHAST, 1X | Post stress               | Wires     | -                                     | 3/9/0                              |

|   |        |                                  |   |    |                                       |   |             |   |   |
|---|--------|----------------------------------|---|----|---------------------------------------|---|-------------|---|---|
| HAST  | A2.1.5 | -                                | 3 | 30 | Bond Pull over Ball, post bHAST, 1X   | Post stress                             | Wires       | -   | 3/9/0   |
| HAST  | A2.2   | JEDEC JESD22-A110                | 3 | 77 | Biased HAST                           | 130C/85%RH                              | 192 Hours   | -   | 3/210/0                                       |
| HAST  | A2.2.1 | -                                | 3 | 22 | SAM Analysis, post bHAST 2X           | Review for delamination                 | Completed   | -   | 3/66/0  |
| HAST  | A2.2.2 | -                                | 3 | 1  | Cross Section, post bHAST, 2X         | Post stress cross section               | Completed   | -   | 3/3/0   |
| HAST  | A2.2.3 | -                                | 3 | 30 | Wire Bond Shear, post bHAST, 2X       | Post stress                             | Wires       | -   | 3/9/0   |
| HAST  | A2.2.4 | -                                | 3 | 30 | Bond Pull over Stitch, post bHAST, 2X | Post stress                             | Wires       | -   | 3/9/0   |
| HAST  | A2.2.5 | -                                | 3 | 30 | Bond Pull over Ball, post bHAST, 2X   | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.1   | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle                     | -65C/150C                               | 500 Cycles  | -   | 3/231/0                                       |
| TC  | A4.1.1 | -                                | 3 | 22 | SAM Analysis, post TC 1X              | Review for delamination                 | Completed   | -   | 3/66/0  |
| TC  | A4.1.2 | -                                | 3 | 1  | Cross Section, post TC, 1X            | Post stress cross section               | Completed   | -   | 3/3/0   |
| TC  | A4.1.3 | -                                | 3 | 30 | Wire Bond Shear, post TC, 1X          | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.1.4 | -                                | 3 | 30 | Bond Pull over Stitch, post TC, 1X    | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.1.5 | -                                | 3 | 30 | Bond Pull over Ball, post TC, 1X      | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.2   | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle                     | -65C/150C                               | 1000 Cycles | -   | 3/210/0                                       |
| TC  | A4.2.1 | -                                | 3 | 22 | SAM Analysis, post TC, 2X             | Review for delamination                 | Completed   | -   | 3/66/0  |
| TC  | A4.2.2 | -                                | 3 | 1  | Cross Section, post TC, 2X            | Post stress cross section               | Completed   | -   | 3/3/0   |
| TC  | A4.2.3 | -                                | 3 | 30 | Wire Bond Shear, post TC, 2X          | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.2.4 | -                                | 3 | 30 | Bond Pull over Stitch, post TC, 2X    | Post stress                             | Wires       | -   | 3/9/0   |
| TC  | A4.2.5 | -                                | 3 | 30 | Bond Pull over Ball, post TC, 2X      | Post stress                             | Wires       | -   | 3/9/0   |
| HTSL  | A6.1   | JEDEC JESD22-A103                | 3 | 45 | High Temperature Storage Life         | 175C                                    | 500 Hours   | -   | 3/135/0                                       |
| HTSL  | A6.1.1 | -                                | 3 | 1  | Cross Section, post HTSL, 1X          | Post stress cross section               | Completed   | -   | 3/3/0   |
| HTSL  | A6.2   | JEDEC JESD22-A103                | 3 | 45 | High Temperature Storage Life         | 175C                                    | 1000 Hours  | -   | 3/132/0                                       |
| HTSL  | A6.2.1 | -                                | 3 | 1  | Cross Section, post HTSL, 2X          | Post stress cross section               | Completed   | -   | 3/3/0   |
| <b>Test Group B - Accelerated Lifetime Simulation Tests</b> |        |                                  |   |    |                                       |   |             |   |   |
| <b>Test Group C - Package Assembly Integrity Tests</b>      |        |                                  |   |    |                                       |   |             |   |   |
| WBS   | C1     | AEC Q100-001                     | 1 | 30 | Wire Bond Shear                       | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires       | -   | 3/90/0  |
| WBP   | C2     | MIL-STD883 Method 2011           | 1 | 30 | Wire Bond Pull                        | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires       | -   | 3/90/0  |
| SD  | C3     | JEDEC J-STD-002                  | 1 | 15 | PB Solderability                      | >95% Lead Coverage                      | -           | -   | 1/15/0  |
| SD  | C3     | JEDEC J-STD-002                  | 1 | 15 | PB-Free Solderability                 | >95% Lead Coverage                      | -           | -   | 1/15/0  |
| PD  | C4     | JEDEC JESD22-B100 and B108       | 1 | 10 | Physical Dimensions                   | Cpk>1.67                                | -           | -   | 3/30/0  |
| <b>Test Group D - Die Fabrication Reliability Tests</b>     |        |                                  |   |    |                                       |   |             |   |   |
| EM  | D1     | JESD61                           | - | -  | Electromigration                      | -                                       | -           | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| TDD   | D2     | JESD35                           | - | -  | Time Dependent Dielectric Breakdown   | -                                       | -           | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |

|      |    |             |   |   |                                       |   |   |   |   |
|------|----|-------------|---|---|---------------------------------------|---|---|---|---|
| HCI  | D3 | JESD60 & 28 | - | - | Hot Carrier Injection                 | - | - | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| NBTI | D4 | -           | - | - | Negative Bias Temperature Instability | - | - | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| SM   | D5 | -           | - | - | Stress Migration                      | - | - | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |

QBS: Qual By Similarity

Qual Device AMC1301QDWVRQ1 is qualified at MSL3 260C

Qual Device AMC1301QDWVRQ1 is qualified at MSL3 260C

Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150 C/300 Hours, and 155C/240 Hours

The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours

The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

**Ambient Operating Temperature by Automotive Grade Level:**

Grade 0 (or E): -40C to +150C

Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C

Grade 3 (or I) : -40C to +85C

**E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):**

Room/Hot/Cold : HTOL, ED

Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room : AC/uHAST

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

ZVEI ID reference: SEM-PA-18, SEM-PA-08, SEM-PA-13, SEM-TF-01, SEM-PW-13, SEM-DS-01

For questions regarding this notice, e-mails can be sent to the contacts shown below or your local Field Sales Representative.

| Location                  | E-Mail   |
|---------------------------|--|
| WW Change Management Team | <a href="mailto:PCN_ww_admin_team@list.ti.com">PCN_ww_admin_team@list.ti.com</a> |

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