



12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN# 20240610001.1

**Qualification of additional Assembly Site (MLA), BOM options for select devices
Change Notification / Sample Request**

Date: June 11, 2024

To: MOUSER PCN

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments. The details of this change are on the following pages.

Texas Instruments requires acknowledgement of receipt of this notification within **30** days of the date of this notice. Lack of acknowledgement of this notice within 30 days constitutes acceptance and approval of this change. If samples or additional data are required, requests must be received within **30 days** of this notification.

The changes discussed within this PCN will not take effect any earlier than the proposed first ship date on Page 3 of this notification, unless customer agreement has been reached on an earlier implementation of the change.

This notice does not change the end-of-life status of any product. Should product affected be on a previously issued product withdrawal/discontinuance notice, this notification does not extend the life of that product or change the life time buy offering/discontinuance plan.

For questions regarding this notice or to provide acknowledgement of this PCN, you may contact your local Field Sales Representative or the change management team.

For sample requests or sample related questions, contact your local Field Sales Representative.

Sincerely,

Change Management Team
SC Business Services

20240610001.1
Attachment: 1

Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, you have recently purchased these devices. The corresponding customer part number is also listed, if available.

| DEVICE | CUSTOMER PART NUMBER |
|------------------|-----------------------------|
| AMC1106E05DWV | NULL |
| AMC1106M05DWVR | NULL |
| AMC1202DWVR | NULL |
| AMC1300BDWV | NULL |
| AMC1300BDWVR | NULL |
| AMC1300DWV | NULL |
| AMC1300DWVR | NULL |
| AMC1301DWV | NULL |
| AMC1301DWVR | NULL |
| AMC1301SDWV | NULL |
| AMC1301SDWVR | NULL |
| AMC1302DWV | NULL |
| AMC1302DWVR | NULL |
| AMC1303E2520DWVR | NULL |
| AMC1303M0510DWV | NULL |
| AMC1303M0520DWV | NULL |
| AMC1303M2510DWV | NULL |
| AMC1303M2510DWVR | NULL |
| AMC1303M2520DWV | NULL |
| AMC1303M2520DWVR | NULL |
| AMC1306E05DWV | NULL |
| AMC1306E25DWVR | NULL |
| AMC1306M05DWV | NULL |
| AMC1306M05DWVR | NULL |
| AMC1306M25DWV | NULL |
| AMC1306M25DWVR | NULL |
| AMC1306M25EDWVR | NULL |
| AMC1311BDWV | NULL |
| AMC1311BDWVR | NULL |
| AMC1311DWV | NULL |
| AMC1311DWVR | NULL |
| AMC1333M10DWVR | NULL |
| AMC1336DWVR | NULL |
| AMC1350DWV | NULL |
| AMC1350DWVR | NULL |
| AMC1351DWV | NULL |
| AMC1351DWVR | NULL |

Technical details of this Product Change follow on the next page(s).

| | | | | | |
|---|---|--------------------------|--|--------------------------|---------------------|
| PCN Number: | 20240610001.1 | | | PCN Date: | June 11, 2024 |
| Title: | Qualification of additional Assembly Site (MLA), BOM options for select devices | | | | |
| Customer Contact: | Change Management team | | Dept: | Quality Services | |
| Proposed 1st Ship Date: | September 09, 2024 | | Sample requests accepted until: | July 11, 2024* | |
| *Sample requests received after July 11, 2024 will not be supported. | | | | | |
| Change Type: | | | | | |
| <input checked="" type="checkbox"/> | Assembly Site | <input type="checkbox"/> | Design | <input type="checkbox"/> | Wafer Bump Material |
| <input checked="" type="checkbox"/> | Assembly Process | <input type="checkbox"/> | Data Sheet | <input type="checkbox"/> | Wafer Bump Process |
| <input checked="" type="checkbox"/> | Assembly Materials | <input type="checkbox"/> | Part number change | <input type="checkbox"/> | Wafer Fab Site |
| <input type="checkbox"/> | Mechanical Specification | <input type="checkbox"/> | Test Site | <input type="checkbox"/> | Wafer Fab Material |
| <input checked="" type="checkbox"/> | Packing/Shipping/Labeling | <input type="checkbox"/> | Test Process | <input type="checkbox"/> | Wafer Fab Process |
| PCN Details | | | | | |
| Description of Change: | | | | | |
| Texas Instruments is pleased to announce the qualification of additional Assembly Site, BOM options for the devices listed below. | | | | | |
| Group 1: (Devices will remain at the current assembly site) | | | | | |
| | Current | Proposed | | | |
| Wire diam/type | 0.96mil Au (Die to die) | 0.80mil Cu | | | |
| | 0.96mil Au or 1.0mil Cu (Die to lead) | 0.80mil Cu | | | |
| Top side marking | TI logo, with G4 | | TI letter, remove G4 | | |
| Group 2: | | | | | |
| | TAI | MLA | | | |
| Wire diam/type | 0.96mil Au (Die to die) | 0.80mil Cu | | | |
| | 0.96mil Au or 1.0mil Cu (Die to lead) | 0.80mil Cu | | | |
| Top side marking | TI logo, with G4 | | TI letter, remove G4 | | |
| Qual details are provided in the Qual Data Section. | | | | | |
| Reason for Change: | | | | | |
| Supply Continuity | | | | | |
| 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.

| RoHS | REACH | Green Status | IEC 62474 |
|---|---|---|---|
| <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:

Assembly Site Information:

| Assembly Site | Assembly Site Origin (22L) | Assembly Country Code (23L) | Assembly City |
|--------------------|----------------------------|-----------------------------|---------------------------|
| TI Taiwan | TAI | TWN | Chung Ho, New Taipei City |
| TI Malaysia | MLA | MYS | Kuala Lumpur |

Sample product shipping label (not actual product label):



TEXAS INSTRUMENTS
MADE IN: Malaysia
2DC: 20:
MSL 2 / 260C/1 YEAR SEAL DT
MSL 1 / 235C/UNLIM 03/29/04
OPT:
ITEM: 39
LBL: 5A (L)T0:1750





(1P) **SN74LS07NSR**
(Q) **2000** (D) **0336**
(31T) LOT: 3959047MLA
(4W) TKY (1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
(20L) CS0: SHE (21L) CC0:USA
(22L) AS0: MLA (23L) AC0: MYS

Product Affected: Group 1

| | | | |
|---------------|-----------------|-----------------|-----------------|
| AMC1106E05DWV | AMC1301SDWV | AMC1303M2510DWV | AMC1311DWVR |
| AMC1106M05DWV | AMC1301SDWVR | AMC1303M2520DWV | AMC1336DWV |
| AMC1290DWV | AMC1302DWV | AMC1306E05DWV | AMC1350DWV |
| AMC1300BDWV | AMC1303E0510DWV | AMC1306E25DWV | AMC1351DWV |
| AMC1300BDWVR | AMC1303E0520DWV | AMC1306M05DWV | SN201811022DWVR |
| AMC1300DWV | AMC1303E2510DWV | AMC1306M25DWV | TLA7002DWVR |
| AMC1300DWVR | AMC1303E2520DWV | AMC1311BDWV | TLA7312DWVR |
| AMC1301DWV | AMC1303M0510DWV | AMC1311BDWVR | |
| AMC1301DWVR | AMC1303M0520DWV | AMC1311DWV | |

Product Affected: Group 2

| | | | |
|------------------|------------------|------------------|-----------------|
| AMC1106E05DWVR | AMC1303E0520DWVR | AMC1303M2520DWVR | AMC1333M10DWVR |
| AMC1106M05DWVR | AMC1303E2510DWVR | AMC1306E05DWVR | AMC1336DWVR |
| AMC1202DWVR | AMC1303E2520DWVR | AMC1306E25DWVR | AMC1350DWVR |
| AMC1290DWVR | AMC1303M0510DWVR | AMC1306M05DWVR | AMC1351DWVR |
| AMC1302DWVR | AMC1303M0520DWVR | AMC1306M25DWVR | SN201811023DWVR |
| AMC1303E0510DWVR | AMC1303M2510DWVR | AMC1306M25EDWVR | TLA8062DWVR |

Group 1 Qualification Report
Automotive Qualification Summary
(As per AEC-Q100 Rev. H and JEDEC Guidelines)
Approve Date 31-January-2024

Product Attributes

| Attributes | Qual Device: AMC1311BQDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741EQDWQ1 | QBS Process, Product Reference: AMC1311BQDWVQ1 | QBS Package, Process, Product Reference: AMC1311CQDWVRQ1 | QBS Package Reference: AMC1305M25QDWQ1 |
|--------------------------|---------------------------------|---|--|--|--|--|
| Automotive Grade Level | 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 |
| Product Function | Signal Chain | Signal Chain | Interface | Signal Chain | Signal Chain | Signal Chain |
| Wafer Fab Supplier | AIZU, AIZU, MH8, MH8 | AIZU | MH8, MH8 | MH8, AIZU, MH8, AIZU | AIZU, MH8, MH8, AIZU | DP1DM5, DP1DM5, AIZU |
| Assembly Site | TAI | TFME | TAI | TAI | TAI | TAI |
| Package Group | SOIC | SOT | SOIC | SOIC | SOIC | SOIC |
| Package Designator | DWV | DKK | DW | DWV | DWV | DW |
| Pin Count | 8 | 6 | 16 | 8 | 8 | 16 |

QBS: Qual By Similarity

Qual Device AMC1311BQDWVRQ1 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: AMC1311BQDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741EQDWQ1 | QBS Process, Product Reference: AMC1311BQDWVQ1 | QBS Package, Process, Product Reference: AMC1311CQDWVRQ1 | QBS Package Reference: AMC1305M25QDWQ1 |
|--|----|-------------------------------------|-------------|----------|-------------------------------|---|------------|---------------------------------|---|--|--|--|--|
| Test Group A - Accelerated Environment Stress Tests | | | | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Preconditioning | MSL2 260C | - | - | - | - | - | - | - |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Preconditioning | MSL3 260C | - | 1/Pass | - | - | - | 3/Pass | 3/Pass |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | 3/231/0 |
| AC/UHAST | A3 | JEDEC JESD22-A102/JEDEC JESD22-A118 | 3 | 77 | Autoclave | 121C/15psig | 96 Hours | - | - | - | - | - | 3/231/0 |
| AC/UHAST | A3 | JEDEC JESD22-A102/JEDEC JESD22-A118 | 3 | 77 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle | -65C/150C | 500 Cycles | 1/77/0 | - | - | - | 3/231/0 | 3/231/0 |
| TC-BP | A4 | MIL-STD883 Method 2011 | 1 | 5 | Post Temp Cycle Bond Pull | - | - | - | - | - | - | - | 1/5/0 |
| TC-SAM | A4 | - | 3 | 3 | Post TC SAM | <50% delamination | - | - | - | - | - | 3/36/0 | - |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temperature Storage Life | 175C | 500 Hours | - | - | - | - | 3/135/0 | - |
| Test Group B - Accelerated Lifetime Simulation Tests | | | | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test | 125C | 1000 Hours | - | 3/231/0 | 3/231/0 | - | - | - |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test | 150C | 408 Hours | - | - | - | 3/231/0 | 1/77/0 | - |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate | 125C | 48 Hours | - | 3/2400/0 | 3/2400/0 | - | - | - |
| Test Group C - Package Assembly Integrity Tests | | | | | | | | | | | | | |
| WBS | C1 | AEC Q100-001 | 1 | 30 | Wire Bond Shear | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | 1/30/0 | - | - | - | 3/90/0 | 3/90/0 |
| WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Wire Bond Pull | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | 1/30/0 | - | - | - | 3/90/0 | 3/90/0 |
| PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Physical Dimensions | Cpk>1.67 | - | 1/10/0 | - | - | 3/30/0 | - | - |

| Test Group D - Die Fabrication Reliability Tests | | | | | | | | | | | | | |
|--|----|--------------|---|----|-------------------------------------|------------------------------|------------|---|---|---|---|---|---|
| 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 |
| TDDb | 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 |
| HCI | 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 |
| BTI | D4 | - | - | - | 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 |
| 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 |
| Test Group E - Electrical Verification Tests | | | | | | | | | | | | | |
| ESD | E2 | AEC Q100-002 | 1 | 3 | ESD HBM | - | 2000 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 | - | - | - | - | 3/9/0/0 | 3/9/0/0 | - |

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

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

Qualification Report

Automotive Qualification Summary
(As per AEC-Q100 Rev. H and JEDEC Guidelines)
Approve Date 18-March-2024

Product Attributes

| Attributes | Qual Device: AMC1311BQDQWRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741EQDQWRQ1 | QBS Package Reference: ISO6763QDQWRQ1 | QBS Package, Process Reference: ISO5452DWR | QBS Process, Product Reference: AMC1311CQDQWRQ1 | QBS Process, Product Reference: AMC1311BQDQWRQ1 |
|--------------------------|---------------------------------|--|---|--|---|--|--|
| Automotive Grade Level | 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 |
| Product Function | Signal Chain | Signal Chain | Interface | Interface | Power Management | Signal Chain | Signal Chain |
| Wafer Fab Supplier | AIZU, AIZU, MH8, MH8 | AIZU | MH8, MH8 | RFAB, RFAB | DP1DM5, DP1DM5, MH8 | MH8, MH8, AIZU, AIZU | AIZU, AIZU, MH8, MH8 |
| Assembly Site | MLA | TFME | TAI | MLA | MLA | MLA | TAI |
| Package Group | SOIC | SOT | SOIC | SOIC | SOIC | SOIC | SOIC |
| Package Designator | DWV | DCK | DW | DW | DW | DWV | DWV |
| Pin Count | 8 | 6 | 16 | 16 | 16 | 8 | 8 |

QBS: Qual By Similarity

Qual Device AMC1311BQDQWRQ1 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: AMC1311BQDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741FQDWQ1 | QBS Package Reference: ISO6763QDWVRQ1 | QBS Package, Process Reference: ISO6452QDW | QBS Process, Product Reference: AMC1311CQDWVRQ1 | QBS Process, Product Reference: AMC1311BQDWVRQ1 |
|--|----|-------------------------------------|-------------|----------|-------------------------------------|---|------------|---|---|---|---|---|--|--|
| Test Group A - Accelerated Environment Stress Tests | | | | | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Preconditioning | MSL2 260C | - | - | - | - | 3/Pass | 1/Pass | - | - |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 1/77/0 | - | - |
| AC/HAST | A3 | JEDEC JESD22-A102/JEDEC JESD22-A118 | 3 | 77 | Autoclave | 121C/15psig | 96 Hours | - | - | - | 3/231/0 | 1/77/0 | - | - |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | - | 3/231/0 | 1/77/0 | - | - |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temperature Storage Life | 150C | 1000 Hours | - | - | - | 3/135/0 | 1/45/0 | - | - |
| Test Group B - Accelerated Lifetime Simulation Tests | | | | | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test | 125C | 1000 Hours | - | 3/231/0 | 3/231/0 | - | - | - | - |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test | 150C | 408 Hours | - | - | - | - | - | 1/77/0 | - |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate | 125C | 48 Hours | - | 3/2400/0 | 3/2400/0 | - | - | - | - |
| Test Group C - Package Assembly Integrity Tests | | | | | | | | | | | | | | |
| WBS | C1 | AEC Q100-001 | 1 | 30 | Wire Bond Shear | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | 1/30/0 | - | - | 3/90/0 | - | - | - |
| WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Wire Bond Pull | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | 1/30/0 | - | - | 3/90/0 | - | - | - |
| PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Physical Dimensions | Cpk>1.67 | - | 1/10/0 | - | - | - | - | - | - |
| Test Group D - Die Fabrication Reliability Tests | | | | | | | | | | | | | | |
| 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 |
| TDD | 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 |
| HCI | 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 |
| BTI | D4 | - | - | - | 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 |
| Test Group E - Electrical Verification Tests | | | | | | | | | | | | | | |
| ESD | E2 | AEC Q100-002 | 1 | 3 | ESD HBM | - | 2000 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 | - |
| ED | E5 | AEC Q100-009 | 3 | 30 | Electrical Distributions | Cpk>1.67 Room, hot, and cold | - | - | - | - | - | - | 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

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

Group 2 Qualification Report

Automotive Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Approve Date 19-May-2022

Product Attributes

| Attributes | Qual Device: AMC1306M25QDWVRQ1 | QBS Product Reference: AMC1300BQDWVRQ1 | QBS Process Reference: AMC1305M25QDWVRQ1 | QBS Process Reference: INA210BQDCKRQ1 | QBS Process Reference: INA215AQDCKRQ1 |
|------------------------|-----------------------------------|---|---|--|--|
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 | Grade 1 | Grade 1 |
| Operating Temp Range | -40 to +125 C | -40 to +125 C | -40 to +125 C | -40 to +125 C | -40 to +125 C |
| Product Function | Signal Chain | Signal Chain | Signal Chain | Signal Chain | Signal Chain |
| Wafer Fab Supplier | AIZU, MH8 | AIZU, MH8 | AIZU, DM5 | AIZU | AIZU |
| Die Revision | A, B | A, B | BC, D, G | D | C |
| Assembly Site | MLA | MLA | TITL (TAI) | NFME | NFME |
| Package Type | SOIC | SOIC | SOIC | SOT | SOT |
| Package Designator | DWV | DWV | DW | DCK | DCK |
| Ball/Lead Count | 8 | 8 | 16 | 6 | 6 |

- QBS: Qual By Similarity
- Qual Device AMC1306M25QDWVRQ1 is qualified at LEVEL3-260C
- Device AMC1306M25QDWVRQ1 contains multiple dies.

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: AMC1306M25QDWVRQ1 | QBS Product Reference: AMC1300BQDWVRQ1 | QBS Process Reference: AMC1305M25QDWVRQ1 | QBS Process Reference: INA210BQDCKRQ1 | QBS Process Reference: INA215AQDCKRQ1 |
|--|----|----------------------------------|-------------|--------|------------------------------------|--------------|-----------------------------------|---|---|--|--|
| Test Group A – Accelerated Environment Stress Tests | | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning Level 2 | Level 2-260C | - | - | - | - | 3/948/0 |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning Level 3 | Level 3 | - | - | 3/960/0 | - | - |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 130C/85%RH | 96 Hours | - | - | 3/231/0 | - | 3/231/0 |
| AC | A3 | JEDEC JESD22-A102 | 3 | 77 | Autoclave 121C | 96 Hours | - | - | 3/231/0 | - | 3/231/0 |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle, -65/150C | 500 Cycles | - | - | 3/231/0 | - | 3/231/0 |
| PTC | A5 | JEDEC JESD22-A105 | 1 | 45 | Power Temperature Cycle | 1000 Cycles | N/A | - | - | - | - |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temp Storage Bake 175C | 500 Hours | - | - | 1/45/0 | - | 1/45/0 |
| Test Group B – Accelerated Lifetime Simulation Tests | | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 125C | 1000 Hours | - | - | - | - | 3/231/0 |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 150C | 408 Hours | - | - | 3/231/0 | - | - |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 125C | 48 Hours | - | - | - | - | 3/2400/0 |

| | | | | | | | | | | | |
|---|----------|------------------------|--------------------|---------------|---|--|---|---|--|--|--|
| ELFR | B 2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 150C | 24 Hours | - | - | 12/2505/0 | - | - |
| EDR | B 3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, and Operational Life | - | N/A | - | - | - | - |
| Test Group C – Package Assembly Integrity Tests | | | | | | | | | | | |
| WBS | C 1 | AEC Q100-001 | 1 | 30 | Auto Wire Bond Shear | Wires | - | 1/30/0 | - | - | 1/30/0 |
| WBP | C 2 | MIL-STD883 Method 2011 | 1 | 30 | Auto Wire Bond Pull | Minimum of 5 devices, 30 wires Cpk>1.33, Ppk>1.67 | 1/30/0 | 1/30/0 | 3/90/0 | - | 1/30/0 |
| LI | C 6 | JEDEC JESD22-B105 | 1 | 50 | Lead Fatigue | To Destruction | - | - | 1/50/0 | - | - |
| Test Group D – Die Fabrication Reliability Tests | | | | | | | | | | | |
| EM | D 1 | JESD81 | - | - | Electromigration | - | Completed Per Process Technology Requirements | - | - | - | - |
| TDD B | D 2 | JESD35 | - | - | Time Dependant Dielectric Breakdown | - | Completed Per Process Technology Requirements | - | - | - | - |
| HCI | D 3 | JESD80 & 28 | - | - | Hot Injection Carrier | - | Completed Per Process Technology Requirements | - | - | - | - |
| NBTI | D 4 | - | - | - | Negative Bias Temperature Instability | - | Completed Per Process Technology Requirements | - | - | - | - |
| SM | D 5 | - | - | - | Stress Migration | - | Completed Per Process Technology Requirements | - | - | - | - |
| Type | # | Test Spec | Min Lot Qty | SS/Lot | Test Name / Condition | Duration | Qual Device: <u>AMC1306M25QDWVR Q1</u> | QBS Product Reference: <u>AMC1300BQDWVR Q1</u> | QBS Process Reference: <u>AMC1305M25QDWR Q1</u> | QBS Process Reference: <u>INA210BQDCKRQ 1</u> | QBS Process Reference: <u>INA215AQDCKRQ 1</u> |
| Test Group E – Electrical Verification Tests | | | | | | | | | | | |
| HBM | E 2 | AEC Q100-002 | 1 | 3 | ESD - HBM - Q100 | 4000V | - | - | 1/3/0 | - | - |
| CDM | E 3 | AEC Q100-011 | 1 | 3 | ESD - CDM - Q100 | 1500V | - | - | 1/3/0 | - | - |
| LU | E 4 | AEC Q100-004 | 1 | 6 | Latch-up | (Per AEC-Q100-004) | 1/6/0 | 1/6/0 | 1/6/0 | 1/6/0 | - |
| ED | E 5 | AEC Q100-009 | 3 | 30 | Auto Electrical Distributions | Cpk>1.67 | 1/30/0 | 1/30/0 | 3/90/0 | 9/270/0 | - |
| MQ | | | - | - | Manufacturability (Auto Assembly) | (per automotive requirements) | Pass | Pass | Pass | - | Pass |
| YLD | | | - | - | FTY and Bin Summary | - | Pass | Pass | - | - | - |

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I) : -40°C to +85°C

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

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

For questions regarding this notice, e-mails can be sent to Change Management team or your local Field Sales Representative.

Automotive Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
Approve Date 19-May-2022

Product Attributes

| Attributes | Qual Device: AMC1311CQDWVRQ1 | QBS Process Reference: INA210BQDCKRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741FQDWQ1 |
|------------------------|---------------------------------|--|--|---|
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 | Grade 1 |
| Operating Temp Range | -40 to +125 C | -40 to +125 C | -40 to +125 C | -40 to +125 C |
| Product Function | Signal Chain | Signal Chain | Signal Chain | Interface |
| Wafer Fab Supplier | AIZU, MIHO | AIZU | AIZU | MIHO |
| Die Revision | A, B | D | C | A |
| Assembly Site | MLA | NFME | NFME | TAI |
| Package Type | SOIC | SOT | SOT | SOIC |
| Package Designator | DWV | DCK | DCK | DW |
| Ball/Lead Count | 8 | 6 | 6 | 16 |

- QBS: Qual By Similarity

- Qual Device AMC1311CQDWVRQ1 is qualified at LEVEL3-260C

- Device AMC1311CQDWVRQ1 contains multiple dies.

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: AMC1311CQDWVRQ1 | QBS Process Reference: INA210BQDCKRQ1 | QBS Process Reference: INA215AQDCKRQ1 | QBS Process Reference: ISO7741FQDWQ1 |
|--|----|-----------------------------------|-------------|--------|------------------------------------|--------------|---------------------------------|--|--|---|
| Test Group A – Accelerated Environment Stress Tests | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD2 2-A113 | 3 | 77 | Automotive Preconditioning Level 2 | Level 2-260C | - | - | 3/948/0 | 3/1304/0 |
| PC | A1 | JEDEC J-STD-020 JESD2 2-A113 | 3 | 77 | Automotive Preconditioning Level 3 | Level 3-260C | 3/0/0 | - | - | - |
| HAST | A2 | JEDEC JESD2 2-A110 | 3 | 77 | Biased HAST, 130C/85%RH | 96 Hours | 3/231/0 | - | 3/231/0 | 3/231/0 |
| AC | A3 | JEDEC JESD2 2-A102 | 3 | 77 | Autoclave 121C | 96 Hours | - | - | 3/231/0 | 3/231/0 |
| UHAST | A3 | JEDEC JESD2 2-A102 | 3 | 77 | Auto Unbiased Hast 130C/85%RH | 96 Hours | 3/77/0 | - | - | - |
| TC | A4 | JEDEC JESD2 2-A104 and Appendix 3 | 3 | 77 | Temperature Cycle, -65/150C | 500 Cycles | 3/231/0 | - | 3/231/0 | - |
| PTC | A5 | JEDEC JESD2 2-A105 | 1 | 45 | Power Temperature Cycle | 1000 Cycles | N/A | - | - | - |
| HTSL | A6 | JEDEC JESD2 2-A103 | 1 | 45 | High Temp Storage Bake 175C | 500 Hours | 3/135/0 | - | 1/45/0 | 3/231/0 |

| Test Group B – Accelerated Lifetime Simulation Tests | | | | | | | | | | |
|--|-----|-----------------------------|-------------|--------|---|---------------------------|---|---|---|--|
| HTOL | B 1 | JEDEC JESD2 2-A108 | 3 | 77 | Auto High Temp Operating Life Grade 1 | 150°C(408 Hours); VCC max | 1/77/0 | - | - | - |
| HTOL | B 1 | JEDEC JESD2 2-A108 | 3 | 77 | Life Test, 125C | 1000 Hours | - | - | 3/231/0 | 3/231/0 |
| ELFR | B 2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 125C | 48 Hours | - | - | 3/2400/0 | 6/2654/0 |
| EDR | B 3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, and Operational Life | - | N/A | - | - | - |
| Test Group C – Package Assembly Integrity Tests | | | | | | | | | | |
| WBS | C 1 | AEC Q100-001 | 1 | 30 | Auto Wire Bond Shear | Wires | 3/30/0 | - | 1/30/0 | 3/228/0 |
| Type | # | Test Spec | Min Lot Qty | SS/Lot | Test Name / Condition | Duration | Qual Device: <u>AMC1311CQDWV RQ1</u> | QBS Process Reference: <u>INA210BQDCK RQ1</u> | QBS Process Reference: <u>INA215AQDCK RQ1</u> | QBS Process Reference: <u>ISO7741FQD WQ1</u> |
| WBP | C 2 | MIL-STD883 Method 2011 | 1 | 30 | Auto Wire Bond Pull | Wires | 3/30/0 | - | 1/30/0 | 3/228/0 |
| SD | C 3 | JEDEC JESD2 2-B102 | 1 | 15 | Surface Mount Solderability >95% Lead Coverage | Pb-free | 1/15/0 | - | - | - |
| SD | C 3 | JEDEC JESD2 2-B102 | 1 | 15 | Surface Mount Solderability >95% Lead Coverage | Pb | 1/15/0 | - | - | - |
| PD | C 4 | JEDEC JESD2 2-B100 and B108 | 3 | 10 | Auto Physical Dimensions | Cpk>1.67 | 3/10/0 | - | - | - |
| LI | C 6 | JEDEC JESD2 2-B105 | 1 | 50 | Lead Integrity | Leads | 1/24/0 | - | - | - |
| Test Group D – Die Fabrication Reliability Tests | | | | | | | | | | |
| EM | D 1 | JESD6 1 | - | - | Electromigration | - | Completed Per Process Technology Requirements | - | - | - |
| TDDb | D 2 | JESD3 5 | - | - | Time Dependant Dielectric Breakdown | - | Completed Per Process Technology Requirements | - | - | - |
| HCI | D 3 | JESD6 0 & 28 | - | - | Hot Injection Carrier | - | Completed Per Process Technology Requirements | - | - | - |

| | | | | | | | | | | |
|---|-----|--------------|---|----|---------------------------------------|---|---|---------|------|--------|
| NBTI | D 4 | - | - | - | Negative Bias Temperature Instability | - | Completed Per Process Technology Requirements | - | - | - |
| SM | D 5 | - | - | - | Stress Migration | - | Completed Per Process Technology Requirements | - | - | - |
| Test Group E – Electrical Verification Tests | | | | | | | | | | |
| HBM | E 2 | AEC Q100-002 | 1 | 3 | Auto ESD HBM | 4000V | 1/3/0 | 1/3/0 | - | - |
| CDM | E 3 | AEC Q100-011 | 1 | 3 | Auto ESD CDM | 1500V | 1/3/0 | 1/3/0 | - | 1/3/0 |
| LU | E 4 | AEC Q100-004 | 1 | 6 | Latch-up | (per AEC-Q100-004) | 1/6/0 | 1/6/0 | - | 1/6/0 |
| ED | E 5 | AEC Q100-009 | 3 | 30 | Auto Electrical | Cpk>1.67 Room, hot, and cold test | 1/30/0 | 9/270/0 | - | 3/90/0 |
| Additional Tests | | | | | | | | | | |
| - | | | - | - | Bond Pull, over ball | Minimum of 5 devices, 30 wires Cpk>1.67 | 3/30/0 | - | - | - |
| - | | | - | - | Bond Pull, over stitch | Minimum of 5 devices, 30 wires Cpk>1.67 | 3/30/0 | - | - | - |
| FLAM | | | - | - | Flammability | Method A - UL94 V-0 | 1/5/0 | - | - | - |
| FLAM | | | - | - | Flammability | Method B - IEC 695-2-2 | 1/5/0 | - | - | - |
| FLAM | | | - | - | Flammability | Method C - UL 1694 | 1/5/0 | - | - | - |
| MQ | | | - | - | Manufacturability (Auto Assembly) | (per automotive requirements) | Pass | - | Pass | Pass |
| MQ | | | - | - | Manufacturability (Wafer Fab) | (per mfg. Site specification) | Pass | - | - | - |
| MSL | | | - | - | Thermal Path Integrity | L3-260C | 3/12/0 | - | - | - |

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I) : -40°C to +85°C

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

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

Automotive Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
Approve Date 19-May-2022

Product Attributes

| Attributes | Qual Device: AMC1300BQDWVRQ1 | QBS Product Reference: AMC1311CQDWVRQ1 | QBS Process Reference: AMC1305M25QDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 |
|------------------------|---------------------------------|---|---|--|
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 | Grade 1 |
| Operating Temp Range | -40 to +125 C | -40 to +125 C | -40 to +125 C | -40 to +125 C |
| Product Function | Signal Chain | Signal Chain | Signal Chain | Signal Chain |
| Wafer Fab Supplier | AIZU, MH8 | AIZU, MH8 | AIZU, DM5-DALLAS, DMOS 5 | AIZU |
| Die Revision | A, B | A, B | BC, D, G | C |
| Assembly Site | MLA | MLA | TITL (TAI) | NFME |
| Package Type | SOIC | SOIC | SOIC | SOT |
| Package Designator | DWV | DWV | DW | DCK |
| Ball/Lead Count | 8 | 8 | 16 | 6 |

- QBS: Qual By Similarity
- Qual Device AMC1300BQDWVRQ1 is qualified at LEVEL3-260C
- Device AMC1300BQDWVRQ1 contains multiple dies.

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: AMC1300BQDWVRQ1 | QBS Product Reference: AMC1311CQDWVRQ1 | QBS Process Reference: AMC1305M25QDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 |
|---|----|----------------------------------|-------------|--------|---|--------------|---------------------------------|---|---|--|
| Test Group A – Accelerated Environment Stress Tests | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning Level 2 | Level 2-260C | - | - | - | 3/948/0 |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning Level 3 | L3-260C | - | 3/0/0 | 3/960/0 | - |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 130C/85%RH | 96 Hours | - | 3/231/0 | 3/231/0 | 3/231/0 |
| AC | A3 | JEDEC JESD22-A102 | 3 | 77 | Autoclave 121C | 96 Hours | - | - | 3/231/0 | 3/231/0 |
| UHAST | A3 | JEDEC JESD22-A102 | - | - | Unbiased HAST 130C/85%RH | 96 Hours | - | 3/231/0 | - | - |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle, -65/150C | 500 Cycles | - | 3/231/0 | 3/231/0 | 3/231/0 |
| PTC | A5 | JEDEC JESD22-A105 | 1 | 45 | Power Temperature Cycle | 1000 Cycles | N/A | - | - | - |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temp Storage Bake 175C | 500 Hours | - | 3/135/0 | 1/45/0 | 1/45/0 |
| Test Group B – Accelerated Lifetime Simulation Tests | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 125C | 1000 Hours | - | - | - | 3/231/0 |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 150C | 408 Hours | - | 1/77/0 | 3/231/0 | - |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 125C | 48 Hours | - | - | - | 3/2400/0 |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 150C | 24 Hours | - | - | 12/2505/0 | - |
| EDR | B3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, and Operational Life | - | N/A | - | - | - |

| Type | # | Test Spec | Min Lot Qty | SS/Lot | Test Name / Condition | Duration | Qual Device: AMC1300BQDWVRQ1 | QBS Product Reference: AMC1311CQDWVRQ1 | QBS Process Reference: AMC1305M25QDWVRQ1 | QBS Process Reference: INA215AQDCKRQ1 |
|--|----|----------------------------|-------------|--------|---|---|---|---|---|--|
| Test Group C – Package Assembly Integrity Tests | | | | | | | | | | |
| WBS | C1 | AEC Q100-001 | 1 | 30 | Auto Wire Bond Shear | Minimum of 5 devices, 30 wires Cpk>1.67 | 1/30/0 | 3/90/0 | 3/90/0 | 1/30/0 |
| WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Auto Wire Bond Pull | Minimum of 5 devices, 30 wires Cpk>1.67 | 1/30/0 | 3/90/0 | 3/90/0 | 1/30/0 |
| SD | C3 | JEDEC JESD22-B102 | 1 | 15 | Pb Free Surface Mount Solderability | Pb Free | - | 1/15/0 | - | - |
| PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Auto Physical Dimensions | Cpk>1.67 | - | 1/30/0 | - | - |
| LI | C6 | JEDEC JESD22-B105 | 1 | 50 | Lead Pull | leads | 1/24/0 | 1/24/0 | 1/5/0 | - |
| Test Group D – Die Fabrication Reliability Tests | | | | | | | | | | |
| EM | D1 | JESD81 | - | - | Electromigration | - | Completed Per Process Technology Requirements | - | - | - |
| TDDb | D2 | JESD35 | - | - | Time Dependant Dielectric Breakdown | - | Completed Per Process Technology Requirements | - | - | - |
| HCI | D3 | JESD60 & 28 | - | - | Hot Injection Carrier | - | Completed Per Process Technology Requirements | - | - | - |
| NBTI | D4 | - | - | - | Negative Bias Temperature Instability | - | Completed Per Process Technology Requirements | - | - | - |
| SM | D5 | - | - | - | Stress Migration | - | Completed Per Process Technology Requirements | - | - | - |
| Test Group E – Electrical Verification Tests | | | | | | | | | | |
| HBM | E2 | AEC Q100-002 | 1 | 3 | Auto ESD HBM | 4000V | 1/3/0 | - | - | - |
| CDM | E3 | AEC Q100-011 | 1 | 3 | Auto ESD CDM | 1500V | 1/3/0 | - | - | - |
| LU | E4 | AEC Q100-004 | 1 | 6 | Latch-up | (Per AEC-Q100-004) | 1/6/0 | 1/6/0 | 1/6/0 | - |
| ED | E5 | AEC Q100-009 | 3 | 30 | Auto Electrical Distributions | Cpk>1.67 Room, hot, and cold test | 1/30/0 | 1/30/0 | 3/90/0 | - |
| Additional Tests | | | | | | | | | | |
| - | | | - | - | Automotive L3 Powerpad Moisture Sensitivity | L3-260C | - | 3/36/0 | - | - |
| FLAM | | | - | - | Flammability (IEC 605-2-2) | Method B/IEC 605-2-2 | - | 1/5/0 | - | - |
| FLAM | | | - | - | Flammability (UL 94V-0) | Method A/UL 94V-0 | - | 1/5/0 | - | - |
| FLAM | | | - | - | Flammability (UL-1694) | Method C/UL-1694 | - | 1/5/0 | - | - |
| MQ | | | - | - | Manufacturability (Auto Assembly) | (per automotive requirements) | Pass | Pass | Pass | Pass |
| MQ | | | - | - | Manufacturability (Wafer Fab) | (per mfg. Site specification) | Pass | Pass | - | - |
| YLD | | | - | - | FTY and Bin Summary | - | Pass | - | - | - |

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I) : -40°C to +85°C

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

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

Automotive Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
Approve Date 30-May-2017

Product Attributes

| Attributes | Qual Device: AMC1200TDWVRQ1 | QBS Product Reference: - AMC1200TDWVRQ1 | QBS Product Reference: AMC1200STDUBRQ1 | QBS Package Reference: AMC1301QDWVRQ1 |
|------------------------|-----------------------------|---|--|---------------------------------------|
| Operating Temp Range | -40 to +105 C | -40 to +105 C | -40 to +105 C | -40 to +125 C |
| Automotive Grade Level | Grade 2 | Grade 2 | Grade 2 | Grade 1 |
| Product Function | Signal Chain | Signal Chain | Signal Chain | Signal Chain |
| Wafer Fab Supplier | DMOS 5, TSMC | DMOS5, TSMC | DMOS 5, TSMC | DMOS5 |
| Die Revision | F, G | F, G | C, F | A, B |
| Assembly Site | TAI | TAI | HANA THAILAND | TAI |
| Package Type | SOIC | SOIC | SOP | SOIC |
| Package Designator | DWV | DWV | DUB | DWV |
| Ball/Lead Count | 8 | 8 | 8 | 8 |

- QBS: Qual By Similarity
- Qual Device AMC1200TDWVRQ1 is qualified at LEVEL2-280C
- Device AMC1200TDWVRQ1 contains multiple dies.

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: AMC1200TDWVRQ1 | QBS Product Reference: AMC1200TDWVRQ1 | QBS Product Reference: AMC1200STDUBRQ1 | QBS Package Reference: AMC1301QDWVRQ1 |
|---|----|----------------------------------|-------------|--------|---|-----------------------------------|---|---|---|---|
| Test Group A – Accelerated Environment Stress Tests | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning | Level 2-280C | 3/599/0 | 3/1350/0 | - | - |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning | Level 3-280C | - | - | - | 3/900/0 |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 130C/85%RH | 96 Hours | - | 3/231/0 | - | 3/231/0 |
| AC | A3 | JEDEC JESD22-A102 | 3 | 77 | Autoclave 121C | 96 Hours | 3/231/0 | 3/231/0 | - | 3/231/0 |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle, -65/150C | 500 Cycles | 3/231/0 | 3/231/0 | - | 3/231/0 |
| TC-BP | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Post Temp Cycle Bond Pull | Wires | 1/30/0 | 1/30/0 | - | 1/50/0 |
| PTC | A5 | JEDEC JESD22-A105 | 1 | 45 | Power Temperature Cycle | 1000 Cycles | N/A | N/A | N/A | N/A |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temp Storage Bake 150C | 1000 Hours | 1/45/0 | 3/135/0 | - | - |
| HTSL | A6 | JEDEC JESD22-A103 | 1 | 45 | High Temp Storage Bake 175C | 500 Hours | - | - | - | 3/135/0 |
| Test Group B – Accelerated Lifetime Simulation Tests | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 150C | 408 Hours | - | 3/231/0 | 1/77/0 | 3/231/0 |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 125C | 48 Hours | - | 3/2400/1 (Note 1) | - | 3/2400/0 |
| EDR | B3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, and Operational Life | -- | N/A | - | - | - |
| Test Group C – Package Assembly Integrity Tests | | | | | | | | | | |
| WBS | C1 | AEC Q100-001 | 1 | 30 | Bond Shear (Cpk>1.67) | Wires | 3/90/0 | 3/90/0 | - | 3/231/0 |
| WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Bond Pull (Cpk>1.67) | Wires | 3/90/0 | 3/90/0 | - | 3/231/0 |
| SD | C3 | JEDEC JESD22-B102 | 1 | 15 | Surface Mount Solderability | Pb Free | 1/15/0 | 1/15/0 | - | 1/15/0 |
| SD | C3 | JEDEC JESD22-B102 | 1 | 15 | Solderability | Pb | 1/15/0 | 1/15/0 | - | - |
| PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Physical Dimensions (Cpk>1.67) | -- | - | 3/30/0 | - | 3/90/0 |
| SBS | C5 | AEC Q100-010 | 3 | 50 | Solder Ball Shear (Cpk>1.67) | Post HTSL/Bump | N/A | N/A | N/A | N/A |
| LI | C6 | JEDEC JESD22-B105 | 1 | 50 | Lead Integrity | Leads | - | - | - | - |
| Test Group D – Die Fabrication Reliability Tests | | | | | | | | | | |
| EM | D1 | JESD61 | - | - | Electromigration | -- | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| TDDb | D2 | JESD35 | - | - | Time Dependant Dielectric Breakdown | -- | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| HCI | D3 | JESD80 & 28 | - | - | Hot Injection Carrier | -- | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | 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 | 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 |
| Test Group E – Electrical Verification Tests | | | | | | | | | | |
| HBM | E2 | AEC Q100-002 | 1 | 3 | ESD - HBM | 2500 V | - | 1/3/0 | 1/3/0 | - |
| CDM | E3 | AEC Q100-011 | 1 | 3 | ESD - CDM | 1000 V | - | 1/3/0 | 1/3/0 | - |
| LU | E4 | AEC Q100-004 | 1 | 6 | Latch-up | (Per AEC Q100-004) | - | 1/6/0 | 1/12/0 | - |
| ED | E5 | AEC Q100-009 | 3 | 30 | Electrical Distributions | Cpk>1.67 Room, hot, and cold test | - | 3/90/0 | - | 3/90/0 |

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST & TC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I) : -40°C to +85°C

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: 1 failure due to EOS QTS FA453167-1

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

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