



**12500 TI Boulevard, MS 8640, Dallas, Texas 75243**

**PCN# 20240605000.1  
Add Cu as Alternative Wire Base Metal for Selected Device(s)  
Change Notification / Sample Request**

**Date:** June 05, 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

**20240605000.1**  
**Change Notification / Sample Request**  
**Attachments**

**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.

| <b>DEVICE</b> | <b>CUSTOMER PART NUMBER</b> |
|---------------|-----------------------------|
| ISO1432DW     | NULL                        |
| ISO1540DR     | NULL                        |
| ISO1541DR     | NULL                        |
| ISO1640BDR    | NULL                        |
| ISO6720BDR    | NULL                        |
| ISO6720FBDR   | NULL                        |
| ISO6721BDR    | NULL                        |
| ISO6721FBDR   | NULL                        |
| ISO7810DWR    | NULL                        |
| ISO7820DW     | NULL                        |
| ISO7820LLDW   | NULL                        |
| UCC5310MCDR   | NULL                        |
| UCC5350MCDR   | NULL                        |
| UCC5350SBDR   | NULL                        |
| UCD3138RHAT   | NULL                        |
| UCD3138RMHT   | NULL                        |

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

|   |  |  |                     |
|---|--|--|---------------------|
| <b>PCN Number:</b>  | 20240605000.1  | <b>PCN Date:</b>                       | June 05, 2024       |
| <b>Title:</b>   | Add Cu as Alternative Wire Base Metal for Selected Device(s) |  |                     |
| <b>Customer Contact:</b>  | Change Management team                                       | <b>Dept:</b>                           | Quality Services    |
| <b>Proposed 1<sup>st</sup> Ship Date:</b>                                   | September 03, 2024   | <b>Sample requests accepted until:</b> | July 05, 2024       |
| <b>*Sample requests received after July 05, 2024 will not be supported.</b> |  |  |                     |
| <b>Change Type:</b>   |  |  |                     |
| <input 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 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 new assembly material set to add Cu as an additional bond wire option for devices listed in "Product affected" section below. Devices will remain in current assembly facility and piece part changes as follows:

#### Group 1 device:

| Material  | Current*              | Proposed  |
|-----------|-----------------------|-----------|
| Wire type | 0.96mil Au, 1.0mil Cu | 0.8mil Cu |

Note: \* - Au wire: Die to die bonding, Cu wire: Die to leadframe

#### Group 2 device:

| Material  | Current    | Proposed  |
|-----------|------------|-----------|
| Wire type | 0.96mil Au | 0.8mil Cu |

#### 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.

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

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

None

#### Group 1 Product Affected:

|             |             |             |             |
|-------------|-------------|-------------|-------------|
| UCC5310MCDR | ISO7810FDWR | ISO7830FDWR | ISO6720FBDR |
| UCC5350MCDR | ISO7820DW   | ISO1540DR   | ISO6721BDR  |
| UCC5350SBDR | ISO7820LLDW | ISO1541DR   | ISO6721FBDR |

|                                  |                |              |             |
|----------------------------------|----------------|--------------|-------------|
| ISO1432DW                        | ISO7821LLSDW   | ISO1640BDR   |             |
| ISO7810DWR                       | ISO7830DW      | ISO6720BDR   |             |
| <b>Group 2 Product Affected:</b> |                |              |             |
| SN3138064RGCR                    | UCD3138064RGCT | UCD3138ARMHR | UCD3138RHAT |
| SN3138RGCR                       | UCD3138064RMHR | UCD3138ARMHT | UCD3138RMHR |
| UCD3138064ARGCR                  | UCD3138064RMHT | UCD3138RGCR  | UCD3138RMHT |
| UCD3138064ARGCT                  | UCD3138ARGCR   | UCD3138RGCT  |             |
| UCD3138064RGCR                   | UCD3138ARGCT   | UCD3138RHAR  |             |

## Group 1 Qualification Report

Automotive Qualification Summary  
(As per AEC-Q100 Rev. J and JEDEC Guidelines)  
Approve Date 01-May-2024

### Product Attributes

| Attributes               | Qual Device:   | QBS Package Reference: | QBS Package Reference: | QBS Process Reference: | QBS Product Reference: |
|--------------------------|----------------|------------------------|------------------------|------------------------|------------------------|
|                          | ISO6721RBQDRQ1 | ISO6721BQDRQ1          | TLV9022QDRQ1           | UCC23513QDWYQ1         | ISO1640QDWRQ1          |
| Automotive Grade Level   | 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             |
| Product Function         | Interface      | Interface              | Signal Chain           | Power Management       | Interface              |
| Wafer Fab Supplier       | RFAB, RFAB     | MH8, MH8               | RFAB                   | RFAB, RFAB             | RFAB, RFAB             |
| Assembly Site            | MLA            | MLA                    | MLA                    | TAI                    | MLA                    |
| Package Group            | SOIC           | SOIC                   | -                      | SOIC                   | SOIC                   |
| Package Designator       | D              | D                      | D                      | DWY                    | DW                     |
| Pin Count                | 8              | 8                      | 8                      | 6                      | 16                     |

QBS: Qual By Similarity

Qual Device ISO6721RBQDRQ1 is qualified at MSL2 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:   | QBS Package Reference: | QBS Package Reference: | QBS Process Reference: | QBS Product Reference: |
|--|----|-------------------------------------|-------------|----------|-------------------------------|-------------------|------------|----------------|------------------------|------------------------|------------------------|------------------------|
| <b>Test Group A - Accelerated Environment Stress Tests</b> |    |                                     |             |          |                               |                   |            |                |                        |                        |                        |                        |
| PC   | A1 | JEDEC J-STD-020 JESD22-A113         | 3           | 77       | Preconditioning               | MSL1 260C         | -          | ISO6721RBQDRQ1 | ISO6721BQDRQ1          | TLV9022QDRQ1           | UCC23513QDWYQ1         | ISO1640QDWRQ1          |
| 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-SAM   | A4 | -                                   | 3           | 3        | Post TC SAM                   | <50% delamination | -          | -              | 1/12/0                 | -                      | -                      | -                      |
| HTSL   | A6 | JEDEC JESD22-A103                   | 1           | 45       | High Temperature Storage Life | 150C              | 1000 Hours | -              | -                      | 3/135/0                | -                      | -                      |
| 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                                       | 3/231/0                                       | -   |
| ELFR   | B2 | AEC Q100-008               | 3           | 800      | Early Life Failure Rate             | 125C                                    | 48 Hours   | -   | -   | -   | 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  | 3/228/0                                       | 3/90/0  | -   | 1/30/0  |
| WBP  | C2 | MIL-STD883 Method 2011     | 1           | 30       | Wire Bond Pull                      | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires      | 1/30/0  | 3/228/0                                       | 3/90/0  | -   | 1/30/0  |
| Type   | #  | Test Spec                  | Min Lot Qty | SS / Lot | Test Name                           | Condition                               | Duration   | Qual Device: ISO6721RBQDRQ1                   | QBS Package Reference: ISO6721BQDRQ1          | QBS Package Reference: TLV9022QDRQ1           | QBS Process Reference: UCC23513QDWYQ1         | QBS Product Reference: ISO1640QDWDRQ1         |
| 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 | 3           | 10       | Physical Dimensions                 | Cpk>1.67                                | -          | 1/10/0  | 3/30/0  | 3/30/0  | -   | -   |
| Test Group D - Die Fabrication Reliability Tests     |    |                            |             |          |                                     |   |            |   |   |   |   |   |
| EM   | D1 | JESD61                     | -           | -        | Electromigration                    | -                                       | -          | Completed Per Process Technology Requirements |
| TDDB   | D2 | JESD35                     | -           | -        | Time Dependent Dielectric Breakdown | -                                       | -          | Completed Per Process Technology Requirements |
| HCI  | D3 | JESD60 & 28                | -           | -        | Hot Carrier Injection               | -                                       | -          | Completed Per Process Technology Requirements |
| BTI  | D4 | -                          | -           | -        | Bias Temperature Instability        | -                                       | -          | Completed Per Process Technology Requirements |
| SM   | D5 | -                          | -           | -        | Stress Migration                    | -                                       | -          | 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   | 1/3/0   | 1/3/0   | 1/3/0   | 1/3/0   |
| ESD  | E3 | AEC Q100-011               | 1           | 3        | ESD CDM                             | -                                       | 500 Volts  | 1/3/0   | 1/3/0   | 1/3/0   | 1/3/0   | 1/3/0   |
| LU   | E4 | AEC Q100-004               | 1           | 6        | Latch-Up                            | Per AEC Q100-004                        | -          | 1/3/0   | 1/6/0   | 1/6/0   | 1/6/0   | 1/6/0   |
| ED   | E5 | AEC Q100-009               | 3           | 30       | Electrical Distributions            | Cpk>1.67 Room, hot, and cold            | -          | 1/30/0  | 3/90/0  | 3/90/0  | 3/90/0  | 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

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. J and JEDEC Guidelines)

Approve Date 05-April-2024

### Product Attributes

| Attributes               |              | Qual Device: UCC5350MCQDRQ1 | Qual Device: UCC5350MCQDRQ1 | QBS Package Reference: IS06721B00R01 | QBS Process Reference: UCC2351300WY01 | QBS Package Reference: AMC22C1200R01 | QBS Product Reference: UCC5390EC00WY01 | QBS Product Reference: UCC5350MCQDRQ1 | QBS Package Reference: UCC215200DWR01 | QBS Package Reference: IS06452DWR | QBS Package, Process, Product Reference: UCC5350SB00R01 | QBS Package Reference: UCC215400DWKR01 |
|--------------------------|--------------|-----------------------------|-----------------------------|--------------------------------------|---------------------------------------|--------------------------------------|--|---------------------------------------|---------------------------------------|-----------------------------------|---|--|
| Automotive Grade Level   | Grade 1      | Grade 1                     | Grade 1                     | 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                            | -40 to 125                        | -40 to 125  | -40 to 125                             |
| Product Function         | Signal Chain | Signal Chain                | Interface                   | Power Management                     | Signal Chain                          | Interface                            | Power Management                       | Interface                             | Power Management                      | Power Management                  | Power Management  | Power Management                       |
| Wafer Fab Supplier       | RFAB, RFAB   | RFAB, RFAB                  | MH8, MH8                    | RFAB, RFAB                           | MH8, DM056                            | DP1DMS, DP1DMS                       | DP1DMS, DP1DMS                         | DP1DMS, DP1DMS, MH8                   | DP1DMS, DP1DMS, MH8                   | RFAB, RFAB                        | MH8, MH8, MH8   | MH8, MH8, MH8                          |
| Assembly Site            | TAI          | MLA                         | MLA                         | TAI                                  | MLA                                   | TAI                                  | TAI                                    | TAI                                   | MLA                                   | MLA                               | TAI   | TAI                                    |
| Package Group            | SOIC         | SOIC                        | SOIC                        | SOIC                                 | SOIC                                  | SOIC                                 | SOIC                                   | SOIC                                  | SOIC                                  | SOIC                              | SOIC  | SOIC                                   |
| Package Designator       | D            | D                           | D                           | DWY                                  | D                                     | DWY                                  | D                                      | DW                                    | DW                                    | DW                                | D   | DWY                                    |
| Pin Count                | 8            | 8                           | 8                           | 6                                    | 8                                     | 8                                    | 8                                      | 16                                    | 16                                    | 8                                 | 14  |  |

QBS: Qual By Similarity

Qual Device UCC5350MCQDRQ1 is qualified at MSL2 260C

Qual Device UCC5350MCQDRQ1 is qualified at MSL2 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: UCC5350MCQDRQ1                   | Qual Device: UCC5350MCQDRQ1                   | QBS Package Reference: IS06721B00R01          | QBS Process Reference: UCC2351300WY01         | QBS Package Reference: AMC22C1200R01          | QBS Product Reference: UCC5390EC00WY01        | QBS Product Reference: UCC5350MCQDRQ1         | QBS Package Reference: UCC215200DWR01         | QBS Package Reference: IS06452DWR             | QBS Package, Product Reference: UCC5350SB00R01 | QBS Package Reference: UCC215400DWKR01        |   |
|---|----|----------------------------------|-------------|----------|-------------------------------------|---|------------|---|---|---|---|---|---|---|---|---|--|---|---|
| <b>Test Group A - Accelerated Environment Stress Tests</b>  |    |                                  |             |          |                                     |   |            |   |   |   |   |   |   |   |   |   |  |   |   |
| PC  | A1 | JEDEC J-STD-020 JE5022-A113      | 3           | 77       | Preconditioning                     | MSL1 260C                               | -          | -   | -   | 3/0/0   | -   | -   | -   | -   | -   | -   | -  | -   |   |
| PC  | A1 | JEDEC J-STD-020 JE5022-A113      | 3           | 77       | Preconditioning                     | MSL2 260C                               | -          | -   | 1/0/0   | -   | -   | 3/0/0   | -   | -   | 3/0/0   | 1/0/0   | -  | 1/0/0   |   |
| HAST  | A2 | JEDEC JESD22-A110                | 3           | 77       | Biased HAST                         | 130C 85%RH                              | 96 Hours   | -   | -   | -   | -   | -   | -   | -   | -   | 1/77/0  | -  | 2/154/0                                       |   |
| ACU/HAST  | A3 | JEDEC JESD22-A118                | 3           | 77       | Autoclave                           | 121C/15psig                             | 96 Hours   | -   | 3/231/0                                       | -   | -   | -   | -   | -   | -   | 1/77/0  | -  | 3/231/0                                       |   |
| ACU/HAST  | A3 | 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  | -  | 2/154/0                                       |   |
| 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                       | -          | -   | 1/12/0  | -   | -   | -   | -   | -   | -   | -   | -  | -   |   |
| HTSL  | A6 | JEDEC JESD22-A103                | 1           | 45       | High Temperature Storage Life       | 150C                                    | 1000 Hours | -   | -   | -   | 3/135/0                                       | -   | -   | -   | -   | 1/45/0  | -  | 1/45/0  |   |
| HTSL  | A6 | JEDEC JESD22-A103                | 1           | 45       | High Temperature Storage Life       | 175C                                    | 500 Hours  | -   | 3/135/0                                       | -   | -   | -   | -   | -   | -   | -   | -  | -   |   |
| <b>Test Group B - Accelerated Lifetime Simulation Tests</b> |    |                                  |             |          |                                     |   |            |   |   |   |   |   |   |   |   |   |  |   |   |
| HTOL  | B1 | JEDEC JESD22-A108                | 3           | 77       | Life Test                           | 125C                                    | 1000 Hours | -   | 1/77/0  | -   | 3/231/0                                       | -   | 1/77/0  | -   | -   | -   | -  | -   | - |
| ELFR  | B2 | AEC Q100-008                     | 3           | 800      | Early Life Failure Rate             | 125C                                    | 48 Hours   | -   | -   | 3/240/0                                       | -   | -   | -   | -   | -   | -   | -  | -   |   |
| <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      | 1/30/0  | 1/30/0  | 3/228/0                                       | -   | 3/9/0   | -   | -   | -   | -   | 1/30/0   | 3/9/0   |   |
| WBP   | C2 | MIL-STD883 Method 2011           | 1           | 30       | Wire Bond Pull                      | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires      | 1/30/0  | 1/30/0  | 3/228/0                                       | -   | 3/9/0   | -   | -   | -   | -   | 1/30/0   | 3/9/0   |   |
| SD  | C3 | JEDEC J-STD-002                  | 1           | 15       | PB Solderability                    | >95% Lead Coverage                      | -          | -   | 1/15/0  | -   | 1/15/0  | -   | -   | -   | -   | -   | -  | -   |   |
| SD  | C3 | JEDEC J-STD-002                  | 1           | 15       | PB-Free Solderability               | >95% Lead Coverage                      | -          | -   | 1/15/0  | -   | 1/15/0  | -   | -   | -   | -   | -   | -  | -   |   |
| PD  | C4 | JEDEC JESD22-B100 and B108       | 3           | 10       | Physical Dimensions                 | Cpk>1.67                                | -          | 1/10/0  | 3/0/0   | -   | 3/0/0   | -   | -   | -   | -   | 1/10/0  | -  | -   |   |
| <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 |   |
| BTI   | D4 | -                                | -           | -        | 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 |   |
| <b>Test Group E - Electrical Verification Tests</b>         |    |                                  |             |          |                                     |   |            |   |   |   |   |   |   |   |   |   |  |   |   |
| ESD   | E2 | AEC Q100-002                     | 1           | 3        | ESD HBM                             | -                                       | 2000 Volts | -   | -   | -   | -   | 1/3/0   | 1/3/0   | -   | -   | 1/3/0   | -  | -   |   |
| ESD   | E3 | AEC Q100-011                     | 1           | 3        | ESD CDM                             | -                                       | 500 Volts  | -   | -   | -   | -   | 1/3/0   | 1/3/0   | -   | -   | 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           | -          | -   | -   | -   | -   | 1/30/0  | 1/30/0  | -   | -   | 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 Cycle

**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

Approve Date 18-April-2024

#### Qualification Results

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

| Type  | #  | Test Name                     | Condition                | Duration   | Qual Device: <a href="#">UCD3138064ARGCR</a> | QBS Process Reference: <a href="#">CC2541S</a> | QBS Package, Process Reference: <a href="#">BQ9000RSMR</a> | QBS Process, Product Reference: <a href="#">UCD3138064RGCR</a> |
|-------|----|-------------------------------|--------------------------|------------|--|--|--|--|
| HAST  | A2 | Biased HAST                   | 110C/85%RH               | 264 Hours  | -  | -  | 1/77/0   | -  |
| UHAST | A3 | Autoclave                     | 121C/15psig              | 96 Hours   | -  | -  | 3/231/0  | -  |
| UHAST | A3 | Unbiased HAST                 | 110C/85%RH               | 264 Hours  | 3/231/0                                      | -  | -  | -  |
| TC    | A4 | Temperature Cycle             | -65C/150C                | 500 Cycles | 3/231/0                                      | -  | 3/231/0  | -  |
| HTSL  | A6 | High Temperature Storage Life | 150C                     | 1000 Hours | 3/231/0                                      | -  | -  | -  |
| HTSL  | A6 | High Temperature Storage Life | 170C                     | 420 Hours  | -  | -  | 3/231/0  | -  |
| HTOL  | B1 | Life Test                     | 125C                     | 1000 Hours | -  | -  | -  | 1/77/0   |
| HTOL  | B1 | Life Test                     | 125C                     | 408 Hours  | -  | 3/231/0  | -  | -  |
| HTOL  | B1 | Life Test                     | 140C                     | 480 Hours  | -  | -  | 3/231/0  | -  |
| ELFR  | B2 | Early Life Failure Rate       | 125C                     | 24 Hours   | -  | 3/2399/0                                       | -  | -  |
| ESD   | E2 | ESD CDM                       | -                        | 250 Volts  | 1/3/0  | -  | -  | -  |
| ESD   | E2 | ESD HBM                       | -                        | 1000 Volts | 1/3/0  | -  | -  | -  |
| LU    | E4 | Latch-Up                      | Per JESD78               | -          | -  | -  | -  | 1/6/0  |
| CHAR  | E5 | Electrical Characterization   | Per Datasheet Parameters | -          | 1/30/0                                       | -  | -  | 1/30/0   |

QBS: Qual By Similarity

Qual Device UCD3138064ARGCR is qualified at MSL2 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, 150C/300 Hours, and 155C/240 Hours

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

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

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