

| PCN Number: | 20230830001.1 | | | PCN Date: | August 31, 2023 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-------------------------------------|---------------------|------------------|---------|--------------|--|---|---|---|---|----------------|---------------------|---------|----------------|------|------|--------|------|------|--------|
| Title: | Qualification of additional Fab Site (RFAB), Die Revision and Assembly BOM options for select devices | | | | | | | | | | | | | | | | | | | | | | |
| Customer Contact: | Change Management team | | Dept: | Quality Services | | | | | | | | | | | | | | | | | | | |
| Proposed 1st Ship Date: | Nov 30, 2023 | | Sample Requests accepted until: | Sept 30, 2023* | | | | | | | | | | | | | | | | | | | |
| *Sample requests received after Sept 30, 2023 will not be supported. | | | | | | | | | | | | | | | | | | | | | | | |
| Change Type: | | | | | | | | | | | | | | | | | | | | | | | |
| <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 checked="" type="checkbox"/> | Wafer Fab Site | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Mechanical Specification | <input type="checkbox"/> | Test Site | <input checked="" 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 RFAB as an additional wafer fab site, die revision and additional assembly BOM options for the devices listed in the "Product Affected" section. | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <thead> <tr> <th colspan="3">Current Fab Site</th> <th colspan="3">Additional Fab Site</th> </tr> <tr> <th>Current Fab Site</th> <th>Process</th> <th>Wafer Diameter</th> <th>Additional Fab Site</th> <th>Process</th> <th>Wafer Diameter</th> </tr> </thead> <tbody> <tr> <td>MIHO</td> <td>LBC8</td> <td>200 mm</td> <td>RFAB</td> <td>LBC8</td> <td>300 mm</td> </tr> </tbody> </table> | | | | | | Current Fab Site | | | Additional Fab Site | | | Current Fab Site | Process | Wafer Diameter | Additional Fab Site | Process | Wafer Diameter | MIHO | LBC8 | 200 mm | RFAB | LBC8 | 300 mm |
| Current Fab Site | | | Additional Fab Site | | | | | | | | | | | | | | | | | | | | |
| Current Fab Site | Process | Wafer Diameter | Additional Fab Site | Process | Wafer Diameter | | | | | | | | | | | | | | | | | | |
| MIHO | LBC8 | 200 mm | RFAB | LBC8 | 300 mm | | | | | | | | | | | | | | | | | | |
| The die was also changed as a result of the process change. | | | | | | | | | | | | | | | | | | | | | | | |
| Additionally, there will be a BOM options introduced for these devices: | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>Current</th> <th>Proposed</th> </tr> </thead> <tbody> <tr> <td>Bond wire diameter composition, diameter</td> <td>Au, 0.96 mil</td> <td>0.8 mil Cu</td> </tr> </tbody> </table> | | | | | | | Current | Proposed | Bond wire diameter composition, diameter | Au, 0.96 mil | 0.8 mil Cu | | | | | | | | | | | | |
| | Current | Proposed | | | | | | | | | | | | | | | | | | | | | |
| Bond wire diameter composition, diameter | Au, 0.96 mil | 0.8 mil 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. | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%;"> <thead> <tr> <th>RoHS</th> <th>REACH</th> <th>Green Status</th> <th>IEC 62474</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> </tr> </tbody> </table> | | | | | | 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 | | | | | | | | | | |
| 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: | | | | | | | | | | | | | | | | | | | | | | | |

Fab Site Information:

| Chip Site | Chip Site Origin Code (20L) | Chip Site Country Code (21L) | Chip Site City |
|-------------|--------------------------------|---------------------------------|-------------------|
| MIHO8 | MH8 | JPN | Ibaraki |
| RFAB | RFB | USA | Richardson |

Die Rev:**Current****New**

| Die Rev [2P] | Die Rev [2P] |
|--------------|--------------|
| A | A |

Sample product shipping label (not actual product label)

**Group 1 Product Affected: Fab site, Assembly BOM (C2212079)**

| | | | |
|-------------|------------|--------------|-------------|
| ISO7741BDWR | ISO7741DWR | ISO7741FBDWR | ISO7741FDWR |
|-------------|------------|--------------|-------------|

Group 2 Product Affected: Fab site, Die Rev, Assembly BOM (C2307066)

| | | | |
|-------------|--------------|-------------|-------------|
| ISO7730DWR | ISO7731DWR | ISO7740DWR | ISO7742FDWR |
| ISO7730FDWR | ISO7731FBDWR | ISO7740FDWR | |
| ISO7731BDWR | ISO7731FDWR | ISO7742DWR | |

Group 1 Qualification Data
Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
 Approve Date 20-June-2023

Product Attributes

| Attributes | Qual Device: | QBS Reference: | QBS Reference: |
|--------------------------|----------------------|-----------------------|----------------------|
| | <u>ISO7741QDWRQ1</u> | <u>UCC23513QDWYQ1</u> | <u>ISO6763QDWRQ1</u> |
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 |
| Operating Temp Range (C) | -40 to 125 | -40 to 125 | -40 to 125 |
| Product Function | Interface | Power Management | Interface |
| Wafer Fab Supplier | RFAB, RFAB | RFAB, RFAB | RFAB, RFAB |
| Assembly Site | MLA | TAI | MLA |
| Package Group | SOIC | SOIC | SOIC |
| Package Designator | DW | DWY | DW |
| Pin Count | 16 | 6 | 16 |

QBS: Qual By Similarity

Qual Device ISO7741QDWRQ1 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: ISO7741QDWRQ1 | QBS Reference: UCC23513QDWYQ1 | QBS Reference: ISO6763QDWRQ1 |
|--|----|-------------------------------------|-------------|----------|---------------------------------------|---|------------|---|---|---|
| Test Group A - Accelerated Environment Stress Tests | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Preconditioning | MSL2 260C | - | - | No Fails | No Fails |
| 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 | 3/231/0 |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle | -65C/150C | 500 Cycles | - | 3/231/0 | 3/231/0 |
| 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 | 1 | 77 | Life Test | 125C | 1000 Hours | - | 3/231/0 | - |
| ELFR | B2 | AEC Q100-008 | 1 | 77 | 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 | 3/90/0 | 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 |
| 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 | - | 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 |
| Tddb | D2 | JESD35 | - | - | Time Dependent Dielectric Breakdown | - | - | 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 |
| NBTI | D4 | - | - | - | Negative Bias Temperature Instability | - | - | 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 |
| Test Group E - Electrical Verification Tests | | | | | | | | | | |
| ESD | E2 | AEC Q100-002 | 1 | 3 | ESD HBM | - | 2000 Volts | 1/3/0 | 1/3/0 | - |
| ESD | E3 | AEC Q100-011 | 1 | 3 | ESD CDM | - | 500 Volts | 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 | 3/90/0 | 3/90/0 |

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 Data

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

Approve Date 15-August-2023

Product Attributes

| Attributes | Qual Device: ISO7742QDWRQ1 | Qual Device: ISO7740QDWRQ1 | QBS Reference: UCC23513QDWYQ1 | QBS Reference: ISO6763QDWRQ1 | QBS Reference: ISO7741QDWRQ1 |
|--------------------------|---|---|--|---|---|
| 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 | Power Management | Interface | Interface |
| Wafer Fab Supplier | RFAB, RFAB | RFAB, RFAB | RFAB, RFAB | RFAB, RFAB | RFAB, RFAB |
| Assembly Site | MLA | MLA | TAI | MLA | MLA |
| Package Group | SOIC | SOIC | SOIC | SOIC | SOIC |
| Package Designator | DW | DW | DWY | DW | DW |
| Pin Count | 16 | 16 | 6 | 16 | 16 |

QBS: Qual By Similarity

Qual Device ISO7742QDWRQ1 is qualified at MSL2 260C

Qual Device ISO7740QDWRQ1 is qualified at MSL2 260C

Qual Device ISO7730QDWRQ1 is qualified at MSL2 260C

Qual Device ISO7731QDWRQ1 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: ISO7742QDWRQ1 | Qual Device: ISO7740QDWRQ1 | QBS Reference: UCC23513QDWYQ1 | QBS Reference: ISO6763QDWRQ1 | QBS Reference: ISO7741QDWRQ1 |
|---|----|-------------------------------------|-------------|----------|-------------------------------|-------------|------------|---|---|--|---|---|
| Test Group A - Accelerated Environment Stress Tests | | | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Preconditioning | MSL2 260C | - | - | - | No Fails | No Fails | - |
| 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 | 3/231/0 | - |
| TC | A4 | JEDEC JESD22-A104 and Appendix 3 | 3 | 77 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | 3/231/0 | 3/231/0 | - |
| 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 | 1 | 77 | Life Test | 125C | 1000 Hours | - | - | 3/231/0 | - | - |
| ELFR | B2 | AEC Q100-008 | 1 | 77 | 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 | - | - | 3/90/0 | 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 | - | - | 3/90/0 | 3/90/0 | 1/30/0 |
| 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 | - | 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 |
| 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 |
| 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 |
| 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 | 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 |
| 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 |
| ESD | E3 | AEC Q100-011 | 1 | 3 | ESD CDM | - | 500 Volts | 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 | - | 1/6/0 | 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 | 1/30/0 | 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

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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/>

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