| | | | |
|---|---|---|---|
| **PCN Number:** | 20230825000.1A | **PCN Date:** | September 27, 2023 |
| **Title:** | Qualification of UMC-F12 as additional Fab site for select LBC9 devices | | |
| **Customer Contact:** | Change Management team | **Dept:** | Quality Services |
| **Proposed 1st Ship Date:** | Nov 28, 2023 | **Sample requests accepted until:** | Oct 27, 2023* |

***Sample requests received after October 27, 2023 will not be supported.**

**Change Type:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Assembly Site | ☐ | Design | ☐ | Wafer Bump Material |
| ☐ | Assembly Process | ☐ | Data Sheet | ☐ | Wafer Bump Process |
| ☐ | Assembly Materials | ☐ | Part number change | ☒ | Wafer Fab Site |
| ☐ | Mechanical Specification | ☐ | Test Site | ☐ | Wafer Fab Material |
| ☐ | Packing/Shipping/Labeling | ☐ | Test Process | ☐ | Wafer Fab Process |

## PCN Details

**Description of Change:**

**Revision A** is to announce the addition of new devices that were not included in the original PCN notification. The new devices are highlighted in yellow and **bolded** in the product affected section below. For these newly added devices ONLY, the expected first shipment date will be 90 days from the date of this notice, and sample requests will be accepted until 30 days from the date of this notice. The proposed 1st ship date of November 28, 2023 still applies for the original set of devices.

Texas Instruments is pleased to announce the qualification of an aUMC-F12 as an additional fab for the selected devices listed in the "Product Affected" section.

| Current Fab Site | | | New Fab Site | | |
|---|---|---|---|---|---|
| **Current Fab Site** | **Process** | **Wafer Diameter** | **New Fab Site** | **Process** | **Wafer Diameter** |
| RFAB | LBC9 | 300 mm | UMC-F12 | LBC9 | 300 mm |

Qual details are provided in the Qual Data Section.

**Reason for Change:**

Continuity of supply

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

None

**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 |
|---|---|---|---|
| RFAB | RFB | USA | Richardson |
| **UMC-F12** | **F12** | **TWN** | **Tainan** |

Sample product shipping label (not actual product label)

| Product Affected: | | | |
|---|---|---|---|
| BQ25300RTER | SN2101016RSMR | SN2206024YBGR | TPS51397ARJER |
| BQ25302RTER | SN2101017RSMR | SN2206025YBGR | TPS65991BFRSMR |
| BQ25303JRTER | SN2101018REFR | SN2206026YBGR | TPS65992DBFREFR |
| BQ25306RTER | SN2101020RSMR | SN2206027YBGR | TPS65992SBFRSMR |
| SN2101008RSMR | SN2101021RSMR | SN2206029YBGR | TPS65993BHYBGR |
| SN2101009RSMR | SN2101022REFR | SN2206030YBGR | TPS65994BHYBGR |
| SN2101010REFR | SN2206023YBGR | SN2206031YBGR | |

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | Qual Device: BQ25300RTER | Qual Device: BQ25302RTER | Qual Device: BQ25303JRTER | Qual Device: BQ25306RTER | QBS Package Reference: TPS61378QWRTERQ1 | QBS Package Reference: BQ25890HRTWR | QBS Process Reference: CD3253DB0YCHR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - | - |
| UHAST | A3 | Autoclave | 121C/15psig | 96 Hours | - | - | - | - | - | 3/231/0 | - |
| UHAST | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - | - |
| TC | A4 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | - | - | 3/231/0 | 3/231/0 | - |
| HTSL | A6 | High Temperature Storage Life | 175C | 500 Hours | - | - | - | - | 3/135/0 | - | - |
| HTOL | B1 | Life Test | 125C | 1000 Hours | - | - | - | - | - | - | 3/231/0 |
| ELFR | B2 | ELFR | 125C | 48 Hours | - | - | - | - | - | - | 3/3000/0 |
| SD | C3 | PB Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | - | - | - | 1/15/0 | - | - |
| SD | C3 | PB-Free Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | - | - | - | 1/15/0 | - | - |
| PD | C4 | Physical Dimensions | Cpk>1.67 | - | - | - | - | - | 3/30/0 | - | - |

| Type | # | Test Name | Condition | Duration | Qual Device: BQ25300RTER | Qual Device: BQ25302RTER | Qual Device: BQ25303JRTER | Qual Device: BQ25306RTER | QBS Package Reference: TPS61378QWRTERQ1 | QBS Package Reference: BQ25890HRTWR | QBS Process Reference: CD3253DB0YCHR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ESD | E2 | ESD CDM | - | 250 Volts | - | - | - | 1/3/0 | - | - | - |
| ESD | E2 | ESD HBM | - | 1000 Volts | - | - | - | 1/3/0 | - | - | - |
| LU | E4 | Latch-Up | Per JESD78 | - | - | - | - | 1/3/0 | - | - | - |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | - | - | - | 1/Pass | - | - | - |
| FTY | E6 | Final Test Yield | - | - | 1/Pass | 1/Pass | 1/Pass | 1/Pass | - | - | - |

- QBS: Qual By Similarity
- Qual Device BQ25300RTER is qualified at MSL2 260C
- Qual Device BQ25302RTER is qualified at MSL1 260C
- Qual Device BQ25303JRTER is qualified at MSL1 260C
- Qual Device BQ25306RTER is qualified at MSL1 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
- 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

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

TI Qualification ID: R-CHG-2212-006

## PCN Rev A Qual Results

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | Qual Device: TPS51397ARJER | QBS Process Reference: TPS51486RJER | QBS Product Reference: TPS51393PRJER | QBS Product Reference: TPS51397ARJER | QBS Product, Package, Process Reference: TPS56C230RJER |
|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 110C/85%RH | 264 Hours | - | 3/231/0 | - | - | - |
| UHAST | A3 | Autoclave | 121C/15psig | 96 Hours | - | 3/231/0 | - | - | - |
| TC | A4 | Temperature Cycle | -55C/125C | 1000 Cycles | - | - | - | - | 1/77/0 |
| TC | A4 | Temperature Cycle | -55C/125C | 700 Cycles | - | 3/231/0 | - | - | - |
| HTSL | A6 | High Temperature Storage Life | 170C | 420 Hours | - | 3/231/0 | - | - | - |
| HTOL | B1 | Life Test | 125C | 1000 Hours | - | 3/231/0 | 1/77/0 | - | 1/77/0 |
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | - | 3/2400/0 | - | - | - |
| ESD | E2 | ESD CDM | - | 1500 Volts | (1) | - | 1/3/0 | 1/3/0 | 1/3/0 |
| ESD | E2 | ESD HBM | - | 3000 Volts | (1) | - | 1/3/0 | 1/3/0 | 1/3/0 |
| LU | E4 | Latch-Up | Per JESD78 | - | (1) | 3/9/0 | 1/6/0 | 1/6/0 | 1/6/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | Pass | Pass | Pass | Pass | Pass |

- QBS: Qual By Similarity
- Qual Device TPS51397ARJER 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
- 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 Notes;

(1) TPS51397ARJE uses the same core silicon and package as TPS56C230RJE

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

TI Qualification ID: R-CHG-2303-022

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | Qual Device: TPS65992DBFREFR | Qual Device: TPS65992DBFREFR | Qual Device: TPS65991BFRSMR | Qual Device: TPS65992SBFRSMR | QBS Reference: TPS61378QWRTERQ1 | QBS Reference: PTPS65992SA0CRSMR PTPS65992ADRSMR | QBS Reference: PTPS65992DADRJKR | QBS Reference: TPS65992DADRJKR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 110C/85%RH | 264 Hours | - | - | - | - | - | 1/77/0 | 2/154/0 | - |
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - | - | - |
| UHAST | A3 | Autoclave | 121C/15psig | 96 Hours | - | - | - | - | - | 1/77/0 | 2/154/0 | - |
| UHAST | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - | - | - |
| TC | A4 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | - | - | 3/231/0 | 1/77/0 | 2/154/0 | 1/77/0 |
| HTSL | A6 | High Temperature Storage Life | 170C | 420 Hours | - | - | - | - | - | 1/77/0 | 2/154/1[1] | - |
| HTSL | A6 | High Temperature Storage Life | 175C | 500 Hours | - | - | - | - | 3/135/0 | - | - | - |
| HTOL | B1 | Life Test | 125C | 1000 Hours | - | - | - | - | - | 3/231/0 | - | 1/77/0 |
| HTOL | B1 | Life Test | 150C | 408 Hours | - | - | - | - | 3/231/0 | - | - | - |
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | - | - | - | - | 3/2400/0 | 3/2400/0 | - | - |
| SD | C3 | PB Solderability | Precondition w 155C Dry Bake (4 hrs +/- 15 minutes) | - | - | - | - | - | 1/15/0 | - | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SD | C3 | PB Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB Solder; | - | - | - | - | - | - | - | 2/44/0 | - |
| SD | C3 | PB-Free Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | - | - | - | 1/15/0 | - | - | - |
| SD | C3 | PB-Free Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder; | - | - | - | - | - | - | - | 2/44/0 | - |
| PD | C4 | Physical Dimensions | Cpk>1.67 | - | - | - | - | - | 3/30/0 | - | - | - |
| ESD | E2 | ESD CDM | - | 1000 Volts | - | - | - | - | 1/3/0 | - | - | 1/3/0 |
| ESD | E2 | ESD CDM | - | 1500 Volts | - | - | - | - | - | 1/3/0 | 1/3/0 | - |
| ESD | E2 | ESD HBM | - | 1500 Volts | - | - | - | - | - | 1/3/0 | - | - |
| ESD | E2 | ESD HBM | - | 2500 Volts | - | - | - | - | - | - | - | 1/3/0 |
| ESD | E2 | ESD HBM | - | 3000 Volts | - | - | - | - | 1/3/0 | - | - | - |
| ESD | E2 | ESD HBM | - | 4000 Volts | - | - | - | - | - | - | 1/3/0 | - |
| LU | E4 | Latch-Up | Per JESD78 | - | - | - | - | - | 1/6/0 | 1/3/0 | 1/6/0 | 1/6/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | 1/30/0 | 1/30/0 | - | 1/30/0 | - | - | - | 1/30/0 |
| CHAR | E5 | Electrical Distributions | Cpk>1.67 Room, hot, and cold | - | - | - | - | - | 3/90/0 | - | - | - |
| FTY | E6 | Final Test Yield | - | - | 1/1/0 | 1/1/0 | 1/1/0 | 1/1/0 | - | - | - | - |

- QBS: Qual By Similarity
- Qual Device TPS65992DBFREFR is qualified at MSL2 260C
- Qual Device TPS65992DBFREFR is qualified at MSL2 260C
- Qual Device TPS65991BFRSMR is qualified at MSL2 260C
- Qual Device TPS65992SBFRSMR 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
- 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

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

TI Qualification ID: R-CHG-2212-027

[1]-Lost or Damaged - Not Tested

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | QBS Process Reference: PCM6260QRTVRQ1 | QBS Process Reference: TPS51486RJER | QBS Product Reference: PTPS65994AAYBGR | QBS Product Reference: PTPS65994AAYBGR | QBS Product Reference: TPS65994ACYBGR | QBS Product Reference: TPS65994ACYBGR |
|---|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | - | 3/231/0 | 1/77/0 | 1/77/0 | 2/154/0 |
| UHAST | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | 3/231/0 | 1/77/0 | 1/77/0 | 2/154/0 |
| TC | A4 | Temperature Cycle | -55C/125C | 700 Cycles | - | - | 3/231/0 | 1/77/0 | 1/77/0 | 2/154/0 |
| HTSL | A6 | High Temperature Storage Life | 170C | 420 Hours | - | - | 3/231/0 | 1/77/0 | 1/77/0 | 2/154/0 |
| HTOL | B1 | Life Test | 125C | 1000 Hours | 3/231/0 | 3/231/0 | 1/77/0 | - | 1/77/0 | 2/154/0 |
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | 3/2400/0 | 3/2400/0 | - | - | - | - |
| PD | C4 | Physical Dimensions | (per mechanical drawing) | - | - | - | 3/15/0 | - | - | - |
| ESD | E2 | ESD CDM | - | 250 Volts | - | - | 1/3/0 | 1/3/0 | 1/3/0 | 1/3/0 |
| ESD | E2 | ESD HBM | - | 1000 Volts | - | - | 1/3/0 | 1/3/0 | 1/3/0 | 1/3/0 |
| LU | E4 | Latch-Up | Per JESD78 | - | - | - | 1/6/0 | 1/3/0 | - | 1/6/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | - | - | 1/Pass | 1/Pass | - | - |
| FTY | E6 | Final Test Yield | - | - | - | - | - | - | - | - |

- 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

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

TI Qualification ID: R-NPD-2207-096

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