| PCN Number: | 20180327002 | **PCN Date:** | March 29, 2018 |
|---|---|---|---|
| **Title:** | Qualification of Aizu as additional Wafer Fab site for BQ76PL455A-Q1 | | |
| **Customer Contact:** | PCN Manager | **Dept:** | Quality Services |
| **Proposed 1st Ship Date:** | Sept 29, 2018 | **Estimated Sample Availability:** | Date provided at sample request. |

**Change Type:**

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

## PCN Details

**Description of Change:**

Texas Instruments is pleased to announce the qualification of its AIZU Wafer fabrication facility as an additional Wafer Fab source and CLARK Probe facility as an additional Probe site for BQ76PL455A-Q1.

| Current Fab Site | Wafer Diameter | Additional Fab Site | Wafer Diameter |
|---|---|---|---|
| MAINEFAB | 200mm | AIZU | 200 mm |

| Current Probe Site | Additional Probe Site |
|---|---|
| MAINEFAB | CLARK-PR |

**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:**

**Current**

| Chip Site | Chip Site Origin (20L) | Chip Site Country Code (21L) | Chip Site City |
|---|---|---|---|
| MAINEFAB | CUA | USA | South Portland |

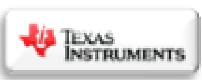
**New**

| Chip Site | Chip Site Origin (20L) | Chip Site Country Code (21L) | Chip Site City |
|---|---|---|---|
| **AIZU** | **CU2** | **JPN** | **Fukushima** |

Sample product shipping label (not actual product label)

**Product Affected Group:**

| | |
|---|---|
| BQ76PL455ATPFCRQ1 | SN700007PFCRQ1 |
| BQ76PL455ATPFCTQ1 | SN700009PFCRQ1 |
| | SN700009PFCTQ1 |



TI Information
Selective Disclosure

# Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

## BQ76PL455APFC-Q1 - Fab transfer for BQ76PL455APFC-Q1 MCM Q100 qualification in AIZU CMOS9T5V / MFAB VIP50CLZ3 , in TITL 80 pin TQFP

**Approved 14-Mar-2018**

Updated 03/15/2018-Added QBS Data

### Product Attributes

| Attributes | Qual Device: BQ76PL455APFC-Q1 | QBS Product Reference: BQ76PL455ATPFCQ1 | QBS Product Reference: BQ76PL455ATPFCQ1 | QBS Product Reference: BQ76PL455TPFC-Q1 | QBS Product Reference: BQ76PL455TPFCQ1 | QBS Product Reference: BQ76PL455TPFCQ1 | QBS Process Reference: LDC1612QDNTQ1 |
|---|---|---|---|---|---|---|---|
| Operating Temp Range | -40 to +105 C | -40 to +105 C | -40 to +105 C | -40 to +85 C | -40 to +105 C | -40 to +85 C | -40 to +125 C |
| Automotive Grade Level | Grade 2 | Grade 2 | Grade 2 | Grade 3 | Grade 2 | Grade 3 | Grade 1 |
| Product Function | - | Power Management | Power Management | - | - | - | Signal Chain |
| Wafer Fab Supplier | AIZU, MFAB | MFAB | MFAB | MFAB | MFAB | MFAB | AIZU |
| Die Revision | D3 | D3 | D2 | D | D1 | D | A |
| Assembly Site | TITL (TAI) | TITL (TAI) | TITL (TAI) | TITL (TAI) | TITL (TAI) | TITL (TAI) | TIEM-AT |
| Package Type | TQFP | TQFP | TQFP | TQFP | TQFP | TQFP | WSON |
| Package Designator | PFC | PFC | PFC | PFC | PFC | PFC | DNT |
| Ball/Lead Count | 80 | 80 | 80 | 80 | 80 | 80 | 12 |

- QBS: Qual By Similarity
- Qual Device BQ76PL455APFC-Q1 is qualified at LEVEL 2-260C
- Device BQ76PL455APFC-Q1 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: BQ76PL455APFC-Q1 | QBS Product Reference: BQ76PL455ATPFCQ1 | QBS Product Reference: BQ76PL455ATPFCQ1 | QBS Product Reference: BQ76PL455TPFC-Q1 | QBS Product Reference: BQ76PL455TPFCQ1 | QBS Product Reference: BQ76PL455TPFCQ1 | QBS Process Reference: LDC1612QDNTQ1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test Group A – Accelerated Environment Stress Tests** | | | | | | | | | | | | | |
| PC | A1 | JEDEC J-STD-020 JESD22-A113 | 3 | 77 | Automotive Preconditioning Level 3 | Level 3-260C | 1/270/0 | - | 3/810/2* | - | - | 7/725/0 | 4/770/0 |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 110C/85%RH | 264 Hours | 1/77/0 | - | 3/231/0 | - | - | - | - |
| 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 | 1/77/0 | - | 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 | 1/77/0 | - | 3/231/0 | - | - | 3/231/0 | 3/231/0 |
| TC-BP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Post Temp. Cycle, Bond Pull | Wires | 1/5/0 | - | 3/15/0 | - | - | 3/15/0 | 1/30/0 |
| 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 150C | 1000 Hours | - | - | 1/45/0 | - | - | 3/150/0 | 1/77/0 |
| **Test Group B – Accelerated Lifetime Simulation Tests** | | | | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 125C | 384 Hours | 3/231/0 | - | 3/231/1* | - | - | - | 3/231/1* |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, 125C | 408 Hours | - | - | 3/231/0 | 3/231/0 | - | 3/240/0 | - |
| ELFR | B2 | AEC Q100-008 | 3 | 800 | Early Life Failure Rate, 125C | 24 Hours | 3/2400/0 | - | 3/2400/1* | - | - | - | - |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EDR | B3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, and Operational Life | – | N/A | - | - | - | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Non-Volatile Memory - 40 C 100 Cycles High Temp. Storage Bake, 150C | 500 Hours | - | - | - | 1/77/0 | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Non-Volatile Memory -40C 100 Cycles High Temp. Storage Bake, 150C | 500 Hours | - | - | - | 2/177/0 | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Non-Volatile Memory 125C 100 Cycles High Temp. Storage Bake, 150C | 500 Hours | - | - | - | 3/288/0 | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Non-Volatile Memory -25C 100 Cycles High Temp. Storage Bake, 150C | 500 Hours | - | - | - | 1/77/0 | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Non-Volatile Memory 25C 100 Cycles High Temp. Storage Bake, 150C | 500 Hours | - | - | - | 1/77/0 | - | - | - |
| | EDR | B3 | AEC Q100-005 | 3 | 77 | Write/Erase Endurance High, Low & Normal, 125C + 150C | 100 Cycles + 1000 Hours | 3/231/0 | - | - | - | - | - | - |
| **Test Group C – Package Assembly Integrity Tests** | | | | | | | | | | | | | | |
| | WBS | C1 | AEC Q100-001 | 1 | 30 | Bond Shear (Cpk>1.33, Ppk>1.67) | Wires | 1/30/0 | - | - | - | - | - | - |
| | WBS | C1 | AEC Q100-001 | 1 | 30 | Post Temp. Cycle, Bond Bond, Shear | Wires | - | - | - | - | - | 3/15/0 | - |
| | WBS | C1 | AEC Q100-001 | 1 | 30 | Bond Shear (Cpk>1.67) | Wires | - | - | - | - | - | - | - |
| | WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Bond Pull (Cpk>1.67) | Wires | - | - | - | - | - | - | - |
| | SD | C3 | JEDEC JESD22-B102 | 1 | 15 | Surface Mount Solderability (>95% Lead Coverage) | 8 Hours Steam Age, Pb | - | - | - | - | - | - | Pass |
| | SD | C3 | JEDEC JESD22-B102 | 1 | 15 | Surface Mount Solderability (>95% Lead Coverage) | 8 Hours Steam Age, Pb-Free | - | - | - | - | - | - | Pass |
| | PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Physical Dimensions (Cpk>1.67) | – | - | - | - | - | - | - | Pass |
| | LI | C6 | JEDEC JESD22-B105 | 1 | 50 | Lead Integrity | Leads | - | - | - | - | - | - | - |
| | LI | C6 | JEDEC JESD22-B105 | 1 | 50 | Lead Pull to Destruction | Leads | 1/50/0 | - | - | - | - | - | - |
| **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 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 | ESD - HBM | 3000 V | 1/3/0 | - | - | - | - | - | - |
| | CDM | E3 | AEC Q100-011 | 1 | 3 | ESD – CDM Pin 76 | 450 V | - | 1/3/0 | 1/6/0 | 1/3/0 | 1/3/0 | - | - |
| | CDM | E3 | AEC Q100-011 | 1 | 3 | ESD – CDM All Pins but 76 | 450 V | - | - | - | - | - | 3/9/0 | - |
| | CDM | E3 | AEC Q100-011 | 1 | 3 | ESD - CDM | 750 V | 1/3/0 | - | 1/3/0 | - | - | 3/9/0 | - |
| | CDM | E3 | AEC Q100-011 | 1 | 3 | ESD - CDM | 750 V Corner Pins | - | 1/3/0 | - | 1/3/0 | 1/3/0 | - | - |
| | LU | E4 | AEC Q100-004 | 1 | 6 | Latch-up | (Per AEC Q100-004) | 2/12/0 | 1/6/0 | 2/12/0 | 1/6/0 | 1/6/0 | 3/18/0 | 3/18/0 |
| | ED | E5 | AEC Q100-009 | 3 | 30 | Electrical Distributions | Cpk>1.67 Room, Hot, & Cold | 3/30/0 | 1/10/0 | - | - | - | - | 1/10/0 |
| | ED | E5 | AEC Q100-009 | 3 | 30 | Electrical Characterization | Per Datasheet Parameters | - | - | Pass | - | Pass | Pass | - |
| **Additional Tests** | | | | | | | | | | | | | | |
| | TC-SAM | | | - | - | Post Temp. Cycle, SAM | 500 Cycles | - | - | - | - | - | 3/30/0 | - |

**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
'*FA showed EOS as fail reason.
**Fails not related to NVM qualification
*** Test escape corrective is adding a VBox tes for registers to capture failure see 8D for details.

**Green/Pb-free Status:**
Qualified Pb-Free(SMT) and Green

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

| Location | E-Mail |
|---|---|
| USA | PCNAmericasContact@list.ti.com |
| Europe | PCNEuropeContact@list.ti.com |
| Asia Pacific | PCNAsiaContact@list.ti.com |
| Japan | PCNJapanContact@list.ti.com |