

| | | | | | |
|---|--|-------------------------------------|--|-------------------------------------|-----------------------|
| PCN Number: | 20230928001.1 | | PCN Date: | September 28, 2023 | |
| Title: | Qualification of RFAB using qualified Process Technology, Die Revision and additional Assembly site/BOM options for select devices | | | | |
| Customer Contact: | Change Management Team | | Dept: | Quality Services | |
| Proposed 1st Ship Date: | Dec 29, 2023 | | Sample requests accepted until: | Oct 29, 2023* | |
| *Sample requests received after Oct 29, 2023 will not be supported. | | | | | |
| Change Type: | | | | | |
| <input checked="" type="checkbox"/> | Assembly Site | <input checked="" type="checkbox"/> | Design | <input type="checkbox"/> | Wafer Bump Material |
| <input 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 checked="" type="checkbox"/> | Wafer Fab Process |
| PCN Details | | | | | |
| Description of Change: | | | | | |
| Texas Instruments is pleased to announce the addition of RFAB using the LBC9 qualified process technology and BOM options and additional Assembly site (TI Malaysia) for select devices listed below in the product affected section. | | | | | |
| Current Fab Site | | | Additional Fab Site | | |
| Current Fab Site | Process | Wafer Diameter | Additional Fab Site | Process | Wafer Diameter |
| DMOS5 | HPA07 | 200 mm | RFAB | LBC9 | 300 mm |
| The die was also changed as a result of the process change. | | | | | |
| Construction differences are as follows: | | | | | |
| Group 1 Device: | | | | | |
| | Current | Proposed | | | |
| Wire type | 0.96mil Au | 0.8mil Cu | | | |
| Group 2 Device: | | | | | |
| | ASESH | TI Malaysia | | | |
| Mount compound | EY1000063 | 4147858 | | | |
| Mold compound | EN2000508 | 4211471 | | | |
| Lead finish | Matte Sn | NiPdAu | | | |
| Qual details are provided in the Qual Data Section. | | | | | |
| 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:

Fab Site Information:

| Chip Site | Chip Site Origin Code (20L) | Chip Site Country Code (21L) | Chip Site City |
|-------------|-----------------------------|------------------------------|-------------------|
| DMOS5 | DM5 | USA | Dallas |
| RFAB | RFB | USA | Richardson |

Die Rev:

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

Assembly Site Information:

| Assembly Site | Assembly Site Origin (22L) | Assembly Country Code (23L) | Assembly City |
|--------------------|----------------------------|-----------------------------|---------------------|
| ASESH | ASH | CHN | Shanghai |
| TI Malaysia | MLA | MYS | Kuala Lumpur |

Sample product shipping label (not actual product label)

Group 1 Product Affected: Wafer fab site, BOM

TLV6004IPWR

Group 2 Product Affected: Assembly site

| | | | |
|--------------|---------------|-------------|-------------|
| LM2902LVIPWR | MCP6294IPWT | TLV9054IPWR | TSV914AIPWT |
| LM324LVIPWR | SN1708039IPWR | TLV9064IPWR | |
| LMV324AIPWR | SN1805023IPWR | TLV9064IPWT | |
| MCP6294IPWR | TLV9004IPWR | TSV914AIPWR | |

Group 1 Qualification Report

Approve Date 13-JANUARY -2023

Qualification Results

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

| Type | # | Test Name | Condition | Duration | Qual Device: TLV9004IPWR | QBS Reference: TLV7031QDCKRQ1 | QBS Reference: SN74HCS74QPWRQ1 | QBS Reference: OPA4991QPWRQ1 | QBS Reference: TLV9004QPWRQ1 |
|-------|----|-------------------------------|---|------------|-----------------------------|----------------------------------|-----------------------------------|---------------------------------|---------------------------------|
| HAST | A2 | Biased HAST | 110C/85%RH | 264 Hours | - | - | - | 1/77/0 | - |
| HAST | A2 | Biased HAST | 110C/85%RH | 264 Hours | - | - | - | 2/154/0 | - |
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | 3/231/0 | 3/231/0 | - | 1/77/0 |
| UHAST | A3 | Autoclave | 121C/15psig | 96 Hours | - | - | 3/231/0 | 3/231/0 | 1/77/0 |
| 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 | 3/231/0 | 1/77/0 |
| HTSL | A6 | High Temperature Storage Life | 150C | 1000 Hours | - | 3/231/0 | 3/135/0 | 3/135/0 | - |
| HTOL | B1 | Life Test | 125C | 1000 Hours | - | 3/231/0 | 3/231/0 | - | - |
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | - | - | 3/2400/0 | - | - |
| SD | C3 | PB Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | 1/15/0 | 1/15/0 | - | - |
| SD | C3 | PB-Free Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | 1/15/0 | 1/15/0 | - | - |
| PD | C4 | Physical Dimensions | Cpk>1.67 | - | - | 3/30/0 | 3/30/0 | 1/10/0 | - |
| ESD | E2 | ESD CDM | - | 500 Volts | - | 1/3/0 | 1/3/0 | - | - |
| ESD | E2 | ESD HBM | - | 2000 Volts | - | 1/3/0 | 1/3/0 | - | - |
| LU | E4 | Latch-Up | Per JESD78 | - | - | 1/6/0 | 1/6/0 | 3/18/0 | 1/6/0 |
| CHAR | E5 | Electrical Distributions | Cpk>1.67 Room, hot, and cold | - | - | 3/90/0 | 3/90/0 | 3/90/0 | 3/90/0 |

QBS: Qual By Similarity

Qual Device TLV9004IPWR 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/>

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

Group 2 Qualification Report

Approve Date 26-JULY -2023

Qualification Results

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

| Type | # | Test Name | Condition | Duration | Qual Device: TLV9064IPWR | Qual Device: TLV9054IPWR | QBS Reference: SN74HCST4QPWRQ1 | QBS Reference: TLV9064QDRQ1 | QBS Reference: TLV9054IDR | QBS Reference: OPA4991QPWRQ1 |
|------|----|-------------------------------|---|------------|-----------------------------|-----------------------------|-----------------------------------|--------------------------------|------------------------------|---------------------------------|
| HAST | A2 | Biased HAST | 110C/85%RH | 264 Hours | - | - | - | - | - | 1/77/0 |
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | - | - | - | 3/231/0 | - |
| UHA | A3 | Autoclave | 121C/15psig | 96 Hours | 0/0/0 | 0/0/0 | 0/0/0 | 0/0/0 | 0/0/0 | 3/231/0 |
| UHA | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | - | 3/231/0 | 3/231/0 | - |
| TC | A4 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | - | - | 3/231/0 | 2/154/0 |
| HTSL | A6 | High Temperature Storage Life | 150C | 1000 Hours | - | - | 3/135/0 | 3/135/0 | - | 1/45/0 |
| HTSL | A6 | High Temperature Storage Life | 170C | 420 Hours | - | - | - | - | 3/231/0 | - |
| HTOL | B1 | Life Test | 125C | 1000 Hours | - | - | 3/231/0 | 3/231/0 | 1/77/0 | - |
| HTOL | B1 | Life Test | 150C | 300 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 | 1/15/0 | - | - |
| SD | C3 | PB-Free Solderability | Precondition w.155C Dry Bake (4 hrs +/- 15 minutes) | - | - | - | 1/15/0 | 1/15/0 | - | - |
| PD | C4 | Physical Dimensions | Cpk>1.67 | - | - | - | 3/30/0 | 3/30/0 | - | 1/10/0 |
| ESD | E2 | ESD CDM | - | 1500 Volts | - | - | - | - | - | 1/3/0 |
| ESD | E2 | ESD CDM | - | 250 Volts | - | - | - | - | 1/3/0 | - |
| ESD | E2 | ESD CDM | - | 500 Volts | - | - | 1/3/0 | 1/3/0 | - | - |
| ESD | E2 | ESD HBM | - | 1000 Volts | - | - | - | - | 1/3/0 | - |
| ESD | E2 | ESD HBM | - | 2000 Volts | - | - | 1/3/0 | 1/3/0 | - | - |
| ESD | E2 | ESD HBM | - | 4000 Volts | - | - | - | - | - | 1/3/0 |
| LU | E4 | Latch-Up | Per JESD78 | - | - | - | 1/6/0 | 1/6/0 | 1/6/0 | 3/18/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | - | - | - | - | 1/30/0 | - |
| CHAR | E5 | Electrical Distributions | Cpk>1.67 Room, hot, and cold | - | - | - | 3/90/0 | 3/90/0 | - | 3/90/0 |

QBS: Qual By Similarity

Qual Device TLV9064IPWR is qualified at MSL1 260C

Qual Device TLV9054IPWR 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/>

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

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