

| <b>PCN Number:</b>  | 20240320001.2A  |  |                    | <b>PCN Date:</b>         | April 16, 2024      |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
|---|---|--|--------------------|--------------------------|---------------------|--|------|---------|----------------|-----------|------------|----------------|--------|---------|---------------|--------|---------|-------------|--------|----------|------------------|--------|-----|
| <b>Title:</b>   | Qualification of TI CDAT as an additional Assembly & Test site for select devices |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Customer Contact:</b>  | Change Management team  |  | <b>Dept:</b>       | Quality Services         |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Proposed 1<sup>st</sup> Ship Date:</b>   | October 13, 2024  | <b>Sample requests accepted until:</b> |                    | May 16, 2024*            |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| *Sample requests received after May 16, 2024 will not be supported.   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Change Type:</b>   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <input checked="" 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 checked="" type="checkbox"/>    | Test Site          | <input type="checkbox"/> | Wafer Fab Material  |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <input checked="" type="checkbox"/>   | Packing/Shipping/Labeling   | <input type="checkbox"/>               | Test Process       | <input type="checkbox"/> | Wafer Fab Process   |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>PCN Details</b>  |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Description of Change:</b>   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Revision A</b> is to announce the addition of lead finish & Pin 1 ID marking change that was not included on the original PCN notification.  |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <p>Texas Instruments is pleased to announce the qualification of TI CDAT as an additional Assembly &amp; test site for the devices listed below.</p> <p>Construction differences are as follows:</p> <table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">UTAC</th> <th style="text-align: center;">TI CDAT</th> </tr> </thead> <tbody> <tr> <td>Wire diam/type</td> <td>1.0mil Au</td> <td>0.96mil Cu</td> </tr> <tr> <td>Mount compound</td> <td>PZ0068</td> <td>4229877</td> </tr> <tr> <td>Mold compound</td> <td>CZ0096</td> <td>4222198</td> </tr> <tr> <td>Lead finish</td> <td>NiPdAu</td> <td>Matte Sn</td> </tr> <tr> <td>Pin 1 ID marking</td> <td>Stripe</td> <td>Dot</td> </tr> </tbody> </table> <p>Upon expiry of this PCN, there will be a transition period where TI will combine lead free solutions in a single <u>standard part number</u>. For example; <u>LM74700QDBVRQ1</u> – can ship with both Matte Sn and NiPdAu.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>– Customer order for 7500 units of LM74700QDBVRQ1 with 2500 units SPQ (Standard Pack Quantity per Reel).</li> <li>– TI can satisfy the above order in one of the following ways. <ul style="list-style-type: none"> <li>I. 3 Reels of NiPdAu finish.</li> <li>II. 3 Reels of Matte Sn finish</li> <li>III. 2 Reels of Matte Sn and 1 reel of NiPdAu finish.</li> <li>IV. 2 Reels of NiPdAu and 1 reel of Matte Sn finish.</li> </ul> </li> </ul> <p>Qual details are provided in the Qual Data Section.</p> |   |  |                    |                          |                     |  | UTAC | TI CDAT | Wire diam/type | 1.0mil Au | 0.96mil Cu | Mount compound | PZ0068 | 4229877 | Mold compound | CZ0096 | 4222198 | Lead finish | NiPdAu | Matte Sn | Pin 1 ID marking | Stripe | Dot |
|   | UTAC  | TI CDAT                                |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Wire diam/type  | 1.0mil Au   | 0.96mil Cu                             |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Mount compound  | PZ0068  | 4229877                                |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Mold compound   | CZ0096  | 4222198                                |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Lead finish   | NiPdAu  | Matte Sn                               |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Pin 1 ID marking  | Stripe  | Dot                                    |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Reason for Change:</b>   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| Continuity of Supply  |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| 1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties<br>2) Maximize flexibility within our Assembly/Test production sites.<br>3) Cu is easier to obtain and stock   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| <b>Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):</b>   |   |  |                    |                          |                     |  |      |         |                |           |            |                |        |         |               |        |         |             |        |          |                  |        |     |
| 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 | <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:

Assembly Site

|         |                            |          |
|---------|----------------------------|----------|
| UTAC    | Assembly Site Origin (22L) | ASO: NSE |
| TI CDAT | Assembly Site Origin (22L) | ASO: CDA |

Sample product shipping label (not actual product label)



## Product Affected:

|                |                |
|----------------|----------------|
| LM74700QDBVRQ1 | LM74700QDBVTQ1 |
|----------------|----------------|

## Qualification Report

Automotive Qualification Summary  
(As per AEC-Q100 Rev. H and JEDEC Guidelines)  
Approve Date 05-March-2024

### Product Attributes

| Attributes               | Qual Device:<br><u>LM74700QDBVRQ1</u> | QBS Process, Product Reference:<br><u>LM74700QDBVRQ1</u> |
|--------------------------|---------------------------------------|--|
| Automotive Grade Level   | Grade 1                               | Grade 1  |
| Operating Temp Range (C) | -40 to 125                            | -40 to 125   |
| Product Function         | Power Management                      | Power Management   |
| Wafer Fab Supplier       | RFAB                                  | RFAB   |
| Assembly Site            | CDAT                                  | UTL2   |
| Package Group            | SOT                                   | SOT  |
| Package Designator       | DBV                                   | DBV  |
| Pin Count                | 6                                     | 6  |

QBS: Qual By Similarity

Qual Device LM74700QDBVRQ1 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:<br>LM74700QDBVRQ1 | QBS Process, Product Reference:<br>LM74700QDBVRQ1 |
|--|----|-------------------------------------|-------------|----------|-------------------------------|---|------------|--------------------------------|---|
| Test Group A - Accelerated Environment Stress Tests  |    |                                     |             |          |                               |   |            |                                |   |
| PC   | A1 | JEDEC J-STD-020 JESD22-A113         | 3           | 77       | Preconditioning               | MSL2 260C                               | -          | 0 Fails                        | 0 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   |
| AC/UHAST   | A3 | JEDEC JESD22-A102/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 | 3/231/0                        | 3/231/0   |
| TC-BP  | A4 | MIL-STD883 Method 2011              | 1           | 5        | Post Temp Cycle Bond Pull     | -                                       | -          | 1/5/0                          | 1/5/0   |
| 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  | -                              | 1/45/0  |
| Test Group B - Accelerated Lifetime Simulation Tests |    |                                     |             |          |                               |   |            |                                |   |
| HTOL   | B1 | JEDEC JESD22-A108                   | 3           | 77       | Life Test                     | 150C                                    | 300 Hours  | 1/77/0                         | 3/231/0   |
| ELFR   | B2 | AEC Q100-008                        | 3           | 800      | Early Life Failure Rate       | 150C                                    | 24 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  |

|   |    |                            |   |    |                                     |   |            |   |   |
|---|----|----------------------------|---|----|-------------------------------------|---|------------|---|---|
| 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  |
| 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                                | -          | 3/30/0  | 3/30/0  |
| <b>Test Group D - Die Fabrication Reliability Tests</b> |    |                            |   |    |                                     |   |            |   |   |
| EM  | D1 | JESD61                     | - | -  | Electromigration                    | -                                       | -          | 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 |
| 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   |
| ESD   | E3 | AEC Q100-011               | 1 | 3  | ESD CDM                             | -                                       | 500 Volts  | -   | 1/3/0   |
| LU  | E4 | AEC Q100-004               | 1 | 6  | Latch-Up                            | Per AEC Q100-004                        | -          | -   | 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  |

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-Q006 and JEDEC Guidelines)  
Approve Date 05-March-2024

### **Product Attributes**

| Attributes               | Qual Device:          |
|--------------------------|-----------------------|
|                          | <u>LM74700QDBVRQ1</u> |
| Automotive Grade Level   | Grade 1               |
| Operating Temp Range (C) | -40 to 125            |
| Product Function         | Power Management      |
| Wafer Fab Supplier       | RFAB                  |
| Assembly Site            | CDAT                  |
| Package Group            | SOT                   |
| Package Designator       | DBV                   |
| Pin Count                | 6                     |

QBS: Qual By Similarity

Qual Device LM74700QDBVRQ1 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: LM74700QDBVRQ1 |
|---|--------|----------------------------------|-------------|----------|---------------------------------------|---|-------------|-----------------------------|
| Test Group A - Accelerated Environment Stress Tests |        |                                  |             |          |                                       |   |             |                             |
| PC  | A1     | JEDEC J-STD-020 JESD22-A113      | 3           | 77       | Preconditioning                       | MSL2 260C                               | -           | 3/639/0                     |
| PC  | A1.1   | -                                | 3           | 22       | SAM Precon Pre                        | Review for delamination                 | -           | 3/66/0                      |
| PC  | A1.2   | -                                | 3           | 22       | SAM Precon Post                       | Review for delamination                 | -           | 3/66/0                      |
| HAST  | A2.1   | JEDEC JESD22-A110                | 3           | 77       | Biased HAST                           | 130C/85%RH                              | 96 Hours    | 3/231/0                     |
| HAST  | A2.1.2 | -                                | 3           | 1        | Cross Section, post bHAST, 1X         | Post stress cross section               | Completed   | 3/3/0                       |
| HAST  | A2.1.3 | -                                | 3           | 3        | Wire Bond Shear, post bHAST, 1X       | Post stress                             | -           | 3/9/0                       |
| HAST  | A2.1.4 | -                                | 3           | 3        | Bond Pull over Stitch, post bHAST, 1X | Post stress                             | -           | 3/9/0                       |
| HAST  | A2.1.5 | -                                | 3           | 3        | Bond Pull over Ball, post bHAST, 1X   | Post stress                             | -           | 3/9/0                       |
| HAST  | A2.2   | JEDEC JESD22-A110                | 3           | 70       | Biased HAST                           | 130C/85%RH                              | 192 Hours   | 3/231/0                     |
| HAST  | A2.2.1 | -                                | 3           | 22       | SAM Analysis, post bHAST 2X           | Review for delamination                 | Completed   | 3/66/0                      |
| HAST  | A2.2.2 | -                                | 3           | 1        | Cross Section, post bHAST, 2X         | Post stress cross section               | Completed   | 3/3/0                       |
| HAST  | A2.2.3 | -                                | 3           | 3        | Wire Bond Shear, post bHAST, 2X       | Post stress                             | -           | 3/9/0                       |
| HAST  | A2.2.4 | -                                | 3           | 3        | Bond Pull over Stitch, post bHAST, 2X | Post stress                             | -           | 3/9/0                       |
| HAST  | A2.2.5 | -                                | 3           | 3        | Bond Pull over Ball, post bHAST, 2X   | Post stress                             | -           | 3/9/0                       |
| TC  | A4.1   | JEDEC JESD22-A104 and Appendix 3 | 3           | 77       | Temperature Cycle                     | -65C/150C                               | 500 Cycles  | 3/231/0                     |
| TC  | A4.1.1 | -                                | 3           | 22       | SAM Analysis, post TC 1X              | Review for delamination                 | Completed   | 3/66/0                      |
| TC  | A4.1.2 | -                                | 3           | 1        | Cross Section, post TC, 1X            | Post stress cross section               | Completed   | 3/3/0                       |
| TC  | A4.1.3 | -                                | 3           | 3        | Wire Bond Shear, post TC, 1X          | Post stress                             | -           | 3/9/0                       |
| TC  | A4.1.4 | -                                | 3           | 3        | Bond Pull over Stitch, post TC, 1X    | Post stress                             | -           | 3/9/0                       |
| TC  | A4.1.5 | -                                | 3           | 3        | Bond Pull over Ball, post TC, 1X      | Post stress                             | -           | 3/9/0                       |
| TC  | A4.2   | JEDEC JESD22-A104 and Appendix 3 | 3           | 70       | Temperature Cycle                     | -65C/150C                               | 1000 Cycles | 3/231/0                     |
| TC  | A4.2.1 | -                                | 3           | 22       | SAM Analysis, post TC, 2X             | Review for delamination                 | Completed   | 3/66/0                      |
| TC  | A4.2.2 | -                                | 3           | 1        | Cross Section, post TC, 2X            | Post stress cross section               | Completed   | 3/3/0                       |
| TC  | A4.2.3 | -                                | 3           | 3        | Wire Bond Shear, post TC, 2X          | Post stress                             | -           | 3/9/0                       |
| TC  | A4.2.4 | -                                | 3           | 3        | Bond Pull over Stitch, post TC, 2X    | Post stress                             | -           | 3/9/0                       |
| TC  | A4.2.5 | -                                | 3           | 3        | Bond Pull over Ball, post TC, 2X      | Post stress                             | -           | 3/9/0                       |
| HTSL  | A6.1   | JEDEC JESD22-A103                | 3           | 45       | High Temperature Storage Life         | 150C                                    | 1000 Hours  | 3/135/0                     |
| HTSL  | A6.1.1 | -                                | 3           | 1        | Cross Section, post HTSL, 1X          | Post stress cross section               | Completed   | 3/3/0                       |
| HTSL  | A6.2   | JEDEC JESD22-A103                | 3           | 44       | High Temperature Storage Life         | 150C                                    | 2000 Hours  | 3/135/0                     |
| HTSL  | A6.2.1 | -                                | 3           | 1        | Cross Section, post HTSL, 2X          | Post stress cross section               | Completed   | 3/3/0                       |
| 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                      |
| WBP   | C2     | MIL-STD883 Method 2011           | 1           | 30       | Wire Bond Pull                        | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires       | 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

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Ambient Operating Temperature by Automotive Grade Level:

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Grade 2 (or T): -40C to +105C

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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/>

ZVEI ID reference: SEM-PA-11, SEM-PA-07, SEM-PA-08, SEM-PA-18, SEM-PA-13, SEM-PA-05, SEM-TF-01

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

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