

| <b>PCN Number:</b>   | 20170510000C  |                                       | <b>PCN Date:</b>          | Aug 24, 2017                        |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
|--|---|---------------------------------------|---------------------------|-------------------------------------|--------------------------|-----|----------|-------|---------------|------------|---------|---------------|-------------|----------|--------|----------|---------------------|--------------|--------------|---------------|------|--------|----------|----------------|------------|---------|
| <b>Title:</b>  | Qualification of Amkor and TI Clark as an additional Assembly and Test Sites and for select Devices |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>Customer Contact:</b>   | <a href="#">PCN Manager</a>   | <b>Dept:</b>                          | Quality Services          |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>Proposed 1<sup>st</sup> Ship Date:</b>  | Nov 24, 2017  | <b>Estimated Sample Availability:</b> | Provided upon Request     |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>Change Type:</b>  |   |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <input checked="" type="checkbox"/>  | Assembly Site   | <input checked="" type="checkbox"/>   | Assembly Process          | <input checked="" type="checkbox"/> | Assembly Materials       |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <input type="checkbox"/>   | Design  | <input type="checkbox"/>              | Electrical Specification  | <input type="checkbox"/>            | Mechanical Specification |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <input checked="" type="checkbox"/>  | Test Site   | <input type="checkbox"/>              | Packing/Shipping/Labeling | <input type="checkbox"/>            | Test Process             |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <input type="checkbox"/>   | Wafer Bump Site   | <input type="checkbox"/>              | Wafer Bump Material       | <input type="checkbox"/>            | Wafer Bump Process       |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <input type="checkbox"/>   | Wafer Fab Site  | <input type="checkbox"/>              | Wafer Fab Materials       | <input type="checkbox"/>            | Wafer Fab Process        |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
|  | <input type="checkbox"/>  |                                       | Part number change        |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>PCN Details</b>   |   |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>Description of Change:</b>  |   |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <p><b>Revision C</b> is to announce the addition of a new set of (Group 4) devices. The additional device group included below is in <b>bold highlight font</b>. The expected first shipment date for this new device will be 90 days from this notice.</p> <p>Texas Instruments is pleased to announce the qualification of Amkor and TI Clark as an additional Assembly and Test site for the devices listed below. Construction differences are as follows:</p> <p><b>Groups 1,2 and 3 Device:</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>What</th> <th>PSi</th> <th>TI Clark</th> <th>Amkor</th> </tr> </thead> <tbody> <tr> <td>Mold Compound</td> <td>SID#202828</td> <td>4208625</td> <td>SID#101384766</td> </tr> <tr> <td>Lead finish</td> <td>Matte Sn</td> <td>NiPdAu</td> <td>Matte Sn</td> </tr> <tr> <td>Bond Wire, Diameter</td> <td>Au, 1.0 mils</td> <td>Au, 1.0 mils</td> <td>Au, 0.96 Mils</td> </tr> </tbody> </table> <p>Upon expiry of this PCN TI will combine lead free solutions in a single <u><a href="#">standard part number</a></u>, for the <u><a href="#">CSD58888Q5D</a></u> – can ship with both Matte Sn and NiPdAu/Ag.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>– Customer order for 7500units of CSD58888Q5D 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><b>Group 4 Device:</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>What</th> <th>Carsem</th> <th>TI Clark</th> </tr> </thead> <tbody> <tr> <td>Mount Compound</td> <td>SID#436781</td> <td>4207768</td> </tr> </tbody> </table> <p>Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ.</p> |   |                                       |                           |                                     | What                     | PSi | TI Clark | Amkor | Mold Compound | SID#202828 | 4208625 | SID#101384766 | Lead finish | Matte Sn | NiPdAu | Matte Sn | Bond Wire, Diameter | Au, 1.0 mils | Au, 1.0 mils | Au, 0.96 Mils | What | Carsem | TI Clark | Mount Compound | SID#436781 | 4207768 |
| What   | PSi   | TI Clark                              | Amkor                     |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| Mold Compound  | SID#202828  | 4208625                               | SID#101384766             |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| Lead finish  | Matte Sn  | NiPdAu                                | Matte Sn                  |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| Bond Wire, Diameter  | Au, 1.0 mils  | Au, 1.0 mils                          | Au, 0.96 Mils             |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| What   | Carsem  | TI Clark                              |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| Mount Compound   | SID#436781  | 4207768                               |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| <b>Reason for Change:</b>  |   |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |
| Continuity of Supply   |   |                                       |                           |                                     |                          |     |          |       |               |            |         |               |             |          |        |          |                     |              |              |               |      |        |          |                |            |         |

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

None

**Anticipated impact on Material Declaration**

|                          |                                       |                                     |   |
|--------------------------|---------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | No Impact to the Material Declaration | <input checked="" type="checkbox"/> | Material Declarations or Product Content reports are driven from production data and will be available following the production release. Upon production release the revised reports can be obtained from the <a href="#">TI Eco-Info website</a> . There is no impact to the material meeting current regulatory compliance requirements with this PCN change. |
|--------------------------|---------------------------------------|-------------------------------------|---|

**Changes to product identification resulting from this PCN:**

| Assembly Site   | Assembly Site Origin (22L) | Assembly Country Code (21L) | Assembly City       |
|-----------------|----------------------------|-----------------------------|---------------------|
| PSI             | PAC                        | PHL                         | Taguig City         |
| Carsem          | CRS                        | MYS                         | Jelapang            |
| <b>TI Clark</b> | <b>QAB</b>                 | <b>PHL</b>                  | <b>Angeles City</b> |
| <b>Amkor</b>    | <b>AP3</b>                 | <b>PHL</b>                  | <b>Binan</b>        |

Sample product shipping label (not actual product label)

TEXAS INSTRUMENTS  
 MADE IN: Malaysia  
 2DC: 2Q:  
 MSL 2 /260C/1 YEAR SEAL DT  
 MSL 1 /235C/UNLIM 03/29/04  
 OPT:  
 ITEM: 39  
 LBL: 5A (L)T0:1750

(1P) SN74LS07NSR  
 (Q) 2000 (D) 0336  
 (31T) LOT: 3959047MLA  
 (4W) TKY (1T) 7523483SI2  
 (P)  
 (2P) REV: (V) 0033317  
 (20L) CSO: SHE (21L) CCO:USA  
 (22L) ASO: MLA (23L) ACO: MYS

**Topside Device marking (if included):**

Assembly site code for PAC= E  
 Assembly site code for CRS= W  
 Assembly site code for QAB = I  
 Assembly site code for AP3 = 3

**Product Affected****Group 1 Device list: Current AT site = PSi & Clark, Additional AT site = Amkor**

|             |             |
|-------------|-------------|
| CSD58872Q5D | CSD58873Q3D |
|-------------|-------------|

**Group 2 Device list: Current AT site= PSi, Additional AT site = Amkor**

|             |               |              |              |
|-------------|---------------|--------------|--------------|
| CSD17575Q3  | CSD18532NQ5B  | CSD19502Q5B  | SN1607042Q5B |
| CSD17575Q3T | CSD18532NQ5BT | CSD19502Q5BT |              |

**Group 3 Device list: Current AT site= PSi, Additional AT site = TI Clark**

|             |             |
|-------------|-------------|
| CSD58888Q5D | CSD58889Q3D |
|-------------|-------------|

**Group 4 Device list: Current AT site= Carsem , Additional AT site = TI Clark**

|                     |                     |
|---------------------|---------------------|
| <b>TPS65131RGER</b> | <b>TPS65131RGET</b> |
|---------------------|---------------------|

## Qualification Report

### Phase 7 Power Block Qual in Amkor P3: CSD87333Q3D, CSD87334Q3D, CSD87335Q3D Approve Date 06-February-2017

#### Product Attributes

| Attributes          | Qual Device:<br>CSD87333Q3D | Qual Device:<br>CSD87334Q3D | Qual Device:<br>CSD87335Q3D |
|---------------------|-----------------------------|-----------------------------|-----------------------------|
| Assembly Site       | AMKOR P3 A/T PHIL           | AMKOR P3 A/T PHIL           | AMKOR P3 A/T PHIL           |
| Package Family      | DQZ                         | DQZ                         | DQZ                         |
| Flammability Rating | UL 94 V-0                   | UL 94 V-0                   | UL 94 V-0                   |
| Wafer Fab Supplier  | CFAB                        | CFAB                        | CFAB                        |
| Wafer Fab Process   | NEXFET-LV 30N10             | NEXFET-LV 30N10             | NEXFET-LV 30N10             |

- QBS: Qual By Similarity
- Qual Device CSD87333Q3D is qualified at LEVEL1-260C
- Qual Device CSD87335Q3D is qualified at LEVEL1-260C
- Qual Device CSD87334Q3D is qualified at LEVEL1-260C
- Device CSD87333Q3D contains multiple dies.
- Device CSD87334Q3D contains multiple dies.
- Device CSD87335Q3D contains multiple dies.

#### Qualification Results

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

| Type | Test Name / Condition        | Duration                        | Qual Device:<br>CSD87333Q3D | Qual Device:<br>CSD87334Q3D | Qual Device:<br>CSD87335Q3D |
|------|------------------------------|---------------------------------|-----------------------------|-----------------------------|-----------------------------|
| MQ   | Manufacturability (Assembly) | (per mfg. Site specification)   | 3/1/0 - Pass                | 3/1/0 - Pass                | 3/1/0 - Pass                |
| PC   | Preconditioning              | (per the appropriate pkg level) | -                           | 3/462/0                     | 3/462/0                     |
| TC   | **T/C -40C/125C              | -40C/+125C (500,1000 Cycles)    | -                           | 3/231/0                     | 3/231/0                     |
| TC   | **T/C -55C/125C              | -55C/+125C (500,1000 Cycles)    | -                           | 3/231/0                     | 3/231/0                     |

\*\* Preconditioning was performed for Temperature Cycle as applicable

- 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



**5x6 QFN Q5D Power Block Qualification Summary**  
**NCH MOSFET – Gen 2.0 30-10**

| <b>CSD87353Q5D Qualification Test Summary</b> |  |                      |                    |                |
|---|--|----------------------|--------------------|----------------|
| <b>Stress</b>                                 | <b>Conditions</b>                      | <b>Test Duration</b> | <b>Sample Size</b> | <b>Results</b> |
| HTRB  | 150°C/80% Rated Vds                    | 1K hrs               | 3 lots x 77 units  | Pass           |
| HTGB  | 150°C/80% Rated Vgs                    | 1K hrs               | 3 lots x 77 units  | Pass           |
| THB   | 85°C/85%R.H./80% Rated Vds             | 1K hrs               | 3 lots x 77 units  | Pass           |
| Autoclave                                     | 121C/100% RH                           | 96 hrs               | 3 lots x 77 units  | Pass           |
| Intermittent Op Life                          | Delta Tj = 100°C<br>2 min on/2 min off | 10K cycles           | 3 lots x 77 units  | Pass           |
| Temp Cycle                                    | -40°C to 125°C                         | 1K cycles            | 3 lots x 77 units  | Pass           |

Pass = 0/77 x 3 lots

MSL1 preconditioning performed on devices prior to THB, Autoclave, & Temp Cycle stresses

- External Visual @ 40X
- Temp Cycle: -40°C to +60°C, 5 cycles, 10 min dwell
- Bake: 24 hours @ 125°C
- Damp Heat: 168 hours @ 85°C/85% RH (Level 1)
- 3X reflow + flux + rinse, 260°C Pb free reflow temp

Original full qualification on CSD87353Q5D was run at PSi (above table). Clark assembly site is qualified by similarity since full qualification of 3 lots on CSD87350Q5D and full qualification of 1 lot on CSD87353Q5D was performed at Clark.

| <b>CSD87353Q5D Qualification Test Summary</b> |  |                      |                    |                |
|---|--|----------------------|--------------------|----------------|
| <b>Stress</b>                                 | <b>Conditions</b>                      | <b>Test Duration</b> | <b>Sample Size</b> | <b>Results</b> |
| HTRB  | 150°C/80% Rated Vds                    | 1K hrs               | 1 lot x 77 units   | Pass           |
| HTGB  | 150°C/80% Rated Vgs                    | 1K hrs               | 1 lot x 77 units   | Pass           |
| THB   | 85°C/85%R.H./80% Rated Vds             | 1K hrs               | 1 lot x 77 units   | Pass           |
| Autoclave                                     | 121C/100% RH                           | 96 hrs               | 1 lot x 77 units   | Pass           |
| Intermittent Op Life                          | Delta Tj = 100°C<br>2 min on/2 min off | 10K cycles           | 1 lot x 77 units   | Pass           |
| Temp Cycle                                    | -40°C to 125°C                         | 1K cycles            | 1 lot x 77 units   | Pass           |

TI Information – Selective Disclosure

# Qualification Report

CSD87334Q3D/CSD58899Q3D Qual for AP3

Approve Date 06-Jul-2017

## Product Attributes

| Attributes          | Qual Device:<br>CSD58899Q3D            | Qual Device:<br>CSD87334Q3D            | QBS Product<br>Reference:<br>CSD87334Q3D | QBS Product<br>Reference:<br>CSD87334Q3D | QBS<br>Product/Package<br>Reference:<br>CSD87334Q3D |
|---------------------|--|--|--|--|---|
| Assembly Site       | AMKOR AP3                              | AMKOR AP3                              | CLARK-AT                                 | CLARK AT                                 | AMKOR AP3   |
| Package Family      | QFN/SON                                | QFN/SON                                | QFN/SON                                  | QFN/SON                                  | QFN/SON   |
| Flammability Rating | UL 94 V-0                              | UL 94 V-0                              | UL 94 V-0                                | UL 94 V-0                                | UL 94 V-0   |
| Wafer Fab Supplier  | CFAB<br>CFAB                           | CFAB<br>CFAB                           | CFAB<br>CFAB                             | CFAB<br>CFAB                             | CFAB<br>CFAB  |
| Wafer Process       | FET_NCH_LV_GEN2.1<br>FET_NCH_LV_GEN2.1 | FET_NCH_LV_GEN2.1<br>FET_NCH_LV_GEN2.1 | FET_NCH_LV_GEN2.1<br>FET_NCH_LV_GEN2.1   | FET_NCH_LV_GEN2.1<br>FET_NCH_LV_GEN2.1   | FET_NCH_LV_GEN2.1<br>FET_NCH_LV_GEN2.1              |

- QBS: Qual By Similarity
- Qual Devices qualified at LEVEL1-260C: CSD87334Q3D, CSD58899Q3D
- Devices contain multiple dies: CSD58899Q3D, CSD87334Q3D

## Qualification Results

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

| Type  | Test Name / Condition                      | Duration                 | Qual Device:<br>CSD58899Q3D | Qual Device:<br>CSD87334Q3D | QBS Product<br>Reference:<br>CSD87334Q3D | QBS Product<br>Reference:<br>CSD87334Q3D | QBS Product<br>Reference:<br>CSD87334Q3D |
|-------|--|--------------------------|-----------------------------|-----------------------------|--|--|--|
| AC    | Autoclave 121C                             | 96 Hours                 | -                           | -                           | 3/231/0                                  | -  | -  |
| ED    | Electrical Characterization                | Per Datasheet Parameters | -                           | -                           | 3/90/0                                   | -  | -  |
| CDM   | ESD - CDM                                  | 2000 V                   | -                           | -                           | 1/3/0                                    | -  | -  |
| HBM   | ESD - HBM                                  | 4000 V                   | -                           | -                           | 1/3/0                                    | -  | -  |
| HTGB  | High Temperature Gate Bias, 150C           | 1000 Hours               | -                           | -                           | 3/231/0                                  | 1/77/0                                   | -  |
| HTRB  | High Temperature Reverse Bias, 150C        | 1000 Hours               | -                           | -                           | 3/231/0                                  | 1/77/0                                   | -  |
| IOL   | Intermittent Operating Life                | 10000 Cycles             | -                           | 1/77/0                      | 3/231/0                                  | -  | -  |
| TC    | Temperature Cycle, -55/125C                | 1000 Cycles              | -                           | -                           | 3/231/0                                  | -  | 3/231/0                                  |
| THB   | Biased Temperature and Humidity, 85C/85%RH | 1000 Hours               | -                           | 1/77/0                      | 3/231/0                                  | -  | -  |
| UHAST | Unbiased HAST, 130C/85%RH                  | 96 Hours                 | -                           | 1/77/0                      | -  | -  | -  |

- 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
- 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

## Qualification Report

### CSD87331Q3D/CSD58889Q3D Qual for Clark-AT

Approve Date 06-Jul-2017

#### Product Attributes

| Attributes          | Qual Device: CSD58889Q3D               | Qual Device: CSD87331Q3D               | Qual Device: CSD87330Q3D               |
|---------------------|--|--|--|
| Assembly Site       | CLARK                                  | CLARK                                  | CLARK                                  |
| Package Family      | QFN/SON                                | QFN/SON                                | QFN/SON                                |
| Flammability Rating | UL 94 V-0                              | UL 94 V-0                              | UL 94 V-0                              |
| Wafer Fab Supplier  | CFAB<br>CFAB                           | CFAB<br>CFAB                           | CFAB<br>CFAB                           |
| Wafer Process       | FET_NCH_LV_GEN2.0<br>FET_NCH_LV_GEN2.0 | FET_NCH_LV_GEN2.0<br>FET_NCH_LV_GEN2.0 | FET_NCH_LV_GEN2.0<br>FET_NCH_LV_GEN2.0 |

- QBS: Qual By Similarity
- Qual Devices qualified at LEVEL1-260CX: CSD58889Q3D, CSD87331Q3D
- Devices contain multiple dies: CSD58889Q3D, CSD87331Q3D

#### Qualification Results

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

| Type | Test Name / Condition               | Duration                 | Qual Device:<br>CSD58889Q3D | Qual Device:<br>CSD87331Q3D | QBS Product: |
|------|-------------------------------------|--------------------------|-----------------------------|-----------------------------|--------------|
| AC   | Autoclave 121C                      | 96 Hours                 | -                           | -                           | 3/231/0      |
| ED   | Electrical Characterization         | Per Datasheet Parameters | -                           | -                           | -            |
| CDM  | ESD – CDM                           | 2000 V                   | -                           | -                           | -            |
| HBM  | ESD – HBM                           | 4000 V                   | -                           | -                           | -            |
| HTGB | High Temperature Gate Bias, 150C    | 1000 Hours               | -                           | -                           | 3/231/0      |
| HTRB | High Temperature Reverse Bias, 150C | 1000 Hours               | -                           | -                           | 3/231/0      |
| IOL  | Intermittent Operating Life         | 10000 Cycles             | -                           | 1/77/0                      | 3/231/0      |
| TC   | Temperature Cycle, -55/125C         | 700 Cycles               | -                           | 1/77/0                      | 3/231/0      |
| TC   | Temperature Cycle, -55/125C         | 1000 Cycles              | -                           | 1/77/0                      | 3/231/0      |

|       |  |             |   |        |         |
|-------|--|-------------|---|--------|---------|
| THB   | Biased Temperature and Humidity, 85C/85%RH | 1000 Cycles | - | 1/77/0 | 3/231/0 |
| UHAST | Unbiased HAST, 110C/85%RH                  | 264 Hours   | - | 1/77/0 | -       |

- 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
- 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 4 Qualification Report

**TPS65131RGE: add Clark AT as second assembly/FT site**

Approve Date 19-July-2017

### Product Attributes

| Attributes                 | Qual Device:<br>TPS65131RGER | QBS Product Reference:<br>TPS65130RGE | QBS Product Reference:<br>TPS65130RGER | QBS Package Reference:<br>ONET4291VARGPR |
|----------------------------|------------------------------|---------------------------------------|--|--|
| <b>Assembly Site</b>       | CLARK AT                     | CAR                                   | CLARK AT                               | CLARK-AT                                 |
| <b>Package Family</b>      | VQFN                         | VQFN                                  | VQFN                                   | QFN                                      |
| <b>Flammability Rating</b> | UL 94 V-0                    | UL 94 V-0                             | UL 94 V-0                              | UL 94 V-0                                |
| <b>Wafer Fab Supplier</b>  | DMOS5                        | DFAB                                  | DFAB                                   | JAZZ                                     |
| <b>Wafer Process</b>       | LBC4X                        | LBC4                                  | LBC4X                                  | RFSIGE                                   |

- QBS: Qual By Similarity

- Qual Device TPS65131RGER is qualified at LEVEL2-260CG

### Qualification Results

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

| Type | Test Name / Condition       | Duration                 | Qual Device:<br>TPS65131RGER | QBS Product Reference:<br>TPS65130RGE | QBS Product Reference:<br>TPS65130RGER | QBS Package Reference:<br>ONET4291VARGPR |
|------|-----------------------------|--------------------------|------------------------------|---------------------------------------|--|--|
| ED   | Electrical Characterization | Per Datasheet Parameters | -                            | 1/5/0                                 | -                                      | -  |
| HAST | Biased HAST, 130C/85%RH     | 96 Hours                 | -                            | -                                     | -                                      | 1/77/0                                   |
| HBM  | ESD - HBM                   | 3000V                    | -                            | 1/3/0                                 | -                                      | -  |
| CDM  | ESD - CDM                   | 1000V                    | -                            | 1/3/0                                 | -                                      | -  |
| HTOL | Life Test, 140C             | 480 Hours                | -                            | -                                     | -                                      | 1/77/0                                   |
| HTOL | Life Test, 150C 7.0V        | 300 Hours                | -                            | 1/77/0                                | -                                      | -  |
| LU   | Latch-up                    | (per JESD78)             | -                            | 1/5/0                                 | -                                      | -  |
| MQ   | Manufacturability           | (per mfg. Site           | Pass                         | Pass                                  | Pass                                   | Pass                                     |

|     |                             |                               |      |        |      |        |
|-----|-----------------------------|-------------------------------|------|--------|------|--------|
|     | (Assembly)                  | specification)                |      |        |      |        |
| MQ  | Test MQ                     | (per mfg. Site specification) | Pass | -      | -    | Pass   |
| MSL | Thermal Path Integrity      | Level 2-260C                  | -    | -      | Pass | -      |
| PD  | Physical Dimensions         | --                            | -    | -      | -    | 1/5/0  |
| TC  | Temperature Cycle, -65/150C | 500 Cycles                    | -    | -      | -    | 1/77/0 |
| TS  | Thermal Shock, -65/150C     | 1000 Cycles                   | -    | 1/77/0 | -    | -      |
| WBP | Bond Pull                   | Wires                         | -    | -      | -    | 1/76/0 |
| WBS | Bond Shear                  | Wires                         | -    | -      | -    | 1/76/0 |

- 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

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

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

| <b>Location</b> | <b>E-Mail</b>  |
|-----------------|--|
| USA             | <a href="mailto:PCNAmericasContact@list.ti.com">PCNAmericasContact@list.ti.com</a> |
| Europe          | <a href="mailto:PCNEuropeContact@list.ti.com">PCNEuropeContact@list.ti.com</a>     |
| Asia Pacific    | <a href="mailto:PCNAsiaContact@list.ti.com">PCNAsiaContact@list.ti.com</a>         |
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