12500 TI Boulevard, MS 8640, Dallas, Texas 75243

# PCN#20141203001

# Qualification of Carsem Suzhou as Additional Assembly/Test location for Select Devices in the QFN package

# Change Notification / Sample Request

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments. The details of this change are on the following pages.

We request you acknowledge receipt of this notification within **30** days of the date of this notice. Lack of acknowledgement of this notice within 30 days constitutes acceptance of the change. If you require samples or additional data to support your evaluation, please request within 30 days.

The changes discussed within this PCN will not take effect any earlier than **90** days from the date of this notification, unless customer agreement has been reached on an earlier implementation of the change. This notification period is per TI's standard process.

This notice does not change the end-of-life status of any product. Should product affected be on a previously issued product withdrawal/discontinuance notice, this notification does not extend the life of that product or change the life time buy offering/discontinuance plan.

For questions regarding this notice, contact your local Field Sales Representative or the PCN Manager (PCN_ww_admin_team@list.ti.com).

Sincerely,

PCN Team
SC Business Services
Phone: +1(214) 480-6037
Fax: +1(214) 480-6659

## PCN# 20141203001
## Attachment: 1

### Products Affected:

According to our records, there are the affected device(s) that you have purchased within the past twenty-four (24) months. Technical details of this Product Change follow on the next page(s).

| | | | |
|---|---|---|---|
| **PCN Number:** | 20141203001 | **PCN Date:** | 12/11/2014 |

| | |
|---|---|
| **Title:** | Qualification of Carsem Suzhou as Additional Assembly/Test location for Select Devices in the QFN package |

| | | | | | |
|---|---|---|---|---|---|
| **Customer Contact:** | PCN Manager | **Phone:** | +1(214)480-6037 | **Dept:** | Quality Services |

| | | | |
|---|---|---|---|
| **Proposed 1st Ship Date:** | 03/11/2015 | **Estimated Sample Availability:** | Date provided upon 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 Carsem Suzhou as an alternate Assembly and test site for the devices listed below. For the devices listed in Group 2, there are no BOM differences. Device construction differences are noted as follows for Group 1 devices:

| **What** | **TI Clark** | **Carsem** |
|---|---|---|
| Mount Compound | 4205846 | SID#435143 |

**or:**

| **What** | **TI Malaysia** | **Carsem** |
|---|---|---|
| Mount Compound | 4207768 | SID#435143 |

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ.

**Reason for Change:**

Continuity of Supply

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

None

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

| Assembly Site | | |
|---|---|---|
| TI Clark | Assembly Site Origin (22L) | ASO: QAB |
| TI Malaysia | Assembly Site Origin (22L) | ASO: MLA |
| **CARZ** | **Assembly Site Origin (22L)** | **ASO: CSZ** |

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)TO:1750
G4
(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**:
Assembly site code for QAB=I
Assembly site code for MLA=K
**Assembly site code for CSZ=F**

## Product Affected

### Group 1 Devices:

| | | | |
|---|---|---|---|
| BQ24192HRGER | BQ24726RGRT | BQ24738RGRR | TPS51427ARHBT |
| BQ24192HRGET | BQ24727RGRR | BQ24738RGRT | TPS51427RHBR |
| BQ24192RGER | BQ24727RGRT | SN0608098RHBR | TPS51427RHBT |
| BQ24192RGET | BQ24728HRGRR | SN1001021DRCR | TPS51601DRBR |
| BQ24195RGER | BQ24728HRGRT | TPS24720RGTR | TPS51601DRBT |
| BQ24195RGET | BQ24728RGRR | TPS24720RGTT | TPS53219RGTR |
| BQ24196BRGER | BQ24728RGRT | TPS40304DRCR | TPS53219RGTT |
| BQ24196BRGET | BQ24735FRGRR | TPS40304DRCT | TPS60150DRVR |
| BQ24196RGER | BQ24735FRGRT | TPS40305DRCR | TPS60150DRVT |
| BQ24196RGET | BQ24735RGRR | TPS40305DRCT | TPS61093DSKR |
| BQ24292IRGER | BQ24735RGRT | TPS51211DSCR | TPS61093DSKT |
| BQ24292IRGET | BQ24735SRGRR | TPS51211DSCT | TPS62122DRVR |
| BQ24707ARGRR | BQ24735SRGRT | TPS51212DSCR | TPS62122DRVT |
| BQ24707ARGRT | BQ24736RGRR | TPS51212DSCT | TPS63030DSKR |
| BQ24707RGRR | BQ24736RGRT | TPS51217DSCR | TPS63030DSKT |
| BQ24707RGRT | BQ24737RGRR | TPS51217DSCT | TPS63031DSKR |
| BQ24725ARGRR | BQ24737RGRT | TPS51220ARTVR | TPS63031DSKT |
| BQ24725ARGRT | BQ24738HRGRR | TPS51220ARTVT | TPS71710DRVR |
| BQ24726RGRR | BQ24738HRGRT | TPS51427ARHBR | TPS71710DRVT |

### Group 2 Devices:

| | | | |
|---|---|---|---|
| TPS51518RUKR | TPS61086DRCT | TPS63060DSCT | TPS63061DSCT |
| TPS51518RUKT | TPS63060DSCR | TPS63061DSCR | TPS65282RGER |
| TPS61086DRCR | | | |

## Group #1 Qualification Data:

**Qualification Report**

# Qualification of BQ24190RGE BQ24192 BQ24192i bq24193 bq24192s bq24196 bq24195 bq24195L BQ24295 BQ24296 BQ24250 BQ24297 in Carsem Suzhou , built with RFAB/LBC7

Approved 10/16/2014

## *Product Attributes*

| Attributes | Qual Device: BQ24190RGE | QBS Product: BQ24190RGE |
|---|---|---|
| **Qual ID** | 20140225-102305 | 20120717-62441 |
| **Assembly Site** | CARSEM SUZHOU | TI-CLARK |
| **Package Family** | QFN | QFN |
| **Flammability Rating** | UL 94 V-0 | UL 94 V-0 |
| **Wafer Fab Site** | RFAB | RFAB |
| **Wafer Fab Process** | LBC7+1UM VIATOP+6DU SEAL | LBC7+1UM VIATOP+6DU SEAL |

- QBS: Qual By Similarity
- Qual Device BQ24190RGE is qualified at LEVEL2-260C

## *Qualification Results*

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

| Type | Test Name / Condition | Duration | Qual Device: BQ24190RGE | QBS Product: BQ24190RGE |
|---|---|---|---|---|
| PC | PreCon Level 2 | Elec/25C | 1/154/0 | - |
| AC | Autoclave 121C | 96 Hours | 1/77/0 | - |
| TC | Temperature Cycle, -65/150C | 500 Cycles | 1/77/0 | - |
| WBS | Bond Shear | Bond/Ball | 1/5/0 | - |
| WBP | Bond Pull | Bond/Pull | 1/5/0 | - |
| HBM | ESD - HBM | 4000V* | 1/3/0 | - |
| CDM | ESD - CDM | 1500V* | 1/3/0 | - |
| ED | Electrical Characterization | Full Temp & Voltage range | - | 1/Pass |

- 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**

# CARSEM SZ 200MM 300MM Cu Wire On LBC7 Thin Al-Pad

Approved 09/16/2014

*Cu-wirebond on LBC7 (Thin AlPad)*
*Thin Alpad assembly for both 200 and 300mm*
*Includes Au and Cu-wirebond devices*
*No-COL devices*
*No Downbonds*

## *Product Attributes*

| Attributes | Qual Device: TPS51217DSCR | Qual Device: TPS51220RHBR | Qual Device: TPS720105DRVR | Package Qual Device: TPS53211RGTR |
|---|---|---|---|---|
| **Assembly Site** | CARSEM SUZHOU | CARSEM SUZHOU | CARSEM SUZHOU | CARSEM SUZHOU |
| **Package Family** | WSON | VQFN | WSON | VQFN |
| **Flammability Rating** | - | - | UL 94 V-0 | |
| **Wafer Fab Site** | RFAB | RFAB | FR-BIP-1 | MIHO8 |
| **Wafer Fab Process** | LBC7 | LBC7X3 | LBC7X3 | LBC7 |

*- QBS: Qual By Similarity*
*- Qual Devices qualified at LEVEL2-260C: TPS51217DSCR, TPS51220RHBR*
*- Qual Device TPS720105DRVR is qualified at LEVEL1-260C*

## *Qualification Results*

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

| Type | Test Name / Condition | Duration | Qual Device: TPS51217DSCR | Qual Device: TPS51220RHBR | Qual Device: TPS720105DRVR | Package Qual Device: TPS53211RGTR |
|---|---|---|---|---|---|---|
| PC | Preconditioning | Level 2-260C | 6/1155/0 | 1/100/0 | - | - |
| HAST | Biased HAST, 130C/85%RH | 96 Hours | - | 1/77/0 | - | 3/230/0 |
| AC | Autoclave 121C | 96 Hours | 3/231/0 | - | - | 3/231/0 |
| TC | Temperature Cycle -65C/150C | 500 Cycles | 3/231/0 | - | - | 3/231/0 |
| HTSL | High Temp. Storage Bake, 170C | 420 Hours | 3/231/0 | - | - | 3/231/0 |
| HTOL | Life Test, 150C | 300 Hours | 3/231/0 | - | - | - |
| CDM | ESD - CDM | 500 Hours | - | - | 1/3/0 | - |
| ED | Electrical Characterization | Per Datasheet Parameters | - | - | Pass | - |
| DPA | Destructive Physical Analysis | x-section and deprocess to examine assembly robustness, particularly BG, die-saw and wirebond | 3/6/0 | - | - | - |
| MQ | Manufacturability (Assembly) | (per mfg. Site specification) | Pass | Pass | Pass | Pass |
| MSL | Thermal Path Integrity | Level 2-260C | 3/36/0 | - | - | 1/12/0 |
| YLD | FTY and Bin Summary | Compare against baseline | 3/-/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 #2 Qualification Data:

### Qualification Data #1: Approved January 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: SN1010017RSAR2 (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 16-RSA, VQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 2.0 Mil Dia., Cu |

**Qualification: ☐ Plan ☒ Test Results**

| Reliability Test | Conditions | Sample Size / Fail | | |
|---|---|---|---|---|
| | | Lot 1 | Lot 2 | Lot 3 |
| Electrical Characterization | Per Datasheet | Pass | -- | -- |
| **High Temp. Storage Bake | 170C (420 Hrs) | 77/0 | 77/0 | 77/0 |
| **Autoclave 121C | 121C, 2 atm (96 Hrs) | 77/0 | 77/0 | 77/0 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 77/0 | 77/0 | 77/0 |

Notes: **Tests require preconditioning sequence: MSL2-260C

### Qualification Data #2: Approved January 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: TPS51123RGER (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 24-RGE, VQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 0.96 Mil Dia., Cu |

**Qualification: ☐ Plan ☒ Test Results**

| Reliability Test | Conditions | Sample Size / Fail | | |
|---|---|---|---|---|
| | | Lot 1 | Lot 2 | Lot 3 |
| Electrical Characterization | Per Datasheet | Pass | -- | -- |
| ** High Temp Operating Life | 125C (168, 500, 1000Hrs) | 38/0 | 38/0 | 38/0 |
| **High Temp. Storage Bake | 170C (420 Hrs) | 77/0 | 77/0 | 77/0 |
| **Autoclave 121C | 121C, 2 atm (96 Hrs) | 77/0 | 77/0 | 77/0 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 77/0 | 77/0 | 77/0 |

Notes: **Tests require preconditioning sequence: MSL2-260C

## Qualification Data #3: Approved January 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: TPS650240RHBR (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 32-RHB, VQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 1.3 Mil Dia., Cu |

**Qualification:** ☐ **Plan** ☒ **Test Results**

| Reliability Test | Conditions | Sample Size / Fail | | |
|---|---|---|---|---|
| | | Lot 1 | Lot 2 | Lot 3 |
| **High Temp. Storage Bake | 170C (420 Hrs) | 77/0 | 77/0 | 77/0 |
| **Autoclave 121C | 121C, 2 atm (96 Hrs) | 77/0 | 77/0 | 77/0 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 77/0 | 77/0 | 77/0 |

Notes: **Tests require preconditioning sequence: MSL2-260C

## Qualification Data #4: Approved September 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: TPA3117D2RHBR (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 32-RHB, VQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 1.3 Mil Dia., Cu |

**Qualification:** ☐ **Plan** ☒ **Test Results**

| Reliability Test | Conditions | Sample Size / Fail | | |
|---|---|---|---|---|
| | | Lot 1 | Lot 2 | Lot 3 |
| Electrical Characterization | Per Datasheet | Pass | Pass | Pass |
| **High Temp. Storage Bake | 170C (420 Hrs) | 77/0 | 77/0 | 77/0 |
| **Biased HAST | 130C/85%RH (96 Hrs) | 77/0 | 77/0 | 77/0 |
| **Autoclave 121C | 121C, 2 atm (96 Hrs) | 77/0 | 77/0 | 77/0 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 77/0 | 77/0 | 77/0 |
| ESD CDM | +/- 250V | 3/0 | 3/0 | 3/0 |

Notes: **Tests require preconditioning sequence: MSL2-260C

## Qualification Data #5: Approved September 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: TPA6132A2RTER (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 16-RTE, WQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 0.96 Mil Dia., Cu |

**Qualification:** ☐ **Plan** ☒ **Test Results**

| Reliability Test | Conditions | Sample Size / Fail |
|---|---|---|
| **Autoclave 121C | 121C, 2 atm (96 Hrs) | 0/77 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 0/77 |

Notes: **Tests require preconditioning sequence: MSL2-260C

## Qualification Data #6: Approved September 2013

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

**Qualification Device: TPS2540RTER (MSL 2-260C)**

**Package Construction Details**

| | | | |
|---|---|---|---|
| Assembly Site: | CARZ | Mold Compound: | SID#441086 |
| # Pins-Designator, Family: | 16-RTE, WQFN | Mount Compound: | SID#435143 |
| Lead Finish: | NiPdAu | Bond Wire: | 1.98 Mil Dia., Cu |

**Qualification:** ☐ **Plan** ☒ **Test Results**

| Reliability Test | Conditions | Sample Size / Fail | | |
|---|---|---|---|---|
| | | Lot 1 | Lot 2 | Lot 3 |
| High Temp Operating Life | 125C (168 Hrs) | 77/0 | 77/0 | 77/0 |
| **T/C -65C/150C | -65C/+150C (500 Cyc) | 77/0 | -- | -- |

Notes: **Tests require preconditioning sequence: MSL2-260C

For questions regarding this notice, e-mails can be sent to the regional contacts shown below or 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 |