

PCN# 20170417000 Qualification of TI Chengdu (CDAT) as an additional Assembly & Test site for select devices Change Notification / Sample Request

Date: April 18, 2017 To: TOKYO ELECTRON DEVICE (DSTR) PCN

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 (<u>PCN_ww_admin_team@list.ti.com</u>).

Sincerely,

PCN Team SC Business Services

Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, these are the devices that you have purchased within the past twenty-four (24) months. The corresponding customer part number is also listed, if available.

| DEVICE | CUSTOMER PART NUMBER |
|---------------|----------------------|
| BQ24074RGTT | null |
| BQ24230RGTT | null |
| BQ24079TRGTR | null |
| BQ24074RGTR | null |
| BQ24230RGTR | null |
| TPS7A8300RGWR | null |
| TPS7A8300RGWT | null |
| OPA2314AIDRBR | null |
| TPS61088RHLR | null |
| TPS61088RHLT | null |
| DRV401AIRGWR | null |
| BQ24079TRGTT | null |
| DRV8837DSGT | null |
| DRV8838DSGR | null |
| DRV8838DSGT | null |
| DRV8837DSGR | null |
| BQ24075RGTR | null |
| BQ24072RGTR | null |
| BQ24072TRGTR | null |

Technical details of this Product Change follow on the next page(s).

| PCN Nun | nber: | 20 | 0170417 | 000 | | | | | PCN Date: | Apr 18, 2017 |
|-----------------------------------|-----------------------|-----------------|----------|-------------|------|-----------------------|------------------|----------|-----------------------|--------------|
| Title: | Qualification devices | of ⁻ | TI Cheng | du (| CDAT |) as an ad | ditional Ass | emt | oly & Test sit | e for select |
| Custome | er Contact: | PC | N Manage | <u>r</u> | Dep | t: | Quality Se | rvic | es | |
| Proposed 1 st Ship Dat | | e: | July 18, | , 20 | 17 | Estimate Availabil | d Sample ity: | Da re | ate Provided quest | at Sample |
| Change 1 | Гуре: | | | | | | | | | |
| | embly Site | | | | Desi | ign | | | Wafer Bum | p Site |
| Asse | embly Process | | | | Data | a Sheet | | | Wafer Bum | p Material |
| | embly Materials | 5 | | | Part | number cl | nange | | Wafer Bum | p Process |
| Mec | hanical Specific | catio | on | \boxtimes | Test | : Site | | | Wafer Fab | Site |
| Packing/Shipping/L | | | eling | | Test | Process | | | Wafer Fab | Materials |
| | | | | | | | | | Wafer Fab | Process |
| | PCN Details | | | | | | | | | |

Description of Change:

Texas Instruments Incorporated is announcing the qualification TI Chengdu (CDAT) as Additional Assembly and Test Site for select devices listed in the "Product Affected" Section. Current assembly sites and Material differences are as follows.

| Assembly Site | Assembly Site Origin | Assembly Country Code | Assembly Site City |
|---------------|----------------------|-----------------------|------------------------|
| TI Clark | QAB | PHL | Angeles City, Pampanga |
| TI Malaysia | MLA | MYS | Kuala Lumpur |
| TI Chengdu | CDA | CHN | Chengdu |

Material Differences:

| | TI Clark | TI Malaysia | TI Chengdu |
|----------------|----------|-------------|------------|
| Mount compound | 4207768 | 4205846 | 4207123 |
| Mold compound | 4208625 | 4208625 | 4222198 |

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

Reason for Change:

Continuity of supply.

Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative): None

Anticipated impact on Material Declaration

No Impact to the Material Declaration 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 <u>TI Eco-Info website</u>. 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 | | |
|---------------|----------------------------|----------|
| TI-CLARK | Assembly Site Origin (22L) | ASO: QAB |
| TI Malaysia | Assembly Site Origin (22L) | ASO: MLA |
| TI Chengdu | Assembly Site Origin (22L) | ASO: CDA |

| Sample product shippi TEXAS INSTRUMENTS MADE IN: Malaysia 2DC: 20: MSL '2 /260C/1 YEAR MSL 1 /235C/UNLIM OPT: ITEM: LBL: 5A (L)TO: ASSEMBLY SITE CODES | ing label (not actual pr G4 EAL DT 3/29/04 39 1750 5: QAB = I , MLA = K, C | oduct label) (1P) SN74LS07N (Q) 2000 (1 (31T) LOT: 39590 (4W) TKY (1T) 75 (P) (2P) REV: (V) (20L) CS0: SHE (211 (22L) AS0: MLA (231) CDA =8 | SR 047MLA 23483512 0033317 L) CCO:USA L) ACO: MYS |
|--|--|--|--|
| Product Affected: Gro | oup 1 | | |
| BQ24072RGTR | BQ24074RGTR | BQ24230RGTR | TPS65262-2RHBR |
| BQ24072RGTT | BQ24074RGTT | BQ24230RGTT | TPS65262-2RHBT |
| BQ24072TRGTR | BQ24075RGTR | BQ24232HARGTR | TPS7A8300RGWR |
| BQ24072TRGTT | BQ24075RGTT | BQ24232HARGTT | TPS7A8300RGWT |
| BQ24073RGTR | BQ24079TRGTR | SN1501005RHBR | |
| BQ24073RGTT | BQ24079TRGTT | SN1501005RHBT | |
| Product Affected: Gro | oup 2 | | |
| BQ24259RGER | BQ29209DRBT | DRV8837DSGT | SN10548DPUR |
| BQ24259RGET | BQ76925RGER | DRV8837LDSGR | SN1409049DPUR |
| BQ27411DRZR-G1D | BQ76925RGET | DRV8838DSGR | SN1509006RHLR |
| BQ29200DRBR | DRV401AIRGWR | DRV8838DSGT | SN1509006RHLT |
| BQ29200DRBT | DRV401AIRGWT | OPA2314AIDRBR | TPS61088RHLR |
| BQ29209DRBR | DRV8837DSGR | OPA2314AIDRBT | TPS61088RHLT |

Group 1: Qualification Report

Chengdu A/T Enterprise Qualification of VQFN/VSON 3x3, 4x4, 5x5 packages Approve Date 17-Apr-2015

Product Attributes

| Attributes | Qual Device: BQ24196RGER | Qual Device: TPS40192DRCR | Qual Device: TPS51200DRCR | Qual Device: TPS51622RSMR | Qual Device: TPS62140RGTR | Qual Device: TPS65262RHBR | Qual Device: TPS7A8001DRBR |
|------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| Assembly Site | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T |
| Package Family | VQFN | VSON | VSON | VQFN | VQFN | VQFN | VSON |
| Flammability Rating | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 |
| Wafer Fab Site | RFAB | DFAB 200MM | RFAB | RFAB | MIHO8 | RFAB | RFAB |
| Wafer Fab Process | LBC7 | LBC4 | LBC7 | LBC7 | LBC7 | LBC7 | LBC7 |

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260CG: BQ24196RGER, TPS40192DRCR, TPS51200DRCR, TPS51622RSMR,

TPS62140RGTR, TPS65262RHBR, TPS7A8001DRBR

Qualification Results

| | Data Displayed as: Number of lots / Total sample size / Total failed | | | | | | | | | |
|----------|--|---|---------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|--|
| Typ e | Test Name / Condition | Duration | Qual Device: BQ24196RG ER | Qual Device: TPS40192DR CR | Qual Device: TPS51200DR CR | Qual Device: TPS51622RS MR | Qual Device: TPS62140RG TR | Qual Device: TPS65262RH BR | Qual Device: TPS7A8001DR BR | |
| HAST | Biased HAST, 110C/85%RH | 264 Hours | - | - | - | - | 3/230/0 | - | - | |
| AC | Autoclave 121C | 96 Hours | 3/231/0 | - | 3/231/0 | 3/230/0 | 3/231/0 | - | 3/231/0 | |
| тс | Temperature Cycle, - 65/150C | 500 Cycles | 3/231/0 | - | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | |
| HTSL | High Temp Storage Bake 170C | 420 Hours | 3/231/0 | - | 3/231/0 | 3/231/0 | 3/231/0 | - | 3/231/0 | |
| WBS | Ball Bond Shear | Wires | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | |
| WBP | Bond Pull | Wires | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | |
| SD | Solderability | Pb Free | 3/66/0 | - | - | - | 3/66/0 | 3/66/0 | - | |
| PD | Physical Dimensions | (per mechanical drawing) | 3/15/0 | 3/15/0 | 3/15/0 | 3/15/0 | 3/15/0 | 3/15/0 | 3/15/0 | |
| ED | Electrical Characterizati on, side by side | Per Datasheet Parameter s | Pass | Pass | Pass | Pass | Pass | Pass | Pass | |
| MEC H | Visual / Mechanical | (per mfg. Site specificatio n) | 3/984/0 | 3/984/0 | 3/984/0 | 3/984/0 | 3/984/0 | 3/984/0 | 3/984/0 | |
| MQ | Manufacturabil ity (Assembly) | (per mfg. Site specificatio n) | Pass | Pass | Pass | Pass | Pass | Pass | Pass | |
| MSL | Thermal Path Integrity | Level 2- 260C | 3/36/0 | - | - | - | 3/36/0 | - | - | |
| VM | Visual Quality Reliability Inspection | Post HAST | - | - | - | - | 3/6/0 | - | - | |
| VM | Visual Quality Reliability Inspection | Post Autoclave | 3/6/0 | - | 3/6/0 | 3/6/0 | 3/6/0 | - | 3/6/0 | |
| VM | Visual Quality Reliability Inspection | Post Temp Cycle | 3/6/0 | - | 3/6/0 | 3/6/0 | 3/6/0 | 3/6/0 | 3/6/0 | |

- 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 TPS7A8300RGW CDAT secondary site qual

Approve Date 24-Mar-2017

Product Attributes

| Attributes | Qual Device: TP S7A8300RGWR | QBS Product Reference: TP S7A8300RGR | QBS Product Reference: TPS7A8300RGW | QBS Product Reference: TP S7A8300RGW | QBS Process Reference: TL S2602DCA (CARDINAL) | QBS Process Reference: TPA6140A2YFF | QBS Process Reference: TPIC2020RTQ |
|---------------------|--------------------------------|--|---|--|--|---|--|
| Assembly Site | CHENGDU A/T | CLARK AT | CLARK AT | CLARK AT | TAI | CLARK-AT | CLARK-AT |
| Package Family | QFN 5 x 5 MM | QFN | QFN | QFN | HTSSOP | DSBGA | VQFN |
| Flammability Rating | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 |
| Wafer Fab Supplier | RFAB | RFAB | RFAB | RFAB | RFAB | RFAB | RFAB |
| Wafer Process | LBC7 | LBC7X (DCU) | LBC7X (DCU) | LBC7X (DCU) | LBC7 | LBC7 | LBC7 |

- QBS: Qual By Similarity
- Qual Device TPS7A8300RGWR is qualified at LEVEL2-260CG

| Attributes | QBS Process Reference: TP S62620YFF | QBS Process Reference: TP S65170RHD (DANGERMOUSE) | QBS Process Reference: TP S65830YFF (JET) | QBS Package Reference: BQ24196RGER | QBS Package Reference: TP S62140RGTR | QBS Package Reference: TRS3122ERGER |
|---------------------|---|--|---|--|--|---|
| Assembly Site | CLARK-AT | CLARK-AT | CLARK-AT | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T |
| Package Family | DSBGA - 0.625 thick | QFN | DSBGA | VQFN | VQFN | VQFN |
| Flammability Rating | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 |
| Wafer Fab Supplier | RFAB | RFAB | RFAB | RFAB | MIHO8 | RFAB |
| Wafer Process | LBC7 | LBC7 | LBC7 | LBC7 | LBC7 | LBC7 |

- QBS: Qual By Similarity - Qual Device TPS7A8300RGWR is qualified at LEVEL2-260CG

Qualification Results

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

| Туре | Test Name / Condition | Duration | Qual Device: TP \$7A8300RGWR | QBS Product Reference: TP S7A8300RGR | QBS Product Reference: TP S7A8300RGW | QBS Product Reference: TP S7A8300RGW | QBS Process Reference: TLS2602DCA (CARDINAL) |
|-------|----------------------------------|-----------------------------|---------------------------------|--|--|--|---|
| AC | Autoclave 121C | 96 Hours | - | - | - | - | 1/77/0 |
| ED | Electrical Characterization | Per Datasheet Parameters | - | 1/30/0 | 1/30/0 | 1/30/0 | - |
| EDR | EEPROM Data Retention, 170C | 420 Hours | - | 1/77/0 | 1/77/0 | 1/77/0 | - |
| FLAM | Flammability (IEC 695-2-2) | - | - | - | - | - | - |
| FLAM | Flammability (UL 94V-0) | - | - | - | - | - | - |
| FLAM | Flammability (UL-1694) | - | - | - | - | - | - |
| HAST | Biased HAST, 110C/85%RH | 264 Hours | - | - | - | - | - |
| HAST | Biased HAST, 130C/85%RH | 96 Hours | 1/77/0 | - | 1/77/0 | - | - |
| HBM | ESD-HBM | 2500 V | - | 1/9/0 | 1/9/0 | 1/9/0 | - |
| CDM | ESD-CDM | 1000V | 2/6/0 | 1/3/0 | 1/3/0 | 1/3/0 | - |
| HTOL | Life Test, 140C | 480 Hours | - | - | - | - | - |
| HTOL | Life Test, 125C | 1000 Hours | - | - | - | - | 3/231/0 |
| HTOL | Life Test, 150C | 300 Hours | - | 1/77/0 | 1/77/0 | 1/77/0 | - |
| HTSL | High Temp. Storage Bake, 150C | 1000 Hours | - | - | - | - | - |
| HTSL | High Temp. Storage Bake, 170C | 420 Hours | 1/77/0 | 1/77/0 | 1/77/0 | 1/77/0 | - |
| LU | Latch-up | (per JESD78) | - | 1/6/0 | 1/6/0 | 1/6/0 | 3/18/0 |
| PD | Physical Dimensions | - | 1/30/0 | - | - | - | - |
| SD | Surface Mount Solderability | Pb Free | 1/22/0 | - | - | - | - |
| TC | Temperature Cycle, -55/125C | 700 Cycles | - | - | - | - | - |
| TC | Temperature Cycle, -65/150C | 500 Cycles | 3/231/0 | 1/77/0 | 1/77/0 | 1/77/0 | 1/77/0 |
| TS | Thermal Shock, -65/150C | 500 Cycles | - | - | - | - | - |
| UHAST | Unbiased HAST, 130C/85%RH | 96 Hours | 1/77/0 | - | - | - | - |
| WBP | Bond Pull | Wires | 1/228/0 | - | - | - | - |
| WBS | Ball Bond Shear | Wires | 1/228/0 | - | - | - | - |

| Туре | Test Name / Condition | Duration | QBS Process Reference: TPA6140A2YFF | QBS Process Reference: TPIC2020RTQ | QBS Process Reference: TP S62620YFF | QBS Process Reference: TP S65170RHD (DANGERMOUSE) |
|-------|----------------------------------|-----------------------------|---|--|---|--|
| AC | Autoclave 121C | 96 Hours | - | 1/77/0 | - | 3/231/0 |
| ED | Electrical Characterization | Per Datasheet Parameters | - | - | - | - |
| EDR | EEPROM Data Retention, 170C | 420 Hours | - | - | - | - |
| FLAM | Flammability (IEC 695-2-2) | - | - | - | - | - |
| FLAM | Flammability (UL 94V-0) | - | - | - | - | - |
| FLAM | Flammability (UL-1694) | - | - | - | - | - |
| HAST | Biased HAST, 110C/85%RH | 264 Hours | - | - | - | - |
| HAST | Biased HAST, 130C/85%RH | 96 Hours | - | 1/77/0 | - | - |
| HBM | ESD-HBM | 2500 V | - | - | - | - |
| CDM | ESD-CDM | 1000V | - | - | - | - |
| HTOL | Life Test, 140C | 480 Hours | 3/231/0 | - | - | - |
| HTOL | Life Test, 125C | 1000 Hours | - | 3/231/0 | - | - |
| HTOL | Life Test, 150C | 300 Hours | - | - | - | - |
| HTSL | High Temp. Storage Bake, 150C | 1000 Hours | - | 1/77/0 | - | - |
| HTSL | High Temp. Storage Bake, 170C | 420 Hours | - | - | - | - |
| LU | Latch-up | (per JESD78) | 3/18/0 | 3/18/0 | 3/18/0 | - |
| PD | Physical Dimensions | - | - | - | - | - |
| SD | Surface Mount Solderability | Pb Free | - | - | - | - |
| TC | Temperature Cycle, -55/125C | 700 Cycles | 3/231/0 | - | 3/231/0 | - |
| TC | Temperature Cycle, -65/150C | 500 Cycles | - | 3/231/0 | - | 3/231/0 |
| TS | Thermal Shock, -65/150C | 500 Cycles | - | - | - | 3/231/0 |
| UHAST | Unbiased HAST, 130C/85%RH | 96 Hours | 3/231/0 | - | 3/231/0 | - |
| WBP | Bond Pull | Wires | - | - | - | - |
| WBS | Ball Bond Shear | Wires | - | - | - | - |

| | | | QBS Process | QBS Package | QBS Package | QBS Package |
|-------|----------------------------------|---------------|-------------------|-------------|---------------|---------------|
| Туре | Test Name / Condition | Duration | Reference: | Reference: | Reference: | Reference: |
| | | | TPS65830YFF (JET) | BQ24196RGER | TP S62140RGTR | TR\$3122ERGER |
| AC | Autoclave 121C | 96 Hours | - | 3/231/0 | 3/231/0 | 3/231/0 |
| ED | Electrical Characterization | Per Datasheet | - | 1/30/0 | 1/30/0 | 1/30/0 |
| | | Parameters | | | | |
| EDR | EEPROM Data Retention, 170C | 420 Hours | - | - | - | - |
| FLAM | Flammability (IEC 695-2-2) | - | - | - | - | 3/15/0 |
| FLAM | Flammability (UL 94V-0) | - | - | - | - | 3/15/0 |
| FLAM | Flammability (UL-1694) | - | - | - | - | 3/15/0 |
| HAST | Biased HAST, 110C/85%RH | 264 Hours | - | - | 3/231/0 | - |
| HAST | Biased HAST, 130C/85%RH | 96 Hours | - | - | - | 3/231/0 |
| HBM | ESD-HBM | 2500 V | - | - | - | - |
| CDM | ESD-CDM | 1000V | - | - | - | - |
| HTOL | Life Test, 140C | 480 Hours | - | - | - | - |
| HTOL | Life Test, 125C | 1000 Hours | - | - | - | - |
| HTOL | Life Test, 150C | 300 Hours | 3/231/0 | - | - | 1/77/0 |
| HTSL | High Temp. Storage Bake, 150C | 1000 Hours | - | - | - | 3/231/0 |
| HTSL | High Temp. Storage Bake, 170C | 420 Hours | - | 3/231/0 | 3/231/0 | - |
| LU | Latch-up | (per JESD78) | 3/18/0 | - | - | 1/6/0 |
| PD | Physical Dimensions | - | - | 3/15/0 | 3/15/0 | 3/30/0 |
| SD | Surface Mount Solderability | Pb Free | - | 3/66/0 | 3/66/0 | 1/22/0 |
| TC | Temperature Cycle, -55/125C | 700 Cycles | 3/229/0 | - | - | - |
| TC | Temperature Cycle, -65/150C | 500 Cycles | - | 3/231/0 | 3/231/0 | 3/231/0 |
| TS | Thermal Shock, -65/150C | 500 Cycles | - | - | - | - |
| UHAST | Unbiased HAST, 130C/85%RH | 96 Hours | 3/228/0 | - | - | - |
| WBP | Bond Pull | Wires | - | 3/228/0 | 3/228/0 | 3/228/0 |
| WBS | Ball Bond Shear | Wires | - | 3/228/0 | 3/228/0 | 3/228/0 |

- 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 Plan

Phase 2 QFN Offload from Clark-AT and MLA to CDAT

(Qualification is On-going)

Product Attributes

| Attributes | Qual Device: BQ27411DRZRG1D | Qual Device: BQ29200DRBR | Qual Device: DRV401AIRGWR | Qual Device: OPA2314AIDRBR | Qual Device: SN1509006RHLR |
|---------------------|--------------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|
| Assembly Site | CDAT | CDAT | CDAT | CDAT | CDAT |
| Package Family | VSON | VSON | VQFN | VSON | QFN |
| 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 | RFAB | DFAB -200 | AIZU | DP1-DM5 | RFAB |
| Wafer Fab Process | LBC8LV | LBC4 | 50HPA07 | 50HPA07 | LBC7 |

| Attributes | QBS Package Reference: BQ24196RGER | QBS Package Reference: BQ294504DRVR | QBS Package Reference: TPS22966DPUR | QBS Package Reference: TPS53641RSBR | QBS Package Reference: TPS62140RGTR | QBS Package Reference: TRS3122ERGER |
|------------------------|--|---|---|---|---|---|
| Assembly Site | CHENGDU A/T | CHENGDU A/T | CDAT | CHENGDU A/T | CHENGDU A/T | CHENGDU A/T |
| Package Family | VQFN | WQFN | QFN | WQFN | VQFN | VQFN |
| Flammability Rating | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 |
| Wafer Fab Supplier | RFAB | RFAB | RFAB | RFAB | MIHO-8 | RFAB |
| Wafer Fab Process | LBC7 | LBC7 | LBC7 | LBC7X | LBC7X | LBC7 |

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260C: SN1509006RHLR, BQ29200DRBR, OPA2314AIDRBR, BQ27411DRZRG1D, DRV401AIRGWR

Qualification Results

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

| | Resu | ts ex | pected (| Oct 3 | 31, | <u>2017</u> |
|--|------|-------|----------|-------|-----|-------------|
|--|------|-------|----------|-------|-----|-------------|

| Туре | Test Name / Condition | Duration | Qual Device: BQ27411DRZRG1D | Qual Device: BQ29200DRBR | Qual Device: DRV401AIRGWR | Qual Device: OPA2314AIDRBR | Qual Device: SN1509006RHLR | |
|------|------------------------------------|--------------------------------|--------------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|--|
| AC | Autoclave 121C | 96 Hours | - | 3/231/TBD | 3/231/TBD | - | - | |
| ED | Electrical Characterizati on | Per Datasheet Parameters | - | - | - | TBD | - | |
| HAST | Biased HAST, 130C/85%RH | 96 Hours | - | - | - | - | - | |
| HTSL | High Temp Storage Bake 150C | 1000 Hours | - | - | - | - | - | |
| HTSL | High Temp Storage Bake 170C | 420 Hours | - | 3/231/TBD | 3/231/TBD | - | - | |

| Туре | Test Name / Condition | Duration | Qual Device: BQ27411DRZRG1D | Qual Device: BQ29200DRBR | Qual Device: DRV401AIRGWR | Qual Device: OPA2314AIDRBR | Qual Device: SN1509006RHLR |
|------|------------------------------------|--------------------------------|--------------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|
| PD | Physical Dimensions | (per mechanical drawing) | 1/5/TBD | - | - | - | 1/5/TBD |
| SD | Solderability | Steam age, 8 hours | 1/22/TBD | - | - | 3/66/TBD | 1/22/TBD |
| тс | Temperature Cycle, - 65/150C | 500 Cycles | - | 3/231/TBD | 3/231/TBD | 3/231/TBD | - |
| WBP | Bond Pull | 76 Wires, 3 units min | 3/228/TBD | 3/228/TBD | 3/228/TBD | 3/228/TBD | 3/228/TBD |
| WBS | Ball Bond Shear | 76 balls, 3 units min | 3/228/TBD | 3/228/TBD | 3/228/TBD | 3/228/TBD | 3/228/TBD |

| Туре | Test Name / Condition | Duration | QBS Package Reference: BQ24196RGE R | QBS Package Reference: BQ294504DRV R | QBS Package Reference: TPS22966DPU R | QBS Package Reference: TPS53641RSB R | QBS Package Reference: TPS62140RGT R | QBS Package Reference: TRS3122ERGE R |
|----------|------------------------------------|--------------------------------|--|---|---|---|---|---|
| AC | Autoclave 121C | 96 Hours | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 |
| ED | Electrical Characterizatio n | Per Datasheet Parameters | - | - | - | - | Pass | Pass |
| FLA M | Flammability (IEC 695-2-2) | - | - | - | - | - | - | 3/15/0 |
| FLA M | Flammability (UL 94V-0) | - | - | - | - | - | - | 3/15/0 |
| FLA M | Flammability (UL-1694) | - | - | - | - | - | - | 3/15/0 |
| HAS T | Biased HAST, 130C/85%RH | 96 Hours | - | 3/231/0 | - | - | - | 3/231/0 |
| HTO L | Life Test, 150C | 300 Hours | - | - | - | - | - | 1/77/0 |
| HTSL | High Temp Storage Bake 150C | 1000 Hours | - | - | - | - | - | 3/231/0 |
| HTSL | High Temp Storage Bake 170C | 420 Hours | - | - | 3/231/0 | 3/231/0 | - | - |
| PD | Physical Dimensions | (per mechanical drawing) | - | - | 3/15/0 | - | - | 3/30/0 |
| SD | Solderability | Steam age, 8 hours | - | - | - | - | - | 1/22/0 |
| тс | Temperature Cycle, - 65/150C | 500 Cycles | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 | 3/231/0 |
| WBP | Bond Pull | 76 Wires, 3 units min | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 |
| WBS | Ball Bond Shear | 76 balls, 3 units min | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 | 3/228/0 |

- 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.

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