| PCI | N Num | ber: | 202 | 3081 | .6003.2 | :A | | | | PCN Date: | | | April 04, 2024 | | |
|-------------|--------|----------------------|---------|-------|---------|-------------|--------------------|-----------------|-----------------|-----------|-------------------------|-----------------------|----------------|--|--|
| Titl | e: | Qualific | ation | of A | ddition | al As | ssembly | / & Test | site opt | ions | ions for select Devices | | | | |
| Cus | stome | r Contac | t: | Cha | nge Ma | nag | ement | team | Dept: | (| Qua | ality Se | ervices | | |
| Pro | posed | 1 st Ship | Dat | e: | April 0 | 4, 2 | 2024 | | Sample accep | | | | Not applicable | | |
| Cha | ange T | ype: | | | | | | | | | | | | | |
| \boxtimes | Assen | nbly Site | | | | | Design | | | | | ☐ Wafer Bump Material | | | |
| | Assen | nbly Proc | ess | | | | Data Sheet | | | | ☐ Wafer Bump Process | | | | |
| X | Assen | nbly Mate | eria Is | | | | Part number change | | | | ☐ Wafer Fab Site | | | | |
| | Mecha | anical Sp | ecific | ation |) | \boxtimes | Test Site | | | | | Wafer Fab Material | | | |
| \boxtimes | Packir | abeli | ng | | Test F | Process | | | | Wafe | r Fab Process | | | | |
| | | · | | | | | PCN | Detail : | S | | | | · | | |

Description of Change:

Revision A is to include a pin 1 ID Marking change that was not included on the original PCN notification for the devices under the Product Affected section.

Texas Instruments is pleased to announce the qualification of FMX and MLA as an additional Assembly & Test Site for Select Devices listed in the "Product Affected" Section.

Construction differences are as follows:

| | ASESH | FMX | MLA |
|------------------|---------------|---------|---------|
| Mount Compound | EY1000063 | 4147858 | 4147858 |
| Mold Compound | EN2000509 | 4211880 | 4211880 |
| Lead finish | NiPdAuAg | NiPdAu | NiPdAu |
| Pin 1 ID marking | <u>Stripe</u> | Dot | Dot |
| Final Test site | ASESH | FMX | MLA |

Test coverage, insertions, conditions will remain consistent with current testing

Reason for Change:

Continuity of supply.

Enable additional A/T capacity to support high volume ramps.

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

None

Impact on Environmental Ratings

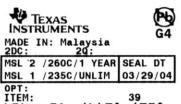
Checked boxes indicate the status of environmental ratings following implementation of this change. If below boxes are checked, there are no changes to the associated environmental ratings.

| RoHS | REACH | Green Status | IEC 62474 | | | | | | | | |
|---|-------------|--------------|-------------|--|--|--|--|--|--|--|--|
| ☑ No Change | ☑ No Change | No Change | ☑ No Change | | | | | | | | |
| Channel to an about the stiff of the second than form this post | | | | | | | | | | | |

Changes to product identification resulting from this PCN:

Assembly Site Information: Assembly Country Code Assembly Site Origin (22L) Assembly Site Assembly City (23L)**ASESH** CHN ASH Shanghai MLA MYS TI Malaysia Kuala Lumpur TI Mexico **MEX** MEX Aguascalientes

Sample product shipping label (not actual product label)



(L)T0:1750



(1P) \$N74L\$07N\$R (Q) 2000 (D) 0336 (31T)LOT: 3959047MLA (4W) TKY(1T) 7523483\$I2 (P) (2P) REV: (V) 0033317 (20L) CSO: SHE (21L) CCO:USA (22L) ASO: MLA (23L) ACO: MYS

Product Affected:

| TLIN1022ADRQ1 | TLIN1029ADRQ1 | TLIN2022ADRQ1 | TLIN2029ADRQ1 | |
|---------------|---------------|---------------|---------------|--|
| TLIN1022DRQ1 | TLIN1029DQ1 | TLIN2022DRQ1 | TLIN2029DQ1 | |
| TLIN1027DRQ1 | TLIN1029DRQ1 | TLIN2027DRQ1 | TLIN2029DRQ1 | |

Qualification Report

Automotive Product Qualification Summary (As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)

Approve Date: 30 January 2023

Product Attributes

| Attributes | QBS Device: TCAN1044VDRQ1 | QBS Device: TCAN1146DRQ1 | Qual Device: TLV9064QDRQ1 | | |
|------------------------|------------------------------|-----------------------------|------------------------------|--|--|
| Assembly Site | MLA | MLA | MLA | | |
| Package Type | SOIC | SOIC | SOIC | | |
| Package Designator | D | D | D | | |
| Wafer Fab Supplier | RFAB | RFAB | RFAB | | |
| Wafer Process ID | LBC9 | LBC9 | LBC9 | | |
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 | | |
| MSL | LEVEL1-260C | LEVEL2-260C | LEVEL2-260C | | |
| Flammability Rating | UL 94 V-0 | UL 94 V-0 | UL 94 V-0 | | |

Qualification ResultsData Displayed as: Number of lots / Total sample size / Total failed

| | | Data | DISP | laye | <u>a as: Number o</u> | 1 1015 / 101 | ai sample sizi | e / Total Tallet | 1 | | | |
|------|----|-------------------------------------|------------|------------|---|----------------|------------------------------|-----------------------------|--------------------------------|--|--|--|
| Туре | # | Test Spec | Lot Qty | SS/ Lot | Test Name / Condition | Duration | QBS Device: TCAN1044VDRQ1 | QBS Device: TCAN1146DRQ1 | Qual Device: TPL5010QDDCRQ1 | | | |
| | | | | | TEST GROUP A - ACCELE | RATED ENVIRON | MENT STRESS TESTS | | | | | |
| PC | A1 | - | 3 | 22 | SAM Analysis, Pre-Stress | Devices | 3/66/0 | 3/66/0 | 3/66/0 | | | |
| PC | A1 | J-STD-020 JESD22-A113 | 3 | - | Auto Preconditioning | Level 1 - 260C | No fails | - | - | | | |
| PC | A1 | J-STD-020 JESD22-A113 | 3 | - | Auto Preconditioning | Level 2 - 260C | - | No fails | No fails | | | |
| PC | A1 | - | 3 | 22 | SAM Analysis, Post-Stress | Devices | 3/66/0 | 3/66/0 | 3/66/0 | | | |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 130C | 96 Hours | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| HAST | A2 | - | 3 | 1 | Cross Section, Post BHAST, 96 Hours | Devices | 1/1/0 | 3/3/0 | 3/3/0 | | | |
| HAST | A2 | - | 3 | 30 | Wire Bond Shear, Post BHAST, 96 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| HAST | A2 | - | 3 | 30 | Bond Pull over Stitch, Post BHAST, 96 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| HAST | A2 | - | 3 | 30 | Bond Pull over Ball, Post BHAST, 96 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| HAST | A2 | JEDEC JESD22-A110 | 3 | 77 | Biased HAST, 130C | 192 Hours | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| HAST | A2 | - | 3 | 1 | Cross Section, Post BHAST, 192 Hours | Devices | 3/3/0 | 3/3/0 | 3/3/0 | | | |
| HAST | A2 | - | 3 | 30 | Wire Bond Shear, Post BHAST, 192 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| HAST | A2 | - | 3 | 30 | Bond Pull over Stitch, Post BHAST, 192 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| HAST | A2 | - | 3 | 30 | Bond Pull over Ball, Post BHAST, 192 Hours | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| AC | A3 | JEDEC JESD22-A102 | 3 | 77 | Autoclave, 121C | 96 Hours | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| тс | A4 | JEDEC JESD22-A104, Appendix 3 | 3 | 77 | Temperature Cycle, - 65/150C | 500 Cycles | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| тс | A4 | - | 3 | 1 | Cross Section, Post TC 500 Cycles | Devices | 3/3/0 | 1/1/0 | 1/1/0 | | | |
| тс | A4 | | 3 | 22 | SAM Analysis, Post TC, 500 Cycles | Devices | 3/66/0 | 3/66/0 | 3/66/0 | | | |
| тс | A4 | | 3 | 30 | Wire Bond Shear, Post TC 500 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| тс | A4 | | 3 | 30 | Bond Pull over Stitch Post TC 500 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| тс | A4 | | 3 | 30 | Bond Pull over Ball Post TC 500 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| тс | A4 | JEDEC JESD22-A104, Appendix 3 | 3 | 77 | Temperature Cycle, - 65/150C | 1000 Cycles | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| тс | A4 | - | 3 | 1 | Cross Section, Post TC 1000 Cycles | Devices | 3/3/0 | 3/3/0 | 3/3/0 | | | |
| TC | A4 | - | 3 | 22 | SAM Analysis, Post TC, 1000 Cycles | Devices | 3/66/0 | 3/66/0 | 3/66/0 | | | |
| тс | A4 | - | 3 | 30 | Wire Bond Shear, Post TC 1000 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| тс | A4 | - | 3 | 30 | Bond Pull over Stitch Post TC 1000 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| тс | A4 | | 3 | 30 | Bond Pull over Ball Post TC 1000 Cycles | Wires | 3/72/0 | 3/90/0 | 3/90/0 | | | |
| PTC | A5 | JEDEC JESD22-A105 | 1 | 45 | Power Temperature Cycle | 1000 Cycles | N/A | N/A | N/A | | | |
| PTC | A5 | JEDEC JESD22-A105 | 1 | 45 | Power Temperature Cycle | 2000 Cycles | N/A | N/A | N/A | | | |
| HTSL | A6 | JEDEC JESD22-A103 | 3 | 45 | High Temperature Storage Life, 170C | 500 Hours | 3/135/0 | 1/45/0 | 3/135/0 | | | |
| HTSL | A6 | - | 3 | 1 | Cross Section, Post HTSL 500 Hours | Devices | 1/1/0 | 1/1/0 | 3/3/0 | | | |
| HTSL | A6 | JEDEC JESD22-A103 | 3 | 45 | High Temperature Storage Life, 170C | 1000 Hours | 3/135/0 | 1/45/0 | 3/135/0 | | | |
| HTSL | A6 | - | 3 | 1 | Cross Section, Post HTSL 500 Hours | Devices | 3/3/0 | 1/1/0 | 3/3/0 | | | |
| HTSL | A6 | JEDEC JESD22-A103 | 3 | 45 | High Temperature Storage Life, 150C | 1000 Hours | - | 3/231/0 | - | | | |
| | | SECOLE A 100 | | | Citingo Line, 1000 | <u> </u> | <u> </u> | <u> </u> | | | | |

| Туре | # | Test Spec | Lot Qty | SS/ Lot | Test Name / Condition | Duration | QBS Device: TCAN1044VDRQ1 | QBS Device: TCAN1146DRQ1 | Qual Device: TPL5010QDDCRQ1 | | | |
|------|----|---|------------|------------|---|---|------------------------------|-----------------------------|------------------------------------|--|--|--|
| | | | • | | TEST GROUP B - ACCEL | ERATED LIFETIME | E SIMULATION TESTS | | | | | |
| HTOL | B1 | JEDEC JESD22-A108 | 3 | 77 | Life Test, Grade 1, 125C | 1000 Hours | 3/231/0 | 3/231/0 | 3/231/0 | | | |
| ELFR | B2 | AEC Q100-008 | 3 | 77 | Early Failure Rate, 125C | 48 Hours | N/A | N/A | N/A | | | |
| EDR | В3 | AEC Q100-005 | 3 | 77 | NVM Endurance, Data Retention, Operational Life | - | N/A | N/A | N/A | | | |
| | | | | | TEST GROUP C - PACI | KAGE ASSEMBLY | INTEGRITY TESTS | | | | | |
| WBS | C1 | AEC Q100-001 | 3 | 30 | Wire Bond Shear (Cpk>1.67) | Bonds | 3/90/0 | 3/90/0 | 3/90/0 | | | |
| WBP | C2 | MIL-STD883 Method 2011 | 3 | 30 | Wire Bond Pull (Cpk>1.67) | Wires | 3/90/0 | 3/90/0 | 3/90/0 | | | |
| SD | СЗ | JEDEC JESD22-B102 | 1 | 15 | Surface Mount Solderability (Pb) | >95% Lead Coverage, 155C Dry Bake | 1/30/0 | 1/15/0 | 1/15/0 | | | |
| SD | С3 | JEDEC JESD22-B102 | 1 | 15 | Surface Mount Solderability (Pb-Free) | >95% Lead Coverage, 155C Dry Bake | 1/30/0 | 1/15/0 | 1/15/0 | | | |
| PD | C4 | JEDEC JESD22-B100 and B108 | 3 | 10 | Auto Physical Dimensions | (Cpk>1.67) | 3/30/0 | 3/30/0 | 3/30/0 | | | |
| SBS | C5 | AEC Q100-010 AEC Q003 | 3 | 50 | Solder Ball Shear | 5 balls from a min. of 10 | N/A | N/A | N/A | | | |
| | | | | | | devices (Cpk>1.67) | | | | | | |
| LI | C6 | JEDEC JESD22-B105 | 1 | 50 | Lead Integrity | # of leads to destruction | 1/24/0 | - | | | | |
| | | | | | TEST GROUP D - DIE | FABRICATION RE | ELIABILITY TESTS | | | | | |
| EM | D1 | JESD61 | - | - | Electromigration | | Completed F | Per Process Technology F | Requirements | | | |
| TDDB | D2 | JESD35 | - | - | Time Dependent Dielectric Breakdown | | Completed F | Per Process Technology F | Process Technology Requirements | | | |
| HCI | D3 | JESD60 & 28 | - | - | Hot Injection Carrier | | Completed F | Per Process Technology F | er Process Technology Requirements | | | |
| NBTI | D4 | - | - | - | Negative Bias Temperature Instability | | Completed F | Per Process Technology F | gy Requirements | | | |
| SM | D5 | - | - | - | Stress Migration | | Completed F | Per Process Technology F | Requirements | | | |
| | | | | | TEST GROUP E - EL | ECTRICAL VERIF | | | | | | |
| TEST | E1 | Test program to supplier data sheet | All | All | Pre- and Post-Stress Function/Parameter | - | Completed | Completed | Completed | | | |
| НВМ | E2 | AEC Q100-002 | 3 | 3 | Electrostatic Discharge, Human Body Model | 0 Fails 2KV HBM (Classification 2 or better) | 3000V 1/3/0 | 4000V 1/3/0 | 4000V 1/3/0 | | | |
| CDM | E3 | AEC Q100-011 | 3 | 3 | Electrostatic Discharge, Charged Device Model | 0 Fails 750V corner pins, 500V all other pins (Classification C4B or better) | 1500V 1/3/0 | 1500V 1/3/0 | 1500V 1/3/0 | | | |
| LU | E4 | AEC Q100-004 | 3 | 6 | Latch-Up | 0 Fails | | | 1/6/0 | | | |
| ED | E5 | AEC Q100-009 AEC Q003 | 3 | 30 | Electrical Distributions | Cpk>1.67 at room, hot, cold test temperatures | 3/90/0 | 3/90/0 | 3/90/0 | | | |

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, Autoclave, Unbiased HAST, Temperature Cycle & Power Temperature Cycle samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40° C to $+150^{\circ}$ C Grade 1 (or Q): -40° C to $+125^{\circ}$ C Grade 2 (or T): -40° C to $+105^{\circ}$ C Grade 3 (or I): -40° C to $+85^{\circ}$ C

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/

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

Qualification Report

Automotive Product Qualification Summary (As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)

Approve Date 20-July-2023

Product Attributes

| Attributes | Qual Device: | Qual Device: | QBS Reference (Process, Product): | QBS Reference (Package): | QBS Reference (Package): |
|--------------------------|--------------|--------------|--------------|--------------|---------------|---------------|-----------------------------------|--------------------------|--------------------------|
| Attitudes | TLIN1029DQ1 | TLIN1029ORQ1 | TLIN2029DQ1 | TLIN2029DRQ1 | TLIN1029ADRQ1 | TLIN2029ADRQ1 | TLIN2029DQ1 | CD4093BQM96Q1 | TCAN1043ADRQ1 |
| Automotive Grade Level | Grade 1 | Grade 1 | Grade 1 | Grade 1 | Grade 1 |
| Operating Temp Range (C) | -40 to 125 | -40 to 125 | -40 to 125 | -40 to 125 | -40 to 125 |
| Product Function | Interface | Interface | Interface | Interface | Interface | Interface | Interface | Interface | Interface |
| Wafer Fab Supplier | RFAB | RFAB | RFAB | RFAB | RFAB | RFAB | RFAB | SH-BIP-1 | RFAB |
| Assembly Site | FMX | FMX | FMX | FMX | FMX | FMX | ASESHAT | FMX | FMX |
| Package Group | SOIC | SOIC | SOIC | SOIC | SOIC | SOIC | SOIC | SOIC | SOIC |
| Package Designator | D | D | D | D | D | D | D | D | D |
| Pin Count | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 14 | 14 |

QBS: Qual By Similarity

Qual Device TLIN1029DQ1 is qualified at MSL1 260C Qual Device TLIN1029DRQ1 is qualified at MSL1 260C Qual Device TLIN2029DQ1 is qualified at MSL1 260C Qual Device TLIN2029DRQ1 is qualified at MSL1 260C Qual Device TLIN1029ADRQ1 is qualified at MSL1 260C Qual Device TLIN2029ADRQ1 is qualified at MSL1 260C

Qualification Results

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

| | | | Dat | .a D | ispiay | -u us. | Nui | HDC1 (| טו וטנט | / 100 | ıı sanış | JIC 31ZC | / TOLA | rane | ٦ | |
|------------|-------------|---|-------------------|-------------|--|--|----------------|--|--|--|--|--|--|--|--|--|
| Туре | * | Test Spec | Min Lot Qty | SS / Lot | Test Name | Condition | Duration | Qual Device: TLIN1029DQ1 | Qual Device: TLIN1029DRQ1 | Qual Device: TLIN2029DQ1 | Qual Device: TLIN2029DRQ1 | Qual Device: TLIN1029ADRQ1 | Qual Device: TLIN2029ADRQ1 | QBS Reference (Process, Product): | QBS Reference (Package): CD4093BQM96Q1 | QBS Reference (Package): TCAN1043ADR |
| Test Group | A - Accele | rated Environm | ent Stress | Tests | | | | | | | | | | | | |
| PC | Al | JEDEC J- STD-020 JESD22- A113 | 3 | 77 | Preconditioning | MSL1 260C | | QBS | QBS | QBS | QBS | QBS | QBS | | | 3/0/0 |
| HAST | A2 | JEDEC JESD22- A110 | 3 | 77 | Biased HAST | 130C/85%RH | 96 Hours | QBS | QBS | QBS | QBS | QBS | QBS | | | 3/231/0 |
| AC/UHAST | A3 | JEDEC JESD22- A102/JEDEC JESD22- A118 | 3 | 77 | Unbiased HAST | 130C/85%RH | 96 Hours | QBS | QBS | QBS | QBS | QBS | QBS | | - | 3/231/0 |
| тс | A4 | JEDEC JESD22- A104 and Appendix 3 | 3 | 77 | Temperature Cycle | -65C/150C | 1000 Cycles | QBS | QBS | QBS | QBS | QBS | QBS | | | 3/231/0 |
| HTSL | A6 | JEDEC JESD22+ A103 | 1 | 45 | High Temperature Storage Life | 150C | 1000 Hours | QBS | QBS | QBS | QBS | QBS | QBS | | | 3/135/0 |
| Test Group | B - Accele | rated Lifetime S | imulation | Tests | | | | | | | | | | | | |
| HTOL | B1 | JEDEC JESD22- A108 | 1 | 77 | Life Test | 140C | 480 Hours | QBS | QBS | QBS | QBS | QBS | QBS | 3/231/0 | | |
| ELFR | B2 | AEC Q100- 008 | 1 | 77 | Early Life Failure Rate | 125C | 48 Hours | QBS | QBS | QBS | QBS | QBS | QBS | 3/2400/1 ² | | |
| Test Group | C - Packag | e Assembly Int | egrity Test | is | | | | | | | | | | | | |
| WBS | C1 | AEC Q100- 001 | 1 | 30 | Wire Bond Shear | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | QBS | QBS | QBS | QBS | QBS | 1/30/0 | - | | 3/90/0 |
| WBP | C2 | MIL-STD883 Method 2011 | 1 | 30 | Wire Bond Pull | Minimum of 5 devices, 30 wires Cpk>1.67 | Wires | QBS | QBS | QBS | QBS | QBS | 1/30/0 | | | 3/90/0 |
| SD | СЗ | JEDEC J- STD-002 | 1 | 15 | PB Solderability | >95% Lead Coverage | | QBS | QBS | QBS | QBS | QBS | QBS | | | |
| SD | C3 | JEDEC J- STD-002 | 1 | 15 | PB-Free Solderability | >95% Lead Coverage | | QBS | QBS | QBS | QBS | QBS | QBS | | 3/66/0 | |
| PD | C4 | JEDEC JESD22- B100 and B108 | 1 | 10 | Physical Dimensions | Cpk>1.67 | | QBS | QBS | QBS | QBS | QBS | 1/10/0 | | | 3/30/0 |
| Test Group | D - Die Fal | brication Reliab | ility Tests | | | | | | | | | | | | | |
| ЕМ | D1 | JESD61 | | | Electromigration | | | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | 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 | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| нсі | D3 | JESD60 & 28 | | | Hot Carrier Injection | | | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| NBTI | D4 | | | | Negative Bias Temperature Instability | | | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
| | | | | | | | | | | | | | | | | |

| SM | D5 | | | | Stress Migration | | | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements | Completed Per Process Technology Requirements |
|------------|--|------------------|---|----|-----------------------------|------------------------------------|---------------|--|--|--|--|--|--|--|--|--|
| Test Group | fest Group E - Electrical Verification Tests | | | | | | | | | | | | | | | |
| ESD | E2 | AEC Q100- 002 | 1 | 3 | ESD HBM | | 4000 Volts | QBS | QBS | QBS | QBS | QBS | QBS | 1/3/0 | | |
| ESD | E2 | AEC Q100- 002 | 1 | 3 | ESD HBM (Custom) | | 8000 Volts | QBS | QBS | QBS | QBS | QBS | QBS | 1/3/0 | | |
| ESD | E3 | AEC Q100- 011 | 1 | 3 | ESD CDM | | 1500 Volts | QBS | QBS | QBS | QBS | QBS | QBS | 1/3/0 | - | |
| ESD | E3 | AEC Q100- 011 | 1 | 3 | ESD CDM | | 500 Volts | QBS | QBS | QBS | QBS | QBS | QBS | | | 1/3/0 |
| LU | E4 | AEC Q100- 004 | 1 | 6 | Latch-Up | Per AEC Q100-004 | | QBS | QBS | QBS | QBS | QBS | QBS | 1/6/0 | | |
| ED | E5 | AEC Q100- 009 | 3 | 30 | Electrical Distributions | Cpk>1.67 Room, hot, and cold | | QBS | QBS | QBS | QBS | QBS | 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/

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

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

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