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# Cypress Semiconductor Automotive Package Qualification Report

**QTP# 093104 VERSION \*C  
August 2014**

**Automotive 32-Lead STSOP  
NiPdAu, MSL3, 260C Reflow  
CML-R**

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT  
[reliability@cypress.com](mailto:reliability@cypress.com) or via a CYLINK CRM CASE**

**Prepared By:**  
Honesto Sintos  
Reliability Engineer

**Reviewed By:**  
Rene Rodgers  
Reliability Manager

**Approved By:**  
Richard Oshiro  
Reliability Director

**PACKAGE QUALIFICATION HISTORY**

| <b>Qual Report</b> | <b>Description of Qualification Purpose</b>   | <b>Date Comp</b> |
|--------------------|---|------------------|
| 093104             | Qualify MoBL SRAM Automotive 32 STSOP Package using 7A62138G, Kyocera G6000DA Mold Compound, QMI509 epoxy, NiPdAu, MSL3/260C assembled in CML-R | July 10          |

| MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION |                       |
|--|-----------------------|
| Package Designation:                                 | ZB32R                 |
| Package Outline, Type, or Name:                      | 32-Lead STSOP         |
| Mold Compound Name/Manufacturer:                     | Kyocera G6000DA       |
| Mold Compound Flammability Rating:                   | V-O per UL94          |
| Mold Compound Alpha Emission Rate:                   | Maximum 0.002 CPH/cm2 |
| Oxygen Rating Index:                                 | N/A                   |
| Lead Frame Material:                                 | C7025                 |
| Lead Finish, Composition / Thickness:                | NiPdAu                |
| Die Backside Preparation Method/Metallization:       | Backgrind             |
| Die Separation Method:                               | 100% Sawing           |
| Die Attach Supplier:                                 | Henkel                |
| Die Attach Material:                                 | QMI 509               |
| Die Attach Method:                                   | Epoxy                 |
| Bond Diagram Designation:                            | 001-48574             |
| Wire Bond Method:                                    | Thermosonic           |
| Wire Material/Size:                                  | Au, 1.0mil            |
| Thermal Resistance Theta JA °C/W:                    | 105.1                 |
| Package Cross Section Yes/No:                        | N/A                   |
| Name/Location of Assembly (prime) facility:          | CML-R                 |
| MSL Level  | 3                     |
| Reflow Profile                                       | 260C                  |

| ELECTRICAL TEST / FINISH DESCRIPTION |             |
|--------------------------------------|-------------|
| Test Location:                       | CML-R, KYEC |

# RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

| Stress/Test  | Test Condition<br>(Temp/Bias)  | Result<br>P/F |
|--|--|---------------|
| High Temperature Operating Life<br>Early Failure Rate    | AEC-Q100-008 and JESD22-A108<br>Dynamic Operating Condition, Vcc Max = 1.85V, 125C   | P             |
| High Temperature Operating Life<br>Latent Failure Rate   | JESD22-A108, 150 C<br>Dynamic Operating Condition, Vcc = 1.85V, 150C   | P             |
| High Accelerated Saturation Test<br>(HAST)               | JESD22-A110, 130C, 3.6V, 85%RH<br>Precondition: JESD22-A113 Moisture Sensitivity MSL 3<br>192 Hrs, 30C/60%RH+3IR-Reflow, 260C+0, -5C     | P             |
| High Temperature Storage Test                            | JESD22-A103, 150 C   | P             |
| Temperature Cycle  | JESD22-A104, -65°C to 150°C<br>Precondition: JESD22-A113 Moisture Sensitivity MSL 3<br>192 Hrs, 30C/60%RH+3IR-Reflow, 260C+0, -5C        | P             |
| Pressure Cooker  | JESD22-A102, 121C, 100%RH, 15 Psig<br>Precondition: JESD22-A113 Moisture Sensitivity MSL 3<br>192 Hrs, 30C/60%RH+3IR-Reflow, 260C+0, -5C | P             |
| Electrostatic Discharge<br>Human Body Model (ESD-HBM)    | AEC-Q100-002<br>500V/1000V/1500V/2000V   | P             |
| Electrostatic Discharge<br>Charge Device Model (ESD-CDM) | AEC-Q100-011<br>250V/500V/750V   | P             |
| Acoustic Microscopy                                      | JEDEC JSTD-020   | P             |
| Ball Shear   | AEC-Q100-001   | P             |
| Bond Pull  | Mil-Std 883, Method 2011   | P             |
| Final Visual Inspection                                  | JESD22-B101B   | P             |
| Physical Dimensions                                      | JESD22-B100/108  | P             |
| Post Temp Cycle Wire Bond Pull                           | Mil-Std 883, Method 2011   | P             |
| Solderability  | JESD22-B102  | P             |
| Static Latchup   | AEC-Q100-004, 125C, 5.4V, ± 200mA  | P             |
| Constructional Analysis                                  | Criteria: Meet external and internal characteristics of Cypress package  | P             |
| Dye Penetrant Test                                       | Test to determine the existence and extent of cracks, Criteria: No<br>Package Crack  | P             |

## Reliability Test Data

QTP #: 093104

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|--------|-----------|------------|----------|----------|------|-----|-------------------|
|--------|-----------|------------|----------|----------|------|-----|-------------------|

### STRESS: ACOUSTIC, MSL3

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 22 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | COMP | 22 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | COMP | 22 | 0 |  |

### STRESS: BALL SHEAR

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 30 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921407 | CML-R | COMP | 25 | 0 |  |

### STRESS: BOND PULL

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 30 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921407 | CML-R | COMP | 25 | 0 |  |

### STRESS: CONSTRUCTIONAL ANALYSIS

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 5 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: DYE PENETRANT TEST

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 15 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | COMP | 15 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | COMP | 15 | 0 |  |

### STRESS: ESD-CHARGE DEVICE MODEL, 250V

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: ESD-CHARGE DEVICE MODEL, 500V

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: ESD-CHARGE DEVICE MODEL, 750V

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 500V

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 1,000V

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

## Reliability Test Data

QTP #: 093104

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|--------|-----------|------------|----------|----------|------|-----|-------------------|
|--------|-----------|------------|----------|----------|------|-----|-------------------|

**STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 1,500V**

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

**STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 2,000V**

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

**STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 4,000V**

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

**STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B, 6,000V**

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 3 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

**STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, +/-2000mA**

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 6 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max**

|                          |         |           |       |    |     |   |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 48 | 935 | 0 |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|

|                          |         |           |       |    |     |   |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | 48 | 827 | 0 |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|

|                          |         |           |       |    |     |   |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 48 | 812 | 0 |  |
|--------------------------|---------|-----------|-------|----|-----|---|--|

**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max**

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 408 | 85 | 0 |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | 408 | 85 | 0 |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 408 | 85 | 0 |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|

**STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3**

|                          |         |           |       |    |    |   |  |
|--------------------------|---------|-----------|-------|----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 96 | 79 | 0 |  |
|--------------------------|---------|-----------|-------|----|----|---|--|

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 128 | 79 | 0 |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|

|                          |         |           |       |    |    |   |  |
|--------------------------|---------|-----------|-------|----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | 96 | 78 | 0 |  |
|--------------------------|---------|-----------|-------|----|----|---|--|

|                          |         |           |       |    |    |   |  |
|--------------------------|---------|-----------|-------|----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 96 | 78 | 0 |  |
|--------------------------|---------|-----------|-------|----|----|---|--|

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 128 | 78 | 0 |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|

**STRESS: HIGH TEMP STORAGE, 150C**

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 1000 | 80 | 0 |  |
|--------------------------|---------|-----------|-------|------|----|---|--|

## Reliability Test Data

QTP #: 093104

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|--------|-----------|------------|----------|----------|------|-----|-------------------|
|--------|-----------|------------|----------|----------|------|-----|-------------------|

### STRESS: PHYSICAL DIMENSIONS

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4850696 | 610921407 | CML-R | COMP | 10 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921604 | CML-R | COMP | 10 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921935 | CML-R | COMP | 10 | 0 |  |

### STRESS: POST TEMP CYCLE BOND PULL

|                          |         |           |       |      |   |   |  |
|--------------------------|---------|-----------|-------|------|---|---|--|
| CY62138FV30LL (7A62138G) | 4850696 | 610921407 | CML-R | COMP | 5 | 0 |  |
|--------------------------|---------|-----------|-------|------|---|---|--|

### STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 96  | 79 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | 168 | 79 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | 96  | 80 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | 168 | 80 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 96  | 80 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | 168 | 80 | 0 |  |

### STRESS: SOLDERABILITY

|                          |         |           |       |      |    |   |  |
|--------------------------|---------|-----------|-------|------|----|---|--|
| CY62138FV30LL (7A62138G) | 4813031 | 610847851 | CML-R | COMP | 15 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610847938 | CML-R | COMP | 15 | 0 |  |
| CY62138FV30LL (7A62138G) | 4813031 | 610848076 | CML-R | COMP | 15 | 0 |  |

### STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

|                          |         |           |       |     |    |   |  |
|--------------------------|---------|-----------|-------|-----|----|---|--|
| CY62138FV30LL (7A62138G) | 4850696 | 610921407 | CML-R | 500 | 90 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921604 | CML-R | 500 | 90 | 0 |  |
| CY62138FV30LL (7A62138G) | 4850696 | 610921935 | CML-R | 500 | 90 | 0 |  |



## History Page

Document Title: 093104: AUTOMOTIVE 32-LEAD STSOP NIPDAU, MSL3, 260C REFLOW CML-R  
QUALIFICATION REPORT  
Document Number: 001-63310

| Rev. | ECN No. | Orig. of Change | Description of Change  |
|------|---------|-----------------|--|
| **   | 2996946 | NSR             | Initial spec release   |
| *A   | 3702806 | NSR             | Removed Version 1.0 in the title page.<br>Removed obsolete Cypress Spec 24-00002.<br>Removed the reference Cypress Spec in Reliability Tests Performed Table and reflect the reference Industry Standard only. |
| *B   | 4092592 | HSTO            | Sunset Review<br>Deleted obsolete specification in major package information used in page 3.<br>Updated test location facility based on current qualified test site  |
| *C   | 4475040 | HSTO            | Align qualification report based on the new template in the front page   |

Distribution: WEB

Posting: None