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Cypress Semiconductor Package Qualification Report

**QTP 104205 VERSION*C
December 2014**

**16-Lead COL (Chip On Lead)
NiPdAu-Ag, MSL3, 260°C Reflow
K1-Amkor (L)**

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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PACKAGE QUALIFICATION HISTORY

| QUAL REPORT | DESCRIPTION OF QUALIFICATION PURPOSE | DATE COMP. |
|-------------|---|--------------|
| 104205 | Qualify COL16L using Samsung Roughened PPF with NiPdAu-Ag L/F, Sumitomo G700 M/C, ATB120A D/A Film at MSL3 260C assembled in Amkor-K1 | October 2010 |

| MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION | |
|--|----------------------------|
| Package Designation: | LG16A |
| Package Outline, Type, or Name: | 16-Lead Chip on Lead (COL) |
| Mold Compound Name/Manufacturer: | G700 Sumitomo |
| Mold Compound Flammability Rating: | V-O per UL94 |
| Mold Compound Alpha Emission Rate: | N/A |
| Oxygen Rating Index: | 28-54% |
| Lead Frame Material: | Copper |
| Lead Finish, Composition / Thickness: | NiPdAu-Ag |
| Die Backside Preparation Method/Metallization: | Backgrind |
| Die Separation Method: | Sawing |
| Die Attach Supplier: | Ablestik |
| Die Attach Material: | ATB120A |
| Die Attach Method: | Film |
| Bond Diagram Designation | 001-63628 |
| Wire Bond Method: | Thermosonic |
| Wire Material/Size: | 0.8mil / Au |
| Thermal Resistance Theta JA °C/W: | N/A |
| Package Cross Section Yes/No: | Yes |
| Assembly Process Flow: | 49-10999 |
| Name/Location of Assembly (prime) facility: | K1-Amkor |
| MSL Level | 3 |
| Reflow Profile | 260C |

| ELECTRICAL TEST / FINISH DESCRIPTION | |
|--------------------------------------|--------|
| Test Location: | CML-RA |

Note: Please contact a Cypress Representative for other packages availability.

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

| Stress/Test | Test Condition (Temp/Bias) | Result P/F |
|--|---|---------------|
| Temperature Cycle | MIL-STD-883C, Method 1010, Condition C, -65 C to 150 C Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30°C/60%RH+3IR-Reflow, 260°C+0, -5°C | P |
| Pressure Cooker Test | 121°C, 100%RH, 15 Psig Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30°C/60%RH+3IR-Reflow, 260°C+0, -5°C | P |
| Electrostatic Discharge Human Body Model (ESD HBM) | (2200V) JEDEC EIA/JESD22-A114-B | P |
| Electrostatic Discharge Charge Device Model (ESD CDM) | (500V) JESD22-C101 | P |
| High Accelerated Saturation Test (HAST) | 130°C, 5.25V, 85% RH Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30°C/60%RH+3IR-Reflow, 260°C+0, -5°C | P |
| High Temp Storage | 150C, no bias | P |
| Acoustics Microscopy | J-STD-020 | P |
| Ball Shear | JESD22-B116A, Cpk : 1.33, Ppk : 1.66 | P |
| Bond Pull | MIL-STD-883 – Method 2011, Cpk : 1.33, Ppk : 1.66 | P |
| Constructional Analysis | Criteria: Meet external and internal characteristics of Cypress package | P |
| Die Shear | MIL-STD-883, Method 2019 | P |
| Dye Penetration | Test to determine the existence and extent of cracks, Criteria: No Package Crack | P |
| Final Visual | JESD22-B101B | P |
| Internal Visual | MIL-STD-883-2014 | P |
| Physical Dimension | MIL-STD-1835, JESD22-B100 | P |
| Solderability, Steam Aged | J-STD-002, JESD22-B102 95% solder coverage minimum | P |
| Thermal Shock | MIL-STD-883C, Method 1011 | P |
| X-ray | MIL-STD-883 2012 | P |



Reliability Test Data

QTP #: 104205

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|--|-----------|------------|----------|----------|------|-----|-------------------|
| STRESS: ACOUSTIC, MSL3 | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 15 | 0 | |
| STRESS: BOND PULL | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 10 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 10 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 10 | 0 | |
| STRESS: BALL SHEAR | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 10 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 10 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 10 | 0 | |
| STRESS: CONSTRUCTIONAL ANALYSIS | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 5 | 0 | |
| STRESS: CROSS SECTION | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 5 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 5 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 5 | 0 | |
| STRESS: DYE PENETRANT TEST | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 15 | 0 | |
| STRESS: ESD-CHARGE DEVICE MODEL, (500V) | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 9 | 0 | |



Reliability Test Data

QTP #: 104205

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

STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, 2,200V

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 8 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

STRESS: HI-ACCEL SATURATION TEST, 130C, 5.25V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 128 | 78 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

STRESS: HIGH TEMP STORAGE

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 500 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

STRESS: INTERNAL VISUAL

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 5 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 5 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 5 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

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

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 168 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

STRESS: PHYSICAL DIMENSION

| | | | | | | | |
|----------------------|---------|-----------|---------|------|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 30 | 0 | |
|----------------------|---------|-----------|---------|------|----|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 30 | 0 | |
|----------------------|---------|-----------|---------|------|----|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 30 | 0 | |
|----------------------|---------|-----------|---------|------|----|---|--|

STRESS: SOLDERABILITY

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 3 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 3 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|------|---|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 3 | 0 | |
|----------------------|---------|-----------|---------|------|---|---|--|

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

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 500 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | 500 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | 500 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|

STRESS: THERMAL SHOCK

| | | | | | | | |
|----------------------|---------|-----------|---------|-----|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 200 | 80 | 0 | |
|----------------------|---------|-----------|---------|-----|----|---|--|



Reliability Test Data

QTP #: 104205

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

STRESS: X-RAY

| | | | | | | | |
|----------------------|---------|-----------|---------|------|----|---|--|
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038975 | L-KOREA | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4021105 | 611038974 | L-KOREA | COMP | 15 | 0 | |

Document History Page

Document Title: QTP 104205: 16-LEAD CHIP ON LEAD (COL) NIPDAU-AG, MSL3, 260C REFLOW, K1-AMKOR
(L) QUALIFICATION REPORT
Document Number: 001-65479

| Rev. | ECN No. | Orig. of Change | Description of Change |
|------|---------|-----------------|---|
| ** | 3093264 | NRG | Initial spec release |
| *A | 3456437 | NSR | Update the test conditions and reference standards/criteria for Ball Shear, Bond Pull, Dye Penetrant Test, Physical Dimension and Solderability test. Removed version 1.0 in the title page. |
| *B | 4184150 | HSTO | Sunset Review Removed reference Cypress spec in the reliability test performed table and replaced it with reference Industry standard. |
| *C | 4605694 | HSTO | Align qualification report based on the new template in the front page |

Distribution: WEB

Posting: None