# Cypress Semiconductor
# Package Qualification Report

**QTP 104001 VERSION*D**
**March 2025**

## 16-Lead COL (Chip On Lead)

## NiPdAu-Ag, MSL3, 260°C Reflow

## P3-Amkor (MB)

**FOR ANY QUESTIONS ON THIS REPORT, PLEAE CONTACT**
**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

| QUAL REPORT | DESCRIPTION OF QUALIFICATION PURPOSE | DATE COMP. |
|---|---|---|
| 104001 | Qualify COL16L using Samsung Roughened PPF with NiPdAu-Ag L/F, Sumitomo G700 M/C, NEX130C D/A Film at MSL3 260C assembled in Amkor-P3 | 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:** | N/A |
| **Lead Frame Material:** | Copper |
| **Lead Finish, Composition / Thickness:** | NiPdAu-Ag |
| **Die Backside Preparation Method/Metallization:** | Backgrind |
| **Die Separation Method:** | Sawing |
| **Die Attach Supplier:** | Nippon |
| **Die Attach Material:** | NEX130C |
| **Die Attach Method:** | Film |
| **Bond Diagram Designation** | 001-14646 |
| **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:** | 001-16573 |
| **Name/Location of Assembly (prime) facility:** | K1-Amkor (P3) |
| **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<br>Precondition: JESD22 Moisture Sensitivity MSL3<br>192 Hrs, 30°C/60%RH+3IR-Reflow, 260°C+0, -5°C | P |
| Pressure Cooker Test | 121°C, 100%RH, 15 Psig<br>Precondition: JESD22 Moisture Sensitivity MSL3<br>192 Hrs, 30°C/60%RH+3IR-Reflow, 260°C+0, -5°C | P |
| Electrostatic Discharge<br>Human Body Model (ESD HBM) | (2200V)<br>JEDEC EIA/JESD22-A114-B | P |
| Electrostatic Discharge<br>Charge Device Model (ESD CDM) | (500V)<br>JESD22-C101 | P |
| High Accelerated Saturation Test (HAST) | 130°C, 5.25V, 85% RH<br>Precondition: JESD22 Moisture Sensitivity MSL3<br>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,<br>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<br>95% solder coverage minimum | P |
| Thermal Shock | MIL-STD-883C, Method 1011 | P |
| X-ray | MIL-STD-883 2012 | P |

# Reliability Test Data

**QTP #: 104001**

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---|---|---|---|---|---|---|---|
| ***STRESS: ACOUSTIC, MSL3*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 30 | 0 | |
| ***STRESS: BOND PULL*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 30 | 0 | |
| ***STRESS: BALL SHEAR*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 30 | 0 | |
| ***STRESS: CROSS SECTION*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 5 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 5 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 5 | 0 | |
| ***STRESS: CONSTRUCTIONAL ANALYSIS*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 5 | 0 | |
| ***STRESS: DYE PENETRANT TEST*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 15 | 0 | |
| ***STRESS: HI-ACCEL SATURATION TEST, 130C, 5.25V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | 128 | 80 | 0 | |

# Reliability Test Data

**QTP #: 104001**

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---|---|---|---|---|---|---|---|
| ***STRESS: HIGH TEMP STORAGE*** | | | | | | | |
| CP7194AT (8C20236AC) | 4021105 | 611038976 | L-KOREA | 500 | 80 | 0 | |
| ***STRESS: INTERNAL VISUAL*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 5 | 0 | |
| ***STRESS: PHYSICAL DIMENSION*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 30 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 30 | 0 | |
| ***STRESS: SOLDERABILITY*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 3 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 3 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 3 | 0 | |
| ***STRESS: TC COND. C –65C TO 150C, PRE COND 192 HR 30C/60%RH, MSL3*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | 500 | 79 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | 500 | 80 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | 500 | 70 | 0 | |
| ***STRESS: X-RAY*** | | | | | | | |
| CP7194AT (8C20236AC) | 4012793 | 611036487 | MB-AMKOR | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036488 | MB-AMKOR | COMP | 15 | 0 | |
| CP7194AT (8C20236AC) | 4012793 | 611036489 | MB-AMKOR | COMP | 15 | 0 | |

# Document History Page

Document Title: QTP 104001:16-Lead COL (Chip on Lead) NiPdAu-Ag, MSL3, 260C Reflow, P3-Amkor (P3) Qualification Report
Document Number: 001-65477

| 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.<br>Removed version 1.0 in the title page. |
| *B | 4184126 | HSTO | Sunset Review<br>Removed reference Cypress spec in the reliability test performed table and replaced reference Industry standard. |
| *C | 4605694 | HSTO | Align qualification report based on the new template in the front page |
| *D | 8113666 | HSTO | Sunset review |