**Please note that Cypress is an Infineon Technologies Company.**
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

**Continuity of document content**
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

**Continuity of ordering part numbers**
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

# Cypress Semiconductor
# Product Qualification Report

**QTP# 99395 VERSION*B**
**December, 2014**

| Synchronous/Asynchronous Dual Port SRAM (3.3V and 5V)<br>R42HD Technology, Fab 4 Qualification | |
|---|---|
| CY7C026A(V)/CY7C036A(V) | 16K x 16/18 Asynchronous DP SRAM |
| CY7C025A(V)/CY7C0251A(V) | 8K x 16/18 Asynchronous DP SRAM |
| CY7C024A(V)/CY7C0241A(V) | 4K x 16/18 Asynchronous DP SRAM |
| CY7C09269A(V)/CY7C09369A(V) | 16K x16/18 Synchronous DP SRAM |
| CY7C09349A(V)/CY7C09359A(V) | 4K/8K x 18 Synchronous DP SRAM |
| CY7C007A(V)/CY7C017A(V) | 32K x 8/9 Asynchronous DP SRAM |
| CY7C006A(V)/CY7C016A(V) | 16K x 8/9 Asynchronous DP SRAM |
| CY7C144A(V)/CY7C145A(V) | 8K x 8/9 Asynchronous DP SRAM |
| CY7C138A(V)/CY7C139A(V) | 4K x 8/9 Asynchronous DP SRAM |
| CY7C09079A(V)/CY7C09179A(V) | 32K x 8/9 Synchronous DP SRAM |
| CY7C09159A(V)/CY7C09169A(V) | 8K/16K x 9 Synchronous DP SRAM |

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT**
reliability@cypress.com or via a CYLINK CRM CASE

**Prepared By:**
Josephine Pineda (JYF)
Reliability Engineer

**Reviewed By:**
Zhaomin Ji (ZIJ)
Reliability Manager

**Approved By:**
Richard Oshiro (RGO)
Reliability Director

## PACKAGE/PRODUCT QUALIFICATION HISTORY

| QTP Number | Description of Qualification Purpose | Date |
|---|---|---|
| 98064 | New Technology R42HD/ New CY7C1093, 1Meg Ram Product. | Apr 98 |
| 98244 | New CY7C026 Asynchronous DP SRam, R42HD Technology | Dec 98 |
| 99395 | New CY7C09269A, Asynchronous DP SRam, R42HD Technology | Nov 99 |

**Note:**
Based on using the same design rules and cells to establish a product family, as in JESD-47, Cypress qualifies devices within a product technology by using generic data from that product family to fill out the qualification requirements for those reliability stresses which test intrinsic reliability of the technology. Reliability stresses, such as ESD and Early Life, which are design sensitive are routinely performed in qualifications to ensure the specific design is reliable.

| PRODUCT DESCRIPTION (for qualification) | | | |
|---|---|---|---|
| Qualification Purpose: To qualify CY7C09269A and its family with new metal layers change,R42HD Technology,Fab 4 | | | |
| Marketing Part #: | CY7C09269A | | |
| Device Description: | 3.3V and 5V, Commercial available in 100-pin TQFP and 68-pin PLCC Package. | | |
| Cypress Division: | Cypress Semiconductor Corporation – Memory Product Division (MPD) | | |
| Overall Die (or Mask) REV: | | Rev. F | |
| Die Size: | 153 x 230 mils | What ID markings on Die: | 7C09369AVA / 7C0369A |

| TECHNOLOGY/FAB PROCESS DESCRIPTION - R42HD | | | |
|---|---|---|---|
| Number of Metal Layers: | 2 | Metal Composition: | Metal 1: 500Å TiW/6000Å Al -5%Cu/1200Å TiW<br>Metal 2: 500Å TiW/8000Å Al -5%Cu/300Å TiW |
| Passivation Type and Materials: | | 7000Å $SiO_2$ + 6000Å $Si_3N_4$ | |
| Free Phosphorus contents in top glass layer(%): | | 0% | |
| Die Coating(s), if used: | | N/A | |
| Generic Process Technology/Design Rule (μ-drawn): | | CMOS, Double Metal /0.42 μm | |
| Gate Oxide Material/Thickness (MOS): | | $SiO_2$ / 110Å | |
| Name/Location of Die Fab (prime) Facility: | | Cypress Semiconductor - Bloomington, MN | |
| Die Fab Line ID/Wafer Process ID: | | Fab4/R42HD | |

## PACKAGE AVAILABILITY

| PACKAGE TYPE | ASSEMBLY SITE FACILITY |
|---|---|
| **68-pin PLCC** | **PHIL-M** |
| **100-pin TQFP** | **TAIWN-G** |

**Note:** Package Qualification details upon request

| MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION | |
|---|---|
| **Package Designation:** | A100 |
| **Package Outline, Type, or Name:** | 100-pin Thin Plastic Quad Flatpack (TQFP) |
| **Mold Compound Name/Manufacturer:** | Hitachi CEL 9200 |
| **Mold Compound Flammability Rating:** | V-O per UL 94 |
| **Oxygen Rating Index:** | **>**28% |
| **Lead Frame Material:** | Copper Alloy 194 |
| **Lead Finish, Composition / Thickness:** | Solder Plated 85%Sn, 15%Pb |
| **Die Backside Preparation Method/Metallization:** | N/A |
| **Die Separation Method:** | Wafer Saw |
| **Die Attach Supplier:** | Ablestik |
| **Die Attach Material:** | 8361H |
| **Wire Bond Method:** | Thermosonic |
| **Wire Material/Size:** | Au, 1.3um |
| **Thermal Resistance Theta JA °C/W:** | 49°C/W |
| **Package Cross Section Yes/No:** | N/A |
| **Name/Location of Assembly (prime) facility:** | ASE, Taiwan (TAIWN-G) |

| ELECTRICAL TEST / FINISH DESCRIPTION | |
|---|---|
| **Test Location:** | ASE, Taiwan (TAIWN-G) |
| **Fault Coverage:** | 100% |

# RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

| Stress/Test | Test Condition (Temp/Bias) | Result P/F |
|---|---|---|
| High Temperature Operating Life<br>Early Failure Rate | Dynamic Operating Condition, 150°C/125°C, 5.75V/6.5V<br>JESD22-A-108 | P |
| High Temperature Operating Life<br>Latent Failure Rate | Dynamic Operating Condition, 150°C, 5.75V<br>JESD22-A-108 | P |
| Extended Dynamic Burn-in | Dynamic Operating Condition, 150°C, 5.75V<br>JESD22-A-108 | P |
| Read and Record Life Test | Dynamic Operating Condition, 150°C, 5.75V<br>JESD22-A-108 | P |
| High Temperature Steady State Life | Static Operating Condition, 150°C, 5.75V | P |
| High Accelerated Saturation Test (HAST) | JEDEC STD 22-A110: 140°C, 85%RH, 5.5V<br>Precondition: JESD22 Moisture Sensitivity Level 3<br>192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C | P |
| Temperature Cycle | MIL-STD-883, Method 1010, Condition C, -65 °C to 150°C<br>Precondition: JESD22 Moisture Sensitivity Level 3<br>192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C | P |
| Pressure Cooker Test | JESD22-A102:121°C /100%RH, 15 PSIG<br>Precondition: JESD22 Moisture Sensitivity Level 3<br>192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C | P |
| Cold Life Test | -30C, 6.5V<br>JESD22-A-108 | P |
| High Temp Storage | JESD22-A103: 165°C, no bias | P |
| Current Density | Meets the Technology Device Level Reliability Specifications | P |
| Age Bond Pull | 200°C, 4HRS<br>MIL-STD-883, Method 883-2011 | P |
| Electrostatic Discharge<br>Human Body Model (ESD-HBM) | 2200V, JESD22-A114 | P |
| Electrostatic Discharge<br>Charge Device Model (ESD-CDM) | 500V, JESD22-C101 | P |
| Latch - up Sensitivity | +/- 300mA, JESD78 | P |

## RELIABILITY FAILURE RATE SUMMARY

| Stress/Test | Device Tested/ Device Hours | # Fails | Activation Energy | Thermal AF[5] | Failure Rate[5] |
|---|---|---|---|---|---|
| High Temperature Operating Life Early Failure Rate[1] | 2,026 | 0 | N/A | N/A | 0 PPM |
| High Temperature Operating Life[2,3] Long Term Failure Rate | 1,055,080 DHRs | 0 | 0.7 | 170 | 5 FIT |

[1] A production burn-in of 48 Hrs at 150°C, 6.5V is required for the product
[2] Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.
[3] Chi-squared 60% estimations used to calculate the failure rate.
[4] Thermal Acceleration Factor is calculated from the Arrhenius equation

$$AF = \exp\left[\frac{E_A}{k}\left[\frac{1}{T_2} - \frac{1}{T_1}\right]\right]$$

where:

$E_A$ =The Activation Energy of the defect mechanism.
K = Boltzmann's constant = $8.62 \times 10^{-5}$ eV/Kelvin.
$T_1$ is the junction temperature of the device under stress and $T_2$ is the junction temperature of the device at use conditions.

[5] **EFR Failure Rate based on QTP 99395 and 99244.**
[5] **LFR Failure Rate based on QTP 98064**.

# RELIABILITY TEST DATA

## QTP#: 99395

| DEVICE | ASSY-LOC | FABLOT# | ASSYLOT# | DURATION | S/S | REJ | FAIL MODE |
|---|---|---|---|---|---|---|---|
| STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V) | | | | | | | |
| CY7C09269A-AC(7C0269F) | TAIWN-G | 4931048 | 619928230L1 | 48 | 518 | 0 | |
| CY7C09269A-AC(7C0269F) | TAIWN-G | 4931048 | 619928230L1 | 48 | 500 | 0 | |
| STRESS: ESD-CHARGE DEVICE MODEL (500V) | | | | | | | |
| CY7C09269A-AC(7C0269F) | TAIWN-G | 4931048 | 619928230L1 | COMP | 3 | 0 | |
| STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (4400V) | | | | | | | |
| CY7C09269A-AC(7C0269F) | TAIWN-G | 4931048 | 619928230L1 | COMP | 3 | 0 | |
| STRESS: STATIC LATCH-UP TESTING (+/-300mA) | | | | | | | |
| CY7C09269A-AC(7C0269F) | TAIWN-G | 4931048 | 619928230L1 | COMP | 3 | 0 | |

# RELIABILITY TEST DATA

## QTP#: 98244

| DEVICE | ASSY-LOC | FABLOT# | ASSYLOT# | DURATION | S/S | REJ | FAIL MODE |
|---|---|---|---|---|---|---|---|
| **STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 6.5V)** | | | | | | | |
| CY7C026-AC(7C026E) | TAIWN-G | 4827620 | 619809368L2 | 48 | 476 | 0 | |
| CY7C026-AC(7C026E) | TAIWN-G | 4827620 | 619809368L2 | 48 | 476 | 0 | |
| CY7C026-AC(7C026E) | TAIWN-G | 4827620 | 619809368L2 | 48 | 56 | 0 | |
| **STRESS: ESD-CHARGE DEVICE MODEL** | | | | | | | |
| CY7C026-AC(7C026E) | TAIWN-G | 4833177 | 619811293 | COMP/500V | 3 | 0 | |
| CY7C017-JCB(7C017E) | PHIL-M | 4833177 | 619812371 | COMP/1000V | 3 | 0 | |
| **STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)** | | | | | | | |
| CY7C026-AC(7C026E) | TAIWN-G | 4833177 | 619811293 | COMP | 3 | 0 | |
| CY7C017-JCB(7C017E) | PHIL-M | 4833177 | 619812371 | COMP | 3 | 0 | |
| **STRESS: STATIC LATCH-UP TESTING (125C, 12V)** | | | | | | | |
| CY7C017-JCB(7C017E) | PHIL-M | 4833177 | 619812371 | COMP | 3 | 0 | |
| **STRESS: PRESSURE COOKER TEST (121C, 100%RH)** | | | | | | | |
| CY7C026-AC(7C026E) | TAIWN-G | 4827620 | 619809368L2 | 168 | 48 | 0 | |
| **STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)** | | | | | | | |
| CY7C026-AC(7C026E) | TAIWN-G | 4827620 | 619809368L2 | 300 | 48 | 0 | |

# RELIABILITY TEST DATA

## QTP#: 98064[1]

| DEVICE | ASSY-LOC | FABLOT# | ASSYLOT# | DURATION | S/S | REJ | FAIL MODE |
|---|---|---|---|---|---|---|---|
| **STRESS: ESD-CHARGE DEVICE MODEL, 1000V** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | COMP | 3 | 0 | |
| **STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2200V** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | COMP | 3 | 0 | |
| **STRESS: STATIC LATCH-UP TESTING (125C, 11V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | COMP | 3 | 0 | |
| **STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V,85%RH), PRECOND. 192 HRS 30C/60%RH** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 128 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738564 | 519712898 | 128 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738564 | 519712898 | 256 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 128 | 46 | 0 | |
| **STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 336 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 500 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 1000 | 46 | 0 | |
| **STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 80 | 78 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 168 | 78 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 80 | 78 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 168 | 78 | 0 | |
| **STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 80 | 528 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 500 | 527 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4745042 | 519800651L1 | 80 | 529 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4745042 | 519800651L1 | 500 | 529 | 0 | |
| **STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 1000 | 527 | 0 | |
| **STRESS: COLD LIFE TEST (-30C, 6.5V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 500 | 45 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 1000 | 45 | 0 | |
| **STRESS: READ & RECORD LIFE TEST (150C, 5.75V)** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 48 | 10 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 500 | 10 | 0 | |

[1] R42HD Technology qualification (1Meg SRAM)

# RELIABILITY TEST DATA

## QTP#: 98064

| DEVICE | ASSY-LOC | FABLOT# | ASSYLOT# | DURATION | S/S | REJ | FAIL MODE |
|---|---|---|---|---|---|---|---|
| **STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH** | | | | | | | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 300 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738602 | 519712560 | 1000 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4738564 | 519712898 | 300 | 46 | 0 | |
| CY7C109-VC(7C109H) | INDNS-O | 4739644 | 519714390 | 300 | 46 | 0 | |

# Document History Page

Document Title: QTP 99395: SYNCHRONOUS/ASYNCHRONOUS DUAL PORT SRAM (3.3V AND 5V) R42HD TECHNOLOGY, FAB 4 QUALIFICATION
Document Number: 001-84795

| Rev. | ECN No. | Orig. of Change | Description of Change |
|---|---|---|---|
| ** | 3819942 | NSR | Initial Release |
| *A | 4202436 | JYF | Sunset review:<br>Complete re-write of Reliability Tests Performed table for template alignment; |
| *B | 4583572 | JYF | Sunset review:<br>Updated QTP title page for template alignment. |

Distribution: WEB

Posting: None