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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# 98424 VERSION*A
June, 2014

| 256K STATIC SRAM, R42HD TECHNOLOGY, FAB 4 | |
|--|----------------------------------|
| CY7C194/195 | 64K x 4 Static RAM (5V) |
| CY7C197 | 256K x 1 Static RAM (5V) |
| CY7C199 | 32K x 8 Static RAM (5V) |

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

Prepared By:
Josephine Pineda
Reliability Engineer

Reviewed By:
Zhaomin Ji
Reliability Manager

Approved By:
Richard Oshiro
Reliability Director

PRODUCT QUALIFICATION HISTORY

| Qual Report | Description of Qualification Purpose | Date Comp |
|-------------|---|-----------|
| 98064 | 1 Meg SRAM fabricated in Fab 4 with R42HD Technology | Feb. 1999 |
| 98424 | 256K STATIC SRAM (CY7C194/195/197/199) - R42DH TECHNOLOGY - FAB 4 | June 2000 |

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION

| | | | |
|---|------------------------------|---------------------|--------------------|
| Package Outline, Type, or Name: | 28-pin, 300-mil SOJ | | |
| Mold Compound Name/Manufacturer | Hitachi CEL 9200 | | |
| Lead Frame material: | Copper | | |
| Lead Finish, composition: | Solder Plated, 90%Sn, 10%Pb | | |
| Die Attach Area Plating: | Silver Spot | | |
| Die Attach Method: | Epoxy | | |
| Die Attach Material: | Ablestik 8361H | | |
| Wire Bond Method: | Thermosonic | Wire Material/Size: | Gold / 1.0/1.3 mil |
| JESD22-A112 Moisture Sensitivity Level : | Level 1 | | |
| Name/Location of Assembly (prime facility) | Cypress Philippines (CSPI-R) | | |

PRODUCT DESCRIPTION (for qualification)

Information provided in this document is intended for generic qualification and technically describes the Cypress part supplied:

| | |
|--|--|
| Marketing Part #: | CY7C199 |
| Device Description: | 32K x 8 Static RAM, R42HD Technology , 28-pin, 300-mil SOJ |
| Cypress Division: | Cypress Semiconductor Corporation – MPD Division |
| Overall Die (or Mask) REV Level (pre-requisite for qualification): | Rev G. |
| What ID markings on Die: | 7C1599C |

TECHNOLOGY/FAB PROCESS DESCRIPTION – RAM42

| | | | |
|---|---|--------------------|---|
| Number of Metal Layers: | 2 | Metal Composition: | Metal 1: 500Å TiW/6000Å Al -5%Cu/1200Å TiW Metal 2: 500Å TiW/8000Å Al -5%Cu/300Å TiW |
| Passivation Type and Materials: | 7000Å SiO ₂ + 6000Å Si ₃ N ₄ | | |
| Free Phosphorus contents in top glass layer(%): | 0% | | |
| 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 | | |

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

RELIABILITY TESTS PERFORMED

| Stress/Test | Test Condition (Temp/Bias) | Result P/F |
|--|--|---------------|
| High Temperature Operating Life Latent Failure Rate | Dynamic Operating Condition, Vcc = 5.75V, 150°C JESD22-A108 | P |
| Extended Dynamic Burn-in | Dynamic Operating Condition, Vcc = 5.75V, 150°C JESD22-A108 | P |
| Read and Record Life Test | Dynamic Operating Condition, Vcc = 5.75V, 150°C JESD22-A108 | P |
| High Temperature Steady State Life | Static Operating Condition, Vcc = 5.75V, 150°C JESD22-A108 | P |
| High Accelerated Saturation Test (HAST) | JEDEC STD 22-A110: 140°C, 85%RH, 5.5V Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30°C, 60% RH) | P |
| Temperature Cycle | MIL-STD-883, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 (192 Hrs, 30C/60%RH) | P |
| Cold Life Test | Dynamic Operating Condition, Vcc = 6.5V, -45 °C JESD22-A108 | P |
| High Temp Storage | JESD22-A103:165°C, No bias | P |
| Electrostatic Discharge Human Body Model (ESD-HBM) | 2,200V MIL-STD-883, Method 3015.7 | P |
| Electrostatic Discharge Charge Device Model (ESD-CDM) | 1000V, JESD22-C101 | P |
| Latchup Sensitivity Static Latchup/ Dynamic Latchup | 11.10V / 7.3V In accordance with JEDEC 17 | P |
| Current Density | Meet Technology Device Level Reliability Specifications | P |
| Aged Bond Pull | MIL-STD-883, Method 2011 | P |

RELIABILITY FAILURE RATE SUMMARY

| Stress/Test | Device Tested/ Device Hours | # Fails | Activation Energy | Thermal AF ⁴ | Failure Rate |
|--|--------------------------------|---------|-------------------|-------------------------|--------------|
| High Temperature Operating Life Early Failure Rate | 3020 | 0 | N/A | N/A | 0 PPM |
| High Temperature Operating Life ^{1,2} , Long Term Failure Rate | 791,500 DHRs | 0 | 0.7 | 170 | 7 FIT |

¹ Assuming an ambient temperature of 55C and a junction temperature rise of 15C.

² Chi-squared 60% estimations used to calculate the failure rate..

³ 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 = 8.62×10^{-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.

⁴ Long Term Failure Rate is based on 1 Meg SRAM, R42HD Technology qualification, QTP#98064

Reliability Test Data

QTP #: 98424

| Device | Fab Lot # | Assy Lot # | Ass Loc | Duration | Samp | Rej | Failure Mechanism |
|--|------------------|-------------------|----------------|-----------------|-------------|------------|--------------------------|
| STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V) | | | | | | | |
| CY7C199-VC | CSPI-R | 4822196 | 619808550 | 48 | 1012 | 0 | |
| CY7C199-VC | CSPI-R | 4822279 | 619809494 | 48 | 1008 | 0 | |
| CY7C199-VC | CSPI-R | 4828707 | 619812830 | 48 | 1000 | 0 | |
| STRESS: ESD-CHARGE DEVICE MODEL (1000V) | | | | | | | |
| CY7C199-VC | CSPI-R | 4828707 | 619812830 | COMP | 3 | 0 | |
| STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V) | | | | | | | |
| CY7C199-VC | CSPI-R | 4828707 | 619812830 | COMP | 3 | 0 | |
| STRESS: PRESSURE COOKER TEST (121C, 100%RH) | | | | | | | |
| CY7C199-VC | CSPI-R | 4828707 | 619812830 | 168 | 48 | 0 | |
| STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1) | | | | | | | |
| CY7C199-VC | CSPI-R | 4828707 | 619812830 | 300 | 48 | 0 | |
| CY7C199-VC | CSPI-R | 4934352 | 619928997 | 1000 | 44 | 0 | |

Reliability Test Data

QTP #: 98064

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

STRESS: ESD-CHARGE DEVICE MODEL, 1000V

| | | | | | | | |
|------------|---------|---------|-----------|------|---|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | COMP | 3 | 0 | |
|------------|---------|---------|-----------|------|---|---|--|

STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2200V

| | | | | | | | |
|------------|---------|---------|-----------|------|---|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | COMP | 3 | 0 | |
|------------|---------|---------|-----------|------|---|---|--|

STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 192 HRS 30C/60%RH

| | | | | | | | |
|------------|---------|---------|-----------|-----|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 128 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738564 | 519712898 | 128 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738564 | 519712898 | 256 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 128 | 46 | 0 | |

STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)

| | | | | | | | |
|------------|---------|---------|-----------|------|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 336 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 500 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 1000 | 46 | 0 | |

STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)

| | | | | | | | |
|------------|---------|---------|-----------|-----|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 80 | 78 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 168 | 78 | 0 | |
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 80 | 78 | 0 | |
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 168 | 78 | 0 | |

STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)

| | | | | | | | |
|------------|---------|---------|-------------|-----|-----|---|--|
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 80 | 528 | 0 | |
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 500 | 527 | 0 | |
| CY7C109-VC | INDNS-O | 4745042 | 519800651L1 | 80 | 529 | 0 | |
| CY7C109-VC | INDNS-O | 4745042 | 519800651L1 | 500 | 529 | 0 | |

STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)

| | | | | | | | |
|------------|---------|---------|-----------|------|-----|---|--|
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 1000 | 527 | 0 | |
|------------|---------|---------|-----------|------|-----|---|--|

STRESS: COLD LIFE TEST (-30C, 6.5V)

| | | | | | | | |
|------------|---------|---------|-----------|------|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 500 | 45 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 1000 | 45 | 0 | |

STRESS: READ & RECORD LIFE TEST (150C, 5.75V)

| | | | | | | | |
|------------|---------|---------|-----------|-----|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 48 | 10 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 500 | 10 | 0 | |

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

| | | | | | | | |
|------------|---------|---------|-----------|------|----|---|--|
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 300 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738602 | 519712560 | 1000 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4738564 | 519712898 | 300 | 46 | 0 | |
| CY7C109-VC | INDNS-O | 4739644 | 519714390 | 300 | 46 | 0 | |

Document History Page

Document Title: QTP #98424: 256K STATIC SRAM (CY7C194/195/197/199) - R42DH TECHNOLOGY - FAB 4
Document Number: 001-88022

| Rev. | ECN No. | Orig. of Change | Description of Change |
|------|---------|-----------------|--|
| ** | 4033729 | ILZ | Initial Spec Release Qualification report published on Cypress.com is not in spec format. Initiated spec for QTP 98424 and removed all Cypress reference spec and replaced with Industry standard. Updated package availability based on current qualified assembly |
| *A | 4417735 | JYF | Sunset review: Updated QTP title page; Updated Reliability Tests Performed table: <ul style="list-style-type: none">- Added industry standard of LFR, Extended Dynamic Burn-In, Read and Record Life Test, HTSSL, HAST, HTS, Cold Life Test and HTS . |

Distribution: WEB

Posting: None