



Cypress Semiconductor Corporation, 198 Champion Court San Jose, CA 95134. Tel: (408) 943-2600

## PRODUCT CHANGE NOTIFICATION

**PCN:** PCN181104A

**Date:** June 13, 2018

**Subject:** Addendum to PCN181104 - Qualification of Fab 25 as an Additional Wafer Fab Site and Test 25 as an Additional Wafer Sort Site for 1.8V 4Mb Parallel nvSRAM Products

**To:** FUTURE ELECTRONICS  
FUTURE ELE  
pcn.system@futureelectronics.com

**Change Type:** Major

### Description of Change:

The purpose of this addendum is to communicate the updated version (QTP#1712609 \*A) of the fab qualification report communicated in PCN181104. This update corrected the wire from CuPd to Au at ASE-Taiwan on page 5 of the attached QTP report and added clarification that the endurance result for QTP 163004 (page 12) is for 1M cycles. The other QTP report attached on the original PCN is accurate and there is no other change to the initial PCN181104.

Cypress announced the qualification of Fab 25 as an additional wafer fab site and Test 25 as an additional wafer sort site in Austin, Texas for 1.8V 4Mb Parallel nvSRAM products. No design or test program changes were made during this fab transfer. There is no change to product datasheets.

### Benefit of Change:

Qualification of alternate manufacturing sites is part of the ongoing flexible manufacturing initiative announced by Cypress. The goal of the flexible manufacturing initiative is to provide the means for Cypress to continue to meet delivery commitments through dynamic, changing market conditions.

### Affected Part Numbers: 12

See the attached 'Affected Parts List' file for a list of all part numbers affected by this change. Note that any new parts that are introduced after the publication of this PCN will include all changes outlined in this PCN.

### Qualification Status:

The new wafer fabrication site and wafer sort site have been qualified through a series of tests identified in the Qualification Test Plans QTP#172609\*A and QTP#171610. The QTP reports can be found as attachments to this notification or by visiting [www.cypress.com](http://www.cypress.com), typing the QTP number in the keyword search window.

**Sample Status:**

Qualification samples may not be built ahead of time for all part numbers affected by this change. Please review the attached 'Affected Parts List' file for a list of affected part numbers with their associated Fab 25 sample ordering part numbers. Samples are available now unless there is an indication that the sample ordering part numbers are subject to lead times. If you require qualification samples, please contact your local Cypress sales representative as soon as possible, preferably within 30 days of the date of this PCN, to place any sample orders.

**Approximate Implementation Date:**

Effective 90 days from the date of this notification, all shipments of the affected part numbers will be fabricated at either SkyWater or Fab 25 and sorted at either SkyWater or Test 25.

**Anticipated Impact:**

Products fabricated at Fab 25 and sorted at Test 25 are completely compatible with existing product from form, fit, functional, parametric and quality performance perspectives.

Cypress also recommends that customers take this opportunity to review these changes against current application notes, system design considerations and customer environment conditions to assess impact (if any) to their application.

**Method of Identification:**

Cypress maintains traceability of product to wafer level, including wafer fabrication location, through the lot number marked on the package.

**Response Required:**

No response is required.

For additional information regarding this change, contact your local sales representative or contact the PCN Administrator at [pcn\\_adm@cypress.com](mailto:pcn_adm@cypress.com).

Sincerely,

Cypress PCN Administration

| Item | Marketing Part Number | Sample Order Part Number                |
|------|-----------------------|-----------------------------------------|
| 1    | CY14V104LA-BA25XI     | CY14V104LA2-BA25XI Subject to lead time |
| 2    | CY14V104LA-BA25XIT    | CY14V104LA2-BA25XI Subject to lead time |
| 3    | CY14V104LA-BA45XI     | CY14V104LA2-BA45XI Subject to lead time |
| 4    | CY14V104LA-BA45XIT    | CY14V104LA2-BA45XI Subject to lead time |
| 5    | CY14V104NA-BA25XI     | CY14V104NA2-BA25XI                      |
| 6    | CY14V104NA-BA25XIT    | CY14V104NA2-BA25XI                      |
| 7    | CY14V104NA-BA45XI     | CY14V104NA2-BA45XI Subject to lead time |
| 8    | CY14V104NA-BA45XIT    | CY14V104NA2-BA45XI Subject to lead time |
| 9    | CG8084AA              | CG8084BA                                |
| 10   | CG8084AAT             | CG8084BA                                |
| 11   | CG8411AA              | CG8411BA Subject to lead time           |
| 12   | CG8411AAT             | CG8411BA Subject to lead time           |

# Cypress Semiconductor Product Qualification Report

**QTP# 172609 VERSION\*A**  
**March 2018**

| <b>4M Parallel 1.8V IO nvSRAM Device Family</b><br><b>S8TNV1-5 Technology, Fab 25</b> |                           |
|---------------------------------------------------------------------------------------|---------------------------|
| CY14V104NA*                                                                           | 4M-bit (256K X 16) nvSRAM |
| CY14V104LA*                                                                           | 4M-bit (512K X 8) nvSRAM  |

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

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

**Reviewed By:**  
Sandhya Chandrashekhar (SANC)  
Principal Reliability Engineer

**Approved By:**  
David Hoffman (DHH)  
Reliability Director

**PRODUCT QUALIFICATION HISTORY**

| <b>QTP Number</b> | <b>Description of Qualification Purpose</b>                                | <b>Date</b>    |
|-------------------|----------------------------------------------------------------------------|----------------|
| 151008            | Qualification of S8* Technology in Fab25 using TSG6M Device                | December 2015  |
| 163004            | S8TNV Fab Transfer Qualification at Fab 25 using 4M Parallel nvSRAM Device | September 2017 |
| 172609            | Qualification of 4M 1.8V IO nvSRAM Device, S8TNV1-5 Technology in Fab 25   | March 2018     |

| PRODUCT DESCRIPTION (for qualification)                                                        |                                                        |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Qualification Purpose: To qualify 4M 1.8V IO nvSRAM device at Fab 25 using S8TNV1-5 technology |                                                        |
| Marketing Part #:                                                                              | CY14V104NA*/ CY14V104LA*                               |
| Device Description:                                                                            | 4M Parallel 1.8V IO nvSRAM Device                      |
| Cypress Division:                                                                              | Cypress Semiconductor – Memory Products Division (MPD) |

| TECHNOLOGY/FAB PROCESS DESCRIPTION                      |             |                    |             |
|---------------------------------------------------------|-------------|--------------------|-------------|
| Number of Metal Layers:                                 | Proprietary | Metal Composition: | Proprietary |
| Passivation Type and Thickness:                         | Proprietary |                    |             |
| Generic Process Technology/Design Rule ( $\mu$ -drawn): | Proprietary |                    |             |
| Gate Oxide Material/Thickness (MOS):                    | Proprietary |                    |             |
| Name/Location of Die Fab (prime) Facility:              | Fab 25      |                    |             |
| Die Fab Line ID/Wafer Process ID:                       | SRT3NNDD    |                    |             |

### MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION

|                                                |                                     |
|------------------------------------------------|-------------------------------------|
| Package Designation:                           | BK48                                |
| Package Outline, Type, or Name:                | 48-Ball FBGA (Fine Ball Grid Array) |
| Mold Compound Name/Manufacturer:               | KE-G2270 / Kyocera                  |
| Mold Compound Flammability Rating:             | V-0 / UL94                          |
| Oxygen Rating Index: >28%                      | N/A                                 |
| Substrate Material:                            | BT Resin                            |
| Solder Ball Finish:                            | Sn/Ag/Cu (SAC) -105                 |
| Die Backside Preparation Method/Metallization: | Backgrind                           |
| Die Separation Method:                         | Saw Process                         |
| Die Attach Supplier:                           | Henkel                              |
| Die Attach Material:                           | 2025D                               |
| Bond Diagram Designation                       | 001-62319                           |
| Wire Bond Method:                              | Thermosonic                         |
| Wire Material/Size:                            | Au/0.9 mil (23um)                   |
| Thermal Resistance Theta JA °C/W:              | 39.9 °C/W                           |
| Package Cross Section Yes/No:                  | Yes                                 |
| Assembly Process Flow:                         | 49-41040                            |
| Name/Location of Assembly (prime) facility:    | ASE-Taiwan (G)                      |
| MSL Level                                      | 3                                   |
| Reflow Profile                                 | 260C                                |

### ELECTRICAL TEST / FINISH DESCRIPTION

|                |       |
|----------------|-------|
| Test Location: | CML-R |
|----------------|-------|

### MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION

|                                                |                                     |
|------------------------------------------------|-------------------------------------|
| Package Designation:                           | BK48                                |
| Package Outline, Type, or Name:                | 48-Ball FBGA (Fine Ball Grid Array) |
| Mold Compound Name/Manufacturer:               | KMC3580LVA /ShinEtsu                |
| Mold Compound Flammability Rating:             | V-0 / UL94                          |
| Oxygen Rating Index: >28%                      | N/A                                 |
| Substrate Material:                            | BT Resin                            |
| Solder Ball Finish:                            | Sn/Ag/Cu (SAC) -105                 |
| Die Backside Preparation Method/Metallization: | Backgrind                           |
| Die Separation Method:                         | Saw Process                         |
| Die Attach Supplier:                           | Sumitomo                            |
| Die Attach Material:                           | CRM-1577DB                          |
| Bond Diagram Designation                       | 001-98462                           |
| Wire Bond Method:                              | Thermosonic                         |
| Wire Material/Size:                            | CuPd/0.8 mil (20um)                 |
| Thermal Resistance Theta JA °C/W:              | 39.9 °C/W                           |
| Package Cross Section Yes/No:                  | Yes                                 |
| Assembly Process Flow:                         | 001-97055                           |
| Name/Location of Assembly (prime) facility:    | Bangkok-Thailand (SB)               |
| MSL Level                                      | 3                                   |
| Reflow Profile                                 | 260C                                |

### ELECTRICAL TEST / FINISH DESCRIPTION

|                |       |
|----------------|-------|
| Test Location: | CML-R |
|----------------|-------|



**PACKAGE AVAILABILITY**

| PACKAGE      | ASSEMBLY FACILITY SITE | WIRE MATERIAL |
|--------------|------------------------|---------------|
| 48-Ball FBGA | ASE-Taiwan (G)         | Au            |
|              | Bangkok-Thailand (SB)  | CuPd          |

## RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

| Stress/Test                                                        | Test Condition (Temp/Bias)                                                                                                                          | Result P/F |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Acoustic Microscopy                                                | J-STD-020<br>Precondition: JESD22 Moisture Sensitivity Level<br>(192 Hrs., 30 °C, 60% RH, 260°C Reflow)                                             | P          |
| Age Bond Strength                                                  | 200°C, 4HRS MIL-STD-883, Method 883-2011                                                                                                            | P          |
| Data Retention                                                     | 150°C/175°C, No Bias<br>JESD22-A117 and JESD22-A103                                                                                                 | P          |
| Electrostatic Discharge Charge Device Model (ESD-CDM)              | 500V/750V/1,000V/1,250V/1,500V/1,750V/2,000V<br>JESD22-C101                                                                                         | P          |
| Electrostatic Discharge Human Body Model (ESD-HBM)                 | 1,100V/2,200V /3,300V/4,000V/5,000V/6,000V/7,000V<br>JESD22, Method A114                                                                            | P          |
| Endurance Test                                                     | Per Datasheet (100K Cycles), JESD22-A117<br>Per Datasheet (1M Cycles), JESD22-A117                                                                  | P          |
| High Accelerated Saturation Test (HAST)                            | JEDEC STD 22-A110: 130°C, 85% RH, 3.3V/5.5V<br>Precondition: JESD22 Moisture Sensitivity Level<br>(192 Hrs., 30 °C, 60% RH, 260°C Reflow)           | P          |
| High Temperature Operating Life Early Failure Rate – Regulator On  | Dynamic Operating Condition, Vcc Max=3.3V,150°C<br>JESD22-A-108                                                                                     | P          |
| High Temperature Operating Life Early Failure Rate – Regulator Off | Dynamic Operating Condition, Vcc Max=2.07V/3.3V/5.0V,150°C<br>JESD22-A-108                                                                          | P          |
| High Temperature Operating Life Latent Failure Rate                | Dynamic Operating Condition, Vcc Max=2.0V/3.3V,150°C<br>JESD22-A-108                                                                                | P          |
| Low Temperature Operating Life                                     | Dynamic Operating Condition, -40°C<br>JESD22-A108                                                                                                   | P          |
| Pressure Cooker                                                    | JESD22-A102:121°C /100%RH, 15 PSIG<br>Precondition: JESD22 Moisture Sensitivity Level<br>(192 Hrs., 30 °C, 60% RH, 260°C Reflow)                    | P          |
| Pre/Post LFR AC/DC Char                                            | AC/DC Critical Parameter Char at 0 hour/500hrs                                                                                                      | P          |
| Soft Error (Alpha Particle)                                        | JESD89                                                                                                                                              | P          |
| Soft Error (Neutron)                                               | JESD89                                                                                                                                              | P          |
| Static Latch-up                                                    | 85°C, +/- 140mA, +/- 200mA, +/-300mA<br>125°C, +/-100mA, +/-140mA<br>JESD 78                                                                        | P          |
| Temperature Cycle                                                  | MIL-STD-883, Method 1010, Condition C, -65°C to 150°C<br>Precondition: JESD22 Moisture Sensitivity Level<br>(192 Hrs., 30 °C, 60% RH, 260°C Reflow) | P          |

### RELIABILITY FAILURE RATE SUMMARY

| Stress/Test                                               | Device Tested/<br>Device Hours | #<br>Fails | Activation<br>Energy | Thermal<br>AF <sup>3</sup> | Failure Rate          |
|-----------------------------------------------------------|--------------------------------|------------|----------------------|----------------------------|-----------------------|
| High Temperature Operating Life<br>Early Failure Rate     | 2,130 Devices                  | 0          | N/A                  | N/A                        | 0 PPM <sup>(1)</sup>  |
| High Temperature Operating Life<br>Long Term Failure Rate | 298,000 DHRs                   | 0          | 0.7                  | 170                        | 18 FIT <sup>(2)</sup> |

1. Early Failure Rate was computed from QTP# 172609.
2. Long Term Failure Rate was computed from QTP#151008 and QTP# 163004 LFR data.

<sup>1</sup> Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.

<sup>2</sup> Chi-squared 60% estimations used to calculate the failure rate.

<sup>3</sup> 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.

## Reliability Test Data

**QTP #: 151008**

| Device                                                                                    | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|-------------------------------------------------------------------------------------------|-----------|------------|----------|----------|------|-----|-------------------|
| <b>STRESS: ACOUSTIC, MSL3</b>                                                             |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | COMP     | 15   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | COMP     | 15   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | COMP     | 15   | 0   |                   |
| <b>STRESS: DATA RETENTION, PLASTIC, 150C</b>                                              |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 500      | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 1000     | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 500      | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 1000     | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | 500      | 80   | 0   |                   |
| <b>STRESS: DATA RETENTION, PLASTIC, 175C</b>                                              |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 76       | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 152      | 79   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 76       | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 152      | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | 76       | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | 152      | 80   | 0   |                   |
| <b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 2.07V, Vcc Max)</b> |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 48       | 1490 | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 48       | 1510 | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4545249   | 611537364  | CML-RA   | 48       | 1547 | 0   |                   |
| <b>STRESS: ENDURANCE (100K CYCLES)</b>                                                    |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | CYCLING  | 78   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 168      | 78   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 500      | 78   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | CYCLING  | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 168      | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4540145   | 611534709  | CML-RA   | 500      | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | CYCLING  | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | 168      | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                      | 4537464   | 611531543  | CML-RA   | 500      | 80   | 0   |                   |
| <b>STRESS: ESD-CHARGE DEVICE MODEL</b>                                                    |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 500      | 9    | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 750      | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 1000     | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 1250     | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 1500     | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                    | 4539372   | 611534008  | CML-RA   | 1750     | 3    | 0   |                   |

## Reliability Test Data

**QTP #: 151008**

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

**STRESS: ESD-CHARGE DEVICE MODEL**

|                        |         |           |        |      |   |   |  |
|------------------------|---------|-----------|--------|------|---|---|--|
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 500  | 9 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 750  | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 1000 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 1250 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 1500 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 1750 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 500  | 9 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 750  | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 1000 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 1250 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 1500 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 1750 | 3 | 0 |  |

**STRESS: ESD-HUMAN BODY MODEL PER JESD22, METHOD A114**

|                        |         |           |        |      |   |   |  |
|------------------------|---------|-----------|--------|------|---|---|--|
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 1100 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 2200 | 8 | 0 |  |
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 3300 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 4000 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 5000 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 1100 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 2200 | 8 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 3300 | 3 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 4000 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 1100 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 2200 | 8 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 3300 | 3 | 0 |  |
| CY8C42452 (8CP44200)   | 4537464 | 611531543 | CML-RA | 4000 | 3 | 0 |  |

**STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 5.5V), PRE COND 192 HR 30C/60%RH (MSL3)**

|                        |         |           |        |    |    |   |  |
|------------------------|---------|-----------|--------|----|----|---|--|
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 96 | 30 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 96 | 30 | 0 |  |

**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 2.07V, Vcc Max)**

|                        |         |           |        |     |     |   |  |
|------------------------|---------|-----------|--------|-----|-----|---|--|
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 80  | 116 | 0 |  |
| CYTT214032 (8CP206101) | 4539372 | 611534008 | CML-RA | 500 | 116 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 80  | 120 | 0 |  |
| CYTT214032 (8CP206101) | 4540145 | 611534709 | CML-RA | 500 | 120 | 0 |  |

## Reliability Test Data

**QTP #: 151008**

| Device                                                                                        | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|-----------------------------------------------------------------------------------------------|-----------|------------|----------|----------|------|-----|-------------------|
| <b>STRESS: LOW TEMPERATURE OPERATING LIFE, -40C</b>                                           |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | 160      | 40   | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | 380      | 40   | 0   |                   |
| <b>STRESS: PRESSURE COOKER TEST (121C, 100%RH), 15 Psig, PRE COND 192 HR 30C/60%RH (MSL3)</b> |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | 168      | 75   | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | 168      | 78   | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | 168      | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | 288      | 80   | 0   |                   |
| <b>STRESS: PRE/POST LFR PARAMETER ASSESSMENT</b>                                              |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 10+2 | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | COMP     | 10+2 | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | COMP     | 10+2 | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 140mA)</b>                                                   |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 6    | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | COMP     | 6    | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | COMP     | 6    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 200mA)</b>                                                   |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | COMP     | 3    | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 300mA)</b>                                                   |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 3    | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | COMP     | 3    | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | COMP     | 3    | 0   |                   |
| <b>STRESS: SEM CROSS SECTION</b>                                                              |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 1    | 0   |                   |
| <b>STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH (MSL3)</b>                     |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | 500      | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | 1000     | 80   | 0   |                   |
| CYTT214032 (8CP206101)                                                                        | 4540145   | 611534709  | CML-RA   | 500      | 80   | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | 500      | 79   | 0   |                   |
| CY8C42452 (8CP44200)                                                                          | 4537464   | 611531543  | CML-RA   | 1000     | 79   | 0   |                   |
| <b>STRESS: THERMAL JUNCTION MEASUREMENT</b>                                                   |           |            |          |          |      |     |                   |
| CYTT214032 (8CP206101)                                                                        | 4539372   | 611534008  | CML-RA   | COMP     | 1    | 0   |                   |

## Reliability Test Data

**QTP #: 163004**

| Device                                       | Fab Lot | Assy Lot # | Assy Loc         | Duration | Samp | Rej | Failure Mechanism |
|----------------------------------------------|---------|------------|------------------|----------|------|-----|-------------------|
| <b>STRESS: ACOUSTIC, MSL3</b>                |         |            |                  |          |      |     |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4647620 | 611645509  | CML-RA           | COMP     | 22   | 0   |                   |
| CY14B104K2 (7C1404B1D)                       | 4652108 | 611703935  | CML-RA           | COMP     | 22   | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | COMP     | 22   | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 3721074 | 611723439  | CML-RA           | COMP     | 22   | 0   |                   |
| CY14B104NA2 (7C1404B6D)                      | 4715938 | 611723536  | CML-RA           | COMP     | 22   | 0   |                   |
| <b>STRESS: AGED BOND STRENGTH</b>            |         |            |                  |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                      | 4647620 | 611645506  | CML-RA           | COMP     | 3    | 0   |                   |
| <b>STRESS: DATA RETENTION, PLASTIC, 150C</b> |         |            |                  |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 1000     | 80   | 0   |                   |
| <b>STRESS: ENDURANCE (1M CYCLES)</b>         |         |            |                  |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA CYCLING |          | 80   | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 168      | 80   | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 500      | 80   | 0   |                   |
| <b>STRESS: ESD-CHARGE DEVICE MODEL</b>       |         |            |                  |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 500      | 9    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 750      | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 1000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 1250     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 1500     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 1750     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4647620 | 611646995  | JT-CHINA         | 2000     | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 500      | 9    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 750      | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 1000     | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 1250     | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 1500     | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 1750     | 3    | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                     | 4652108 | 611703705  | G-TAIWAN         | 2000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 500      | 9    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 750      | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 1000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 1250     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 1500     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 1750     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                      | 4652108 | 611705917  | JT-CHINA         | 2000     | 3    | 0   |                   |

## Reliability Test Data

**QTP #: 163004**

| Device                                                      | Fab Lot | Assy Lot # | Assy Loc  | Duration | Samp | Rej | Failure Mechanism |
|-------------------------------------------------------------|---------|------------|-----------|----------|------|-----|-------------------|
| <b>STRESS: ESD-CHARGE DEVICE MODEL</b>                      |         |            |           |          |      |     |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 500      | 9    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 750      | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 1000     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 1250     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 1500     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 1750     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 4652108 | 611705462  | GM-TAIWAN | 2000     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 500      | 9    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 750      | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 1000     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 1250     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 1500     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 1750     | 3    | 0   |                   |
| CY14B104M2 (7C1404B2D)                                      | 3720073 | 611726034  | GM-TAIWAN | 2000     | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 500      | 9    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 750      | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 1000     | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 1250     | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 1500     | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 1750     | 3    | 0   |                   |
| CY14B104NA2 (7CP1404B6D)                                    | 3720073 | 611728313  | GM-TAIWAN | 2000     | 3    | 0   |                   |
| <b>STRESS: ESD-HUMAN BODY MODEL PER JESD22, METHOD A114</b> |         |            |           |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 1100     | 3    | 0   |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 2200     | 8    | 0   |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 3300     | 3    | 0   |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 4000     | 3    | 0   |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 5000     | 3    | 0   |                   |
| CY14B104K2 (7CC1404B1D)                                     | 4647620 | 611645506  | CML-RA    | 6000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 1100     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 2200     | 8    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 3300     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 4000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 5000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 6000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                     | 4647620 | 611646995  | JT-CHINA  | 7000     | 3    | 0   |                   |



## Reliability Test Data

**QTP #: 163004**

| Device                                                                                            | Fab Lot | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---------------------------------------------------------------------------------------------------|---------|------------|----------|----------|------|-----|-------------------|
| <b>STRESS: ESD-HUMAN BODY MODEL PER JESD22, METHOD A114</b>                                       |         |            |          |          |      |     |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 1100     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 2200     | 8    | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 3300     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 4000     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 5000     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 6000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 1100     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 2200     | 8    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 3300     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 4000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 5000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 6000     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 7000     | 3    | 0   |                   |
| <b>STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 3.3V), PRE COND 192 HR 30C/60%RH (MSL3)</b>     |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                                                                           | 4647620 | 611645506  | CML-RA   | 96       | 30   | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 96       | 30   | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                                                                          | 4652108 | 611703705  | G-TAIWAN | 96       | 30   | 0   |                   |
| <b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, REG-ON (150C, 3.3V, Vcc Max)</b>  |         |            |          |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4647620 | 611646995  | JT-CHINA | 48       | 50   | 0   |                   |
| <b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, REG-OFF (150C, 3.3V, Vcc Max)</b> |         |            |          |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4647620 | 611646995  | JT-CHINA | 48       | 3400 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 48       | 3399 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 3721074 | 611722753  | JT-CHINA | 48       | 1489 | 0   |                   |
| <b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.3V, Vcc Max)</b>         |         |            |          |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4647620 | 611646995  | JT-CHINA | 80       | 120  | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4647620 | 611646995  | JT-CHINA | 500      | 120  | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 80       | 120  | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4652108 | 611705917  | JT-CHINA | 500      | 120  | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4703546 | 611706560  | JT-CHINA | 80       | 120  | 0   |                   |
| CY14B104NA2 (7A1404B6D)                                                                           | 4703546 | 611706560  | JT-CHINA | 500      | 120  | 0   |                   |
| <b>STRESS: PRESSURE COOKER TEST (121C, 100%RH), 15 Psig, PRE COND 192 HR 30C/60%RH (MSL3)</b>     |         |            |          |          |      |     |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 96       | 80   | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 168      | 79   | 0   |                   |
| CY14B104K2 (7C1404B1D)                                                                            | 4652108 | 611703935  | CML-RA   | 288      | 79   | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                                                                          | 4652108 | 611703705  | G-TAIWAN | 168      | 80   | 0   |                   |
| CY14B104NA2 (7CC1404B6D)                                                                          | 3721074 | 611723439  | CML-RA   | 168      | 80   | 0   |                   |
| CY14B104NA2 (7C1404B6D)                                                                           | 4715938 | 611723536  | CML-RA   | 168      | 80   | 0   |                   |

## Reliability Test Data

**QTP #: 163004**

| Device                                           | Fab Lot | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|--------------------------------------------------|---------|------------|----------|----------|------|-----|-------------------|
| <b>STRESS: PRE/POST LFR PARAMETER ASSESSMENT</b> |         |            |          |          |      |     |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | 0        | 10+2 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | 500      | 10+2 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | 0        | 10+2 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | 500      | 10+2 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4703546 | 611706560  | JT-CHINA | 0        | 10+2 | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4703546 | 611706560  | JT-CHINA | 500      | 10+2 | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (125C, 100mA)</b>     |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | COMP     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                           | 4652108 | 611703935  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (125C, 140mA)</b>     |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | COMP     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                           | 4652108 | 611703935  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 140mA)</b>      |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | COMP     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                           | 4652108 | 611703935  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 200mA)</b>      |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | COMP     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                           | 4652108 | 611703935  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 300mA)</b>      |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4647620 | 611646995  | JT-CHINA | COMP     | 3    | 0   |                   |
| CY14B104K2 (7C1404B1D)                           | 4652108 | 611703935  | CML-RA   | COMP     | 3    | 0   |                   |
| CY14B104NA2 (7A1404B6D)                          | 4652108 | 611705917  | JT-CHINA | COMP     | 3    | 0   |                   |
| <b>STRESS: SER – ALPHA PARTICLE SEL</b>          |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |
| <b>STRESS: SER – NEUTRON SEL</b>                 |         |            |          |          |      |     |                   |
| CY14B104K2 (7CC1404B1D)                          | 4647620 | 611645506  | CML-RA   | COMP     | 3    | 0   |                   |



## Reliability Test Data

**QTP #: 163004**

| <i>Device</i>                                                             | <i>Fab Lot</i> | <i>Assy Lot #</i> | <i>Assy Loc</i> | <i>Duration</i> | <i>Samp</i> | <i>Rej</i> | <i>Failure Mechanism</i> |
|---------------------------------------------------------------------------|----------------|-------------------|-----------------|-----------------|-------------|------------|--------------------------|
| <b>STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH (MSL3)</b> |                |                   |                 |                 |             |            |                          |
| CY14B104NA2 (7CC1404B6D)                                                  | 4647620        | 611645509         | CML-RA          | 500             | 80          | 0          |                          |
| CY14B104NA2 (7CC1404B6D)                                                  | 4647620        | 611645509         | CML-RA          | 1000            | 80          | 0          |                          |
| CY14B104K2 (7C1404B1D)                                                    | 4652108        | 611703935         | CML-RA          | 500             | 80          | 0          |                          |
| CY14B104K2 (7C1404B1D)                                                    | 4652108        | 611703935         | CML-RA          | 1000            | 80          | 0          |                          |
| CY14B104NA2 (7CC1404B6D)                                                  | 4652108        | 611703705         | G-TAIWAN        | 500             | 79          | 0          |                          |
| CY14B104NA2 (7CC1404B6D)                                                  | 3721074        | 611723439         | CML-RA          | 500             | 79          | 0          |                          |
| <b>STRESS: THERMAL JUNCTION MEASUREMENT</b>                               |                |                   |                 |                 |             |            |                          |
| CY14B104K2 (7CC1404B1D)                                                   | 4647620        | 611645506         | CML-RA          | COMP            | 1           | 0          |                          |

## Reliability Test Data

**QTP #: 172609**

| Device                                                                                          | Fab Lot | Assy Lot # | Assy Loc    | Duration | Samp | Rej | Failure Mechanism |
|-------------------------------------------------------------------------------------------------|---------|------------|-------------|----------|------|-----|-------------------|
| <b>STRESS: ACOUSTIC, MSL3</b>                                                                   |         |            |             |          |      |     |                   |
| CY14V104NA2 (7CP1424B6D)                                                                        | 3743153 | 611745754  | SB-THAILAND | COMP     | 22   | 0   |                   |
| <b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, REG-OFF (150C, 5V, Vcc Max)</b> |         |            |             |          |      |     |                   |
| CY14V104NA2 (7CP1424B6D)                                                                        | 3743153 | 611745754  | SB-THAILAND | COMP     | 2130 | 0   |                   |
| <b>STRESS: ESD-CHARGE DEVICE MODEL</b>                                                          |         |            |             |          |      |     |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 500      | 9    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 1000     | 3    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 1250     | 3    | 0   |                   |
| <b>STRESS: ESD-HUMAN BODY MODEL PER JESD22, METHOD A114</b>                                     |         |            |             |          |      |     |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | 1100     | 3    | 0   |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | 2200     | 8    | 0   |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | 3300     | 3    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 1100     | 3    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 2200     | 8    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | 3300     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (125C, 100mA)</b>                                                    |         |            |             |          |      |     |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | COMP     | 3    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | COMP     | 3    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (125C, 140mA)</b>                                                    |         |            |             |          |      |     |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 140mA)</b>                                                     |         |            |             |          |      |     |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| <b>STRESS: STATIC LATCH-UP (85C, 200mA)</b>                                                     |         |            |             |          |      |     |                   |
| CY14V104LA2 (7C1424B8D)                                                                         | 3743153 | 611746122  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| CY14V104NA2 (7C1424B6D)                                                                         | 3743153 | 611746121  | G-TAIWAN    | COMP     | 2    | 0   |                   |
| <b>STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH (MSL3)</b>                       |         |            |             |          |      |     |                   |
| CY14V104NA2 (7CP1424B6D)                                                                        | 3743153 | 611745754  | SB-THAILAND | 500      | 80   | 0   |                   |

Note: Lot 611746122 also covers CG8084BA MPN

## Document History Page

Document Title: QTP# 172609: 4M 1.8V IO nvSRAM Device, S8TNV1-5 Technology in Fab 25  
Document Number: 002-23246

| Rev. | ECN No. | Orig. of Change | Description of Change                                                                |
|------|---------|-----------------|--------------------------------------------------------------------------------------|
| **   | 6089625 | JYF             | Initial spec release.                                                                |
| *A   | 6109243 | JYF             | Minor update (formatting) and addition of Endurance cycles in Reliability Test Data. |

# Cypress Semiconductor Sort Site Qualification Report

**QTP# 171610 VERSION \*A  
September 2017**

**Cypress Test 25, Austin, Texas**

**Sort Site for S8 Technology**

**MPD / MCD Devices**

**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:**  
Lorena Zapanta  
Reliability Manager

**Approved By:**  
David Hoffman  
Reliability Director

**PACKAGE/PRODUCT QUALIFICATION HISTORY**

| <b>QTP<br/>Number</b> | <b>Description of Qualification Purpose</b>                              | <b>Date</b> |
|-----------------------|--------------------------------------------------------------------------|-------------|
| 151907                | Cypress Test 25, Austin, Texas Sort Site Qualification for S4 Technology | June 2015   |
| 171610                | Cypress Test 25, Austin, Texas Sort Site Qualification for S8 Technology | April 2017  |

### QUALIFICATION COVERAGE RANGE

| MARKETING PART NUMBER                                                                                                                                               | DEVICE DESCRIPTION                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| CY8C4013 / CY8C4014 / CY8CMBR3002 / CY8CMBR3102 / CY8CMBR3110                                                                                                       | CapSense® MBR3                                     |
| CY8CMBR31 / CY8C4013 / CY8C4014                                                                                                                                     | PSoC® 4000                                         |
| CY8C4014                                                                                                                                                            | Automotive PSoC® 4000                              |
| CY8C4124 / CY8C4125 / CY8C4244 / CY8C4245                                                                                                                           | PSoC® 4100 & PSoC® 4200                            |
| CY8C4124 / CY8C4125 / CY8C4244 / CY8C4245                                                                                                                           | Automotive PSoC® 4100 & PSoC® 4200                 |
| CY8CEBIKE                                                                                                                                                           | PSoC® 4100 & PSoC® 4200                            |
| CY8C4125 / CY8C4126 / CY8C4127                                                                                                                                      | PSoC® 4100M & PSoC® 4200M M Series                 |
| CY8C4245 / CY8C4246 / CY8C4247                                                                                                                                      | PSoC® 4100M & PSoC® 4200M M Series                 |
| CY8C4246 / CY8C4247 / CY8C4248                                                                                                                                      | PSoC® 4200L L-Series                               |
| CY8C4127 / CY8C4247                                                                                                                                                 | PSoC® 4 BLE 128K                                   |
| CYBL1016 / CYBL10162 / CYBL10163                                                                                                                                    | PRoCTM-BLE 128K                                    |
| CYBL10461 / CYBL10462 / CYBL10463                                                                                                                                   | PRoCTM-BLE 128K                                    |
| CYBL10561 / CYBL10562 / CYBL10563                                                                                                                                   | PRoCTM-BLE 128K                                    |
| CYBL10999                                                                                                                                                           | PRoCTM-BLE 128K                                    |
| CY8C4128 / CY8C4248                                                                                                                                                 | PSoC® 4 BLE 256K                                   |
| CYBL10573                                                                                                                                                           | PRoCTM-BLE 256K                                    |
| CY8C3244 / CY8C3245 / CY8C3246 / CY8C3444                                                                                                                           | Automotive PSoC® 3                                 |
| CY8C3445 / CY8C3446 / CY8C3645 / CY8C3646<br>CY8C3665 / CY8C3666 / CY8C3846 / CY8C3866 /                                                                            | Automotive PSoC® 3                                 |
| CY8C3244 / CY8C3245 / CY8C3246 / CY8C3444                                                                                                                           | PSoC® 3                                            |
| CY8C3445 / CY8C3446 / CY8C3665 / CY8C3666 / CY8C3846 / CY8C3865 / CY8C3866 / CY8C3MFIDOCK / CY8C3USBAUDIO                                                           | PSoC® 3                                            |
| CY8C5267 / CY8C5268 / CY8C5287 / CY8C5288 / CY8C5467 / CY8C5468 / CY8C5488 / CY8C5666<br>CY8C5667 / CY8C5668 / CY8C5688 / CY8C5866 / CY8C5867 / CY8C5868 / CY8C5888 | PSoC® 5LP                                          |
| CY8CTMA1036 / CY8CTMA460 / CY8CTMA461 / CY8CTMA768                                                                                                                  | Automotive True Touch® Gen4 Touchscreen Controller |



### QUALIFICATION COVERAGE RANGE

| MARKETING PART NUMBER                                                                           | DEVICE DESCRIPTION                                   |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------|
| CYTMA445A / CYTMA525A / CYTT21100<br>CYTT21401 / CYTT21402 / CYTT21403                          | True Touch® Gen6M Touchscreen Controller             |
| CYTT21100 / CYTT21401 / CYTT21402<br>CYTT21403 / CYTT31401 / CYTT31702<br>CYTT31802 / CYTT32302 | True Touch® Gen6L Touchscreen Controller             |
| CYAT81682 / CYAT81685 / CYAT81688                                                               | Automotive True Touch® Gen6XL Touchscreen Controller |
| CYFPA1I                                                                                         | True Touch® Fingerprint                              |
| CYPD1103 / CYPD1104 / CYPD1105<br>CYPD1120 / CYPD1121 / CYPD1122<br>CYPD1134                    | EZ-PDTM CCG1 USB Type-C PD Controller                |
| CYPD2103 / CYPD2104 / CYPD2105<br>CYPD2119 / CYPD2120 / CYPD2134                                | EZ-PDTM CCG2 USB Type-C PD Controller                |
| CY7C65210 / CY7C65211 / CY7C65213<br>CY7C65215 / CY7C65217 / CY7C65221                          | USB-Serial Bridge Controller                         |
| CY14B064 / CY14E064 / CY14MB064 / CY14ME064                                                     | 64Kb Serial nvSRAM                                   |
| CY14B256 / CY14E256                                                                             | 256Kb Serial nvSRAM                                  |
| CY14B512                                                                                        | 512Kb Serial nvSRAM                                  |
| CY14B101 / CY14E101                                                                             | 1Mb Serial nvSRAM                                    |
| CY14V101                                                                                        | 1Mb Quad SPI nvSRAM                                  |
| CY14B256 / CY14E256 / CY14U256 / CY14V256                                                       | 256Kb Parallel nvSRAM                                |
| CY14101V / CY14B101 / CY14V101                                                                  | 1Mb Parallel nvSRAM                                  |
| CY14B102NS                                                                                      | 2Mb Parallel nvSRAM                                  |
| CY14104V / CY14B104 / CY14V104                                                                  | 4Mb Parallel nvSRAM                                  |
| CY14B108 / CYATB108                                                                             | 8Mb Parallel nvSRAM                                  |
| CY14B116 / CY14V116 / CY14E116                                                                  | 16Mb Parallel nvSRAM                                 |
| CY27410F / CY27410L                                                                             | 4-PLL Spread-Spectrum Clock Generator                |

## Reliability Test Data

**QTP #: 151907**

| <i>Device</i>                        | <i>Fab Lot #</i>   | <i>Assembly Lot#</i> | <i>Test Loc</i> | <i>Yield</i> |
|--------------------------------------|--------------------|----------------------|-----------------|--------------|
| <b><i>SORT TEST: CORRELATION</i></b> |                    |                      |                 |              |
| <b>Sort Yield:</b>                   |                    |                      |                 |              |
| 8C24094AC                            | 4446219 w2, w4, w5 | N/A                  | CMI-FAB25       | Correlated   |
| 8A24094AC                            | 4510997 w5, w6, w7 | N/A                  | CMI-FAB25       | Correlated   |
| 8A24094AC                            | 4506339 w6, w7, w8 | N/A                  | CMI-FAB25       | Correlated   |
| <b>Bin Movement:</b>                 |                    |                      |                 |              |
| 8C24094AC                            | 4446219 w2         | N/A                  | CMI-FAB25       | Correlated   |
| 8A24094AC                            | 4510997 w5         | N/A                  | CMI-FAB25       | Correlated   |
| 8A24094AC                            | 4506339 w6         | N/A                  | CMI-FAB25       | Correlated   |
| <b>Fishers Exact:</b>                |                    |                      |                 |              |
| 8C24094AC                            | 4446219 w2, w4, w5 | N/A                  | CMI-FAB25       | >0.05        |
| 8A24094AC                            | 4510997 w5, w6, w7 | N/A                  | CMI-FAB25       | >0.05        |
| 8A24094AC                            | 4506339 w6, w7, w8 | N/A                  | CMI-FAB25       | >0.05        |



## Reliability Test Data

**QTP #: 171610**

| <b>Device</b> | <b>Fab Lot #</b> | <b>Assembly Lot#</b> | <b>Test Loc</b> | <b>Yield</b> |
|---------------|------------------|----------------------|-----------------|--------------|
|---------------|------------------|----------------------|-----------------|--------------|

### ***SORT TEST: CORRELATION***

#### **Sort Yield:**

|           |             |     |       |            |
|-----------|-------------|-----|-------|------------|
| 8A20680BB | 3639013 w21 | N/A | FAB25 | Correlated |
|-----------|-------------|-----|-------|------------|

#### **Bin Movement:**

|           |             |     |       |     |
|-----------|-------------|-----|-------|-----|
| 8A20680BB | 3639013 w21 | N/A | FAB25 | <2% |
|-----------|-------------|-----|-------|-----|

## Document History Page

Document Title: QTP#171610: Cypress Test 25, Austin, Texas Sort Site for S8 Technology  
Document Number: 002-19700

| Rev. | ECN No. | Orig. of Change | Description of Change                                                                                                                                      |
|------|---------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **   | 5747717 | HSTO            | Initial Spec Release                                                                                                                                       |
| *A   | 5874099 | GKUS            | 1. Rearranged the nvSRAM parts as per the density & interface.<br>2. Included CY14B101 in the 1Mb Serial nvSRAM row which was missed in the last revision. |

# Cypress Semiconductor Corporation

## CY14V104X nvSRAM Characterization Report

### Design Engineering Director

*David Still*

[dstl@cypress.com](mailto:dstl@cypress.com)

### Product Engineering Director

*Jesse Siman*

[zsj@cypress.com](mailto:zsj@cypress.com)

### Product Engineer

*Gokul Kumar S*

[gkus@cypress.com](mailto:gkus@cypress.com)

### Applications Engineer

*Shivendra Singh*

[zsk@cypress.com](mailto:zsk@cypress.com)

### Marketing Engineer

*Douglas Mitchell*

[dmit@cypress.com](mailto:dmit@cypress.com)



[www.cypress.com](http://www.cypress.com)

198 Champion Ct.  
San Jose, CA 95134 USA

Tel: (408) 943 2600

Fax: (408) 943 4730

Company Confidential

A printed copy of this document is considered uncontrolled. Refer to online copy for latest revision.

## 1.0 Table of Contents

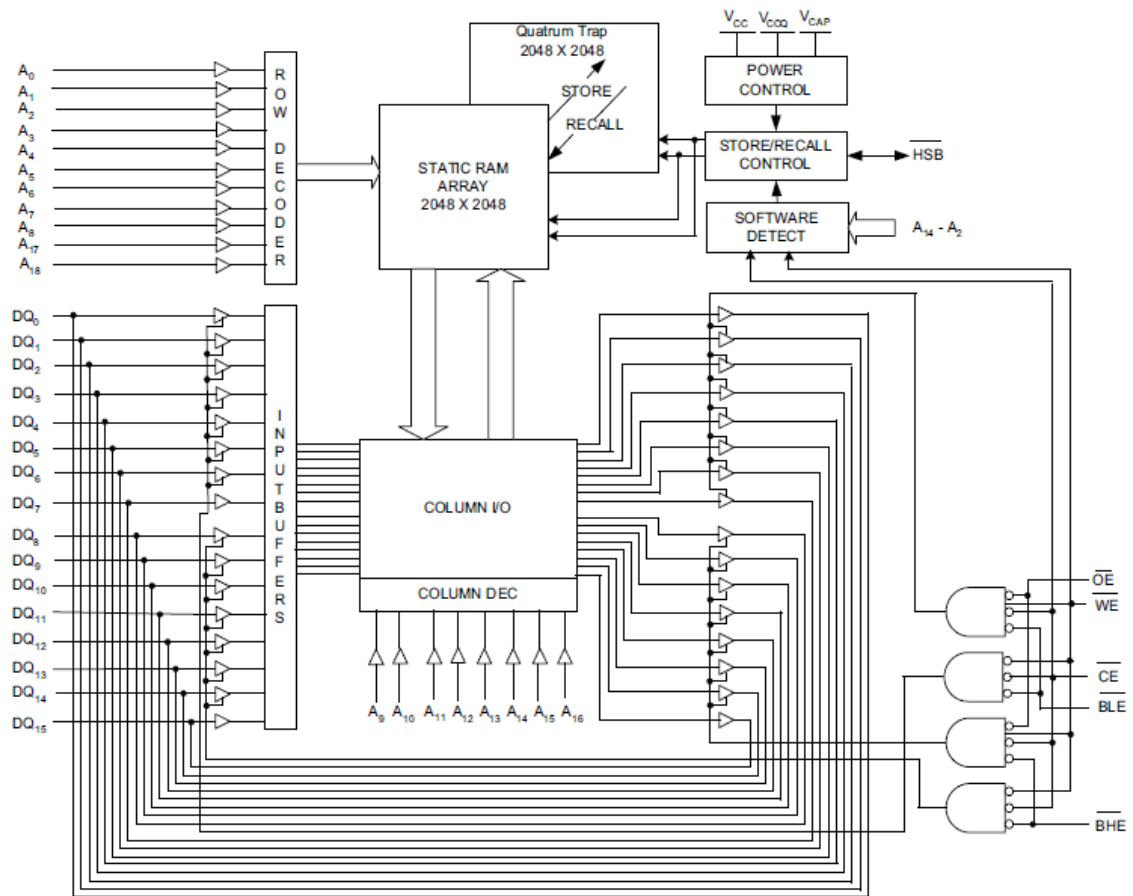
|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>1.0 Table of Contents.....</b>                   | <b>2</b>  |
| <b>2.0 Introduction .....</b>                       | <b>3</b>  |
| 2.1 General Description .....                       | 3         |
| 2.2 Pin Definitions .....                           | 4         |
| 2.3 Datasheets .....                                | 5         |
| 2.4 Application Notes .....                         | 5         |
| 2.5 White Papers .....                              | 5         |
| 2.6 Qualification Reports .....                     | 5         |
| <b>3.0 Characterization Hardware and Setup.....</b> | <b>6</b>  |
| 3.1 ATE Characterization Hardware .....             | 6         |
| 3.2 Characterization Conditions.....                | 6         |
| <b>4.0 Characterization Data .....</b>              | <b>7</b>  |
| 4.1 DC Parameters (CY14V104 Devices) .....          | 7         |
| 4.2 AC Parameters .....                             | 8         |
| 4.3 Store/Recall Parameters.....                    | 8         |
| <b>Document History Page.....</b>                   | <b>10</b> |

## 2.0 Introduction

### 2.1 General Description

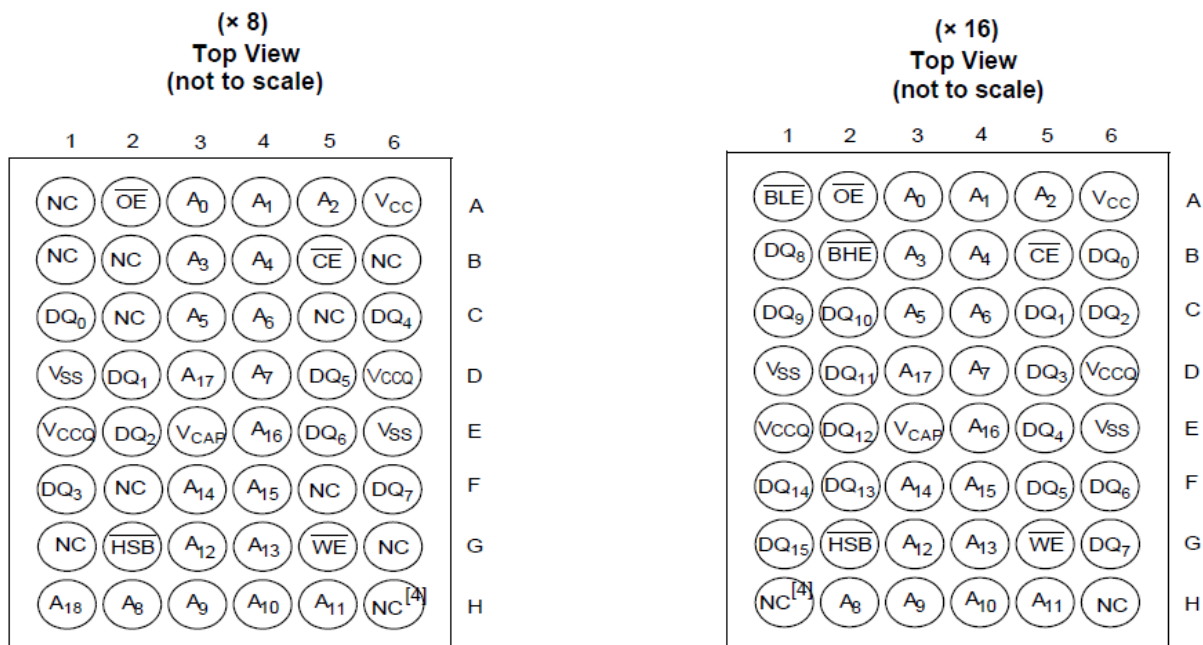
The Cypress CY14V104x is a 4-Mbit nonvolatile static RAM (nvSRAM). The embedded nonvolatile elements incorporate Quantum Trap technology producing the world's most reliable nonvolatile memory. The SRAM is read and written infinite number of times, while independent nonvolatile data resides in the nonvolatile elements.

Figure 1: Logic Block Diagram



## 2.2 Pin Definitions

Figure 2: CY14V104L/N – 48-ball FBGA





## 2.3 Datasheets

The 4M-bit nvSRAM devices meet all datasheet specifications.

| Density | Device      | Datasheet                 |
|---------|-------------|---------------------------|
| 4M-bit  | CY14V104L/N | <a href="#">001-53954</a> |

## 2.4 Application Notes

Following are some of the application notes associated with the 4M-bit/2M-bit/8M-bit nvSRAM products:

- [AN43380](#) - HSB Operation in nvSRAMs
- [AN43593](#) - Storage Capacitor (VCAP) options for Cypress NVSRAM

## 2.5 White Papers

Following are the white papers associated with the 4M-bit/2M-bit/8M-bit nvSRAM products:

- [Nonvolatile SRAM \(NVSRAM\) basics](#)
- [NVSRAM as write journal in RAID storage systems](#)
- [Using Cypress NVSRAM as Program Memory](#)
- [Probability of Occurrence of a Soft Sequence in Asynchronous nvSRAMs](#)
- [Data Retention Performance of 130-nm nvSRAM](#)

## 2.6 Qualification Reports

The CY14V104x device is qualified under QTP 172609. The qualification reports are available from the Cypress website at <http://www.cypress.com> (Specific website URL is TBD).

## **3.0 Characterization Hardware and Setup**

### **3.1 ATE Characterization Hardware**

#### **Temperature Forcing System**

The Temptronic XStream 4300 was used to force all the required temperatures.

#### **ATE Testers**

Advantest T5581 tester was used to characterize the DC, AC and Store/Recall parameters.

### **3.2 Characterization Conditions**

All units were tested across 3.0V to 3.6V VCC and 1.65V to 1.95V on IO VCCQ in addition to a +/- 100mV guardband. The temperature range for the characterization was from -45C to 90C. A guardband of +/-5C was used.

## 4.0 Characterization Data

This characterization report compares devices from the FAB4 (SkyWater) which is the old Cypress fab at Bloomington, MN, U.S.A. to the new FAB25 (Cypress) at Austin, TX, U.S.A.

### 4.1 DC Parameters (CY14V104 Devices)

| Parameter           | Name                                                | Test Conditions                                                                                                                                                   | Datasheet |     |          | Fab4  |       | Fab25 |       | Unit |
|---------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|----------|-------|-------|-------|-------|------|
|                     |                                                     |                                                                                                                                                                   | Min       | Typ | Max      | Min   | Max   | Min   | Max   |      |
| ICC1                | Average VCC current                                 | tRC = 25 ns, Values obtained without output loads (IOUT = 0 mA)                                                                                                   |           |     | 70       | 33.40 | 34.00 | 32.80 | 40.40 | mA   |
|                     |                                                     | tRC = 45 ns, Values obtained without output loads (IOUT = 0 mA)                                                                                                   |           |     | 52       | 25.40 | 26.00 | 25.20 | 31.60 | mA   |
| ICCQ1               | Average VCCQ current                                | tRC = 25 ns, Values obtained without output loads (IOUT = 0 mA)                                                                                                   |           |     | 70       | 6.20  | 7.80  | 6.10  | 7.70  | mA   |
|                     |                                                     | tRC = 45 ns, Values obtained without output loads (IOUT = 0 mA)                                                                                                   |           |     | 52       | 3.80  | 6.20  | 3.70  | 6.30  | mA   |
| ICC2                | Average VCC current during STORE                    | All inputs don't care, VCC = Max. Average current for duration tSTORE                                                                                             | -         | -   | 10       | 2.00  | 2.20  | 3.20  | 4.00  | mA   |
| ICC3                | Average VCC current at tRC=200ns, VCC (Typ), 25 °C  | All inputs cycling at CMOS Levels. Values obtained without output loads (IOUT = 0 mA).                                                                            | -         | 35  | -        | 17.40 | 17.80 | 20.40 | 22.80 | mA   |
| ICCQ3               | Average VCCQ current at tRC=200ns, VCC (Typ), 25 °C | All inputs cycling at CMOS Levels. Values obtained without output loads (IOUT = 0 mA).                                                                            | -         | 5   | -        | 0.80  | 1.20  | 0.90  | 1.40  | mA   |
| ICC4 <sup>[1]</sup> | Average VCAP current during AutoStore cycle         | All inputs don't care. Average current for duration tSTORE                                                                                                        | -         | -   | 8        | 2.20  | 3.20  | 0.80  | 1.20  | mA   |
| ISB                 | VCC standby current                                 | CE# > (VCC - 0.2 V). VIN < 0.2 V or > (VCC - 0.2 V). 'W' bit set to '0'. Standby current level after nonvolatile cycle is complete. Inputs are static. f = 0 MHz. | -         | -   | 8        | 2.20  | 3.20  | 0.80  | 1.20  | mA   |
| IIX <sup>[2]</sup>  | Input leakage current (except HSB#)                 | VCC = Max, VSS < VIN < VCC                                                                                                                                        | -1        | -   | 1        | -0.01 | 0.39  | -0.20 | 0.20  | uA   |
|                     | Input leakage current (for HSB#)                    | VCC = Max, VSS < VIN < VCC                                                                                                                                        | -100      | -   | 1        | -5.20 | -4.70 | -7.62 | -3.98 | uA   |
| IOZ                 | Off state output leakage current                    | VCC = VCC(Max), VSS < VOUT < VCC, CE# or OE# > VIH or BLE#, BHE# > VIH or WE# < VIL                                                                               | -1        | -   | 1        | -0.02 | 0.14  | -0.60 | 0.14  | uA   |
| VIH                 | Input HIGH voltage                                  |                                                                                                                                                                   | 0.7X Vccq | -   | Vccq+0.3 | 0.94  | 0.96  | 0.93  | 1.39  | V    |
| VIL                 | Input LOW voltage                                   |                                                                                                                                                                   | Vss-0.3   | -   | 0.3XVccq | 0.60  | 0.60  | 0.14  | 0.70  | V    |
| VOH                 | Output HIGH voltage                                 | IOUT=-1mA                                                                                                                                                         | Vccq-0.45 | -   | -        | 1.40  | 1.40  | 1.42  | 1.46  | V    |
| VOL                 | Output LOW voltage                                  | IOUT=2mA                                                                                                                                                          | -         | -   | 0.45     | 0.11  | 0.12  | 0.09  | 0.17  | V    |

#### Notes:

- These parameters are guaranteed by design but not tested.
- The HSB pin has IOUT = -4 uA for VOH of 1.07 V when both active HIGH and LOW drivers are disabled. When they are enabled standard VOH and VOL are valid. This parameter is characterized but not tested.

## 4.2 AC Parameters

| Parameter <sup>[1]</sup> | Name                             | Datasheet |     |     | Fab4  |       | Fab25  |       | Unit |
|--------------------------|----------------------------------|-----------|-----|-----|-------|-------|--------|-------|------|
|                          |                                  | Min       | Typ | Max | Min   | Max   | Min    | Max   |      |
| tACE                     | Chip enable access time          | -         | -   | 25  | 17.80 | 18.20 | 18.13  | 18.94 | ns   |
| tAA <sup>[2]</sup>       | Address access time              | -         | -   | 25  | 19.00 | 19.40 | 19.50  | 20.37 | ns   |
| tDOE                     | Output enable to data valid      | -         | -   | 12  | 7.20  | 7.40  | 7.50   | 8.00  | ns   |
| tOHA <sup>[2]</sup>      | Output hold after address change | 3         | -   | -   | 7.20  | 7.60  | 6.94   | 8.19  | ns   |
| tDBE                     | Byte enable to data valid        | -         | -   | 12  | 8.80  | 8.80  | 7.19   | 9.19  | ns   |
| tPWE                     | Write pulse width                | 20        | -   | -   | 10.60 | 10.80 | 11.25  | 12.62 | ns   |
| tSCE                     | Chip enable to end of write      | 20        | -   | -   | 11.00 | 11.00 | 10.00  | 11.50 | ns   |
| tSD                      | Data setup to end of write       | 10        | -   | -   | 6.00  | 7.00  | 5.69   | 7.56  | ns   |
| tHD                      | Data hold after end of write     | 0         | -   | -   | -4.20 | -3.00 | -4.56  | -2.75 | ns   |
| tAW                      | Address setup to end of write    | 20        | -   | -   | 10.80 | 11.80 | 12.62  | 14.25 | ns   |
| tSA                      | Address setup to start of write  | 0         | -   | -   | -6.80 | -6.60 | -8.19  | -7.00 | ns   |
| tHA                      | Address hold after end of write  | 0         | -   | -   | -8.90 | -8.70 | -11.12 | -9.69 | ns   |
| tBW                      | Byte enable to end of write      | 20        | -   | -   | 10.00 | 10.20 | 10.19  | 11.75 | ns   |

### Notes:

- Test conditions assume signal transition time of 1.8 ns or less, timing reference levels of VCCQ/2, input pulse levels of 0 to VCCQ (typ) and output loading of the specified IOL/IOH and load capacitance
- Device is continuously selected with CE#, OE# and BLE# / BHE# LOW.

## 4.3 Store/Recall Parameters

### AutoStore/Power-UP RECALL Characteristics

| Parameter               | Name                                      | Datasheet |     |      | Fab4  |       | Fab25 |       | Unit |
|-------------------------|-------------------------------------------|-----------|-----|------|-------|-------|-------|-------|------|
|                         |                                           | Min       | Typ | Max  | Min   | Max   | Min   | Max   |      |
| tHRECALL <sup>[1]</sup> | Power-Up RECALL duration                  | -         | -   | 20   | 13.30 | 17.90 | 12.70 | 17.20 | ms   |
| tSTORE <sup>[2]</sup>   | STORE cycle duration                      | -         | -   | 8    | 5.70  | 6.50  | 4.80  | 6.60  | ms   |
| tDELAY <sup>[3]</sup>   | Time allowed to complete SRAM write cycle | -         | -   | 25   | 19.00 | 19.00 | 19.00 | 19.00 | ns   |
| VSWITCH                 | Low voltage trigger level                 | -         | -   | 2.90 | 2.48  | 2.60  | 2.40  | 2.49  | V    |

### Software Controlled STORE and RECALL Characteristics

| Parameter<br>[4,5] | Name               | Datasheet |     |     | Fab4  |       | Fab25 |       | Unit |
|--------------------|--------------------|-----------|-----|-----|-------|-------|-------|-------|------|
|                    |                    | Min       | Typ | Max | Min   | Max   | Min   | Max   |      |
| tSA                | Address setup time | 0         | -   | -   | -3.30 | -3.10 | -5.25 | -4.06 | ns   |
| tCW                | Clock pulse width  | 20        | -   | -   | 7.20  | 7.40  | 8.88  | 9.44  | ns   |
| tHA                | Address hold time  | 0         | -   | -   | -5.19 | -4.38 | -4.40 | -3.06 | ns   |
| tRECALL            | RECALL duration    | -         | -   | 200 | 80.00 | 91.00 | 60.00 | 90.00 | us   |

### Hardware STORE Characteristics

| Parameter            | Name                                                | Datasheet |     |     | Fab4  |       | Fab25 |       | Unit |
|----------------------|-----------------------------------------------------|-----------|-----|-----|-------|-------|-------|-------|------|
|                      |                                                     | Min       | Typ | Max | Min   | Max   | Min   | Max   |      |
| tDHSB                | HSB# to output active time when write latch not set | -         | -   | 25  | 17.00 | 18.00 | 19.00 | 20.00 | ns   |
| tPHSB                | Hardware STORE pulse width                          | 15        | -   | -   | 3.50  | 4.50  | 4.60  | 4.80  | ns   |
| tSS <sup>[6,7]</sup> | Soft sequence processing time                       | -         | -   | 100 | 60.00 | 87.50 | 55.00 | 70.00 | us   |

#### Notes:

1. tHRECALL starts from the time VCC rises above VSWITCH.
2. If an SRAM write has not taken place since the last NV cycle, no AutoStore or Hardware STORE takes place.
3. On a Hardware STORE and AutoStore initiation, SRAM write operation continues to be enabled for time tDELAY.
4. The software sequence is clocked with CE# controlled or OE# controlled reads.
5. The six consecutive addresses must be read in the order listed. WE# must be HIGH during all six cycles.
6. This is the amount of time it takes to take action on a soft sequence command. VCC power must remain HIGH to effectively register command.
7. Commands such as STORE and RECALL lock out I/O until complete which further increases this time.

## Document History Page

| Rev. | ECN No. | Orig. of Change | Description of Change        |
|------|---------|-----------------|------------------------------|
| **   | 6084450 | ARAV            | New Characterization Report. |

## Sales, Solutions, and Legal Information

### Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [cypress.com/sales](http://cypress.com/sales).

### Products

PSoC [psoc.cypress.com](http://psoc.cypress.com)  
 Clocks & Buffers [clocks.cypress.com](http://clocks.cypress.com)  
 Wireless [wireless.cypress.com](http://wireless.cypress.com)  
 Memories [memory.cypress.com](http://memory.cypress.com)  
 Image Sensors [image.cypress.com](http://image.cypress.com)

### PSoC Solutions

General [psoc.cypress.com/solutions](http://psoc.cypress.com/solutions)  
 Low Power/Low Voltage [psoc.cypress.com/low-power](http://psoc.cypress.com/low-power)  
 Precision Analog [psoc.cypress.com/precision-analog](http://psoc.cypress.com/precision-analog)  
 LCD Drive [psoc.cypress.com/lcd-drive](http://psoc.cypress.com/lcd-drive)  
 CAN 2.0b [psoc.cypress.com/can](http://psoc.cypress.com/can)  
 USB [psoc.cypress.com/usb](http://psoc.cypress.com/usb)

© Cypress Semiconductor Corporation, 2018. The information contained herein is subject to change without notice. Cypress Semiconductor Corporation assumes no responsibility for the use of any circuitry other than circuitry embodied in a Cypress product. Nor does it convey or imply any license under patent or other rights. Cypress products are not warranted nor intended to be used for medical, life support, lifesaving, critical control or safety applications, unless pursuant to an express written agreement with Cypress. Furthermore, Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress products in life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Any Source Code (software and/or firmware) is owned by Cypress Semiconductor Corporation (Cypress) and is protected by and subject to worldwide patent protection (United States and foreign).  
 United States copyright laws and international treaty provisions. Cypress hereby grants to licensee a personal, non-exclusive, non-transferable license to copy, use, modify, create derivative works of, and compile the Cypress Source Code and derivative works for the sole purpose of creating custom software and or firmware in support of licensee product to be used only in conjunction with a Cypress integrated circuit as specified in the applicable agreement. Any reproduction, modification, translation, compilation, or representation of this Source Code except as specified above is prohibited without the express written permission of Cypress.

Disclaimer: CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Cypress reserves the right to make changes without further notice to the materials described herein. Cypress does not assume any liability arising out of the application or use of any product or circuit described herein. Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress' product in a life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges. Use may be limited by and subject to the applicable Cypress software license agreement.

All products and company names mentioned in this document may be the trademarks of their respective holders.