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Cypress Semiconductor
Product Qualification Report

QTP# 99395 VERSION*B
December, 2014

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

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

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

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

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

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

PACKAGE AVAILABILITY

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

Note: Package Qualification details upon request

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

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

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

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

RELIABILITY FAILURE RATE SUMMARY

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

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

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

where:

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

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

RELIABILITY TEST DATA

QTP#: 99395

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

RELIABILITY TEST DATA

QTP#: 98244

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

RELIABILITY TEST DATA

QTP#: 98064[1]

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

[1] R42HD Technology qualification (1Meg SRAM)

RELIABILITY TEST DATA

QTP#: 98064

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

Document History Page

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Document Number: 001-84795

Rev.	ECN No.	Orig. of Change	Description of Change
**	3819942	NSR	Initial Release
*A	4202436	JYF	Sunset review: Complete re-write of Reliability Tests Performed table for template alignment;
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