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

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

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

Cypress Semiconductor
Product Qualification Report

QTP# 98424 VERSION*A
June, 2014

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

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

Prepared By:
Josephine Pineda
Reliability Engineer

Reviewed By:
Zhaomin Ji
Reliability Manager

Approved By:
Richard Oshiro
Reliability Director

PRODUCT QUALIFICATION HISTORY

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

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

PRODUCT DESCRIPTION (for qualification)		
Information provided in this document is intended for generic qualification and technically describes the Cypress part supplied:		
Marketing Part #:	CY7C199	
Device Description:	32K x 8 Static RAM, R42HD Technology , 28-pin, 300-mil SOJ	
Cypress Division:	Cypress Semiconductor Corporation – MPD Division	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev G.
What ID markings on Die:	7C1599C	

TECHNOLOGY/FAB PROCESS DESCRIPTION – RAM42			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500Å TiW/6000Å Al -5%Cu/1200Å TiW Metal 2: 500Å TiW/8000Å Al -5%Cu/300Å TiW
Passivation Type and Materials:		7000Å SiO2 + 6000Å Si3N4	
Free Phosphorus contents in top glass layer(%):		0%	
Generic Process Technology/Design Rule (µ-drawn):		CMOS, Double Metal /0.42 □m	
Gate Oxide Material/Thickness (MOS):		SiO2 / 110Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor - Bloomington, MN	
Die Fab Line ID/Wafer Process ID:		Fab4/R42HD	

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

RELIABILITY TESTS PERFORMED

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

RELIABILITY FAILURE RATE SUMMARY

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

1 Assuming an ambient temperature of 55C and a junction temperature rise of 15C.
2 Chi-squared 60% estimations used to calculate the failure rate..
3 Thermal Acceleration Factor is calculated from the Arrhenius equation

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

where:

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

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

.

Reliability Test Data

QTP #: 98424

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

Reliability Test Data

QTP #: 98064

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 1000V							
CY7C109-VC	INDNS-O	4738602	519712560	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2200V							
CY7C109-VC	INDNS-O	4738602	519712560	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 192 HRS 30C/60%RH							
CY7C109-VC	INDNS-O	4738602	519712560	128	46	0	
CY7C109-VC	INDNS-O	4738564	519712898	128	46	0	
CY7C109-VC	INDNS-O	4738564	519712898	256	46	0	
CY7C109-VC	INDNS-O	4739644	519714390	128	46	0	
STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)							
CY7C109-VC	INDNS-O	4738602	519712560	336	46	0	
CY7C109-VC	INDNS-O	4738602	519712560	500	46	0	
CY7C109-VC	INDNS-O	4738602	519712560	1000	46	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	4738602	519712560	80	78	0	
CY7C109-VC	INDNS-O	4738602	519712560	168	78	0	
CY7C109-VC	INDNS-O	4739644	519714390	80	78	0	
CY7C109-VC	INDNS-O	4739644	519714390	168	78	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C109-VC	INDNS-O	4739644	519714390	80	528	0	
CY7C109-VC	INDNS-O	4739644	519714390	500	527	0	
CY7C109-VC	INDNS-O	4745042	519800651L1	80	529	0	
CY7C109-VC	INDNS-O	4745042	519800651L1	500	529	0	
STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)							
CY7C109-VC	INDNS-O	4739644	519714390	1000	527	0	
STRESS: COLD LIFE TEST (-30C, 6.5V)							
CY7C109-VC	INDNS-O	4738602	519712560	500	45	0	
CY7C109-VC	INDNS-O	4738602	519712560	1000	45	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	4738602	519712560	48	10	0	
CY7C109-VC	INDNS-O	4738602	519712560	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH							
CY7C109-VC	INDNS-O	4738602	519712560	300	46	0	
CY7C109-VC	INDNS-O	4738602	519712560	1000	46	0	
CY7C109-VC	INDNS-O	4738564	519712898	300	46	0	
CY7C109-VC	INDNS-O	4739644	519714390	300	46	0	

Document History Page

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

Rev.	ECN No.	Orig. of Change	Description of Change
**	4033729	ILZ	Initial Spec Release Qualification report published on Cypress.com is not in spec format. Initiated spec for QTP 98424 and removed all Cypress reference spec and replaced with Industry standard. Updated package availability based on current qualified assembly
*A	4417735	JYF	Sunset review: Updated QTP title page; Updated Reliability Tests Performed table: - Added industry standard of LFR, Extended Dynamic Burn-In, Read and Record Life Test, HTSSL, HAST, HTS, Cold Life Test and HTS .

Distribution: WEB

Posting: None