Cypress Semiconductor
Qualification Report

QTP# 97253, VERSION 2.0
July, 2003

1 Meg SRAM, R28 Technology, Fab 4 Qualification	
CY7C106A	**256K x 4 Static RAM**
CY7C109	**128K x 8 Static RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT/TECHNOLOGY/FAB DESCRIPTION

PRODUCT DESCRIPTION (for qualification)	
Information provided in this document is intended for generic qualification and technically describes the Cypress part supplied:	
Marketing Part #:	CY7C106A/CY7C109
Package:	32-pin, 400 mil SOJ
Device Description:	1 Meg SRAM, R28 Technology
Cypress Division:	Cypress Semiconductor Corporation - MPD Division
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. F
What ID markings on Die:	7C109AC

TECHNOLOGY/FAB PROCESS DESCRIPTION - R28			
Number of Metal Layers:	2	Metal Composition:	Metal 1: Ti/TiW/Al-Si/TiW, 500A/1.2KA/6KA/1.2KA Metal 2: TiW/Al-Si/Ti, 1.2KA/10KA/150A
Passivation Type and Materials:	7,000A TEOS + 6,000A Si_2N_4		
Free Phosphorus contents in top glass layer(%):	0%		
Die Coating(s), if used:	n/a		
Number of Transistors in device:	4,200,00		
Number of Gates in device:	1,100,00		
Generic Process Technology/Design Rule (µ-drawn):	CMOS, Single Poly, Double Metal /0.65 µm		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 165 Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R28		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION

Package Outline, Type, or Name:	32-pin, 400-mil SOJ		
Mold Compound Name/Manufacturer:	NITO MP-8000CHV		
Lead Frame material:	Copper		
Lead Finish, composition:	Solder Plated, 85%Sn, 15%Pb		
Die Attach Area Plating:	Silver Spot		
Die Attach Method:	Epoxy	Die Attach Material:	Ablestik 84-1MISR4
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level	Level 1		
Assembly Line ID and Process ID:	Omedata, Indonesia		

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	P
Read and Record Life Test	Dynamic Operating Condition, Vcc = 5.75V, 150°C	P
High Temperature Steady State Life	Static Operating Condition, Vcc = 5.75V, 150°C	P
High Accelerated Saturation Test (HAST)	140°C, 85%RH, 5.5V Precondition: JESD22 Moisture Sensitivity Level 1 168 Hrs. 85°C/85%RH	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 1 168 Hrs. 85°C/85%RH	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1,500V Cypress Spec. 25-00020	P
Latchup Sensitivity	9.5V In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Devive Hours	# Fail	Activation Energy	Thermal AF	Failure Rate
High Temperature Operating Life[1,] Early Failure Rate	N/A	N/A	N/A	N/A	N/A
High Temperature Operating Life[2,3,4] Long Term Failure Rate	366,500 DHRs	0	0.7	170	15 FIT

[1] Early Failure Rate was not performed. Production burn-in at 62 Hrs/6.5V/150°C is performed for CY7C106A and CY7C109 frabicated in Fab 4.
[2] Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.
[3] Fit Rate was calculated for 1 Meg SRAM, Rev. E, R28 technology qualified in fab 3 (QTP 96313) and fab 4 (QTP 97253).
[4] Chi-squared 60% estimations used to calculate the failure rate.

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

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.

RELIABILITY TEST DATA

QTP #: 97253[1]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: ESD-CHARGE DEVICE MODEL (1500V)							
CY7C109-VC	INDNS-O	4646419	519615484	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)							
CY7C109-VC	INDNS-O	4646419	519615484	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C,85%RH, 5.5V), PRECOND. 168 HRS 85C/85%RH							
CY7C109-VC	INDNS-O	4646419	519615484	128	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	4646419	519615484	80	80	0	
CY7C109-VC	INDNS-O	4646419	519615484	168	80	0	
CY7C109-VC	INDNS-O	4646419	519615485	80	80	0	
CY7C109-VC	INDNS-O	4646419	519615485	168	80	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C109-VC	INDNS-O	4646419	519615486	80	260	0	
CY7C109-VC	INDNS-O	4646419	519615486	500	259	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	4646419	519615484	500	10	0	
STRESS: TEMPERATURE CYCLE COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH							
CY7C109-VC	INDNS-O	4646419	519615484	300	48	0	
CY7C109-VC	INDNS-O	4646419	519615484	1000	48	0	
CY7C109-VC	INDNS-O	4646419	519615485	300	48	0	
CY7C109-VC	INDNS-O	4646419	519615487	300	48	0	

[1] QTP #97253, 1Meg SRAM, Rev. F, R28 technology, Fab 4 qualification.

DEVICE RELATED RELIABILITY TEST DATA

QTP #: 96313[2]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C109-VC	INDNS-O	3627860	519610489	48	510	0	
CY7C109-VC	INDNS-O	3631357	519610871	48	510	0	
CY7C109-VC	INDNS-O	3630218	519610893	48	510	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 85%RH, 5.5V), PRECOND. 168 HRS 85C/85%RH							
CY7C109-VC	INDNS-O	3627860	519610489	128	48	0	
CY7C109-VC	INDNS-O	3630218	519610893	128	48	0	
CY7C109-VC	INDNS-O	3632497	519611457	128	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	3627860	519610489	80	80	0	
CY7C109-VC	INDNS-O	3627860	519610489	168	80	0	
CY7C109-VC	INDNS-O	3631357	519610871	80	80	0	
CY7C109-VC	INDNS-O	3631357	519610871	168	80	0	
CY7C109-VC	INDNS-O	3630218	519610893	80	80	0	
CY7C109-VC	INDNS-O	3630218	519610893	168	77	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C109-VC	INDNS-O	3627860	519610489	80	118	0	
CY7C109-VC	INDNS-O	3627860	519610489	500	118	0	
CY7C109-VC	INDNS-O	3631357	519610871	500	120	0	
CY7C109-VC	INDNS-O	3630218	519610893	500	120	0	
CY7C109-VC	INDNS-O	3627860	519610489	1000	118	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.75V)							
CY7C109-VC	INDNS-O	3627860	519610489	48	10	0	
CY7C109-VC	INDNS-O	3627860	519610489	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH							
CY7C109-VC	INDNS-O	3627860	519610489	300	48	0	
CY7C109-VC	INDNS-O	3630218	519610893	300	48	0	
CY7C109-VC	INDNS-O	3632497	519611457	300	48	0	

[2] QTP #96313, 1Meg SRAM, Rev. F, R28 technology, Fab 3 qualification.