Cypress Semiconductor
Qualification Report

QTP# 97517 VERSION 1.0
August, 1998

1/2 Meg SRAM, R42D Technology, Fab 4 Qualification	
CY7C1020V/CY7C1022V	32K x 16 Static RAM

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT DESCRIPTION (for qualification)		
Information provided in this document is intended for generic qualification and technically describes the Cypress part supplied:		
Marketing Part #:	CY7C1020V/CY7C1022V	
Package:	44-pin TSOP Type II	
Device Description:	½ MegSRAM, R42D Technology	
Cypress Division:	Cypress Semiconductor Corporation – MPD Division	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. B
What ID markings on Die:	7C1320B/7C1322B	

TECHNOLOGY/FAB PROCESS DESCRIPTION - R42D			
Number of Metal Layers:	2	Metal Composition:	Metal 1: TiW,AlCu,TiW/500Å,6000Å,1200Å Metal 2: TiW,AlCu,TiW/500Å,8000Å,300Å
Passivation Type and Materials:		3000Å 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 /0.35 µm	
Gate Oxide Material/Thickness (MOS):		SiO_2 / 70 Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor - Bloomington, MN	
Die Fab Line ID/Wafer Process ID:		Fab4/R42D	

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	44-pins TSOP Type II		
Mold Compound Name/Manufacturer:	Sumitomo7320		
Lead Frame material:	Copper Alloy 194		
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 / 1.3 mil
JESD22-A112 Moisture Sensitivity Level:	Level 3		
Name/Location of Assembly (prime) facility:	Huyndai, Korea (KOREA-H)		

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 Early Failure Rate	Dynamic Operating Condition, Vcc = 3.8 V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 3.8 V, 125°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 (192 Hrs, 30C/60%RH)	P
Acoustic Microscopy	Cypress Spec 25-000104	P
Electrostatic Discharge Human Body Model (ESD-HBM)	MIL-STD-883, Method 3015.7	2,200V
Electrostatic Discharge Charge Device Model (ESD-CDM)	Cypress Spec. 25-00020	1000V
Latchup Sensitivity Static Latchup	In accordance with JEDEC 17. Cypress Spec. 01-00081	8.3V

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[1]	3012 devices (4 Meg SRAM, R42D, Qtp #97396)	1	N/A	N/A	332 PPM
	1500 devices (1/2 Meg SRAM, R42D, Qtp #97517)	0	N/A	N/A	0 PPM
High Temperature Operating Life[2,3] Long Term Failure Rate	341,500 DHRs (4 Meg SRAM, R42D, Qtp #97396)	0	0.7	170	16 FIT
	258,192 DHRs (1/2 Meg SRAM, R42D, Qtp #97517)	0	0.7	55	64 FIT

[1] A production burn-in of 24 Hrs at 150°C, 4.3V 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.

RELIABILITY TEST DATA

QTP#: 97517

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.8V)							
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	96	1500	0	
STRESS: ESD-CHARGE DEVICE MODEL (1000V)							
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2000V)							
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 3.8V)							
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	168	261	0	
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	2000	117	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1020V33-ZSC	KOREA-H	4801568	619802538/9/40L	300	48	0	

DEVICE RELATED RELIABILITY TEST DATA

QTP#: 97396[1]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)							
CY7C1049V33-VC	KOREA-L	4744980	619711941	48	217	0	
CY7C1049V33-VC	KOREA-L	4743899	619711944	48	410	1	1 METAL DEFECT
CY7C1049V33-VC	KOREA-L	4745051	619800475	48	756	0	
CY7C1049V33-VC	KOREA-L	4744957	619800476	48	443	0	
CY7C1049V33-VC	KOREA-L	4741412	619801943	48	1186	0	1 EOS
STRESS: ESD-CHARGE DEVICE MODEL (1000V)							
CY7C1049V33-VC	KOREA-L	4743899	619711944	COMP	3	0	
CY7C1041V33-VC	CSPI-R	4751412	619801712	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (4,400V)							
CY7C1049V33-VC	KOREA-L	4744957	619800476	COMP	3	0	
CY7C1041V33-VC	CSPI-R	4751412	619801712	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1049V33-VC	KOREA-L	4743899	619711944	128	45	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
CY7C1049V33-VC	KOREA-L	4745051	619800475	80	76	0	
CY7C1049V33-VC	KOREA-L	4745051	619800475	168	76	0	
CY7C1049V33-VC	KOREA-L	4744957	619800476	80	75	0	1 EOS
CY7C1049V33-VC	KOREA-L	4744957	619800476	168	74	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY7C1049V33-VC	KOREA-L	4745051	619800475	80	380	0	
CY7C1049V33-VC	KOREA-L	4745051	619800475	500	379	0	1 EOS
CY7C1049V33-VC	KOREA-L	4744957	619800476	80	304	0	
CY7C1049V33-VC	KOREA-L	4744957	619800476	500	304	0	
STRESS: COLD LIFE TEST (-30C, 4.3V)							
CY7C1049V33-VC	KOREA-L	4743899	619711944	500	41	0	
CY7C1049V33-VC	KOREA-L	4743899	619711944	1000	41	0	
STRESS: READ & RECORD LIFE TEST (150C, 3.8V)							
CY7C1049V33-VC	KOREA-L	4743899	619711944	80	10	0	
CY7C1049V33-VC	KOREA-L	4743899	619711944	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1049V33-VC	KOREA-L	4743899	619711944	300	45	0	
CY7C1049V33-VC	KOREA-L	4743899	619711944	1000	45	0	
CY7C1049V33-VC	KOREA-L	4745051	619800475	300	45	0	
CY7C1049V33-VC	KOREA-L	4745051	619800475	1000	45	0	
CY7C1049V33-VC	KOREA-L	4744957	619800476	300	45	0	
CY7C1049V33-VC	KOREA-L	4744957	619800476	1000	45	0	

[1] 4 Meg SRAM , R42D Technology, Fab 4 qualification