Cypress Semiconductor
Qualification Report

QTP# 98393 VERSION 1.3
March, 1999

Dual Port SRAM - R28 Technology - Fab 2	
CY7C0241	4K x 18 Dual Port SRAM
CY7C024	4K x 16 Dual Port SRAM
CY7C145	8K x 9 Dual Port SRAM
CY7C144	8K x 8 Dual Port SRAM
CY7C139	4K x 9 Dual Port SRAM
CY7C1342/135/138	4K x 8 Dual Port SRAM
CY7C133/143	2K x 16 Dual Port SRAM

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Cypress Semiconductor
Quality and Reliability Department

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Transfer CY7C0241 (Rev. C, 7C025D chop) and its options from Fab3 to Fab2			
Marketing Part #:	CY7C0241		
Package:	100 pins TQFP		
Device Description:	4K x 18 Synchronous Dual Port Static RAM, R28 Technology		
Cypress Division:	Cypress Semiconductor Corporation – DCD Division		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. C	
Die Size (stepping):	190.5 mils x 190 mils	What ID markings on Die:	7C0241A

TECHNOLOGY/FAB PROCESS DESCRIPTION – R28			
Number of Metal Layers:	2	Metal Composition:	Metal 1: Ti/TiW/Al-Si/TiW, 500Å/1.2KÅ/6KÅ/1.2K Å Metal 2: TiW/Al-Si/TiW, 1.2KÅ/10KÅ/150Å
Passivation Type and Materials:		7000A TEOS + 6000A Si_2N_4	
Free Phosphorus contents in top glass layer(%):		0%	
Die Coating(s), if used:	None		
Generic Process Technology/Design Rule (µ-drawn):		CMOS, Double Poly, Double Metal /0.65 µm	
Gate Oxide Material/Thickness (MOS):		SiO_2 / 165 Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor - Round Rock, TX	
Die Fab Line ID/Wafer Process ID:		Fab2/R28	

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	100-pin TQFP		
Mold Compound Name/Manufacturer:	Nitto 8000		
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 mil
JESD22-A112 Moisture Sensitivity Level:	Level 5 (previously qualified)		
Name/Location of Assembly (prime) facility:	Anam, Korea (KOREA-Q)		

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 = 5.75V, 150°C	P
High Temperature Operating Life Long Term Failure Rate	Dynamic Operating Condition, Vcc = 5.75V, 150°C	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	500V
Latchup Sensitivity	In accordance with JEDEC 17. Cypress Spec. 01-00081	12V

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]	999	0	N/A	N/A	0 PPM
High Temperature Operating Life[2,3] Long Term Failure Rate	122,500 DHRs	0	0.7	170	44 FIT[5]

[1] A production burn-in of 104 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] Long Term Failure Rate is based DP SRAM (7C0251D), R28 Technology qualified in Fab2, Qtp 98302.

RELIABILITY TEST DATA

QTP#: 98393

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C0241-AC	KOREA-Q	2829511	619810551	48	999	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY7C0241-AC	KOREA-Q	2829511	619810551	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY7C0241-AC	KOREA-Q	2829511	619810551	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C0241-AC	KOREA-Q	2829511	619810551	80	125	0	
CY7C0241-AC	KOREA-Q	2829511	619810551	500	125	0	

DEVICE RELATED RELIABILITY TEST DATA

QTP#: 98302[1]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C0251-AC	KOREA-Q	2824171	619809165	48	536	0	
CY7C0251-AC	KOREA-Q	2824171	619809165	48	125	0	
CY7C0251-AC	KOREA-Q	2824171	619809165	48	467	0	
CY7C0251-AC	KOREA-Q	2824171	619809165	48	505	0	
CY7C0251-AC	KOREA-Q	2828426	619810549	48	509	1	1 UNKNOWN CAUSE
STRESS: ESD-CHARGE DEVICE MODEL (1000V)							
CY7C0251-AC	KOREA-Q	2824171	619809165	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY7C0251-AC	KOREA-Q	2824171	619809165	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 192 HRS 30C/60%RH							
CY7C0251-AC	KOREA-Q	2824171	619809165	128	45	0	1 EOS
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. DB + 72 HRS 30C/60%RH							
CY7C0251-AC	KOREA-Q	2824171	619809165	128	47	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C0251-AC	KOREA-Q	2824171	619809165	80	125	0	
CY7C0251-AC	KOREA-Q	2824171	619809165	500	125	0	
CY7C0251-AC	KOREA-Q	2828426	619810549	80	120	0	
CY7C0251-AC	KOREA-Q	2828426	619810549	500	120	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C0251-AC	KOREA-Q	2824171	619809165	168	47	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 72 HRS 30/60%RH (MSL 5)							
CY7C0251-AC	KOREA-Q	2824171	619809165	300	47	0	
CY7C0251-AC	KOREA-Q	2828426	619810548	300	50	0	
CY7C0251-AC	KOREA-Q	2828426	619810549	300	50	0	
CY7C0251-AC	KOREA-Q	2828426	619810549	1000	50	0	

[1] DP SRAM, R28 Technology, qualified in Fab 2.