Cypress Semiconductor
Qualification Report

QTP# 97195 VERSION 2.0
July, 2003

128K x 8 SRAM - R32 Technology - Fab4 Qualification	
CY62128	128K x 8 Static Ram (5V Operation)
CY62128V	128K x 8 Static Ram (3V Operation)

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 #:	CY62128/CY62128V	
Package:	32-pin, 400-mil SOIC	
Device Description:	128K x 8 Static RAM	
Cypress Division:	Cypress Semiconductor Corporation	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A
What ID markings on Die:	7C1128 (CY62128) 7C1129 (CY62128V)	

TECHNOLOGY/FAB PROCESS DESCRIPTION - R32			
Number of Metal Layers:	1	Metal Composition:	Metal 1: TiW/Al, 500Å/8,000Å
Passivation Type and Materials:	Silicon Dioxide 7,000Å + Silicon Nitride 6,000Å		
Number of Transitors in device	6,655,000		
Number of Gates in devices	2,200,000 (Logic Gates)		
Free Phosphorus contents in top glass layer(%):	0%		
Die Coating(s), if used:	N/A		
Generic Process Technology/Design Rule (µ-drawn):	CMOS, Single Local Interconnect, Single Metal /0.5 µm		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 145Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R32		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	32-pin, 450-mil SOIC		
Mold Compound Name/Manufacturer:	NITTO-8000CH		
Lead Frame material:	Copper Alloy 194		
Lead Finish, composition:	Solder Plated, 85%Sn, 15%Pb		
Die Attach Area Plating:	Silver Spot		
Die Attach Method:	Epoxy	Die Attach Material:	Ablestick 8361
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level:	Level 3		
Name/Location of Assembly (prime) facility:	ASE, Taiwan (SOIC)		

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/3.8V, 150°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 5.75V/3.8V, 150°C	P
Read and Record Life Test	Dynamic Operating Condition, Vcc = 5.75V, 150°C	P
Long Life Verification	Dynamic Operating Condition, Vcc = 5.75V, 150°C	P
High Temperature Steady State Life	Static Operating Condition, Vcc = 5.75V/3.8V, 150°C	P
High Accelerated Saturation Test (HAST)	130°C /140°C, 85%RH, 5.5V/3.6V Precondition: JESD22 Moisture Sensitivity Level 3 (192 Hrs, 30C/60%RH)	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
High Temp Storage	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)	2,000V / 750V Cypress Spec. 25-00020	P
Latchup Sensitivity	10V / 12V In accordance with JEDEC 17. Cypress Spec. 01-00081	P
Aged Bond Strength	MIL-STD-883, Method 2011	P
Acoustic Microscopy	JEDEC A112-A	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[3]	Failure Rate
High Temperature Operating Life Early Failure Rate[1]	1561	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	484,000 DHRs	0	0.7	170	11 FIT

[1] Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.
[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.

RELIABILITY TEST DATA

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DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	TEST COND.	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE								
CY62128-SC	TAIWN-G	4729040	349704738	150C /5.75V	48	498	0	
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	48	535	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	48	528	0	
STRESS: ESD-CHARGE DEVICE MODEL								
CY62128-SC	TAIWN-G	4724754	619705451	750V	COMP	3	0	
CY62128V-SC	TAIWN-G	4724785	619705603	2000V	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015								
CY62128-SC	TAIWN-G	4724754	619705451	2200V	COMP	3	0	
CY62128V-SC	TAIWN-G	4724785	619705603	2200V	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST, PRECOND. 168 HRS 85C/85%RH								
CY62128-SC	TAIWN-G	4724754	619705451	130C /5.5V	128	45	0	
CY62128-SC	TAIWN-G	4724754	619705451	130C /5.5V	256	45	0	
CY62128-SC	TAIWN-G	4724754	619705451	140C /5.5V	128	47	0	
STRESS: HI-ACCEL SATURATION TEST, PRECOND. 192 HRS 30C/60%RH								
CY62128V-SC	TAIWN-G	4724785	619705603	130C /3.6V	128	47	0	
CY62128V-SC	TAIWN-G	4724785	619705603	130C /3.6V	256	47	0	
STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)								
CY62128-SC	TAIWN-G	4724754	619705451	165C	336	45	0	
CY62128-SC	TAIWN-G	4724754	619705451	165C	1000	45	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST								
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	80	78	0	
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	168	78	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	80	78	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	168	78	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE								
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	80	121	0	
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	500	121	0	
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	500	198	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	80	121	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	500	121	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /3.80V	500	407	0	

RELIABILITY TEST DATA

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DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	TEST COND.	DURATION	S/S	REJ	FAIL MODE
STRESS: LONG LIFE VERIFICATION								
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	1000	121	0	
STRESS: READ & RECORD LIFE TEST								
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	80	10	0	
CY62128-SC	TAIWN-G	4724754	619705451	150C /5.75V	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH								
CY62128-SC	TAIWN-G	4724754	619705451	150C /-65C	300	45	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /-65C	300	47	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH								
CY62128V-SC	TAIWN-G	4724785	619705603	150C /-65C	300	47	0	
CY62128V-SC	TAIWN-G	4724785	619705603	150C /-65C	1000	47	0	