Cypress Semiconductor
Product Qualification Report

QTP# 96144 VERSION*A
February 2025

256K SRAM - RAM28 TECHNOLOGY FAB4	
CY7C194	64K x 4 Static RAM
CY7C195	64K x 4 Static RAM
CY7C199	32K x 8 Static RAM

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Completed
96093	Qualify Super Low Cost 256K In Fab3, 7C194/5/9R	April, 1996
96144	256K SRAM - RAM28 TECHNOLOGY FAB4	July, 2003

PRODUCT DESCRIPTION (for qualification)			
Information provided in this document is intended for generic qualification and technically describes the Cypress part			
Marketing Part #:	CY7C199		
Package:	28-pin, 300-mil SOJ		
Device Description:	32K x 8 Static RAM		
Cypress Division:	Cypress Semiconductor Corporation		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. R	
What ID markings on Die:	7C199C		

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/TiW, 1.2KA/10KA/150A
Passivation Type and Materials:	7000A TEOS + 6000A Oxynitride		
Free Phosphorus contents in top glass layer(%):	n/a		
Die Coating(s), if used:	No die coat (Low Alpha Molding)		
Generic Process Technology/Design Rule (□-drawn):	CMOS, Double Poly, Double Metal /0.65 □m		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 165 A		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor, Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R28		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY	QTP NUMBER
28-Lead SOJ	**JCET, China(JT)**	**104811**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	VZ28
Package Outline, Type, or Name:	28L SOJ (300 mils)
Mold Compound Name/Manufacturer:	KEG6000 / Kyocera
Mold Compound Flammability Rating:	V-O per UL94
Mold Compound Alpha Emission Rate:	0.002 CPH/cm2
Oxygen Rating Index: >28%	N/A
Lead Frame Designation:	Reduced Metal Pad
Lead Frame Material:	Copper
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	NiPdAu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafersaw
Die Attach Supplier:	Henkel
Die Attach Material:	QMI509
Wire Bond Method:	Thermosonic
Wire Material/Size:	0.9mil / Au
Thermal Resistance Theta JA □C/W:	11.3 C/W
Package Cross Section Yes/No:	Yes
Name/Location of Assembly (prime) facility:	JT-JCET China
MSL LEVEL	3
REFLOW PROFILE	235C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	**CML-R , KYEC**

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

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 5.75V, 150°C	**P**
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 5.75V, 150°C	**P**
Extended Dynamic Burn-In	Dynamic Operating Condition, Vcc = 5.75V, 150C	**P**
Read & Record Life Test	Dynamic Operating Condition, Vcc = 5.75V, 150C	**P**
High Accelerated Saturation Test (HAST)	JEDEC STD 22-A110: 130C, 5.5V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 1 192 Hrs, 85C/85%RH, 220 ºC Reflow	**P**
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65 ºC to 150 ºC Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH, 220 ºC Reflow	**P**
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JEDEC EIA/JESD22-A114-B	**P**
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V JESD22-C101	**P**
Static Latch-up	125C, ± 200mA/ ± 140mA JESD78B	**P**

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor	Failure Rate
High Temperature Operating Life Early Failure Rate	1532 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	236,000 DHRs (Fab3)	0	0.7	170	23 FIT
High Temperature Operating Life[1,2] Long Term Failure Rate	236,000 DHRs (Fab4)	0	0.7	170	23 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

QTP #: 96144

Device	Assy Loc	Fab Lot #	Assy Lot #	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	48	508	0	
CY7C199-VC	ALPHA-X	4612149	219607623	48	511	0	
CY7C199-VC	ALPHA-X	4610089	219607624	48	513	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	128	46	0	
CY7C199-VC	ALPHA-X	4612149	219607623	128	31	0	
CY7C199-VC	ALPHA-X	4610089	219607624	128	48	1	PARTICLE
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	80	79	0	
CY7C199-VC	ALPHA-X	4611121	219606653	168	79	0	
CY7C199-VC	ALPHA-X	4612149	219607623	80	81	0	
CY7C199-VC	ALPHA-X	4612149	219607623	168	81	0	
CY7C199-VC	ALPHA-X	4612149	219607623	252	81	0	
CY7C199-VC	ALPHA-X	4610089	219607624	80	80	0	
CY7C199-VC	ALPHA-X	4610089	219607624	168	80	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	80	116	0	
CY7C199-VC	ALPHA-X	4611121	219606653	500	116	0	
CY7C199-VC	ALPHA-X	4612149	219607623	80	120	0	
CY7C199-VC	ALPHA-X	4612149	219607623	500	120	0	
CY7C199-VC	ALPHA-X	4610089	219607624	80	120	0	
CY7C199-VC	ALPHA-X	4610089	219607624	500	120	0	
STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	1000	116	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.75V)							
CY7C199-VC	ALPHA-X	4611121	219606653	48	10	0	
CY7C199-VC	ALPHA-X	4611121	219606653	80	10	0	
CY7C199-VC	ALPHA-X	4611121	219606653	500	9	0	

Reliability Test Data

QTP #: 96144

Device	Assy Loc	Fab Lot #	Assy Lot #	Duration	Samp	Rej	Failure Mechanism
STRESS:	***TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH***						
CY7C199-VC	ALPHA-X	4611121	219606653	300	48	0	
CY7C199-VC	ALPHA-X	4611121	219606653	1000	48	0	
CY7C199-VC	ALPHA-X	4612149	219607623	300	48	0	
CY7C199-VC	ALPHA-X	4612149	219607623	1000	48	0	
CY7C199-VC	ALPHA-X	4610089	219607624	300	48	0	
CY7C199-VC	ALPHA-X	4610089	219607624	1000	48	0	

Reliability Test Data

QTP #: 96093

Device	Assy Loc	Fab Lot #	Assy Lot #	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)							
CY7C199-VC	ALPHA-X	3604586	219603042	48	505	0	
CY7C199-VC	ALPHA-X	3606954	219604212	48	506	0	
CY7C199-VC	ALPHA-X	3605689	219604391	48	500	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 168 HRS 85C/85%RH							
CY7C199-VC	ALPHA-X	3604586	219603042	128	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C199-VC	ALPHA-X	3604586	219603042	80	80	0	
CY7C199-VC	ALPHA-X	3604586	219603042	168	80	0	
CY7C199-VC	ALPHA-X	3606954	219604212	80	80	0	
CY7C199-VC	ALPHA-X	3606954	219604212	168	80	0	
CY7C199-VC	ALPHA-X	3605689	219604391	80	80	0	
CY7C199-VC	ALPHA-X	3605689	219604391	168	80	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)							
CY7C199-VC	ALPHA-X	3604586	219603042	80	118	0	
CY7C199-VC	ALPHA-X	3604586	219603042	500	118	0	
CY7C199-VC	ALPHA-X	3606954	219604212	80	118	0	
CY7C199-VC	ALPHA-X	3606954	219604212	500	118	0	
CY7C199-VC	ALPHA-X	3605689	219604391	80	118	0	
CY7C199-VC	ALPHA-X	3605689	219604391	500	118	0	
STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)							
CY7C199-VC	ALPHA-X	3604586	219603042	1000	118	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.75V)							
CY7C199-VC	ALPHA-X	3604586	219603042	48	10	0	
CY7C199-VC	ALPHA-X	3604586	219603042	80	10	0	
CY7C199-VC	ALPHA-X	3604586	219603042	500	10	0	
STRESS: TEMP CYCLE, COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH							
CY7C199-VC	ALPHA-X	3604586	219603042	300	48	0	
CY7C199-VC	ALPHA-X	3604586	219603042	1000	48	0	
CY7C199-VC	ALPHA-X	3606954	219604212	300	48	0	
CY7C199-VC	ALPHA-X	3605689	219604391	300	48	0	

Document History Page

Document Title: QTP # 96144 : 256K SRAM - RAM28 TECHNOLOGY, FAB4
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Rev.	ECN No.	Orig. of Change	Description of Change
**	4011453	ILZ	Initial Spec Release Qualification report published on Cypress.com is not in spec format. Initiated spec for QTP 96144 and updated current assembly site and package information qualified for package options for this device qualification.
*A	8110124	JYF AVE	Sunset review: Removed obsolete spec 001-64159. Updated logo and removed distribution and posting information in the history page