

Cypress Semiconductor Qualification Report

QTP# 98372 VERSION 1.0
November, 1998

1 Meg SRAM, R52H Technology, Fab 4 Qualification

CY62128V	128K x 8 Static RAM
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CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: Quality 1 Meg SRAM, CY62128V, STSOP package in Fab 4 with R52H Technology.		
Marketing Part #:	CY62128V	
Package:	32-pin STSOP	
Device Description:	128K x 8 Static RAM, R52H Technology	
Cypress Division:	Cypress Semiconductor Corporation – MPD Division	
Overall Die (or Mask) REV Level (pre-requisite for qualification):	7C621295C	
What ID markings on Die:	7C1129A/62128V	

TECHNOLOGY/FAB PROCESS DESCRIPTION – R52H			
Number of Metal Layers:	1	Metal Composition:	Metal 1: 300Å TiW/8000Å Al -0.5%Cu/500Å CoTi
Passivation Type and Materials:	1K Å TEOS + 9K Å SiN		
Die Coating(s), if used:	N/A		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Single Metal /0.25 μm		
Gate Oxide Material/Thickness (MOS):	SiO ₂ / 55Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R52H		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	32-pin STSOP		
Mold Compound Name/Manufacturer:	Hitachi CEL9200		
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 8361H
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level:	Level 1		
Name/Location of Assembly (prime) facility:	Cypress Philippines (CSPI-R)		

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 = 3.8V, 125°C	P
High Accelerated Saturation Test (HAST)	140°C, 85%RH, 3.63V Precondition: JESD22 Moisture Sensitivity MSL 1 (168 Hrs, 85C/85%RH)	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 1 (168 Hrs, 85C/85%RH)	P
Electrostatic Discharge Human Body Model (ESD-HBM)	MIL-STD-883, Method 3015.7	P 2,200V
Electrostatic Discharge Charge Device Model (ESD-CDM)	Cypress Spec. 25-00020	P 500V
Acoustic Microscopy/C-SAM	25-00104	P
Age Ball Shear	22-00018	P
Bon Pull	22-00002	P
Latchup Sensitivity	In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF ⁴	Failure Rate ⁵
High Temperature Operating Life Early Failure Rate ¹	6107	0	N/A	N/A	0 PPM
High Temperature Operating Life ^{2,3} Long Term Failure Rate	1,073,960 DHRs	1	0.7	55.3	34 FIT

- ¹ A production burn-in of 24 Hrs at 150°C, 4.0V 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 = 8.62x10⁻⁵ eV/Kelvin.

T₁ is the junction temperature of the device under stress and T₂ is the junction temperature of the device at use conditions.

⁵ Fit Rate is based on CY62128V,R52H technology qualifications, Qtps 98311 and 98372

RELIABILITY TEST DATA

QTP#: 98372¹

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: C-SAM							
7C621295C-RZACB	CSPI-R	4818838	619811028	168	15	0	
7C621295C-RZACB	CSPI-R	4818838	619811056	168	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)							
7C621295C-RZACB	CSPI-R	4829824	619811945	48	1504	0	
7C621295C-RZACB	CSPI-R	4835351	619811946	48	1501	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
7C621295CC-RZACB	CSPI-R	4829824	619811108	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
7C621295CC-RZACB	CSPI-R	4835351	619811946	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 3.63V), PRECOND. 168 HRS 85C/85%RH							
7C621295CC-RZAC	CSPI-R	4818839	619807177	128	45	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1)							
7C621295CC-RZAC	CSPI-R	4818839	619807177	300	45	0	
7C621295CC-RZAC	CSPI-R	4818839	619807177	1000	45	0	
7C621295CC-RZAC	CSPI-R	4816664	619807389	300	47	0	
7C621295CC-RZAC	CSPI-R	4816664	619807389	1000	47	0	
7C621295C-RZACB	CSPI-R	4818838	619811028	560	50	0	
7C621295C-RZACB	CSPI-R	4818838	619811056	300	50	0	
7C621295C-RZACB	CSPI-R	4818838	619811056	1000	50	0	

¹ QTP 98372, CY62128V, STSOP package qualified in R52H technology.

DEVICE RELATED RELIABILITY TEST DATA

QTP#: 98311²

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)							
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	48	1002	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	48	1050	0	
7C621295CC-RVCB	CSPI-R	4824410	619808438/4	48	1050	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
7C621295CC-RVCB	CSPI-R	4816664	619806447/48/81	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/6/7	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)							
7C621295CC-RVCB	CSPI-R	4816664	619806447/48/81	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	COMP	3	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 3.63V), PRECOND. 168 HRS 85C/85%RH							
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	128	50	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	256	50	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	128	51	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	256	51	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/4	128	51	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/4	256	51	0	
STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)							
7C621295CC-RVCB	CSPI-R	4816664	619806447/48/81	336	48	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	336	50	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	336	50	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	1000	50	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	80	154	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	168	154	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	80	154	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	168	154	0	

² QTP 98311, CY62128V, SOJ package qualified in Fab 4 with new technology R52H.

RELIABILITY TEST DATA

QTP#: 98311

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	80	540	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	300	540	0	
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	500	539	0	1 EOS
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	80	540	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	500	528	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	80	540	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	200	540	1	UNKNOWN, FA PENDING
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	500	539	0	
STRESS: EXTENDED DYNAMIC BURN-IN (150C, 3.8V)							
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	1000	539	0	
STRESS: COLD LIFE TEST (-30C, 4.3V)							
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	300	46	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	500	46	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/9/40	1000	46	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
7C621295CC-RVCB	CSPI-R	4816664	619806447/48/81	168	45	0	
7C621295CC-RVCB	CSPI-R	4816665	619806482/83/84	168	46	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	168	51	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/4	168	51	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1)							
7C621295CC-RVCB	CSPI-R	4818839	619806702/03/04	300	50	0	
7C621295CC-RVCB	CSPI-R	4818838	619809145/1	300	51	0	
7C621295CC-RVCB	CSPI-R	4824410	619809438/4	300	51	0	