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Cypress Semiconductor
Product Qualification Report

QTP# 020804
August 2013

Synchronous SRAM Family Technology Derivative R7FT-1.8, Fab4	
CY7C1061AV33	**1M x 16 Static RAM**
CY7C1069AV33 **CY7C1012AV33**	**2M x 8 Static RAM** **512K x 24 Static RAM**
CY7C1062AV33	**512K x 32 Static RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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Reliability Director
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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
012411	New Technology R7LD-1.8 / New Device, 8Meg, MoBL Static RAM CY62157CV18LL	Jun 01
020804	New Technology Derivative R7FT-1.8, New 1M x 16 Static SRAM CY7C1061AV33	Nov 02
024901	Qualify 7C1069AC Fab Device Metal 3 Option of 7C1061AC Base Die	Dec 02

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify New Technology Derivative R7FT-1.8, Fab 4 and Device CY7C1061AV33 and options			
Marketing Part #:	CY7C1061AV33, CY7C1062AV33, CY7C1069AV33, CY7C1012AV33		
Device Description:	3.3V, Industrial and Commercial available in 48-Ball BGA, 119-Ball PBGA and 54-Pin TSOP II		
Cypress Division:	Cypress Semiconductor Corporation –Memory Image Division (MID)		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A	
What ID markings on Die:	7C1061A		

TECHNOLOGY/FAB PROCESS DESCRIPTION – R7FT-1.8			
Number of Metal Layers:	3	Metal Composition:	Metal 1: 150Å Ti / 4,000Å Al / 300Å TiW Metal 2: 150Å Ti/4,000 Å Al / 300Å TiW Metal 3: 300Å Ti/8,000 Å Al / 300Å TiW
Passivation Type and Materials:	1000Å TEOS Oxide / 9000Å PECVD Nitride		
Free Phosphorus contents in top glass layer (%):	0%		
Number of Transistors in Device	115 million		
Number of Gates in Device	115 million		
Generic Process Technology/Design Rule (-	CMOS, Triple Metal /0.15 um		
Gate Oxide Material/Thickness (MOS):	SiO_2, 32Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R7FT-1.8		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
54-Lead TSSOP II	**ASE Taiwan**
119-Ball BGA	**ASE Taiwan**
48-Ball FBGA	**CML-RA, ASE Taiwan**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	ZS544A
Package Outline, Type, or Name:	54- Thin Small Outline Package (TSOP II)
Mold Compound Name/Manufacturer:	Hitachi CEL 9200-THF-U
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Solder Plate, 85%Sn, 15%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361H
Die Attach Method:	Silver Epoxy
Bond Diagram Designation	10-06017
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold, 1.0mil
Thermal Resistance Theta JA °C/W:	57.12C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-41028
Name/Location of Assembly (prime) facility:	ASE Taiwan (TAIWN-G)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R, KYEC
Fault Coverage:	100%

Note: Please contact a Cypress Representative for other packages 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 = 2.45V, 125 C Dynamic Operating Condition, Vcc Max = 2.75V, 125 C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max= 2.45V, 135 C Dynamic Operating Condition, Vcc Max = 2.07V, 150 C	P
High Temperature Steady State Life	Static Operating Condition, Vcc Max = 2.3V, 150 C Static Operating Condition, Vcc Max = 1.98V, 150 C	P
High Accelerated Saturation Test (HAST)	130 C, 1.98V/3.3V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH, 235C+0, -5C Reflow	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65 C to 150 C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH, 235C+0, -5C Reflow	P
Pressure Cooker	121C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH, 235C+0, -5C Reflow	P
High Temperature Storage	150C,No bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V, JESD22-A114E	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V, JESD22-C101C	P
Age Bond Strength	200C, 4HRS MIL-STD-883, Method 883-2011	P
SEM-X Section	MIL-STD-883, Method 883-2018-2	P
Low Temperature Operating Life	-30C, 2.6V/3.25V, 8MHZ	P
Acoustic Microscopy	J-STD-020	P
Current Density	Meets the Technology Device Level Reliability Specifications	P
Static Latch up	125C, 6.5V/10V, 300mA, JEDEC 17.	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[3]	Failure Rate[4]
High Temperature Operating Life Early Failure Rate	2,685 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	756,000 DHRs	0	0.7	88	14 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.

[4] EFR Failure Rate and LFR FIT Rate based on QTP #020804.

Reliability Test Data

QTP #:012411

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.75V, Vcc Max							
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	96	1596	0	
CY62157CV18LL (7C62357C)	4110220	*610114276L2*	CSPI-R	96	1246	0	
CY62157CV18LL (7C62357C)	4039754	*610100977L1*	CSPI-R	96	791	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.07V, Vcc Max							
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	96	390	0	
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	500	389	1	SINGLE BIT FAILURE
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	96	389	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	500	388	0	
CY62157CV18LL (7C623571C)	4048795	*610103046*	CSPI-R	96	200	0	
CY62157CV18LL (7C623571C)	4048795	*610103046*	CSPI-R	500	199	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	9	0	
***STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V,* and +/300mA**							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	3	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	3	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	3	0	
STRESS: ACOUSTIC-MSL3							
CY62157CV18LL (7C623571C)	4107546	*610112460*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C623571C)	4107546	*610112461*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C623571C)	4107546	*610112462*	CSPI-R	COMP	15	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150C, 1.98V, Vcc MAX							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	168	77	0	
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	336	76	1	POLYSILICON PROTRUSION

Reliability Test Data

QTP #:012411

STRESS: LOW TEMPERATURE OPERATING LIFE, -30C, 3.25V, 8 MHz

CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	500	44	1	POLYSILICON PROTRUSION

STRESS: AGE BOND STRENGTH

CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	COMP	15	0
CY62157CV18LL (7C62357C)	4111455	*610114268*	CSPI-R	COMP	15	0
CY62157CV18LL (7C62357C)	4110220	*610114276L2*	CSPI-R	COMP	15	0

STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C

CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	500	48	0
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	1000	48	0

STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3

CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	168	54	0
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	168	47	0
CY62157CV18LL (7C62357C)	4111455	*610114268L4*	CSPI-R	168	45	0

STRESS: HI-ACCEL SATURATION TEST, (130C, 85%RH, 1.98V), PRE COND 192 HR 30C/60%RH, MSL3

CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	128	45	0
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	128	50	0
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	128	50	0

STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	300	46	0
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	300	102	0
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	300	47	0

Reliability Test Data

QTP #: 020804

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC - MICROSCOPE, MSL3							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	COMP	15	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	COMP	15	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.45V, Vcc Max							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	96	653	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	96	1225	0	
CY7C1061AV33-ZC (7C1061A)	4225801	*610234273*	TAIWN-G	96	807	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 135C, 2.45V, Vcc Max							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	108	400	0	
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	630	400	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	108	400	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	630	400	0	
CY7C1061AV33-ZC (7C1061A)	4225801	*610234273*	TAIWN-G	108	400	0	
CY7C1061AV33-ZC (7C1061A)	4225801	*610234273*	TAIWN-G	630	400	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239312*	TAIWN-G	COMP	9	0	
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239311*	TAIWN-G	COMP	9	0	
CY7C1061AV33-ZSC (7C1061A)	4228555	*610244242*	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1061AV33-ZSC (7C1061A)	4216780	*610221628*	TAIWN-G	COMP	9	0	
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239312*	TAIWN-G	COMP	9	0	
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239311*	TAIWN-G	COMP	9	0	
CY7C1061AV33-ZSC (7C1061A)	4228555	*610244242*	TAIWN-G	COMP	9	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150C, 2.3V, Vcc MAX							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	80	80	0	
CY7C1061AV33-ZC (7C1061A)	4225801	*610234273*	TAIWN-G	336	80	0	
STRESS: LOW TEMPERATURE OPERATING LIFE, -30C, 2.6V							
CY7C1061AV33-ZSC (7C1061A)	4218409	*610225868*	TAIWN-G	500	48	0	

Reliability Test Data

QTP #: 020804

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
***STRESS: STATIC LATCH-UP TESTING, 125C, 10V,* and +/300mA**							
CY7C1061AV33-ZSC (7C1061A)	4216780	*610221628*	TAIWN-G	COMP	3	0	
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239312*	TAIWN-G	COMP	3	0	
CY7C1061AV33-ZSC (7C1061A)	4225801	*610239311*	TAIWN-G	COMP	3	0	
CY7C1061AV33-ZSC (7C1061A)	4228555	*610244242*	TAIWN-G	COMP	3	0	
STRESS: AGE BOND STRENGTH							
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	COMP	15	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C							
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	500	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	1000	45	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	168	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	168	43	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.3V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	128	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	128	45	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	300	45	0	
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	500	45	0	
CY7C1061AV33-ZC (7C1061A)	4223335	*610233056*	TAIWN-G	1000	45	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	300	45	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	500	45	0	
CY7C1061AV33-ZC (7C1061A)	4221940	*610232973*	TAIWN-G	1000	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	300	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	500	45	0	
CY7C1061AV33-ZC (7C1061A)	4218409	*610225868*	TAIWN-G	1000	45	0	

Reliability Test Data

QTP #: 024901

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1069AV33-ZSC (7C1069A)	4228555	*610247111M*	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1069AV33-ZSC (7C1069A)	4228555	*610247111M*	TAIWN-G	COMP	9	0	
***STRESS: STATIC LATCH-UP TESTING, 125C, 10V*, and +/300mA**							
CY7C1069AV33-ZSC (7C1069A)	4228555	*610247111M*	TAIWN-G	COMP	3	0	

Document History Page

Document Title: QTP # 020804 : Synchronous SRAM Family Technology Derivative R7FT-1.8, Fab4
Document Number: 001-87693

Rev.	ECN No.	Orig. of Change	Description of Change
**	4008954	ILZ	Initial Spec Release Qualification report published on Cypress.com is documented on memo LGQ-387 and not in spec format. Initiated spec for QTP 020804 and data from LGQ-387 was transferred to qualification report spec template.
*A	4087091	ILZ	Added QTP 024901 Data - Page 2 – Package / Product Qualification History - Page 11 – QTP / Reliability Test Data

Distribution: WEB

Posting: None