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Cypress Semiconductor
Product Qualification Report

QTP # 011908 VERSION *A
August 2014

Fast Asynchronous SRAM Technology Derivative R7FD, Fab 4 Qualification	
CY7C1018CV33 CY7C1019CV33 CY7C1021CV33	128K x 8 Static RAM 64K x 16 Static RAM

FOR ANY QUESTIONS ON THIS REPORT, PLEAE CONTACT
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PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
011305	New Technology Derivative R7FD-3R / 4Meg, Fast Asynchronous SRAM CY7C1041CV33 and its metal option family	Dec 01
011908	1Meg, Fast Asynchronous SRAM CY7C1021CV33 and its metal/package option family	Jan 02

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify CY7C1021CV33 product and its metal option family in Technology Derivative R7FD-3R,Fab 4	
Marketing Part #:	CY7C1018CV33, CY7C01019CV33, CY7C1021CV33
Device Description:	3.3V, Commercial and Industrial available in 32/34/44-lead SOJ, 44-lead TSSOP II and 48-ball BGA package respectively
Cypress Division:	Cypress Semiconductor Corporation –Memory Product Division (MPD)
Overall Die (or Mask) Rev Level (pre-requisite for qualification):	Rev.G
What ID markings on Die	7C1320C/7C1321C

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 150Å Ti / 4,200Å Al / 300Å TiW Metal 2: 300Å Ti /8,000 Å Al / 300Å TiW
Passivation Type and Thickness:			1000Å TEOS / 9000Å PECVD Nitride
Free Phosphorus contents in top glass layer (%):			0%
Number of Transistors in Device			7.4 million
Number of Gates in Device			7.4 million
Generic Process Technology/Design Rule (µ-drawn):			CMOS, Double Metal /0.15 um
Gate Oxide Material/Thickness (MOS):			SiO2, 32Å
Name/Location of Die Fab (prime) Facility:			Cypress Semiconductor -- Bloomington, MN
Die Fab Line ID/Wafer Process ID:			Fab4/R7FD-3R

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
32-lead SOJ	**JCET**
36/44-lead SOJ	**JCET**
44-lead TSSOP II	**CML-RA**
48-ball BGA	**CML-RA, ASE Taiwan**

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	V444
Package Outline, Type, or Name:	44 lead Plastic Small Outline J-Bend (SOJ)
Mold Compound Name/Manufacturer:	Sumitomo EME 9600HR
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Leadframe Material:	Copper
Lead Finish, Composition / Thickness:	Solder Plated 90%Sn, 10%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Dexter
Die Attach Material:	QMI-509
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold, 1.0mil
Thermal Resistance Theta JA C/W:	77.74°C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	Cypress Philippines (CML-R)

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

Note: Please contact a Cypress Representative for other package availability

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	1) QTP #011908, QTP #011305 Dynamic Operating Condition, Vcc Max = 2.3V, 150C	P
High Temperature Operating Life Latent Failure Rate	1) QTP #011908, QTP #011305 Dynamic Operating Condition, Vcc Max=2.3V, 150C	P
High Temperature Steady State Life	1) QTP #011305 Static Operating Condition, Vcc Max=2.2V, 150C	P
High Accelerated Saturation Test (HAST)	1) QTP #011305 130C, 3.63V,85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220C+5, 0C	P
Temperature Cycle	1) QTP #011908, QTP #011305 MIL-STD-883C, Method 1010, Condition C, -65C to 150C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220C+5, 0C	P
Pressure Cooker	1) QTP #011908, QTP #011305 121C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220C+5, 0C	P
High Temperature Storage	1) QTP #011305 150C 5C no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	1) QTP #011908, QTP #011305 2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1) QTP #011908, QTP #011305 500V , JESD22-C101	P
Age Bond Strength	1) QTP #011305 200C, 4HRS MIL-STD-883, Method 883-2011	P
SEM X-Section	1) QTP #011305 MIL-STD-883, Method 883-2018-2	P

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS (continuation)

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Acoustic Microscopy, MSL 3	1) QTP #011305 J-STD-020	P
Current Density	1) QTP #011305 meets the Technology Device level reliability specifications	P
Dynamic Latchup	1) QTP #011305 In accordance with JEDEC 17.	P
Static Latchup	1) QTP #011908, QTP #011305 125C, 10V, 300mA In accordance with JEDEC 17.	P

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]	4,153	0	N/A	N/A	0 PPM
High Temperature Operating Life[2,3] Long Term Failure Rate	842,160 DHRs	0	0.7	170	6 FIT

[1] A production burn-in of 6 Hrs at 150°C, 2.75V 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.

Reliability Test Data

QTP#:011908

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	48	10005	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 2.3V)							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	80	395	0	
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	500	395	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING, 125c, 10V, +/300mA							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	COMP	3	0	
STRESS: PRESSURE COOKER TEST, 121C, 100% RH. PRE COND 192HR 30C/60%R.H.. MSL3							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	168	50	0	
STRESS: TC COND. C -65 TO 150C, PRECONDITION 192HRS 30C/60%RH, MSL3							
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	300	50	0	
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	500	50	0	
CY7C1021CV33-VC (7C1321G)	4126989	610130646	CSPI-R	1000	50	0	

Reliability Test Data

QTP#: 011305

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	15	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	COMP	15	0	
CY7C1041CV33-VC (7C1341F)	4135715	610140940	CSPI-R	COMP	20	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	48	1050	0	
CY7C1041CV33-VC (7C1341F)	4133290	*610134313*	CSPI-R	48	1048	0	
CY7C1041CV33-VC (7C1341F)	4135715	*610140940*	CSPI-R	48	1050	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C1041CV33-BC (7C1341F)	4132141	610132436	CSPI-R	80	297	0	
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	500	295	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	80	394	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	500	394	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	80	600	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	500	600	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	9	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	COMP	9	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	9	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	COMP	9	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	COMP	9	0	
STRESS: STATIC LATCH-UP, 125C, 10V, +/300mA							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	3	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	COMP	3	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	COMP	3	0	
STRESS: DYNAMIC LATCH-UP							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	3	0	

Reliability Test Data

QTP#: 011305

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: AGED BOND							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	COMP	3	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	COMP	3	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	COMP	3	0	
STRESS: LOW TEMPERATURE OPERATING LIFE, -30c, 2.6V							
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	500	48	0	
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	500	50	0	
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	1000	50	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150C, 2.2V, Vcc MAX							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	80	80	0	
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	168	80	0	
STRESS: PRESSURE COOKER TEST, 121C, 100% RH, PRE COND 192HR 30C/60%RH							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	168	49	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	168	50	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	168	50	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85% RH, 3.63V, PRE COND 192HR 30C/60% RH, MSL3							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	128	50	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	128	50	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	128	50	0	
STRESS: TC COND. C -65 TO 150C, PRECONDITION 192HRS 30C/60%RH, MSL3							
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	300	50	0	
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	500	50	0	
CY7C1041CV33-VC (7C1341F)	4132141	610132436	CSPI-R	1000	50	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	300	50	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	500	50	0	
CY7C1041CV33-VC (7C1341F)	4133290	610134313	CSPI-R	1000	50	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	300	50	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	500	50	0	
CY7C1041CV33-ZC (7C1341F)	4135715	610140940	CSPI-R	1000	50	0	

Document History Page

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Rev.	ECN No.	Orig. of Change	Description of Change
**	4090218	HSTO	Initial Spec Release Qualification report published on Cypress.com was transferred to qualification report spec template.
*A	4470755	HSTO	Align qualification report based on the new template in the front page

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