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Cypress Semiconductor
Product Qualification Report

QTP# 095301
May 2013

32 Meg Asynchronous SRAM Family C9FD-3R Technology, Fab4	
CY7C1071DV33	**32-Mbit (2M x 16) Static RAM**
CY7C1079DV33	**32-Mbit (4M x 8) Static RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Zhaomin Ji
Principal Reliability Engineer
(408) 432-7021

Mira Ben-Tzur
Quality Engineering Director
(408) 943-2675

PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
052207	C9FD-3R, Fab 4 New Process using CY7C104*D (4Meg Fast Synchronous SRAM) Product Family	Mar 06
080602	Qualify 16 Meg Fast Async Rev.B Mask DDLIM Fix	Jun 08
095301	Qualify C9 32M - Stack Die of C9 16M device	Mar 10

PRODUCT DESCRIPTION (for qualification)	
Purpose: Qualify C932M - stack die of C916M device	
Marketing Part #:	CY7C1071DV33, CY7C1079DV33
Device Description:	32M Asynchronous SRAM
Cypress Division:	Cypress Semiconductor Corporation –Memory Image Division (MID)

TECHNOLOGY/FAB PROCESS DESCRIPTION – C9FD-3R			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 100Å Ti / 3200Å Al / 300Å TiW Metal 2: 150Å Ti / 8000Å Al / 300Å TiW
Passivation Type and Materials:		Si_2N_3 7000Å & SiO2 700Å (on metal2), Si_2N_3 9000Å & SiO2 1000Å (on flat)	
Generic Process Technology/Design Rule (□-drawn):		C9FD-3R/0.90µm	
Gate Oxide Material/Thickness (MOS):		20.5Å (LV) & 58Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor -- Bloomington, MN	
Die Fab Line ID/Wafer Process ID:		Fab4/C9FD-3R	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
54-Lead TSOPII	**ASE-Taiwan (G)**
119 BGA	**ASE-Taiwan (G)**
48 BGA	**ASE-Taiwan (G)**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BK48J
Package Outline, Type, or Name:	48-Lead Ball Grid Array (BGA)
Mold Compound Name/Manufacturer:	KE-G-2270
Mold Compound Flammability Rating:	UL-94
Mold Compound Alpha Emission Rate:	0.001c/cm2-h
Oxygen Rating Index:	>28%
Lead Finish, Composition / Thickness:	SAC405
Substrate Material:	A10856
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	100% Saw Through
Die Attach Supplier:	Ablestik /Hitachi
Die Attach Material:	Ablestik 2025D / Hitachi FH-900
Die Attach Method:	Tape Film
Bond Diagram Designation:	001-51846
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 0.8mil
Thermal Resistance Theta JA °C/W:	59.06CW
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	001-56462
Name/Location of Assembly (prime) facility:	ASE-Taiwan (G)
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R

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 = 3.77V, 150°C, JESD22-A108 Dynamic Operating Condition, Vcc Max = 3.77V, 125°C, JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 3.77V, 150°C, JESD22-A108 Dynamic Operating Condition, Vcc Max = 3.77V, 125°C, JESD22-A108	P
Long Life Verification	Dynamic Operating Condition, Vcc = 3.77V, 150°C, JESD22-A108	P
High Temperature Steady State Life	Static Operating Condition, Vcc Max = 3.77V, 150°C, JESD22-A108 Static Operating Condition, Vcc Max = 3.77V, 150°C, JESD22-A108	P
High Accelerated Saturation Test (HAST)	JEDEC STD 22-A110: 130°C, 3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, **260°C**+0, -5°C 130°C, 3.65V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, **260°C**+0, -5°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, **260°C**+0, -5°C	P
Pressure Cooker	JESD22-A102: 121°C, 100%RH, 15 Psig Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, **260°C**+0, -5°C	P
High Temperature Storage	JESD22-A103: 150°C, no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JEDEC EIA/JESD22-A114	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V JESD22-C101	P
Current Density	Meets the Technology Device Level Reliability Specifications	P
Age Bond Strength	200°C, 4HRS MIL-STD-883, Method 883-2011	P
Acoustic Microscopy	J-STD-020 Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, **260°C**+0, -5°C	P
Static Latch up	125C, ± 200/200mA 125C, 5.4V± 140mA JESD78	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	2994 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	2,683,300 DHRs	6*	0.7	170	18 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.

* Failures are fixed with reference corrective action (CAR) # 200613035.

Reliability Test Data

QTP #: 052207

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	15	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	15	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	15	0	
STRESS: AGE BOND STRENGTH							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	10	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	10	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	10	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 3.77V, Vcc Max							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	48	1551	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	48	1518	1	LI DEFFECT
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	48	3314	1	NON-VISUAL
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 3.77V, Vcc Max							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	80	1544	0	
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	500	1542	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	80	1516	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	500	1514	3	SINGLE BIT & BLOCKED CONTACT
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	80	1517	1	LOST REJECT
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	500	1511	2	SINGLE BIT
STRESS: LONG LIFE VERIFICATION, 150C, 3.77V, Vcc Max							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	1000	400	0	
STRESS: HIGH TEMPERATURE STEADY STATE LIFE, 150C, 3.77V, Vcc Max							
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	80	80	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	168	80	0	
STRESS: HIGH TEMPERATURE STORAGE							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	500	50	0	
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	1000	50	0	

Reliability Test Data

QTP #: 052207

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	9	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	9	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	9	0	
CY7C1041D (7C1541N)	4538630	*610610603*	CML-R	COMP	9	0	
CY7C1049D (7C1549N)	4538680	*610611050*	CML-R	COMP	9	0	
CY7C1046D (7C1346N)	4538680	*610610606*	CML-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-B, 2,200V							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	9	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	9	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	9	0	
CY7C1041D (7C1541N)	4530733	*610607231*	CML-R	COMP	9	0	
CY7C1049D (7C1549N)	4538680	*610611050*	CML-R	COMP	9	0	
CY7C1046D (7C1346N)	4538680	*610610606*	CML-R	COMP	9	0	
CY7C1049DV33 (7C1349N)	4538680	*610611051*	CML-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	3	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	3	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	3	0	
CY7C1041D (7C1541N)	4530733	*610607231*	CML-R	COMP	3	0	
CY7C1049D (7C1549N)	4538680	*610611050*	CML-R	COMP	3	0	
CY7C1046D (7C1346N)	4538680	*610610606*	CML-R	COMP	3	0	
CY7C1049DV33 (7C1349N)	4538680	*610611051*	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-200mA							
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	COMP	3	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	COMP	3	0	
CY7C1046DV33 (7C1346N)	4538680	*610610605*	CML-R	COMP	3	0	
CY7C1049DV33 (7C1349N)	4538680	*610611051*	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-300mA							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	COMP	3	0	

Reliability Test Data

QTP #: 052207

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: STATIC LATCH-UP TESTING, 125C, 8.5V, +/-200mA							
CY7C1049D (7C1549N)	4538680	*610611050*	CML-R	COMP	3	0	
CY7C1046D (7C1346N)	4538680	*610610606*	CML-R	COMP	3	0	
CY7C1041D (7C1541N)	4552229	*610617290*	CML-R	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	128	45	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	128	45	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	128	45	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	168	46	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	168	50	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	288	50	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	168	50	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	288	50	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	300	45	0	
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	500	45	0	
CY7C1041DV33 (7C1341N)	4533793	*610553668*	CML-R	1000	45	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	300	50	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	500	50	0	
CY7C1041DV33 (7C1341N)	4536828	*610558451*	CML-R	1000	50	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	300	50	0	
CY7C1041DV33 (7C1341N)	4530733	*610607229*	CML-R	500	50	0	

Reliability Test Data

QTP #: 080602

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	COMP	15	0	
CY7C1061DV33 (7C1061NC)	4646309	610706778	TAIWAN-G	COMP	15	0	
CY7C1062DV33 (7C1062NC)	4648234	610730021	TAIWAN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 3.77V, Vcc Max							
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	96	1415	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485	TAIWAN-G	96	918	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485N	TAIWAN-G	96	217	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485N1	TAIWAN-G	96	444	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 3.77V, Vcc Max							
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	168	199	0	
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	1000	199	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485R222	TAIWAN-G	168	200	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485R222	TAIWAN-G	1000	200	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	COMP	9	0	
CY7C1062DV33 (7C1062NC)	4713292	0	TAIWAN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-E, 2,200V							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	COMP	8	0	
CY7C1062DV33 (7C1062NC)	4713292	0	TAIWAN-G	COMP	8	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.65V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	128	45	0	
STRESS: HIGH TEMPERATURE STEADY STATE LIFE, 150C, 3.77V, Vcc Max							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	168	80	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	168	45	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-200mA							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	COMP	3	0	

Reliability Test Data

QTP #: 080602

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	300	45	0	
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	500	44	0	
CY7C1061DV33 (7C1061NC)	4641622	610673799	TAIWAN-G	1000	44	0	
CY7C1061DV33 (7C1061NC)	4646309	610706778	TAIWAN-G	300	45	0	
CY7C1062DV33 (7C1062NC)	4648234	610730021	TAIWAN-G	300	50	0	
CY7C1062DV33 (7C1062NC)	4648234	610730021	TAIWAN-G	500	50	0	
CY7C1062DV33 (7C1062NC)	4648234	610730021	TAIWAN-G	1000	45	0	

Reliability Test Data

QTP #: 095301

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7C1071DV33 (7C1071NC)	4907587	610927400	TAIWAN-G	COMP	14	0	
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	COMP	15	0	
CY7C1071DV33 (7C1071NC)	4906129	610927399	TAIWAN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 3.77V, Vcc Max							
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	96	1415	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485	TAIWAN-G	96	1579	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 3.77V, Vcc Max							
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	168	199	0	
CY7C1061DV33 (7C1061NC)	4801414	610809978N	TAIWAN-G	1000	199	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485	TAIWAN-G	168	200	0	
CY7C1061DV33 (7C1061NC)	4802871	610814485	TAIWAN-G	1000	200	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-E, 2,200V							
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	COMP	8	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.65V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	264	77	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, +/-140mA							
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	COMP	6	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CY7C1071DV33 (7C1071NC)	4907587	610927400	TAIWAN-G	500	76	0	
CY7C1071DV33 (7C1071NC)	4907587	610927400	TAIWAN-G	1000	76	0	
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	500	76	0	
CY7C1071DV33 (7C1071NC)	4908217	610927398	TAIWAN-G	1000	76	0	
CY7C1071DV33 (7C1071NC)	4906129	610927399	TAIWAN-G	500	77	0	
CY7C1071DV33 (7C1071NC)	4906129	610927399	TAIWAN-G	1000	77	0	

Document History Page

Document Title: 095301: 32 MEG ASYNCHRONOUS SRAM FAMILY C9FD-3R TECHNOLOGY, FAB4
Document Number: 001-61392

Rev.	ECN No.	Orig. of Change	Description of Change
**	2927519	HGA	Initial spec release
*A	4005013	NSR	Removed VERSION 1.0 in the title page. Removed reference Cypress specs in reliability tests performed table and added the reference industry standards.

Distribution: WEB

Posting: None