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Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

Cypress Semiconductor
Product Qualification Report

QTP# 000305
May, 2013

4 Meg Asynchronous SRAM R52D-3 Technology at Fab 4	
CY7C1041BV33	**256K X 16 STATIC RAM**
CY7C1049BV33	**512K X 8 STATIC RAM**
CY7C1041BNV33	**256 K × 16 STATIC RAM**
CY7C1049BNV33	**512K X 8 STATIC RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Mira Ben-Tzur
Reliability Director
(408) 943-2675

Zhaomin Ji
Principal Reliability Engineer
(408) 432-7021

PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
99311	New Technology R52D-3 / New 2Meg CY7C1329 Product	Aug 99
99503	New 4Meg, CY7C1325B, Sync Product, R52D-3 Technology	Jan 00
000305	New 4Meg Async SRAM CY7C1049BV33, R52D-3 Technology	Feb 00

Note:
Based on using the same design rules and cells to establish a product family, as in JESD-47, Cypress qualifies devices within a product technology by using generic data from that product family to fill out the qualification requirements for those reliability stresses which test intrinsic reliability of the technology. Reliability stresses, such as ESD and Early Life, which are design sensitive are routinely performed in qualifications to ensure the specific design is reliable.

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualifies 4 Meg Synchronous RAM, CY7C1049BV33 and its options in qualified R52-3D technology, Fab4.			
Marketing Part #	CY7C1041BV33/ CY7C1049BV33/ CY7C1041BNV33/ CY7C1049BNV33		
Device Description:	3.3V, Commercial and Industrial, available in 36-pin SOJ package		
Cypress Division:	Cypress Semiconductor Corporation – Memory Product Division (MPD)		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. C	
Die Size (stepping):	253 mils x 265 mils	What ID markings on Die:	7C1049B

TECHNOLOGY/FAB PROCESS DESCRIPTION R52D-3			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500Å TiW/6,000Å Al-0.5%Cu/300Å TiW Metal 2: 300Å Ti/8,000Å Al-0.5%Cu/300Å TiW
Passivation Type and Materials:		1000Å TEOS + 9000Å SiN	
Free Phosphorus contents in top glass layer(%):		0%	
Number of Transistors in Device		26M	
Number of Gates in Device		4,5M	
Generic Process Technology/Design Rule (µ-drawn):		CMOS, Double Metal /0.25 µm	
Gate Oxide Material/Thickness (MOS):		55 Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor - Bloomington, MN	
Die Fab Line ID/Wafer Process ID:		Fab4/R52D-3	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
36-lead SOJ / 44-lead SOJ	**CSPI-R**
44 lead TSOP II	**CSPI-R**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	V3644
Package Outline, Type, or Name:	36-lead Plastic Small Outline J-Bend (SOJ)
Mold Compound Name/Manufacturer:	Hitachi CEL9200 CY
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	>28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Solder Plate, 90%Sn - 10%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	Ablestik 8361H
Bond Diagram Designation	10-03636
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0um
Thermal Resistance Theta JA °C/W:	50°C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	Cypress Philippines (CSPI-R)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CSPI-R)
Fault Coverage:	100%

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:	Hitachi CEL9200
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	>28%
Lead Frame Material:	Copper Alloy 194
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:	Ablestik
Die Attach Material:	Ablestik 8361H
Bond Diagram Designation	10-03636
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0um
Thermal Resistance Theta JA °C/W:	50°C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	Cypress Philippines (CSPI-R)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CSPI-R)
Fault Coverage:	100%

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	1) QTP #000305, QTP #99311 Dynamic Operating Condition, Vcc = 4.5 V, 150°C 2) QTP #99503 Dynamic Operating Condition, Vcc = 3.8 V, 150°C	P
High Temperature Operating Life Latent Failure Rate	1) QTP #000305, QTP #99503, QTP #99311 Dynamic Operating Condition, Vcc = 3.8 V, 150°C	P
High Temperature Steady State Life	1) QTP #99311 150C, 3.63V,Vcc Max	P
High Accelerated Saturation Test (HAST)	2) QTP #000305, QTP #99503, QTP #99311 130°C, 3.63V,85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30/60% RH	P
Temperature Cycle	1) QTP #000305, QTP #99503, QTP #99311 MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH	P
Pressure Cooker	1) QTP #000305, QTP #99503, QTP #99311 121C, 100%RH MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2) QTP #000305, QTP #99503, QTP #99311 2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1) QTP #000305, QTP #99503, QTP #99311 500V	P
Acoustic Microscopy, MSL 3	J-STD-020	P

*LTOL done on QTP #99075, R52LD-3 Technology

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT (continuation)

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Storage	1) QTP #99311 165C, no bias	P
Latchup Sensitivity	1) 000305 125°C, 8V, +/- 300mA 2) QTP #99503, QTP #QTP #99311 125°C, 10V, +/- 200mA 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]	14,463	1	N/A	N/A	69 PPM
High Temperature Operating Life[2,3] Long Term Failure Rate	2,459,240 DHRs	3	0.7	170	10 FIT

[1] A production burn-in of 24 Hrs at 150°C, 4.5V 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.

[5] **EFR and LFR FIT Rate based on QTP #000305, QTP #99503 and QTP #99311.**

RELIABILITY TEST DATA

QTP#: 000305

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C,4.5V)							
CY7C1049V33-VCB (7C1349C)	CSPI-R	4931076	619937742M	48	1475	0	
CY7C1049V33-VCB (7C1349C)	CSPI-R	4931076	619937742	48	1373	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY7C1049V33-VC (7C1349C)	CSPI-R	4921786	619925327	COMP	3	0	
CY7C1041V33-VCB (7C1349C)	CSPI-R	4931076	619937391	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY7C1049V33-VC (7C1349C)	CSPI-R	4921786	619925327	COMP	3	0	
CY7C1041V33-VCB (7C1349C)	CSPI-R	4931076	619937391	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (9.5V, +/-300 mA)							
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	COMP	3	0	
STRESS: ACOUSTIC-MSL3							
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	COMP	15	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	168	48	0	
STRESS: HI-ACCEL SATURATION TEST (130C/85%RH/3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	128	50	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY7C1049V33-VCB(7C1349C)	CSPI-R	4931076	619937741	80	530	0	
CY7C1049V33-VCB(7C1349C)	CSPI-R	4931076	619937741	500	530	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	300	48	0	
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	500	48	0	
CY7C1049V33-VC(7C1349C)	CSPI-R	4921786	619925327	1000	48	0	

RELIABILITY TEST DATA

QTP#: 99503

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)							
CY7C1338B-BC(7C1338B)	CSPI-R	4932158	619934137/8/76	48	1500	0	
CY7C1325B-BC(7C1325B)	CSPI-R	4931078	619927801	48	1798	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY7C1325B-BC(7C1325B)	CSPI-R	4906012	619907774	COMP	3	0	
CY7C1345B-BC(7C1345B)	CSPI-R	4906012	619911173	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)							
CY7C1325B-BC(7C1325B)	CSPI-R	4906012	619907774	COMP	3	0	
CY7C1345B-BC(7C1345B)	CSPI-R	4906012	619911173	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (+/-200 mA)							
CY7C1325B-BC(7C1325B)	CSPI-R	4906012	619907774	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (130C/85%RH/3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1325B-BC(7C1325B)	CSPI-R	4907111	619910139	128	47	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY7C1325B-BC(7C1338B)	CSPI-R	4931078	619927801	80	400	0	
CY7C1325B-BC(7C1338B)	CSPI-R	4931078	619927801	500	400	0	
CY7C1338B-BC(7C1338B)	CSPI-R	4932158	619934137/8/76	80	400	0	
CY7C1338B-BC(7C1338B)	CSPI-R	4932158	619934137/8/76	500	399	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C1325B-BC(7C1325B)	CSPI-R	4906012	619907775	168	47	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1325B-BC(7C1325B)	CSPI-R	4906012	619907775	300	40	0	
CY7C1325B-BC(7C1325B)	CSPI-R	4907111	619910139	300	47	0	
CY7C1325B-BC(7C1325B)	CSPI-R	4907111	619910139	500	47	0	
CY7C1325B-BC(7C1325B)	CSPI-R	4907111	619910139	1000	47	0	

RELIABILITY TEST DATA

QTP#: 99311

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 4.5V)							
CY7C1329-AC(7C1329D)	CSPI-R	4905886		48	2988	0	
CY7C1329-AC(7C1329D)	CSPI-R	4905886	619909761	48	1205	0	
CY7C1329-AC(7C1329D)	CSPI-R	4905886	619909776	48	871	0	
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911324	48	1584	1	1 Particle Defect
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911327	48	1669	0	
STRESS: ESD-CHARGE DEVICE MODEL							
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	1000V	3	0	
CY7C1329-AC(7C1329D)	CSPI-R	4901357	619903817	750V	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015							
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	2200V	3	0	
CY7C1329-AC(7C1329D)	CSPI-R	4901357	619903817	2200V	3	0	
STRESS: HI-ACCEL SATURATION TEST (130C/85%RH/3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	128	48	0	
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	256	48	0	
CY7C1329-AC(7C1329D)	CSPI-R	4901357	619903817	128	48	0	
STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)							
CY7C1329-ACB(7C1329D)	CSPI-R	4842121	619815465	336	48	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4843204	619815797	336	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
CY7C1329-ACB(7C1329D)	CSPI-R	4842121	619815465	80	80	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4842121	619815465	168	80	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4843204	619815797	80	80	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4843204	619815797	168	80	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY7C1329-AC(7C1329D)	CSPI-R	4905886	619909761	80	1196	0	
CY7C1329-AC(7C1329D)	CSPI-R	4905886	619909761	500	799	0	
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911324	80	1491	1	1 Unknown Cause
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911324	500	1202	1	1 Unknown Cause
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911327	80	1640	0	
CY7C1329-AC(7C1329D)	CSPI-R	4909345	619911327	500	1452	1	1 Unknown Cause
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	168	48	0	
CY7C1329-AC(7C1329D)	CSPI-R	4901357	619903817	168	46	0	
STRESS: STATIC LATCH-UP TESTING (+/-200 mA)							
CY7C1329-AC(7C1329D)	CSPI-R	4853292	619902690	9.98V	3	0	
CY7C1329-AC(7C1329D)	CSPI-R	4901357	619903817	9.96V	3	0	

RELIABILITY TEST DATA

QTP#: 99311

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1329-ACB(7C1329D)	CSPI-R	4842121	619815465	300	48	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4842121	619815465	1000	48	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4843204	619815797	300	45	0	
CY7C1329-ACB(7C1329D)	CSPI-R	4843204	619815797	1000	45	0	

Document History Page

Document Title: 000305: 4 MEG ASYNCHRONOUS SRAM (CY7C1041/49BV33, CY7C1041/49BNV33) R52D-3 TECHNOLOGY, FAB4
Document Number: 001-69304

Rev.	ECN No.	Orig. of Change	Description of Change
**	3242044	HGA	Initial Spec Release
*A	4011757	NSR	Removed Assembly Process Flow with obsolete spec 11-20004. Removed reference Cypress specs in reliability tests performed table. Updated the Cypress technical contact person.

Distribution: WEB

Posting: None