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Cypress Semiconductor
Product Qualification Report

QTP# 062201 VERSION*A
June, 2014

MoBL ADM DUAL PORT STATIC RAM FAMILY R52LD-3 TECHNOLOGY, FAB4	
CYDMX256A16 **CYDMX128A16** **CYDMX064A16**	**4K/8K/16K x 16 MoBL® ADM Asynchronous Dual–Port Static RAM**

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

QUAL REPORT	DESCRIPTION OF QUALIFICATION PURPOSE	DATE COMP.
99075	New Technology R52LD-3 / New Slow Low Power MoBL SRAM, CY62137V	Apr 99
052103	Qualify 256K Dual Port (Split Voltage) Device Family, R52LD3 Technology from Fab4	Nov 05
062201	Qualification of Device 7C02638A (MoBL ADM Dual Port) in R52LD-3 Technology at Fab 4	Sep 06

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: To qualify 3rd Generation MoBL DP ADM on existing package and qualified technology, R52LD-3.	
Marketing Part #:	CYDMX256A16, CYDMX128A08, CYDMX064A16
Device Description:	1.8/2.5/3V 256K/128K/64K (16K/8K/4K x 16) MoBL ADMux Dual port
Cypress Division:	Cypress Semiconductor Corporation – Data Communication Division
Overall Die (or Mask) REV:	Rev. A
What ID markings on Die:	7C02638A

TECHNOLOGY/FAB PROCESS DESCRIPTION – R52LD3			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500 Å-TiW/6000 Å Al-Cu/500 Å TiW Metal 2: 300 Å-Ti/8000 Å Al-Cu/300 Å TiW
Passivation Type and Materials:			1,000A TEOS + 9,000A SiN
Free Phosphorus contents in top glass layer (%):			0%
Die Coating(s), if used:			N/A
Number of Transistors in Device:			2932342
Number of Gates in Device:			733086
Generic Process Technology/Design Rule (µ-drawn):			R52 TDR (01-30065), 0.25um Technology
Gate Oxide Material/Thickness (MOS):			55Å
Name/Location of Die Fab (prime) Facility:			Cypress Semiconductor – Bloomington Minnesota
Die Fab Line ID/Wafer Process ID:			7C02638A

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
100-Ball VFBGA	ASE Taiwan (TAIWN-G), CML-RA

Note: Package Qualification details upon request.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BZ100
Package Outline, Type, or Name:	100-Ball, Very Fine Ball Grid Array (VFBGA)
Mold Compound Name/Manufacturer:	KE-G2270
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	N/A
Substrate Material:	CCL-HL832NX
Lead Finish, Composition / Thickness:	SnAgCu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	100%
Die Attach Supplier:	Ablestik
Die Attach Material:	2025D
Die Attach Method:	Epoxy
Bond Diagram Designation:	001-08055
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 0.8mil
Thermal Resistance Theta JA and JC °C/W:	44.21 , 19
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	001-06964
Name/Location of Assembly (prime) facility:	ASE Taiwan (TAIWN-G)

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

Note: Please contact a Cypress Representative for other packages availability.

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Alpha Particle Emission	0.001 CPH/Cm^2	P
Data Retention (Hermetic)	250°C, non-biased	P
Data Retention (Plastic)	150°C, non-biased	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V JESD22-C101	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JEDEC EIA/JESD22-A114	P
High Accelerated Saturation Test (HAST)	JEDEC STD 22-A110: 140°C, 3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30°C, 60% RH, 260°C Reflow)	P
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max=3.45V, 125°C Dynamic Operating Condition, Vcc Max=3.45V, 150°C Dynamic Operating Condition, Vcc Max=3.8V, 150°C JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max=3.45V, 125°C Dynamic Operating Condition, Vcc Max=3.45V, 150°C Dynamic Operating Condition, Vcc Max=3.8V, 150°C JESD22-A108	P
High Temperature Steady State Life	Static Operating Condition, Vcc Max = 3.63V, 150°C JESD22-A108	P
High Temperature Storage	JESD22-A103:165°C, no bias	P
Long Life Verification	Dynamic Operating Condition, Vcc Max = 3.8V, 150°C JESD22-A108	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc = 3.8V, -30°C, f = 8 MHz JESD22-A108	P
Pressure Cooker	JESD22-A102, 121°C, 100%RH, 15 PSIG Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30°C, 60% RH, 260C Reflow)	P
Static Latch-up	125C, ± 200mA In accordance with JEDEC 17	P
Temperature Cycle	MIL-STD-883, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30°C, 60% RH, 260C Reflow)	P
Thermal Series	MIL-STD-883-5005, D3	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fail	Activation Energy	Acceleration Factor[3]	Failure Rate
High Temperature Operating Life Early Failure Rate	1078 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	400,500 HRs	1	0.7	170	30 FITs

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[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.

Reliability Test Data

QTP #: 99075

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62137V-ZSIB	4852210	619903364	CSPI-R	COMP	3	0	
CY62137V-ZSIB	4851023	619907600	CSPI-R	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, >Vcc Max)							
CY62137V-ZSIB	4852210	619903364	CSPI-R	48	1505	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	48	1504	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V, >Vcc Max)							
CY62137V-ZSIB	4852210	619903364	CSPI-R	80	405	0	
CY62137V-ZSIB	4852210	619903364	CSPI-R	500	405	1	UNKNOWN
CY62137V-ZSIB	4902501	619905577	CSPI-R	80	396	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	500	396	0	
STRESS: LONG LIFE VERIFICATION, (150C, 3.8V, >Vcc Max)							
CY62137V-ZSIB	4852210	619903364	CSPI-R	1000	404	0	
STRESS: HIGH TEMP DYNAMIC STEADY STATE LIFE TEST, (150C, 3.63V, >Vcc Max)							
CY62137V-ZSIB	4852210	619903364	CSPI-R	80	80	0	
CY62137V-ZSIB	4852210	619903364	CSPI-R	168	80	0	
STRESS: LOW TEMPERATURE OPERATING LIFE, (-30C, 3.8V, 8 MHZ)							
CY62137V-ZSIB	4852210	619903364	CSPI-R	500	45	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CY62137V-ZSIB	4852210	619903364	CSPI-R	COMP	3	0	
CY62137V-ZSIB	4851023	619907600	CSPI-R	COMP	3	0	
STRESS: HIGH TEMPERATURE STORAGE, 165C, no bias							
CY62137V-ZSIB	4852210	619903364	CSPI-R	336	47	0	
CY62137V-ZSIB	4852210	619903364	CSPI-R	1000	47	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	336	48	0	
STRESS: TC CONDITION C, -65C TO 150C, PRE COND 192 HRS 30C/60% RH, MSL3							
CY62137V-ZSIB	4852210	619903364	CSPI-R	300	48	0	
CY62137V-ZSIB	4852210	619903364	CSPI-R	1000	48	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	300	48	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	1000	48	0	

Reliability Test Data

QTP #: 99075

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: PRESSURE COOKER TEST (121C, 100%RH), PRE COND 192HRS 30C/60%RH, MSL3							
CY62137V-ZSIB	4852210	619903364	CSPI-R	168	48	0	
STRESS: HI-ACCEL SATURATION TEST, (140C, 3.63V), 85%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY62137V-ZSIB	4852210	619903364	CSPI-R	128	48	0	
CY62137V-ZSIB	4852210	619903364	CSPI-R	256	48	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	128	48	0	
CY62137V-ZSIB	4902501	619905577	CSPI-R	256	48	0	
CY62137V-ZSIB	4903568	619907944	CSPI-R	128	48	0	

Reliability Test Data

QTP #: 052103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 3.45V, Vcc Max							
CYDC256B16 (7C02628A)	4531145	610540035	TAIWN-G	48	330	0	
CYDC256B16 (7C02628A)	4531145	610540036	TAIWN-G	48	328	0	
CYDC256B16 (7C02628A)	4531145	610540037	TAIWN-G	48	332	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CYDM256B16 (7C02628A)	4531145	610539449	TAIWN-G	COMP	9	0	
CYDC256B16 (7C02628A)	4531145	610540035/6/7	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CYDM256B16 (7C02628A)	4531145	610539449	TAIWN-G	COMP	9	0	
CYDC256B16 (7C02628A)	4531145	610540035/6/7	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYDM256B16 (7C02628A)	4531145	610539449	TAIWN-G	COMP	3	0	
CYDC256B16 (7C02628A)	4531145	610540035/6/7	TAIWN-G	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 7.0V, +/-300mA)							
CYDM256B16 (7C02628A)	4531145	610539449	TAIWN-G	COMP	3	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	168	50	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	300	50	0	
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	500	50	0	
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	1000	50	0	

Reliability Test Data

QTP #: 062201

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ALPHA PARTICLE EMISSION							
CYDC256B16 (7C02628A)	4522569	610543349	TAIWN-G	COMP	5	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 3.45V, Vcc Max							
CYDCX256A16 (7C02638A)	4622252	610647256	CML-R	48	485	0	
CYDCX256A16 (7C02638A)	4622252	610647257	CML-R	48	400	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 3.45V, Vcc Max							
CYDMX256A16 (7C02638A)	4622252	610646577	TAIWN-G	96	193	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CYDMX256A16 (7C02638A)	4622252	610646577	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CYDMX256A16 (7C02638A)	4622252	610646577	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYDMX256A16 (7C02638A)	4622252	610646577	TAIWN-G	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 5.4V, +/-200mA)							
CYDMX256A16 (7C02638A)	4622252	610646577	TAIWN-G	COMP	3	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	168	50	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	300	50	0	
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	500	50	0	
CYDM256A16 (7C02618A)	4503160	610510254	TAIWN-G	1000	50	0	

Document History Page

Document Title: QTP # 062201 : MoBL ADM DUAL-PORT RAM, (CYDMX064/128/256xxx Product Family), R52LD-3 TECHNOLOGY, FAB 4
Document Number: 001-88008

Rev.	ECN No.	Orig. of Change	Description of Change
**	4033621	ILZ	Initial Spec Release Qualification report published on Cypress.com is documented on memo HGA-168 and not in spec format. Initiated spec for QTP 062201 and all data from memo# HGA-168 was transferred to qualification report spec template. Deleted package qualification details on package qualification history table. Deleted Cypress reference Spec and replaced with Industry Standards Updated package availability based on current qualified test & assembly site.
*A	4417735	JYF	Sunset review: Updated QTP title page and Reliability Tests Performed table (ESD-HBM, HAST, EFR/LFR, HTSSL, HTS, LLV, LTOL, PCT) for template alignment.

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