

# Cypress Semiconductor Product Qualification Report

QTP# 062206 VERSION 3.0  
March 2007

<b>2 Meg MoBL SRAM Family</b>	
<b>Technology R95LD-3R, Fab4</b>	
<b>CY62137FV18 MoBL®</b>	<b>2-Mbit (128K x 16) Static RAM</b>
<b>CY62136FV30 MoBL®</b>	<b>2-Mbit (128K x 16) Static RAM</b>
<b>CY62137FV30 MoBL®</b>	<b>2-Mbit (128K x 16) Static RAM</b>
<b>CY62138F MoBL®</b>	<b>2-Mbit (256K x 8) Static RAM</b>
<b>CY62138FV30 MoBL®</b>	<b>2-Mbit (256K x 8) Static RAM</b>
<b>CY62135 MoBL®</b>	<b>2-Mbit Static RAM Die</b>

## 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

<b>Qual Report</b>	<b>Description of Qualification Purpose</b>	<b>Date Comp</b>
054302	New Technology R95LD-3R, Fab 4, and New Device CY7C62xxx (4Meg) MoBL Product Family.	Dec 05
062206	Qualify 2Meg Device Family, R95LD-3R Technology, Fab4	Feb 07
070905	MM1 (450B) Mask Change on R95 2Meg Device Family, Fab4	Mar 07

<b>PRODUCT DESCRIPTION (for qualification)</b>	
Purpose: Qualify 2Meg CY7C6xxx MoBL product family in qualified technology R95LD-3R, Fab 4	
Marketing Part #:	CY62135, CY62136/7/8FV30, CY62137FV18, CY62138F
Device Description:	1.8V, 3V, 2Meg MoBL SRAM
Cypress Division:	Cypress Semiconductor Corporation –Memory Image Division (MID)

<b>TECHNOLOGY/FAB PROCESS DESCRIPTION – R95LD-3R</b>			
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:	1000Å Oxide TEOS / 9000Å Nitride		
Generic Process Technology/Design Rule (□-drawn):	CMOS, Double Metal, 0.09µm		
Gate Oxide Material/Thickness (MOS):	28Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor -- Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R95LD-3R		

**PACKAGE AVAILABILITY**

<b>PACKAGE</b>	<b>ASSEMBLY SITE FACILITY</b>
<b>36-Ball VFBGA</b>	<b>TAIWAN-G</b>
<b>48-Ball VFBGA</b>	<b>TAIWAN –G</b>
<b>32-Lead TSOP II/STSOP II</b>	<b>TAIWAN-T, CML-R</b>
<b>32-Lead SOIC</b>	<b>CML-R</b>
<b>44-Lead TSOP II</b>	<b>CML-R</b>

**Note:** Package Qualification details upon request

<b>MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION</b>	
<b>Package Designation:</b>	BZ48
<b>Package Outline, Type, or Name:</b>	48-Ball BGA
<b>Mold Compound Name/Manufacturer:</b>	KE-G2270
<b>Mold Compound Flammability Rating:</b>	NA
<b>Oxygen Rating Index:</b>	NA
<b>Lead Frame Material:</b>	BT Resin
<b>Lead Finish, Composition / Thickness:</b>	SnAgCu
<b>Die Backside Preparation Method/Metallization:</b>	Backgrind
<b>Die Separation Method:</b>	Sawing 100%
<b>Die Attach Supplier:</b>	Abelstik
<b>Die Attach Material:</b>	Ablebond 2025D
<b>Die Attach Method:</b>	Epoxy
<b>Bond Diagram Designation:</b>	001-08357
<b>Wire Bond Method:</b>	Thermosonic
<b>Wire Material/Size:</b>	Au, 1.0mil
<b>Thermal Resistance Theta JA °C/W:</b>	37.31°C/W
<b>Package Cross Section Yes/No:</b>	N/A
<b>Assembly Process Flow:</b>	001-04693
<b>Name/Location of Assembly (prime) facility:</b>	Taiwan-G
<b>MSL Level</b>	3
<b>Reflow Profile</b>	260C

<b>ELECTRICAL TEST / FINISH DESCRIPTION</b>	
<b>Test Location:</b>	Cypress Philippines (CML-R)

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

**RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT**

<b>Stress/Test</b>	<b>Test Condition (Temp/Bias)</b>	<b>Result P/F</b>
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 1.85V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 1.85V, 150°C	P
Long Life Verification	Dynamic Operating Condition, Vcc = 1.85V, 150°C	P
High Temperature Steady State Life	Static Operating Condition, Vcc Max = 1.75V, 125°C	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc = 2.0V, -30°C	P
High Accelerated Saturation Test (HAST)	130°C, 3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, <b>260°C</b> +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, <b>260°C</b> +0, -5°C	P
Pressure Cooker	121°C, 100%RH, 15 Psig Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, <b>260°C</b> +0, -5°C	P
High Temperature Storage	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-B	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Alpha Particle Sensitivity	Cypress Spec. 25-00055	P
Current Density	Cypress Spec 22-00029	P
Age Bond Strength	200°C, 4HRS MIL-STD-883, Method 883-2011	P
Acoustic Microscopy	Cypress Spec. 25-00104	P
Dynamic Latchup	Cypress Spec. 01-00081	P
Static Latchup	125C, ± 200/ 300mA Cypress Spec. 01-00081	P

**RELIABILITY FAILURE RATE SUMMARY**

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF <sup>3</sup>	Failure Rate
High Temperature Operating Life Early Failure Rate	1,519 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	600,000 DHRs	1	0.7	170	10 FIT

<sup>1</sup> Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.

<sup>2</sup> Chi-squared 60% estimations used to calculate the failure rate..

<sup>3</sup> 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<sub>A</sub> =The Activation Energy of the defect mechanism.

k = Boltzmann's constant = 8.62x10<sup>-5</sup> eV/Kelvin.

T<sub>1</sub> is the junction temperature of the device under stress and T<sub>2</sub> is the junction temperature of the device at use conditions.

## Reliability Test Data

QTP #: 054302

<i>Device</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
<b>STRESS: ACOUSTIC-MSL3</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	COMP	15	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	15	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	COMP	15	0	
<b>STRESS: AGE BOND STRENGTH</b>							
CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	10	0	
CY62136EV30LL (7C62136F)	4516742	610537839	CML-R	COMP	10	0	
CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	10	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	96	679	0	
CY62147EV30LL (7C62147F)	4527847	610558767	CML-R	96	4031	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	96	1711	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	96	917	1	Single Bit (Non-visual)
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	80	400	0	
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	500	400	1	Blocked contact at Poly
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	80	400	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	500	400	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	80	400	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	500	400	0	
<b>STRESS: LONG LIFE VERIFICATION, 150C, 1.85V, Vcc Max</b>							
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	1000	393	0	
<b>STRESS: HIGH TEMPERATURE STEADY STATE LIFE, 125C, 1.75V, Vcc Max</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	168	76	0	
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	336	75	0	
<b>STRESS: LOW TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, -30C, 2.0V, Vcc</b>							
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	500	45	0	
<b>STRESS: HIGH TEMPERATURE STORAGE</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	500	45	0	
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	1000	45	0	

## Reliability Test Data

**QTP #: 054302**

<b>Device</b>	<b>Fab Lot #</b>	<b>Assy Lot #</b>	<b>Assy Loc</b>	<b>Duration</b>	<b>Samp</b>	<b>Rej</b>	<b>Failure Mechanism</b>
<b>STRESS: ESD-CHARGE DEVICE MODEL, 500V</b>							
CY62147EV30LL (7C62147F)	4527847	610548767	CML-R	COMP	9	0	
CY62148EV30LL (7C62148F)	4527847	610548491	TAIWN-G	COMP	9	0	
CY62148EV30LL (7C62148F)	4527847	610550592	CML-RA	COMP	9	0	
CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	9	0	
CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	9	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	9	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-B, 2,200V</b>							
CY62147EV30LL (7C62147F)	4527847	610548767	CML-R	COMP	9	0	
CY62148EV30LL (7C62148F)	4527847	610548491	TAIWN-G	COMP	9	0	
CY62148EV30LL (7C62148F)	4527847	610551587	CML-R	COMP	9	0	
CY62148EV30LL (7C62148F)	4527847	610550592	CML-RA	COMP	9	0	
CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	9	0	
CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	9	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	9	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V</b>							
CY62147EV30LL (7C62147F)	4527847	610548767	CML-R	COMP	3	0	
CY62148EV30LL (7C62148F)	4527847	610548491	TAIWN-G	COMP	3	0	
CY62148EV30LL (7C62148F)	4527847	610551587	CML-R	COMP	3	0	
CY62148EV30LL (7C62148F)	4527847	610550592	CML-RA	COMP	3	0	
CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	3	0	
CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	3	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	3	0	
<b>STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62137EV30LL (7C62137F)	4516742	610539321	CML-R	128	45	0	
CY62137EV30LL (7C62137F)	4516742	610539321	CML-R	256	45	0	
CY62137EV30LL (7C62137F)	4516742	610539321	CML-R	128	54	0	
<b>STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 5.5V, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62147EV30LL (7C62147F)	4527847	610558767	CML-R	128	45	0	
CY62147EV30LL (7C62147F)	4527847	610558767	CML-R	264	45	0	



## Reliability Test Data

**QTP #: 054302**

<b>Device</b>	<b>Fab Lot #</b>	<b>Assy Lot #</b>	<b>Assy Loc</b>	<b>Duration</b>	<b>Samp</b>	<b>Rej</b>	<b>Failure Mechanism</b>
<b>STRESS: DYNAMIC LATCH-UP TESTING, 9.0V</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	TAIWN-G	COMP	3	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-300mA</b>							
CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	3	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 10V, +/-300mA</b>							
CY62147EV30LL (7C62147F)	4527847	610548767	CML-R	COMP	3	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 9.5V, +/-300mA</b>							
CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	3	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	3	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 8.5V, +/-200mA</b>							
CY62148EV30LL (7C62148F)	4527847	610548491	TAIWN-G	COMP	3	0	
CY62148EV30LL (7C62148F)	4527847	610551587	CML-R	COMP	3	0	
CY62148EV30LL (7C62148F)	4527847	610550592	CML-RA	COMP	3	0	
<b>STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62147EV30LL (7C62147F)	4516742	610537714	CML-R	168	50	0	
CY62147EV30LL (7C62147F)	4516742	610537714	CML-R	288	50	0	
CY62147EV30LL (7C62147F)	4516646	610537739	CML-R	168	50	0	
CY62147EV30LL (7C62147F)	4516646	610537739	CML-R	288	50	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	168	50	0	
<b>STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3</b>							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	300	42	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	300	49	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	500	48	0	
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	1000	46	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	300	45	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	500	44	0	
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	1000	44	0	

## Reliability Test Data

QTP #: 062206

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
--------	-----------	------------	----------	----------	------	-----	-------------------

**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	96	1519	0	
--------------------------	---------	-----------	---------	----	------	---	--

**STRESS: ESD-CHARGE DEVICE MODEL, 500V**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	COMP	9	0	
--------------------------	---------	-----------	---------	------	---	---	--

**STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-B, 2,200V**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	COMP	9	0	
--------------------------	---------	-----------	---------	------	---	---	--

**STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	COMP	3	0	
--------------------------	---------	-----------	---------	------	---	---	--

**STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-200mA**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	COMP	3	0	
--------------------------	---------	-----------	---------	------	---	---	--

**STRESS: STATIC LATCH-UP TESTING, 125C, 8.5V, +/-200mA**

CY62137FV18LL (7C62137G)	4624056	610651979	TAIWN-G	COMP	3	0	
--------------------------	---------	-----------	---------	------	---	---	--

## Reliability Test Data

QTP #: 070905

<b>Device</b>	<b>Fab Lot #</b>	<b>Assy Lot #</b>	<b>Assy Loc</b>	<b>Duration</b>	<b>Result</b>
<b>STRESS: SORT YIELD</b>					
7C62135GC	4640977			COMP	COMPARABLE