

Cypress Semiconductor Product Qualification Report

QTP# 071302 VERSION 1.0
April 2007

16 Meg MoBL SRAM Family	
Technology R95LD-3R, Fab4	
CY62167EV18 MoBL®	16-Mb (1M x 16) Static RAM
CY62167EV30 MoBL®	16-Mb (1M x 16/2m x 8) Static RAM
CY62168EV30 MoBL®	16-Mbit (2048 x 8) Static RAM
CY62165E MoBL®	16-Mbit (1M x 16/2Mx8) Static RAM Die

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
054302	R95LD-3R, Fab 4 and New Device CY7C62xxx (4Meg) MoBL Product Family	Dec 05
071302	16Meg Rev. B MoBL Product Family, R95LD-R Technology at Fab4	Mar 07

PRODUCT DESCRIPTION (for qualification)	
Purpose: Qualify CY62xx MoBL product family in qualified technology R95LD-3R, Fab 4	
Marketing Part #:	CY62167EV18, CY62167EV30, CY62168EV30, CY62165E
Device Description:	1.8V, 3V, 5V 16 Meg MoBL SRAM
Cypress Division:	Cypress Semiconductor Corporation –Memory Image Division (MID)

TECHNOLOGY/FAB PROCESS DESCRIPTION – R95LD-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:	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

PACKAGE	ASSEMBLY SITE FACILITY
48-Ball FBGA	ASE-TAIWAN (G)
48-Lead TSOP I	ASE-TAIWAN (G)

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BZ48
Package Outline, Type, or Name:	48 Ball
Mold Compound Name/Manufacturer:	KE-G2270
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	NA
Lead Frame Material:	NA
Lead Finish, Composition / Thickness:	SnAgCu
Die Backside Preparation Method/Metallization:	Back grind
Die Separation Method:	100% Saw Through
Die Attach Supplier:	Hitachi
Die Attach Material:	FH900
Die Attach Method:	Tape Film
Bond Diagram Designation:	001-08355
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0mil
Thermal Resistance Theta JA °C/W:	30.31°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-41999
Name/Location of Assembly (prime) facility:	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 = 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/5.5V, 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	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	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 ³	Failure Rate
High Temperature Operating Life Early Failure Rate	3,742 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life ^{1,2} Long Term Failure Rate	399,500 DHRs	0	0.7	170	14 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.

Reliability Test Data

QTP #: 054302

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
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	
STRESS: AGE BOND STRENGTH							
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	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max							
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)
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max							
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	
STRESS: LONG LIFE VERIFICATION, 150C, 1.85V, Vcc Max							
CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	1000	393	0	
STRESS: HIGH TEMPERATURE STEADY STATE LIFE, 125C, 1.75V, Vcc Max							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	168	76	0	
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	336	75	0	
STRESS: LOW TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, -30C, 2.0V, Vcc							
CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	500	45	0	
STRESS: HIGH TEMPERATURE STORAGE							
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	500	45	0	
CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	1000	45	0	

Reliability Test Data

QTP #: 054302

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: ESD-CHARGE DEVICE MODEL, 500V

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	

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

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	

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

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	

STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3

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	

STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 5.5V, PRE COND 192 HR 30C/60%RH, MSL3

CY62147EV30LL (7C62147F)	4527847	610558767	CML-R	128	45	0	
CY62147EV30LL (7C62147F)	4527847	610558767	CML-R	264	45	0	

Reliability Test Data

QTP #: 054302

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: DYNAMIC LATCH-UP TESTING, 9.0V

CY62147EV30LL (7C62147F)	4438656	610461414	TAIWN-G	COMP	3	0	
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STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, +/-300mA

CY62147EV30LL (7C62147F)	4514985	610527600	CML-R	COMP	3	0	
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STRESS: STATIC LATCH-UP TESTING, 125C, 10V, +/-300mA

CY62147EV30LL (7C62147F)	4527847	610548767	CML-R	COMP	3	0	
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STRESS: STATIC LATCH-UP TESTING, 125C, 9.5V, +/-300mA

CY62147EV30LL (7C62147F)	4516646	610527599	CML-R	COMP	3	0	
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CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	COMP	3	0	
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STRESS: STATIC LATCH-UP TESTING, 125C, 8.5V, +/-200mA

CY62148EV30LL (7C62148F)	4527847	610548491	TAIWN-G	COMP	3	0	
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CY62148EV30LL (7C62148F)	4527847	610551587	CML-R	COMP	3	0	
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CY62148EV30LL (7C62148F)	4527847	610550592	CML-RA	COMP	3	0	
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STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3

CY62147EV30LL (7C62147F)	4516742	610537714	CML-R	168	50	0	
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CY62147EV30LL (7C62147F)	4516742	610537714	CML-R	288	50	0	
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CY62147EV30LL (7C62147F)	4516646	610537739	CML-R	168	50	0	
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CY62147EV30LL (7C62147F)	4516646	610537739	CML-R	288	50	0	
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CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	168	50	0	
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STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY62147EV30LL (7C62147F)	4438656	610461414	CML-RA	300	42	0	
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CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	300	49	0	
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CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	500	48	0	
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CY62147EV30LL (7C62147F)	4519690	610533058	CML-RA	1000	46	0	
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CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	300	45	0	
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CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	500	44	0	
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CY62147EV30LL (7C62147F)	4447261	610506302N	CML-R	1000	44	0	
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Reliability Test Data

QTP #: 071302

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	COMP	15	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	COMP	15	0	
CY62167EV30 (7C62167F)	4632963	610702735	TAIWN-G	COMP	15	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	COMP	9	0	
CY62167EV30 (7C62167F)	4632963	610704952	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JEDEC EIA/JESD22-A114-B, 2,200V							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	COMP	8	0	
CY62167EV30 (7C62167F)	4632963	610704952	TAIWN-G	COMP	8	0	
STRESS: DYNAMIC LATCH-UP TESTING, 8.6V							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	96	1909	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	96	1833	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	80	400	0	
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	500	400	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	80	399	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	500	399	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	128	44	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	168	50	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 8.5V, +/-200mA							
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 8.3V, +/-200mA							
CY62167EV30 (7C62167F)	4632963	610704952	TAIWN-G	COMP	3	0	

Reliability Test Data

QTP #: 071302

<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>
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STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	500	50	0	
CY62167EV30 (7C62167F)	4631509	610672951	TAIWN-G	1000	50	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	300	50	0	
CY62167EV30 (7C62167F)	4632963	610702733	TAIWN-G	500	50	0	
CY62167EV30 (7C62167F)	4632963	610702735	TAIWN-G	300	50	0	