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# Cypress Semiconductor Automotive Product Qualification Report

**QTP# 071103**  
**November 2013**

<b>8 Meg MoBL SRAM Automotive Devices R95LD-3R Technology, Fab 4</b>	
<b>CY62157E MoBL®</b>	<b>8-Mbit (512K x 16) Static RAM</b>
<b>CY62158E MoBL®</b>	<b>8-Mbit (1024K x 8) Static RAM</b>
<b>CY62157EV18 MoBL®</b>	<b>8-Mbit (512K x 16) Static RAM</b>
<b>CY62157EV30 MoBL®</b>	<b>8-Mbit (512K x 16) Static RAM</b>
<b>CY62158EV30 MoBL®</b>	<b>8-Mbit (1024K x 8) Static RAM</b>

## **CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

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**PRODUCT QUALIFICATION HISTORY**

<b>QTP Number</b>	<b>Description of Qualification Purpose</b>	<b>Date Comp</b>
071103	8 Meg MoBL SRAM Automotive Device & Technology (R95LD-3R) at Fab 4	Mar 07
130801	Qualify polyimide mask to qualified Automotive 8Meg MoBL SRAM, R95LD-3R Technology at Fab 4	Oct 13

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify 8Meg MoBL SRAM Automotive Device and Technology (R95LD-3R) at Fab 4	
Marketing Part #:	CY62157E, CY62158E, CY62157EV18, CY62157EV30, CY62158EV30
Device Description:	1.8V, 3V, 5V Automotive
Cypress Division:	Cypress Semiconductor Corporation –Programmable Systems Division (PSD)

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 (μ-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
44-Pin TSOP II	CML-RA, CHINA,JT
48-Ball VFBGA	CML-RA, TAIWAN-G
48-Pin TSOP I	CML-RA, TAIWAN-T, CHINA-JT

**Note:** Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	ZW44
Package Outline, Type, or Name:	44-Pin TSOPII
Mold Compound Name/Manufacturer:	Hitachi CEL9200CYRU
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	28%
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	NiPdAu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Dexter
Die Attach Material:	QMI509
Die Attach Method:	Die Attach Epoxy
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au. 1.0mil
Thermal Resistance Theta JA °C/W:	37.93 °C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	CML-R
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-RA, KYEC, Taiwan ,CHIPMOS-GO
Fault Coverage:	100%

**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	AEC-Q100-008 and JESD22-A108 Dynamic Operating Condition, Vcc Max = 1.85V, 125C	P
High Temperature Operating Life Latent Failure Rate	AEC-Q100-008 and JESD22-A108 Dynamic Operating Condition, Vcc Max = 1.85V, 150C,125C	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130C, 5.5V, 85%RH Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260C+0, -C	P
Temperature Cycle	JESD22-A104, Condition C, -65C to 150C Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260C+0, -5C	P
Pressure Cooker	JESD22-A102, 121C, 100%RH, 15 Psig Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260C+0, -5C	P
Ball Shear	AEC-Q100-010	P
Bond Pull	Mil-Std 883, Method 2011	P
Electrostatic Discharge Human Body Model (ESD-HBM)	AEC-Q100-002	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	AEC-Q100-011	P
Electrical Distributions	AEC Q100-009	P
External Visual	JESD22-B100	P
Internal Visual	MIL-STD-883-2014	P
High Temperature Storage	JESD22-A103, 150C	P
Physical Dimensions	JESD22B100 and B108	P
Post Temp Cycle Bond Pull	Mil-Std 883, Method 2011	P
Solderability	JESD22-B102	P
Static Latch-up	AEC-Q100-004	P

### RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF <sup>4</sup>	Failure Rate
High Temperature Operating Life Early Failure Rate	13,058 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life Long Term Failure Rate	96,400 DHRs	0	0.7	170	FIT**

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

<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:

$E_A$  =The Activation Energy of the defect mechanism.

$k$  = Boltzmann's constant =  $8.62 \times 10^{-5}$  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.

\*\*Insufficient samples to calculate FIT Rate.

\*\*Based on Automotive qual samples size not Commercial qual sample size.

## Reliability Test Data

### QTP #: 071103

<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: BALL SHEAR</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	5	0	
<b>STRESS: BOND PULL</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	5	0	
<b>STRESS: POST TEMP CYCLE BOND PULL</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	5	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 250V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 500V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 750V, Corner Pins Only</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 500V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 1,000V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 1,500V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 2,000V</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	3	0	
<b>STRESS: EXTERNAL VISUAL</b>							
CY62157EV30 (7C62157F)	4641534	610700620/2/3	CML-R	COMP	4452	0	
CY62157EV30 (7C62157F)	4644874	610701731/2/3	CML-R	COMP	4292	0	
CY62157EV30 (7C62157F)	4638533	610702506/8/981	CML-R	COMP	4344	0	
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	340	0	
CY62157EV30 (7C62157F)	4629071	610660071	CML-R	COMP	30	0	
CY62157EV30 (7C62157F)	4627156	610661704	CML-R	COMP	30	0	

## Reliability Test Data

### QTP #: 071103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
<b>STRESS: ELECTRICAL DISTRIBUTIONS</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	30	0	
CY62157EV30 (7C62157F)	4629071	610660071	CML-R	COMP	30	0	
CY62157EV30 (7C62157F)	4627156	610661704	CML-R	COMP	30	0	
<b>STRESS: PHYSICAL DIMENSIONS</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	10	0	
CY62157EV30 (7C62157F)	4641534	610700620	CML-R	COMP	10	0	
CY62157EV30 (7C62157F)	4644874	610701731	CML-R	COMP	10	0	
CY62157EV30 (7C62157F)	4638533	610702506	CML-R	COMP	10	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max</b>							
CY62157EV30 (7C62157F)	4641534	610700620	CML-R	48	1410	0	
CY62157EV30 (7C62157F)	4641534	610700622	CML-R	48	1497	0	
CY62157EV30 (7C62157F)	4641534	610700623	CML-R	48	1535	0	
CY62157EV30 (7C62157F)	4644874	610701731	CML-R	48	1427	0	
CY62157EV30 (7C62157F)	4644874	610701732	CML-R	48	1469	0	
CY62157EV30 (7C62157F)	4644874	610701733	CML-R	48	1386	0	
CY62157EV30 (7C62157F)	4638533	610702506	CML-R	48	1490	0	
CY62157EV30 (7C62157F)	4638533	610702508	CML-R	48	1444	0	
CY62157EV30 (7C62157F)	4638533	610702981	CML-R	48	1400	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	408	50	0	
<b>STRESS: HIGH TEMPERATURE STORAGE, 150C, no bias</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	1000	50	0	
<b>STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 5.5V, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	96	45	0	
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	128	45	0	

## Reliability Test Data

### QTP #: 071103

<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: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	96	50	0	
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	168	48	0	
<b>STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	500	55	0	
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	1000	50	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 8.27V, 100mA</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	6	0	
<b>STRESS: SOLDERABILITY</b>							
CY62157EV30 (7C62157F)	4622329	610650792	CML-R	COMP	15	0	
CY62157EV30 (7C62157F)	4629071	610660070	CML-R	COMP	15	0	
CY62157EV30 (7C62157F)	4627156	610661706	CML-R	COMP	15	0	

## Reliability Test Data

### QTP #: 130801

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 1.85V, Vcc Max (Core)**

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	168	76	0	
CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	1000	76	0	

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

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	500	77	0	
CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	1000	76	0	

**STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3**

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	96	76	0	
CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	168	65	0	

**STRESS: HI-ACCEL SATURATION TEST, 110C, 85%RH, 1.85V, PRE COND 192 HR 30C/60%RH, MSL3**

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	128	77	0	
CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	264	77	0	

**STRESS: HIGH TEMPERATURE STORAGE**

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	1000	77	0	
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**STRESS: INTERNAL VISUAL**

CY62157EV30LL (7C62157F)	4229219	611238363	CML-RA	COMP	5	0	
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**STRESS: SORT YIELD**

7C62155FC	VARIOUS	NA	NA	COMP	EQUIVALENT		
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**STRESS: E-TEST YIELD**

7C62155FC	VARIOUS	NA	NA	COMP	EQUIVALENT		
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## Document History Page

Document Title: QTP # 071103 : 8MEG, MOBL SRAM AUTOMOTIVE (CY6215XX AND FAMILY), R95LD-3R  
TECHNOLOGY , FAB 4  
Document Number: 001-88016

Rev.	ECN No.	Orig. of Change	Description of Change
**	4033719	ILZ	Initial Spec Release Qualification report published on Cypress.com is documented on memo LGQ-722 and not in spec format. Initiated spec for QTP 071103 and all data from memo# LGQ-722 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	4146240	JYF	Template alignment and addition of polyimide qualification data.

Distribution: WEB

Posting: None