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# Cypress Semiconductor Automotive Product Qualification Report

QTP# 072002  
November 2013

<b>2 Meg MoBL SRAM Automotive Devices</b>	
<b>R95LD-3R, Fab 4</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>CY62138FV30 MoBL®</b>	<b>2-Mbit (256K 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</b>
071103	8 Meg MoBL SRAM Automotive Device Family & Technology (R95LD-3R) Qualification at Fab 4	Mar 07
072002	Qualify 2 Meg MoBL Static RAM Automotive device and family on R95LD-3R Technology at Fab 4	Jun 07
134511	Qualify polyimide mask to qualified Automotive 2 Meg MoBL SRAM, R95LD-3R Technology at Fab 4	Nov 13

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: : Qualify 2Meg MoBL SRAM Automotive device and family, R95LD-3R Technology at Fab 4	
Automotive Marketing Part #:	CY63136FV30, CY63137FV30, CY63138FV30
Device Description:	3V Automotive
Cypress Division:	Cypress Semiconductor Corporation – Programmable Systems Division (PSD)

TECHNOLOGY/FAB PROCESS DESCRIPTION			
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 Thickness:	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 FACILITY SITE
44-Pin TSOP II	CML-R
32-Pin STSOP	CML-R

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
Bond Diagram Designation:	001-08163
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au. 1.0mil
Thermal Resistance Theta JA °C/W:	51.42 °C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	001-64160
Name/Location of Assembly (prime) facility:	CML-R
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R

**Note:** Please contact a Cypress Representative for other package availability.

## RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

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, 125°C/150°C	P
High Temperature Operating Life Latent Failure Rate	JESD22-A108 Dynamic Operating Condition, Vcc Max = 1.85V, 125°C/150°C	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130°C, 5.5V, 85%RH Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C	P
Temperature Cycle	JESD22-A104, Condition C, -65°C to 150°C Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C	P
Pressure Cooker	JESD22-A102, 121°C, 100%RH, 15 Psig Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+ Reflow, 260°C+0, -5°C	P
Acoustics	J-STD-020 Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs., 30°C/60%RH + Reflow, 260°C+0, -5°C	P
Ball Shear	AEC-Q100-010	P
Bond Pull	Mil-Std 883, Method 2011	P
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P
Dye Penetration Test	Test to determine the existence and extent of cracks, Criteria: No Package Crack	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
High Temperature Storage	JESD22-A103, 150C	P
Physical Dimensions	JESD22B100 and B108 AEC Q100-009	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>3</sup>	Failure Rate
High Temperature Operating Life Early Failure Rate	11,169 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	96,400 DHRs	0	0.7	170	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:

$E_A$  = 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)	4622329	610650792	CML-R	COMP	340	0	
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)	4629071	610660071	CML-R	COMP	30	0	
CY62157EV30 (7C62157F)	4627156	610661704	CML-R	COMP	30	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: 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

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
<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 #: 072002

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
<b>STRESS: ESD-CHARGE DEVICE MODEL, 250V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 500V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 500V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 1,000V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 1,500V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT, 2,000V</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, ±100mA</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	6	0	
<b>STRESS: ELECTRICAL DISTRIBUTIONS</b>							
CY62137FV30LL (7C62137G)	4648158	610709631	CML-R	COMP	30	0	
CY62137FV30LL (7C62137G)	4645277	610709637	CML-R	COMP	30	0	
CY62137FV30LL (7C62137G)	4646629	610709638	CML-R	COMP	30	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max</b>							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	48	3742	0	
CY62137FV30LL (7C62137G)	4702408	610725035	CML-R	48	3792	0	
CY62137FV30LL (7C62137G)	4701014	610725034	CML-R	48	3635	0	

## Reliability Test Data

### QTP #: 134511

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# 072002: 2 Meg MoBL SRAM Automotive Devices R95LD-3R, FAB 4  
Document Number: 001-65843

Rev.	ECN No.	Orig. of Change	Description of Change
**	3106175	NRG	Initial Spec Release Added device CY63138FV30.
*A	4185734	JYF	Deleted obsolete spec 11-20047 in Major Package Information table and replaced with 001-64160; Template alignment & addition of polyimide qualification data.

Distribution: WEB

Posting: None