Cypress Semiconductor Automotive Product Qualification Report

QTP# 072002
March 2025rev*B

2 Meg MoBL SRAM Automotive Devices R95LD-3R, Fab 4	
CY62136FV30 MoBL®	**2-Mbit (128K X 16) Static RAM**
CY62137FV30 MoBL®	**2-Mbit (128K X 16) Static RAM**
CY62138FV30 MoBL®	**2-Mbit (256K X 8) Static RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Mira Ben-Tzur
Reliability Director
(408) 943-2675

Rene Rodgers
Reliability Engineer, MTS
(408) 943-2732

PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
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
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[3]	Failure Rate
High Temperature Operating Life Early Failure Rate	11,169 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	96,400 DHRs	0	0.7	170	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.

**Insufficient samples to calculate FIT Rate.
**Based on Automotive qual samples size not Commercial qual sample size.

Reliability Test Data

QTP #: 071103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: BALL SHEAR							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	5	0	
STRESS: BOND PULL							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	5	0	
STRESS: POST TEMP CYCLE BOND PULL							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	5	0	
STRESS: ESD-CHARGE DEVICE MODEL, 250V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 750V, Corner Pins Only							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT, 500V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT, 1,000V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT, 1,500V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT, 2,000V							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	3	0	
STRESS: EXTERNAL VISUAL							
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

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ELECTRICAL DISTRIBUTIONS							
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	
STRESS: PHYSICAL DIMENSIONS							
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	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max							
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	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 1.85V, Vcc Max							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	408	50	0	
STRESS: HIGH TEMPERATURE STORAGE, 150C, no bias							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	1000	50	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 5.5V, PRE COND 192 HR 30C/60%RH, MSL3							
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
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	96	50	0	
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	168	48	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	500	55	0	
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	1000	50	0	
***STRESS: STATIC LATCH-UP TESTING, 125C, 8.27V,* ±100mA**							
CY62157EV30 (7C62157F)	4622329	*610650792*	*CML-R*	COMP	6	0	
STRESS: SOLDERABILITY							
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
STRESS: ESD-CHARGE DEVICE MODEL, 250V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT , 500V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT , 1,000V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT , 1,500V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT , 2,000V							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, ±100mA							
CY62137FV30LL (7C62137G)	4702374	610725036	CML-R	COMP	6	0	
STRESS: ELECTRICAL DISTRIBUTIONS							
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	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 1.85V, Vcc Max							
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
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	
STRESS: INTERNAL VISUAL							
CY62157EV30LL (7C62157F)	4229219	*611238363*	CML-RA	COMP	5	0	
STRESS: SORT YIELD							
7C62155FC	VARIOUS	*NA*	NA	COMP	EQUIVALENT		
STRESS: E-TEST YIELD							
7C62155FC	VARIOUS	*NA*	NA	COMP	EQUIVALENT		

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.
*B	8114563	HSTO	Sunset review Removed obsolete specs#001-64160