

# Cypress Semiconductor Product Qualification Report

QTP# 041302 VERSION 2.0

May 2004

<b>8 Meg (3V) MoBL Devices</b> RAM8NLD-1.8 Technology, Fab4	
<b>CY62157DV30 MoBL®</b>	<b>8 MB (512K x 16) Static RAM Die</b>
<b>CY62157DV30 MoBL®</b>	<b>8-Mbit (512K x 16) MoBL® Static RAM</b>
<b>CY62158DV30 MoBL®</b>	<b>8-Mbit (1024K x 8) MoBL® Static RAM</b>

**CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

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### TECHNOLOGY QUALIFICATION HISTORY

<b>Qual Report</b>	<b>Description of Qualification Purpose</b>	<b>Date Comp</b>
041302	New Device , 8Meg MoBL Static RAM CY62155DV*, 3V and Options on Ram8NLD-18 Technology	Apr 04

<b>PRODUCT DESCRIPTION (for qualification)</b>	
Qualification Purpose: Qualify CY62155DV* device and family, RAM8NLD-1.8 Technology	
Marketing Part #:	CY62155DV*, CY62157DV*, CY62158DV*
Device Description:	2.20V-3.6V, Industrial available in 48-ball FBGA, 44/48-pin TSOP package.
Cypress Division:	Cypress Semiconductor Corporation –Memory Product Division (MPD)
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. D
What ID markings on Die:	7C62155D

<b>TECHNOLOGY/FAB PROCESS DESCRIPTION – RAM8NLD-1.8</b>			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 150 Å Ti / 300 Å Al / 300 Å Cu Metal 2: 300 Å Ti / 8000 Å Al
Passivation Type and Materials:	1000Å TEOS / 9000Å Si3N4		
Free Phosphorus contents in top glass layer(%):	N/A		
Number of Transistors in Device	~74 million		
Number of Gates in Device	~19 million		
Generic Process Technology/Design Rule (μ-drawn):	0.13 μm		
Gate Oxide Material/Thickness (MOS):	26 Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor -- Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/RAM8NLD-1.8		

**PACKAGE AVAILABILITY**

<b>PACKAGE</b>	<b>ASSEMBLY SITE FACILITY</b>
<b>48-ball FBGA</b>	<b>TAIWN-G</b>
<b>44-lead TSOP II</b> <b>48-lead TSOP-I</b>	<b>CML-RA, CML-R</b>

**Note:** Package Qualification details upon request

<b>MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION</b>	
<b>Package Designation:</b>	ZW44
<b>Package Outline, Type, or Name:</b>	44-lead Thin Small Outline Package, Type II (TSOP II)
<b>Mold Compound Name/Manufacturer:</b>	Hitachi CEL9200CYU
<b>Mold Compound Flammability Rating:</b>	V-O per UL94
<b>Oxygen Rating Index:</b>	>28%
<b>Substrate Material:</b>	N/A
<b>Lead Finish, Composition / Thickness:</b>	85%Sn, 15%Pb
<b>Die Backside Preparation Method/Metallization:</b>	Backgrind
<b>Die Separation Method:</b>	100%
<b>Die Attach Supplier:</b>	Dexter
<b>Die Attach Material:</b>	QMI 509
<b>Die Attach Method:</b>	Silver Epoxy
<b>Bond Diagram Designation:</b>	10-05216
<b>Wire Bond Method:</b>	Thermosonic
<b>Wire Material/Size:</b>	Au, 1.0um
<b>Thermal Resistance Theta JA °C/W:</b>	73 °C/W
<b>Package Cross Section Yes/No:</b>	N/A
<b>Assembly Process Flow:</b>	11-20035
<b>Name/Location of Assembly (prime) facility:</b>	CML-R

<b>ELECTRICAL TEST / FINISH DESCRIPTION</b>	
<b>Test Location:</b>	CML-R
<b>Fault Coverage:</b>	100%

**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 = 2.4V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 2.4V, 150°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Pressure Cooker	121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	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 JESD22, Method A114-B	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Static Latch-up	125C, 9.0V, ± 300mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

**RELIABILITY FAILURE RATE SUMMARY**

<b>Stress/Test</b>	<b>Device Tested/ Device Hours</b>	<b># Fails</b>	<b>Activation Energy</b>	<b>Thermal AF<sup>4</sup></b>	<b>Failure Rate</b>
High Temperature Operating Life Early Failure Rate	3232	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	200,000 DHRs	0	0.7	170	27 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 #: 041302

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V</b>							
CY62157DV30L (7C62157D)	4315232	610413059N	CML-R	COMP	9	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V</b>							
CY62157DV30L (7C62157D)	4315232	610413059N	CML-R	COMP	3	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 500V</b>							
CY62157DV30L (7C62157D)	4315232	610413059N	CML-R	COMP	9	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 9.0V, ±300mA</b>							
CY62157DV30L (7C62157D)	4315232	610413059N	CML-R	COMP	3	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.4V, Vcc Max</b>							
CY62157DV30L (7C62157D)	4337577	610353432	CML-R	96	3232	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.4V, Vcc Max</b>							
CY62157DV30L (7C62157D)	4337577	610353432	CML-R	80	400	0	
CY62157DV30L (7C62157D)	4337577	610353432	CML-R	500	400	0	
<b>STRESS: PRESSURE COOKER TEST (121C, 100%RH), PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY62157DV30L (7C62157D)	4337577	610353432	CML-R	168	45	0	
<b>STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH, MSL3</b>							
CY62157DV30L (7C62157D)	4337577	610353432	CML-R	300	45	0	