CYPRESS SEMICONDUCTOR

PRODUCT CHANGE NOTIFICATION

PCN: 013971 **DATE:** September 27, 2001

Subject: SRAM, 2 Meg, 1.8V, Slow Asynchronous Die Change

To:

Description of change:
The part numbers listed below have been qualified to be transferred from R5.2D, 0.25µ CMOS process, to R7-18, a 0.15µ CMOS process in Cypress's Bloomington, MN, Fab 4. This will result in a die shrink. The new die revision is C and is marked on the device after the date code.
Data Sheet Changes:
1.- The ordering part number has been revised to contain the letter 'C' to designate the new die. (I.e.- CY62137CV18LL-70BAI, CY62137CV18LL-70BAIT, CY62137CV18LL-55BAI).

2.-Some electrical parameter limits have changed as described in the "Benefits of Change" section at the bottom of this page. Parameter limits were improved on I_{CC}, I_{SB2} and I_{CCDR}

New datasheets have been issued to reflect these changes and can be downloaded from the following link:

http://www.cypress.com/sram/datasheets.html#MoBL™

No other changes have been made that affect form, fit, or function. Qualification report QTP# 013806 is attached.

Cypress part numbers affected:
CY62136BV18*, CY62135BV18*, and CY62137BVB18*.

Cypress Manufacture Part Number:
Not applicable

Customer part numbers affected:
«Customer_Part_Number»

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Subject: SRAM, 2 Meg 1.8V, Slow Asynchronous Die Change

Benefit of change:
This new die rev, C, has been optimized for 55ns and 70ns operation between the voltage range of 1.65V to 1.95V. The active current, standby current, and data retention current values have improved compared to those for the B Rev product.

Qualification status:
Complete. Qualification Report # 013806 is attached.

Sample status:
Samples are available by contacting our local sales office.

Approximate Implementation Date:
Production release of the new product will be phased starting WW0145 or as stipulated per your contract terms and conditions.

We encourage conversion to the new revision product as quickly as possible. Please contact your local sales representative for specific information product availability.

End of Life Time (Die Change Only):

Response Required:

Sincerely,

Michael Burke
Director of Quality

Al Laxman
QA Manager

Cypress Semiconductor
Product Qualification Report

QTP# 013806 VERSION 1.0
September, 2001

MoBL2™ and Micrpower-Low Power Asynchronous SRAM **R7LD-1.8 Technology, Fab4**	
CY62135CV18LL **CY62136CV18LL** **CY62137CV18LL**	**128K x 16** **Static RAM**

MoBL, MoBL2 and more battery life are trademark of Cypress Semiconductor

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	**Date Comp**
012411	New Technology R7LD-1.8 / New Device, 8Meg, MoBL Static RAM CY62157CV18LL	Jun 01
013806	New Device, 2Meg, MoBL Static RAM CY62137CV18LL and Metal options	Sep 01

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PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify New CY62137CV18LL and Metal options in Technology R7LD-1.8, Fab 4			
Marketing Part #:	CY62135CV18LL, CY62136CV18LL , CY62137CV18LL		
Device Description:	1.65V – 1.95V, Industrial and commercial available in Wafer Die Sales and 48-ball FBGA package.		
Cypress Division:	Cypress Semiconductor Corporation –Memory Product Division (MPD)		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. B	
Die Size (stepping):	103.0 mils x 164.0 mils	What ID markings on Die:	7C62335C

TECHNOLOGY/FAB PROCESS DESCRIPTION – R7LD-1.8			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 100Å Ti / 300Å TiN / 4,000Å Al / 300Å TiW Metal 2: 8,000Å TiAl / 300Å TiN
Passivation Type and Materials:	1000Å TEOS / 9000Å Nitride		
Free Phosphorus contents in top glass layer(%):	0%		
Number of Transistors in Device	12.5 million		
Number of Gates in Device	1.375 million		
Generic Process Technology/Design Rule (µ-drawn):	CMOS, Double Metal /0.16 µm		
Gate Oxide Material/Thickness (MOS):	SiO_2, 32Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor -- Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R7LD-1.8		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
48-ball FBGA	**TAIWN-G, CSPI-R**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BA48
Package Outline, Type, or Name:	48-ball Fine Pitch Ball Grid Array (FBGA)
Mold Compound Name/Manufacturer:	PLASKON SMT-B-1
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Lead Frame Designation:	BA
Substrate Material:	BT Resin
Lead Finish, Composition / Thickness:	63%Sn, 37%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	Ablestik 8355F
Die Attach Method:	Epoxy
Bond Diagram Designation:	10-04040
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0um
Thermal Resistance Theta JA °C/W:	40°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-41010M
Name/Location of Assembly (prime) facility:	ASE Taiwan

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	ASE Taiwan
Fault Coverage:	100%

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	1) QTP #013806 Dynamic Operating Condition, Vcc Max = 2.07V, 125°C 2) QTP #012411 Dynamic Operating Condition, Vcc Max = 2.75V, 125°C	P
High Temperature Operating Life Latent Failure Rate	1) QTP #012411 Dynamic Operating Condition, Vcc Max=2.07V, 150°C	P
High Temperature Steady State Life	1) QTP # QTP #012411 Static Operating Condition, Vcc Max=1.98V, 150°C	P
High Accelerated Saturation Test (HAST)	1) QTP #012411 130°C, 2.75V,85%RH Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Temperature Cycle	1) QTP #013806, QTP #012411 MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Pressure Cooker	1) QTP #013806, QTP #012411 121°C, 100%RH Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
High Temperature Storage	1) QTP #012411 150°C ± 5°C no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	1) QTP #013806, QTP #012411 2) 2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1) QTP #013806, QTP #012411 500V Cypress Spec. 25-00020	P
Age Bond Strength	1) QTP #012411 200C, 4HRS MIL-STD-883, Method 883-2011	P

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
SEM X-Section	1) QTP #012411 MIL-STD-883, Method 883-2018-2 / Cypress Spec. 22-00009	P
Low Temperature Operating Life	1) QTP #012411 -30C, 3.25V, 8MHZ	P
Acoustic Microscopy, Level 3	1) QTP #012411 Cypress Spec. 25-00104	P
Current Density	1) QTP #012411 Cypress Spec 22-00029	P
Alpha Particle Sensitivity	1) QTP #012411 Cypress Spec. 25-00055, 111 FIT	P
Static Latchup	1) QTP #013806, QTP #012411 125C, 6.5V, ± 300mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[4]	Failure Rate
High Temperature Operating Life Early Failure Rate[1]	6,039	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	488,000 DHRs	1	0.7	170	24 FIT

[1] A production burn-in of 12 Hrs at 125°C, 2.75V is required for the product.
[2] Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.
[3] Chi-squared 60% estimations used to calculate the failure rate..
[4] 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 #: 013806

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 2.07V, Vcc Max)							
CY62137CV18LL (7C62337B)	41125681	*610125199*	TAIWN-G	96	1607	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING (125C, 6.5V, +/300mA)							
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	COMP	3	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH), PRE COND 192 HR 30C/60%RH, MSL3)							
CY62137CV18LL (7C62337B)	4111527	*610116217Q*	TAIWN-G	168	48	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH (MSL3)							
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	500	47	0	
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	1500	47	0	
CY62137CV18LL (7C62337B)	4038574	*610047321*	TAIWN-G	2000	45	0	

Reliability Test Data

QTP #: 012411

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 2.75V, Vcc Max)							
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	96	1596	0	
CY62157CV18LL (7C62357C)	4110220	*610114276L2*	CSPI-R	96	1246	0	
CY62157CV18LL (7C62357C)	4039754	*610100977L1*	CSPI-R	96	800	0	
CY62157CV18LL (7C62357C)	4039754	*610100977L1*	CSPI-R	96	791	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 2.07V, Vcc Max)							
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	96	390	0	
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	168	390	0	
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	500	389	1	OPEN FA
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	96	389	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	168	388	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	500	388	0	
CY62157CV18LL (7C623571C)	4048795	*610103046*	CSPI-R	96	200	0	
CY62157CV18LL (7C623571C)	4048795	*610103046*	CSPI-R	168	199	0	
CY62157CV18LL (7C623571C)	4048795	*610103046*	CSPI-R	500	199	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	9	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING (125C, 6.5V, +/300mA)							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	COMP	3	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	COMP	3	0	
CY62157CV18LL (7C62357C)	4028521	*340000332*	CSPI-R	COMP	3	0	
STRESS: ACOUSTIC-MSL3							
CY62157CV18LL (7C623571C)	4107546	*610112460*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C623571C)	4107546	*610112461*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C623571C)	4107546	*610112462*	CSPI-R	COMP	15	0	

Reliability Test Data

QTP #: 012411

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: AGE BOND STRENGTH							
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C62357C)	4111455	*610114268*	CSPI-R	COMP	15	0	
CY62157CV18LL (7C62357C)	4110220	*610114276L2*	CSPI-R	COMP	15	0	
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	500	48	0	
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	1000	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 1.98V, Vcc MAX)							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	168	77	0	
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	336	76	1	POLYSILICON PROTRUSION
STRESS: PRESSURE COOKER TEST (121C, 100%RH), PRE COND 192 HR 30C/60%RH							
CY62157CV18LL (7C623571C)	4107546	*610112305*	CSPI-R	168	54	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	168	47	0	
CY62157CV18LL (7C62357C)	4111455	*610114268L4*	CSPI-R	168	45	0	
STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 1.98V), PRE COND 192 HR 30C/60%RH							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	128	45	0	
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	128	50	0	
CY62157CV18LL (7C623571C)	4108785	*610112193*	CSPI-R	128	50	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH (MSL3)							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	300	46	0	
CY62157CV18LL (7C623571C)	4107546	*610112215*	CSPI-R	300	102	0	
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	300	47	0	
STRESS: LOW TEMPERATURE OPERATING LIFE (-30C, 3.25V)							
CY62157CV18LL (7C62357C)	4039638	*610046995*	CSPI-R	500	44	1	POLYSILICON PROTRUSION