

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

**PCN:020011**

**DATE:** June 26, 2002

**Subject:** SRAM,9 Meg Sync Process Technology Changed to RAM7FT-3R

**To:**

### **Description of change:**

The part numbers listed below have been qualified to be transferred from TSMC, 0.25 $\mu$  process and Cypress RAM63D-25 process respectively to RAM7FD-3R, a 0.15 $\mu$  process in Cypress's Bloomington, MN, Fab 4. This will result in a die shrink. The new die revision is B and is marked on the device after the date code.

The part number will be revised to contain the letter "B" in the part number. New datasheets have been issued to reflect the part number change and improvement on.

Datasheets for both the old and new part numbers can be downloaded from the Cypress web site.

No other changes have been made that effect form, fit, or function. Qualification report QTP 012502 is attached.

### **Cypress part numbers affected:**

CY7C1354BV25\*, all speeds, commercial and industrial temperature range, all packages. Refer to below for complete list of part numbers.

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Old Part#	New Part#
CY7C1354V25-100BGI	CY7C1354BV25-166BGI (replace with higher speed)
CY7C1354V25-100BGIT	CY7C1354BV25-166BGIT (replace with higher speed)
CY7C1354V25-133AC	CY7C1354BV25-166AC (replace with higher speed)
CY7C1354V25-133ACT	CY7C1354BV25-166ACT (replace with higher speed)
CY7C1354V25-133BGC	CY7C1354BV25-166BGC (replace with higher speed)
CY7C1354V25-133BGCT	CY7C1354BV25-166BGCT (replace with higher speed)
CY7C1354V25-133AI	CY7C1354BV25-166AI (replace with higher speed)
CY7C1354V25-133AIT	CY7C1354BV25-166AIT (replace with higher speed)
CY7C1354V25-166AC	CY7C1354BV25-166AC
CY7C1354V25-166ACT	CY7C1354BV25-166ACT
CY7C1354V25-166BGC	CY7C1354BV25-166BGC
CY7C1354V25-166BGCT	CY7C1354BV25-166BGCT
CY7C1354V25-166AI	CY7C1354BV25-166AI
CY7C1354V25-166AIT	CY7C1354BV25-166AIT
CY7C1354V25-166BGI	CY7C1354BV25-166BGI
CY7C1354V25-166BGIT	CY7C1354BV25-166BGIT
CY7C1354V25-200AC	CY7C1354BV25-200AC
CY7C1354V25-200ACT	CY7C1354BV25-200ACT
CY7C1354V25-200BGC	CY7C1354BV25-200BGC
CY7C1354V25-200BGCT	CY7C1354BV25-200BGCT

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**Subject:** SRAM,9 Meg Sync Process Technology Changed to RAM7FT-3R

**Customer part numbers affected:**

**Benefit of change:**

This change will increase the number of good die per wafer resulting in shorter leadtimes and improved availability.

**Qualification status:**

Complete. Qualification Report # 012502 is attached.

**Sample status:**

Samples are available by contacting our local sales office.

**Approximate Implementation Date:**

Production release of the new material will be phased in immediately or as agreed per your contract terms and conditions.

**Response Required:**

*Fax signed approval to Jim Al Laxman at 408-943-2165 or reply by E-mail.  
For any additional information regarding this change, contact your local sales representative.*

Sincerely,

Mike Burke  
Director of QA

Al Laxman  
QA Manager

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### Cypress Semiconductor Product Qualification Report

QTP# 012502 VERSION 1.2  
June, 2002

#### **Synchronous SRAM Family**

**Technology Derivative R7FT-3R, Fab4**

<b>CY7C1354BV25</b>	<b>256K x 36 Pipelined SRAM with NoBL Architecture</b>
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#### **CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

Ed Russell  
Reliability Director  
(408) 432-7069

Al Laxman  
Quality Engineering  
(408) 545-7120

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### PRODUCT QUALIFICATION HISTORY

<b>Qual Report</b>	<b>Description of Qualification Purpose</b>	<b>Date Comp</b>
012502	Device CY7C1354BV25 transfer from technology R63D-25 to Technology Derivative R7FT-3R, fab 4	Apr 02

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify CY7C1354BV25 in qualified technology Derivative R7FT-3R, Fab 4			
Marketing Part #:	<b>CY7C1354BV25</b>		
Device Description:	2.5V, Commercial and Industrial available in 100-lead TQFP, 119-ball BGA and 165ball 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):	224 mils x 370 mils	What ID markings on Die:	7C13542B / 7C13600B

TECHNOLOGY/FAB PROCESS DESCRIPTION – R7FT-3R			
Number of Metal Layers:	3	Metal Composition:	Metal 1: 150Å Ti / 4,200Å Al / 300Å TiW Metal 2: 150Å Ti / 4,200 Å Al / 300Å TiW Metal 3: 150Å Ti / 8,000Å Al / 300Å TiW
Passivation Type and Materials:	1000Å TEOS / 9000Å PECVD Nitride		
Free Phosphorus contents in top glass layer(%):	0%		
Number of Transistors in Device	60 million		
Number of Gates in Device	20 million		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Double Metal /0.15 μm		
Gate Oxide Material/Thickness (MOS):	SiO <sub>2</sub> , 32Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor -- Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R7FD-3R		

### PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
<b>119-ball BGA</b>	<b>ASE Taiwan</b>
<b>172-ball FBGA</b>	<b>ASE Taiwan</b>
<b>100-lead TQFP</b>	<b>CSPI-R / ASE Taiwan</b>

**Note:** Package Qualification details upon request

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
<b>Package Designation:</b>	A100
<b>Package Outline, Type, or Name:</b>	100-Thin Quad Flat Pack (TQFP)
<b>Mold Compound Name/Manufacturer:</b>	Hitachi CEL 9200
<b>Mold Compound Flammability Rating:</b>	V-O per UL94
<b>Oxygen Rating Index:</b>	>28%
<b>Lead Frame Material:</b>	Copper
<b>Lead Finish, Composition / Thickness:</b>	Solder plate, 85%Sn, 15%Pb
<b>Die Backside Preparation Method/Metallization:</b>	N/A
<b>Die Separation Method:</b>	Wafer Saw
<b>Die Attach Supplier:</b>	Dexter
<b>Die Attach Material:</b>	QMI 509
<b>Die Attach Method:</b>	Epoxy
<b>Bond Diagram Designation:</b>	10-03700
<b>Wire Bond Method:</b>	Thermosonic
<b>Wire Material/Size:</b>	Au, 1.0um
<b>Thermal Resistance Theta JA °C/W:</b>	41.71°C/W
<b>Package Cross Section Yes/No:</b>	N/A
<b>Assembly Process Flow:</b>	11-20005
<b>Name/Location of Assembly (prime) facility:</b>	Cypress Philippines (CSPI-R)

ELECTRICAL TEST / FINISH DESCRIPTION	
<b>Test Location:</b>	Cypress Philippines (CSPI-R)
<b>Fault Coverage:</b>	100%

**Note:** Please contact a Cypress Representative for other packages availability

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	1) QTP #012502 Dynamic Operating Condition, Vcc Max = 2.3V, 150°C	P
High Temperature Operating Life Latent Failure Rate	1) QTP #012502 Dynamic Operating Condition, Vcc Max=2.3V, 150°C	P
High Temperature Steady State Life	1) QTP #012502, QTP #014807 Static Operating Condition, Vcc Max=3.63V, 150°C	P
High Accelerated Saturation Test (HAST)	1) QTP #012502 130°C, 2.75V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+5, 0°C	P
Temperature Cycle	1) QTP #012502 MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+5, 0°C	P
Pressure Cooker	1) QTP #012502 121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+5, 0°C	P
High Temperature Storage	1) QTP #012502 150°C ± 5°C no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	1) QTP #012502 2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1) QTP #012502 500V Cypress Spec. 25-00020	P
Age Bond Strength	1) QTP #012502 200C, 4HRS MIL-STD-883, Method 883-2011	P

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT (continuation)

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Acoustic Microscopy, MSL 3	1) QTP #012502 Cypress Spec. 25-00104	P
Current Density	1) QTP #012502 Cypress Spec 22-00029	P
Alpha Particle Sensitivity	1) QTP #012502 750 FIT, Waiver #00348 Cypress Spec. 25-00055	P
Dynamic Latchup	1) QTP #012502 In accordance with JEDEC 17. Cypress Spec. 01-00081	P
Static Latchup	1) QTP #012502 125C, 10V, $\pm$ 300mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### 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	2,889	1	N/A	N/A	346 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	788,280 DHRs	0	0.7	170	7 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.

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## PRODUCT CHANGE NOTIFICATION

### Reliability Test Data

QTP #: 012502

<b>Device Mechanism</b>	<b>Fab Lot #</b>	<b>Assy Lot #</b>	<b>Ass Loc</b>	<b>Duration</b>	<b>Samp</b>	<b>Rej</b>	<b>Failure</b>
<b>STRESS: ACOUSTIC-MSL3</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	COMP	15	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	COMP	15	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	COMP	15	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	36	500	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	36	988	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	36	1401	1	NON VISUAL
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.3V, Vcc Max</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	80	397	0	
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	500	382	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	80	398	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	500	398	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	80	795	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	500	794	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610134485	CSPI-R	COMP	9	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	COMP	9	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 500V</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610134485	CSPI-R	COMP	9	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	COMP	9	0	
<b>STRESS: STATIC LATCH-UP TESTING, 125C, 10V, +/300Ma</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610134485	CSPI-R	COMP	3	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	COMP	3	0	
<b>STRESS: DYNAMIC LATCH-UP TESTING, 5.5V</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	COMP	15	0	
<b>STRESS: AGE BOND STRENGTH</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	COMP	15	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	COMP	15	0	
<b>STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C</b>							
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	500	48	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	1000	48	0	

# CYPRESS SEMICONDUCTOR

## PRODUCT CHANGE NOTIFICATION

### *Reliability Test Data*

QTP #: 012502

<i>Device</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Ass Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
<b>STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150C, 3.63V, Vcc MAX</b>							
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	80	83	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	168	83	0	
<b>STRESS: PRESSURE COOKER TEST, 121C, 100%RH,, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	168	48	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	168	48	0	
<b>STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 2.75V, PRE COND 192 HR 30C/60%RH, MSL3</b>							
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	128	48	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	128	46	0	
<b>STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH, MSL3</b>							
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	300	47	0	
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	500	47	0	
CY7C1354BV25-AC (7C1354B)	4131928	610132955	CSPI-R	1000	47	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	300	48	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	500	48	0	
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	1000	48	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	300	50	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	500	50	0	
CY7C1354BV25-AC (7C1354B)	4134403	610144437	CSPI-R	1000	50	0	
<b>STRESS: LOW TEMPERATURE OPERATING LIF, (-30C, 3.25V)</b>							
CY7C1354BV25-AC (7C1354B)	4132009	610137503	CSPI-R	500	47	0	