Cypress Semiconductor
Product Qualification Report

QTP# 014807, 020709, 023101 VERSION 2.0
June 2005

Synchronous Dual Port RAM Family CY7C083xV / CY7C085xV R7FTW-3R Technology Fab4	
CY7C0831V **CY7C0832V**	**128K/256 x 18 Synchronous Dual Port RAM**
CY7C0851V **CY7C0852V** **CY7C0853V**	**64K/128/256K x 36 Synchronous Dual-Port RAM**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

QUAL REPORT		DESCRIPTION OF QUALIFICATION PURPOSE		DATE COMP.
014807		New Technology Derivative R7FT-3R (Hot Al) / Synchronous Dual-Port RAM CY7C0852V, product family and package option.		Feb 02
020709		Process R7FT-3R with Via 2 W Plug (4 Meg Dual Port)		Apr 02
023101		9 Meg Sync Dual Port Stacked Die, R7FT-3R, 172-ball PBGA (15mm x 15mm x 1.25mm), ASE Taiwan Assembly, MSL3		Dec 02

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: 9 Meg Sync Dual Port Stacked Die, R7FT-3R, 172-ball PBGA (15mm x 15mm x 1.25mm), ASE Taiwan Assembly, MSL3			
Marketing Part #:	CY7C0851V/ CY7C0852V/ CY7C0853V/CY7C0831V/CY7C0832V		
Device Description:	Synchronous Dual Port RAM, 3.3V, Commercial and Industrial, available in 172-ball Grid Array (BGA) & 176-pin Flat Pack (TQFP)		
Cypress Division:	Cypress Semiconductor Corporation – Data Com Division (DCD)		
Overall Die (or Mask) REV:		Rev. A	
What ID markings on Die:	7C08523VA		

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:		1,000A TEOS + 9,000A SiN	
Free Phosphorus contents in top glass layer(%):		0%	
Die Coating(s), if used:		N/A	
Number of Transistors in Device:		62 million	
Number of Gates in Device:		112K	
Generic Process Technology/Design Rule (□-drawn):		CMOS, Triple Metal /0.18 um	
Gate Oxide Material/Thickness (MOS):		SiO_2 32Å	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor – Bloomington Minnesota	
Die Fab Line ID/Wafer Process ID:		RAM7FT-3R	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
172-lead BGA, 176-lead TQFP	**ASE Taiwan (TAIWN-G)**

Note: Package Qualification details upon request.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BB172
Package Outline, Type, or Name:	172-ball, Thin Ball Grid Array (FBGA)
Mold Compound Name/Manufacturer:	KE-G2270
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Substrate Material:	BT Resin
Lead Finish, Composition / Thickness:	Solder Ball, 63%Sn, 37%Pb
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Dexter
Die Attach Material:	QMI 536 / 2025D
Die Attach Method:	Silver Epoxy
Bond Diagram Designation:	10-04438
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0um
Thermal Resistance Theta JA °C/W:	16° C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-41024
Name/Location of Assembly (prime) facility:	ASE Taiwan (TAIWN-G)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	ASE Taiwan (TAIWN-G), CML-R
Fault Coverage:	100%

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

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	A176
Package Outline, Type, or Name:	176-pin Thin Quad Flat Pack (TQFP)
Mold Compound Name/Manufacturer:	Sumitomo EME 7320A
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Solder Plate, 85%Sn, 15%Pb
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	Ablestik 8361
Bond Diagram Designation	10-04266
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold/ 1.2mil
Thermal Resistance Theta JA °C/W:	38°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-41021
Name/Location of Assembly (prime) facility:	ASE Taiwan (TAIWN-G)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	ASE Taiwan (TAIWN-G), CML-R
Fault Coverage:	100%

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

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 2.3V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max=2.3V, 125°C	P
High Temperature Steady State Life	Static Operating Condition, Vcc = 3.63 V, 150°C, Vcc Max	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs., 30°C/60%RH+3IR-Reflow, 220°C+0, -5°C	P
Pressure Cooker	121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, 220°C+0, -5°C	P
High Accelerated Saturation Test (HAST)	130°C, 3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, 220°C+0, -5°C	P
High Temperature Storage	150ºC ± 5ºC	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015	P
Age Bond Strength	MIL-STD-883, Method 883-2011, 200C	P
Ball Shear	Cypress Spec. 12-00292	P
Bond Pull	Cypress Spec. 12-00292	P
Die Shear	Cypress Spec. 12-00292	P
Internal Visual	Cypress Spec. 25-00017	P
X-Ray	MIL-STD-883C, Method 2012/Cypress Spec. 12-00292	P
Thermal Shock	-55C to +125°C Cypress Spec. 25-00014	P
Current Density	Cypress Spec 22-00029	P
Acoustic Microscopy, MSL 3	Cypress Spec. 25-00104	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor[3]	Failure Rate[54]
High Temperature Operating Life Early Failure Rate (4 Meg)	2832	0	N/A	N/A	0 PPM
High Temperature Operating Life Early Failure Rate (9 Meg)	499	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	724,190 HRs	0	0.7	170	8 FIT

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[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.

Reliability Test Data

QTP #: 014807

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	COMP	15	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	COMP	15	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	48	772	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.3V, Vcc Max							
CY7C0853V-BBC (7C08533A)	4147878	*610145152*	TAIWN-G	96	455	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C0852V-AC (7C08523A)	4131840	*610135256*	TAIWN-G	80	400	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256*	TAIWN-G	336	256	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256*	TAIWN-G	500	193	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	80	300	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	336	295	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	500	274	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	80	400	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	336	255	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	500	193	0	
CY7C0852V-AC (7C08523A)	4133371	*610137695*	TAIWN-G	80	400	0	
CY7C0852V-AC (7C08523A)	4133371	*610137695*	TAIWN-G	336	398	0	
CY7C0852V-AC (7C08523A)	4133371	*610137695*	TAIWN-G	500	385	0	
CY7C0852V-AC (7C08523A)	4133371	*610138257L1*	TAIWN-G	80	400	0	
STRESS: HIGH TEMP STEADY STATE LIFE, 150C, 3.63V, Vcc Max							
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	80	78	0	
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	168	76	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C0852V-AC (7C08523A)	4133371	*610137695*	TAIWN-G	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	COMP	9	0	
CY7C0852V-AC (7C08523A)	4133371	*610137695*	TAIWN-G	COMP	9	0	

Reliability Test Data

QTP #: 014807

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: STATIC LATCH-UP TESTING (125C, 10.0V, +/-300mA)							
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	COMP	3	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	COMP	3	0	
STRESS: AGE BOND STRENGTH							
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	COMP	5	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	COMP	6	0	
STRESS: HIGH TEMPERATURE STORAGE, +150C							
CY7C0852V-BBC (7C08523A)	4128335	*610130788*	TAIWN-G	500	48	0	
CY7C0852V-BBC (7C08523A)	4128335	*610130788*	TAIWN-G	1000	48	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C0852V-AC (7C08523A)	4131840	*610135256*	TAIWN-G	128	47	0	
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	128	48	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	128	46	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C0852V-AC (7C08523A)	4131840	*610135256L1*	TAIWN-G	168	47	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	168	48	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH , MSL3							
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	300	47	0	
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	500	46	0	
CY7C0852V-AC (7C08523A)	4130707	*610133760L1*	TAIWN-G	1000	45	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	300	46	0	
CY7C0852V-AC (7C08523A)	4131841	*610137123L1*	TAIWN-G	500	45	0	

Reliability Test Data

QTP #: 020709

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.3V, Vcc Max							
CY7C0852V-AC (7C08523A)	4147843	*610203531*	TAIWN-G	96	601	0	
CY7C0852V-AC (7C08523A)	4147843	*610203532*	TAIWN-G	96	505	0	
CY7C0852V-AC (7C08523A)	4150386	*610206445*	TAIWN-G	96	499	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 2.3V, Vcc Max							
CY7C0852V-AC (7C08523A)	4147843	*610203532*	TAIWN-G	336	503	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH , MSL3							
CY7C0852V-AC (7C08523A)	4147843	*610203532*	TAIWN-G	300	44	0	
CY7C0852V-AC (7C08523A)	4147843	*610203532*	TAIWN-G	500	44	0	
CY7C0852V-AC (7C08523A)	4147843	*610203532*	TAIWN-G	1000	44	0	

Reliability Test Data

QTP #: 023101

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	15	0	
CY7C0853V-BBC (7C08533A)	4147878	*610145152L1*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.3V, Vcc Max							
CY7C0853V-BBC (7C08533A)	4147878	*610145152*	TAIWN-G	96	499	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 2.3V, Vcc Max							
CY7C0853V-BBC (7C08533A)	4147878	*610145152*	TAIWN-G	168	118	0	
CY7C0853V-BBC (7C08533A)	4147878	*610145152*	TAIWN-G	500	118	0	
CY7C0853V-BBC (7C08533A)	4147878	*610145152*	TAIWN-G	1000	118	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,000V							
CY7C0853V-BBC (7C08533A)	4147878	*610145152L1*	TAIWN-G	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING (125C, 10.0V, +/-300mA)							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	3	0	
STRESS: THERMAL SHOCK, +125C/-55C							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	100	48	0	
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	200	48	0	
STRESS: HIGH TEMPERATURE STORAGE, +150C							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	500	48	0	
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	1000	48	0	
STRESS: PHYSICAL DIMENSIONS							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	5	0	
STRESS: EXTERNAL VISUAL							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	15	0	
STRESS: BALL SHEAR							
CY7C0853V-BBC (7C08533A)	4223477	*610234276LM*	TAIWN-G	COMP	10	0	
CY7C0853V-BBC (7C08533A)	4223477	*610237235M*	TAIWN-G	COMP	10	0	
STRESS: BOND PULL							
CY7C0853V-BBC (7C08533A)	4223477	*610234276LM*	TAIWN-G	COMP	10	0	
CY7C0853V-BBC (7C08533A)	4223477	*610237235M*	TAIWN-G	COMP	10	0	

Reliability Test Data

QTP #: 023101

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: DIE SHEAR							
CY7C0853V-BBC (7C08533A)	4223477	*610234276LM*	TAIWN-G	COMP	15	0	
CY7C0853V-BBC (7C08533A)	4223477	*610237235M*	TAIWN-G	COMP	15	0	
STRESS: INTERNAL VISUAL							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	5	0	
STRESS: X-RAY							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	COMP	15	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C0853V-BBC (7C08533A)	4133371	*610136480L*	TAIWN-G	128	47	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C0853V-BBC (7C08533A)	4223476	*610232577LM1*	TAIWN-G	168	50	0	
CY7C0853V-BBC (7C08533A)	4223477	*610234276LM*	TAIWN-G	168	50	0	
CY7C0853V-BBC (7C08533A)	4223477	*610237235M*	TAIWN-G	168	49	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH , MSL3							
CY7C0853V-BBC (7C08533A)	4223477	*610234276LM*	TAIWN-G	300	47	0	
CY7C0853V-BBC (7C08533A)	4223476	*610232577LM1*	TAIWN-G	300	50	0	
CY7C0853V-BBC (7C08533A)	4223476	*610232577LM1*	TAIWN-G	500	50	0	
CY7C0853V-BBC (7C08533A)	4223476	*610232577LM1*	TAIWN-G	1000	50	0	
CY7C0853V-BBC (7C08533A)	4223477	*610237235M*	TAIWN-G	300	49	0	