Cypress Semiconductor
Product Qualification Report

QTP# 032005 VERSION 3.0
May 2005

B53D-3RF Technology, Fab 4	
CYWUSB6932 **CYWUSB6934**	**WirelessUSB™ LS 2.4 GHz DSSS Radio SoC**
CYWUSB6935	**WirelessUSB™ LR 2.4 GHz DSSS Radio SoC**
CYWUSB6941	**Wireless USB™ EX Radio**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report		Description of Qualification Purpose		Date Comp
99256		New Technology, B53D-3, Fab 4, CY7B993V / CY7B994V		Aug 00
032005		New Device, CYWUSB693*, B53D-3 Technology in Fab4		Jan 04
041503		B53D-3RF 3 Layer Mask change on 7B6934A (MM1, VIM, MM2)		Jun 04
041605		B53D-3RF 4 Layer Mask change on 7B6934A & 7B6963B (implementation of poly resistors in gate poly)		Jun 04
044305		CYWUSB6035A/B Device qualified by extension		Oct 04
051209		3 Layer Mask change on 7B6934A (450C MM1, 500C VIM, 550D MM2)		May 05

PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: Qualify CYWUSB69* Device in qualified B53D-3 Technology		
Marketing Part #:	CYWUSB6932/CYWUSB6934/CYWUSB6935/CYWUSB6941	
Device Description:	Wireless USB ™ LS 2.4-GHz DSSS Radio SoC	
Cypress Division:	Cypress Semiconductor Corporation – Personal Communication Division (PCD) WA	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A
What ID markings on Die:	CY7B6934A	

TECHNOLOGY/FAB PROCESS DESCRIPTION – B53D-3			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500/6000/300 [Å] Metal 2: 500/6000/300 [Å]
Passivation Type and Materials:	1,000A TEOS + 9,000A Si_2N_4		
Free Phosphorus contents in top glass layer(%):	0%		
Die Coating(s), if used:	N/A		
Number of Transistors in Device	150K		
Number of Gates in Device	30K		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, 0.25 μm		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 55Å		
Name/Location of Die Fab (prime) Facility:	Cypress Minnesota, Fab4		
Die Fab Line ID/Wafer Process ID:	Fab4 / B53D-3		

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R
Fault Coverage:	95%

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	SE283
Package Outline, Type, or Name:	28-pin Exposed Pad Plastic Small Outline Ics (ESOIC)
Mold Compound Name/Manufacturer:	Sumitomo G700
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	N/A
Lead Frame Designation:	N/A
Lead Frame Material:	Copper Base
Lead Finish, Composition / Thickness:	SnPb 85/15 300-800u inch
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Sawing
Die Attach Supplier:	Ablestik
Die Attach Material:	8290
Die Attach Method:	Dispensing
Bond Diagram Designation	10-05114
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au 1.0mil
Thermal Resistance Theta JA °C/W:	27.8°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-14999
Name/Location of Assembly (prime) facility:	Amkor-Seoul Korea-K1 (SEOL-L)

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
28-lead ESOIC	CML-R, PHIL-M

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	Dynamic Operating Condition, Vcc = 3.8V, 125°C Dynamic Operating Condition, Vcc = 3.65V, 125°C Dynamic Operating Condition, Vcc = 4.0V, 125°C Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 3.65V, 125°C Dynamic Operating Condition, Vcc = 4.0V, 125°C Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
Long Life Verification	Dynamic Operating Condition, Vcc = 4.0V, 125°C	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc = 4.3V, -30°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs., 30°C/60%RH+3IR-Reflow, 220°C+5, -0°C	P
Pressure Cooker	121°C, 100%RH MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs., 30°C/60%RH+3IR-Reflow, 220°C+5, -0°C	P
High Accelerated Saturation Test	130°C, 85%RH, 3.63V MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs., 30°C/60%RH+3IR-Reflow, 220°C+5, -0°C	P
Electrostatic Discharge Human Body Model (ESD-HBM)	1100V/2200V JESD22, Method A114-B	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
High Temperature Steady State Life	125°C, 3.63V	P
High Temperature Storage	150°C, no bias	P
Age Bond Pull	MIL-STD-883C, Method 2011	P
Low Temperature Operating Life	-30°C, 4.3V	P
Current Density	Cypress Spec. 22-00029	P
SEM X-Section	MIL-STD-883C, Method 2018.2	P
Acoustic Microscopy, Level 3	Cypress Spec. 25-00104	P
Latchup Sensitivity	In accordance with JEDEC 17. Cypress Spec. 01-00081, ± 300mA	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal[3] A.F	Failure Rate
High Temperature Operating Life Early Failure Rate @125C	3,708 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life Early Failure Rate @150C	1,093 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	306,265 DHRs	0	0 .7	70	18 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.

Reliability Test Data

QTP #: 99256

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	COMP	15	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	COMP	15	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERTING LIFE - EARLY FAILURE RATE, 125C, 4.0V, >VCC MAX							
CY7B994V-AC	1009007	*610021056*	TAIWN-G	96	672	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	96	665	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	96	664	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	96	681	0	
STRESS: HIGH TEMP DYNAMIC OPERTING LIFE-LATENT FAILURE RATE, 125C, 4.0, >Vcc Max							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	168	235	0	
CY7B994V-ACB	1937245	*619937409*	TAIWN-G	770	234	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	168	232	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	770	232	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	168	236	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	770	224	0	
STRESS: LONG LIFE VERIFICATION 125C, 4.0V,>Vcc Max							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	2000	170	0	
STRESS: AGE BOND STRENGTH							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	COMP	3	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	COMP	6	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	COMP	6	0	
STRESS: ESD-CHARGE DEVICE MODEL, 750V							
CY7B994V-AC	1937245	*619936456S*	TAIWN-G	COMP	3	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	COMP	3	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 1,100V							
CY7B994V-AC	1937245	*619936456S*	TAIWN-G	COMP	3	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	COMP	3	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	COMP	3	0	

Reliability Test Data

QTP #: 99256

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: DYNAMIC LATCH-UP TESTING, 6.5V							
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	128	46	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	256	46	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	128	46	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	128	48	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192HRS 30C/60%RH, MSL3							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	168	50	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	168	46	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	168	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 125C, 3.63V,>Vcc Max							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	168	78	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	336	76	0	
STRESS: LOW TEMPERATURE OPERATING LIKE, -30C,4.3V, 8MHZ							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	500	50	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	1000	50	0	
STRESS: LONG LIFE VERIFICATION 125C, 4.0V,>Vcc Max							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	2000	170	0	
STRESS: HIGH TEMP STORGAE, PLASTIC, 150C							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	500	50	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	1000	50	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	500	48	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	1000	48	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	500	48	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	1000	48	0	

Reliability Test Data

QTP #: 99256

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: TC CONDITION C, -65C TO 150C, PRE COND. 192 HRS 30C/60% RH, MSL3							
CY7B993V-AC	1937245	*619937409*	TAIWN-G	300	50	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	500	50	0	
CY7B993V-AC	1937245	*619937409*	TAIWN-G	1000	50	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	300	46	0	
CY7B994V-ACB	1942384	*610003953*	TAIWN-G	500	46	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	300	48	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	500	48	0	
CY7B994V-AC	1949608	*340000124*	TAIWN-G	1000	48	0	

Reliability Test Data

QTP #: 032005

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.8V, Vcc Max)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	96	1025	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, Vcc Max)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	48	1093	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V, Vcc Max)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	168	269	0	
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	500	266	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CYWUSB6934	4318747	*610344902/5909*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 1,100V							
CYWUSB6934	4318747	*610344902/5909*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYWUSB6934	4318747	*610344902/5909*	SEOL-L	COMP	3	0	
STRESS: LOW TEMP OPERATING LIFE (-30C, 4.3V, Vcc Max)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	120	51	0	
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	500	51	0	
STRESS: STATIC LATCH-UP TESTING (125C, 9.5V, +/-300mA)							
CYWUSB6934	4318747	*610344902/5909*	SEOL-L	COMP	3	0	
STRESS: PRESSURE COOKER, 121C,100%RH, PRECONDITION 192HRS 30C/60%RH, MSL3							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	168	96	0	
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	288	96	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192HRS 30C/60%RH, MSL3							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	300	77	0	
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	500	77	0	
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	1000	77	0	

Reliability Test Data

QTP #: 041503

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 9.5V, +/-300mA)							
CYWUSB6934	4318747	*610336918/9/20*	SEOL-L	COMP	3	0	

Reliability Test Data

QTP #: 041605

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CYWUSB6934	4401005	*610422644/7/50*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CYWUSB6934	4401005	*610422644/7/50*	SEOL-L	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYWUSB6934	4401005	*610422644/7/50*	SEOL-L	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 9.5V, +/-300mA)							
CYWUSB6934	4401005	*610422644/7/50*	SEOL-L	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.65V, Vcc Max)							
CYP15G0403DXB	4330065	*610406937/8/9*	TAIWN-G	96	504	0	
CYV15G0402DXB	4322602	*610331374/5/6*	TAIWN-G	96	1003	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 3.65V, Vcc Max)							
CYP15G0403DXB	4330065	*610406937/8/9*	TAIWN-G	168	180	0	
CYP15G0403DXB	4330065	*610406937/8/9*	TAIWN-G	500	180	0	
CYV15G0402DXB	4322602	*610331374/5/6*	TAIWN-G	168	192	0	