

Cypress Semiconductor Product Qualification Report

QTP# 081206 VERSION 1.0
November 2008

C8Q-3RL Technology, Fab 5	
CYWB0224ABS CYWB0226ABS CYWB0224ABSX CYWB0226ABSX CYWB0224ABM CYWB0226ABM CYWB0224ABMX CYWB0226ABMX	West Bridge™: Astoria™ USB and Mass Storage Peripheral Controller

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
065201	Qualify FX2LP18 Device Family on C8Q-3R Technology at GSMC Foundry (Fab 5)	Sep 07
072404	Qualify West Bridge Antioch (7C07100A) on C8Q-3RL Technology at Fab 5	Jan 08
081206	Qualify West Bridge Astoria-Switch (7C07101B, 100VFBGA 6X6mm) on C8Q-3RL Technology at Fab5	Aug 08

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify West Bridge Astoria-Switch (7C07101B) on C8Q-3RL Technology at Fab 5	
Marketing Part #:	CYWB0224ABS*, CYWB0224ABM*, CYWB0226ABS*, CYWB0226ABM*,
Device Description:	Astoria Switch- Handset Peripheral Controller
Cypress Division:	Cypress Semiconductor Corporation – Data Com Division (DCD)

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	4	Metal Composition:	Metal 1: 150A Ti/3,200A Al 0.5% Cu/300A TiW Metal 2: 150A Ti/4,000A Al 0.5% Cu/300A TiW Metal 3: 150A Ti/4,000A Al 0.5% Cu/300A TiW Metal 4: 150A Ti/8,000A Al 0.5% Cu/300A TiW
Passivation Type and Materials:		1000A TEOS + 9,000A Si ₃ N ₄	
Number of Transistors in device:		3.9M	
Number of Gates in device:		250K	
Generic Process Technology/Design Rule (μ-drawn):		CMOS, 0.13 μm	
Gate Oxide Material/Thickness (MOS):		SiO ₂ DGOX 32/55A	
Name/Location of Die Fab (prime) Facility:		GSMC	
Die Fab Line ID/Wafer Process ID:		C8Q-3RL, Fab5	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
100-Ball VFBGA	CML-RA, AT-INDONESIA

Note: Package Qualification details upon request.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BZ100
Package Outline, Type, or Name:	100-Ball VFBGA
Mold Compound Name/Manufacturer:	KE-2270
Mold Compound Flammability Rating:	V-O per UL94
Mold Compound Alpha Emission Rate:	N/A
Oxygen Rating Index:	N/A
Substrate Material	CCL-HL832NX
Lead Finish, Composition / Thickness:	SnAgCu
Die Backside Preparation Method / Metallization:	Backgrind
Die Separation Method:	100% Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	2025D
Die Attach Method:	Epoxy
Bond Diagram Designation:	001-15762 (AIT)/ 001-14167 (RA)
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 0.8mil
Thermal Resistance Theta JA °C/W:	44.21
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-00111
Name/Location of Assembly (prime) facility:	CML-RA
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-R

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

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=3.8V, 125°C Dynamic Operating Condition, Vcc Max=3.8V, 150°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max=3.8V, 150°C	P
High Temperature Steady State life	Dynamic Operating Condition, Vcc Max=3.63V, 150°C	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc=4.3V, -30C	P
High Temperature Storage	150 C, no bias	P
High Accelerated Saturation Test (HAST)	130°C, 1.8V/3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260°C+0, -5°C	P
Temperature Cycle	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, 260°C+0, -5°C	P
Pressure Cooker	121°C, 100%RH, 15 Psig Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260°C+0, -5°C	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JESD22, Method A114-E	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Acoustic Microscopy	Cypress Spec. 25-00104	P
Static Latch-up	125C, ± 200 Cypress Spec. 01-00081	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 ¹	3,027 Devices	1	N/A	N/A	330 PPM
High Temperature Operating Life ^{1,2} Long Term Failure Rate	810,168 DHRs	0	0.7	170	12 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 #: 065201

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	COMP	15	0	
CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	COMP	15	0	
CY7C68053 (7C680510BK)	4727325	610739937	TAIWN-G	COMP	15	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	COMP	9	0	
CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, 2200V							
CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	COMP	8	0	
CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	COMP	8	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	80	80	0	
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	168	80	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, Vcc Max)							
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	48	338	0	
CY7C68053 (7C680510BK)	4720785	610731288	CML-R	48	348	0	
CY7C68053 (7C680510BK)	4727325	610739215	CML-R	48	340	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V, Vcc Max)							
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	80	182	0	
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	500	182	0	
CY7C68053 (7C680510BK)	4720785	610731288	CML-R	80	182	0	
CY7C68053 (7C680510BK)	4720785	610731288	CML-R	500	182	0	
CY7C68053 (7C680510BK)	4727325	610739215	CML-R	80	180	0	
CY7C68053 (7C680510BK)	4727325	610739215	CML-R	500	180	0	
STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 3.65V), PRE COND 192 HR, 30C/60%RH, MSL3							
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	128	50	0	
CY7C68053 (7C680510BK)	4720785	610731288	CML-R	128	45	0	
STRESS: LOW TEMPERATURE OPERATING LIFE (-30C, 4.3V)							
CY7C68053 (7C680510BK)	9714792	610721250	CML-R	500	45	0	

Reliability Test Data

QTP #: 065201

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: STATIC LATCH-UP TESTING (125C, ±200mA)

CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	COMP	3	0	
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CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	COMP	6	0	
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STRESS: HIGH TEMPERATURE STORAGE, 150C, no bias

CY7C68053 (7C680510BK)	9714792	610721250	CML-R	500	50	0	
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CY7C68053 (7C680510BK)	9714792	610721250	CML-R	1000	50	0	
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STRESS: PRESSURE COOKER TEST (121C, 100%RH), 15 Psig, PRE COND 192 HR, 30C/60%RH, MSL3

CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	168	48	0	
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CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	168	50	0	
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STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS, 30C/60%RH, MSL3

CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	300	50	0	
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CY7C68053 (7C680510BK)	9714792	610721014	TAIWN-G	1000	50	0	
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CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	500	50	0	
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CY7C68053 (7C680510BK)	4720785	610729797	TAIWN-G	1000	50	0	
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CY7C68053 (7C680510BK)	4727325	610739937	TAIWN-G	300	50	0	
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Reliability Test Data

QTP #: 072404

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: ACOUSTIC-MSL3

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	COMP	15	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	COMP	5	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	COMP	5	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	COMP	5	0	
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	COMP	5	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	COMP	5	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	COMP	5	0	

STRESS: ESD-CHARGE DEVICE MODEL (500V)

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	COMP	9	0	
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STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, 2,200V

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	COMP	8	0	
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.8V, Vcc Max)

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	96	817	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	96	268	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	96	270	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	96	269	0	
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	96	270	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	96	270	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	96	270	0	

STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 3.8V, Vcc Max)

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	168	180	0	
CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	1000	179	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	168	60	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	1000	60	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	168	60	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	1000	60	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	168	60	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	1000	60	0	

Reliability Test Data

QTP #: 072404

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 3.8V, Vcc Max)

CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	168	60	0	
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	1000	60	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	168	60	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	1000	60	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	168	59	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	1000	59	0	

STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 3.63V), PRE COND 192 HR, 30C/60%RH, MSL3

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	128	76	0	
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STRESS: PRESSURE COOKER TEST (121C, 100%RH), 15 Psig, PRE COND 192 HR, 30C/60%RH, MSL3

CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	168	26	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	168	26	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	168	26	0	
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	168	26	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	168	24	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	168	26	0	

STRESS: STATIC LATCH-UP TESTING (125C, 5.4V, ±200mA)

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	COMP	6	0	
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STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS, 30C/60%RH, MSL3

CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	300	50	0	
CYWB0124AB (7C07100B)	4738561	610754005/6/7/8	CML-RA	500	50	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	300	32	0	
CYWB0124AB (7C07100B)	4739848	610756608	CML-RA	500	32	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	300	32	0	
CYWB0124AB (7C07100B)	4739848	610756609	CML-RA	500	32	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	300	32	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	500	32	0	
CYWB0124AB (7C07100B)	4739848	610756607	CML-RA	1000	32	0	

Reliability Test Data

QTP #: 072404

<i>Device</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	300	32	0	
CYWB0124AB (7C07100B)	4739893	610756142	CML-RA	500	32	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	300	31	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	500	31	0	
CYWB0124AB (7C07100B)	4739893	610756144	CML-RA	1000	31	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	300	31	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	500	31	0	
CYWB0124AB (7C07100B)	4739893	610756145	CML-RA	1000	31	0	

Reliability Test Data

QTP #: 081206

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.8V, Vcc Max)

CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	96	2308	1	Non-Visual Defect
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CYWB0226ABS (7C07101BK)	4824037	610829451	CML-RA	96	719	0	
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STRESS: ESD-CHARGE DEVICE MODEL (500V)

CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	COMP	9	0	
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STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, 2,200V

CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	COMP	8	0	
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STRESS: STATIC LATCH-UP TESTING (125C, 5.4V, ±200mA)

CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	COMP	6	0	
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STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS, 30C/60%RH, MSL3

CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	500	77	0	
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CYWB0226ABS (7C07101BK)	4818850	610821607	CML-RA	1000	77	0	
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