



Please note that Cypress is an Infineon Technologies Company.

The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content

The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers

Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

Cypress Semiconductor Reliability Qualification Report

QTP# D21699c, I43502UXC2EKWB9GT Version *B

CYW4356XKUBGT

**Qualification of: CYW4356XKUBGT, Single-Chip 5G WiFi IEEE 802.11ac
2x2 MAC/Baseband/Radio with Integrated Bluetooth**

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
reliability@cypress.com or via a CYLINK CRM CASE

Prepared By:
Bak Lee Chan
Reliability Engineer

Reviewed By:
Francis Classe
Reliability Manager

Approved By:
David Hoffman
Reliability Director

I.A. Product and Package Information

Product Description: CYW4356XKUBG **Cypress Division:** IoT Division
 Single-Chip 5G WiFi IEEE 802.11ac 2x2 MAC/Baseband/Radio with Integrated Bluetooth

Package: WLBGA	QTP: D21699c	
Description: (4.91 x 7.71 x 0.55mm) 192 Ball, Wafer Level Ball Grid Array (WLBGA)		Flammability: O2 Index:
Assembly: ASE Kaifa	Molding Compound: N/A	UL-V0 >28
Electrical Test: ASE	Theta Ja / Psi Jt: 21 °C/W / 1 °C/W	
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 95.5Sn / 4.0Ag / 0.5Cu	Bond Wire: N/A	
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 100 mA	Life Test Dynamic Current: 25 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.5 V
Est. Field Power Dissipation: 120 mWatts	Est. Stress Power Dissipation: 37.5 mWatts
Est. Field Tj: 57.5 °C	Est. Stress Tj: 125.7 °C

Die: 43502UXC2-E	Die Size: 7.71 x 4.91 mm
Process: 40NM LP	Fab: UMC-12A
Type: Bluetooth	N/A

I.B. Product and Package Information

Product Description: CYW4356XKWBG **Cypress Division:** IoT Division
Single Chip 5G WiFi IEEE 802.11ac 2x2 MAC/Baseband/Radio with Integrated Bluetooth 4.1, FM Receiver, and Wireless Charging

Package: WLCSP	QTP: I43502UXC2EKWB	
Description: (7.71 x 4.91 x 0.33mm) 395 Ball, Wafer Level Chip Scale Package (WLCSP)		Flammability: O2 Index:
Assembly: ASE Kaifa	Molding Compound: N/A	UL-V0 >28
Electrical Test: ASE Taiwan	Theta Ja / Psi Jt: 27 °C/W / 2.4 °C/W	
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 98.2Sn / 1.8Ag	Bond Wire: N/A	
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 100 mA	Life Test Dynamic Current: 25 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.5 V
Est. Field Power Dissipation: 120 mWatts	Est. Stress Power Dissipation: 37.5 mWatts
Est. Field Tj: 58.2 °C	Est. Stress Tj: 126.0 °C

Die: 43502YUXC2-E	Die Size: 7.71 x 4.91 mm
Process: 40NM LP	Fab: UMC-12A
Type:	

II. 40nm GLL/LP/RF Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °C

Failure Mechanism	Read Points / Test Results				Modeling Parameters @ 55°C					Avg. Failure Rate FITS @ 55°C, 60% Conf.	
	24 hrs	168 hrs	500 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	PPM	FIT
PLASTIC											
Sample Size	2716	2519	1559	1559							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	71	1	71			
Totals	0	0	0	0					14269	0	8

* - Contributes to early life FITS

III. Summary of Stress Test Results

Stress Test	Stress Condition	Package Type	Sample Size	Num. of Lots	Num. of Fails	Failure Rate %	Comments
Data From Qualification D21699c, I43502UXC2EKWB9GT:							
Early Life Failure Rate	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	24 Hours
HTOL (EL)	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	192 Hours
HTOL (IL)	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	500 Hours
HTOL (XL)	125°C, Vddnom x 1.15	WLBGA ¹	96	1	0	0.00	1000 Hours
ESD CDM	N/A	WLBGA ¹	3	1	Pass 300V		
	N/A	WLCSP ²	3	1	Pass 500V		
ESD HBM	N/A	WLBGA ¹	3	1	Pass 1kV		
	N/A	WLCSP ²	3	1	Pass 1.5kV		
ESD MM	N/A	WLBGA ¹	3	1	Pass 50V		
	N/A	WLCSP ²	3	1	Pass 75V		
Latch Up	125°C	WLBGA ¹	3	1	Pass 200mA		
	125°C	WLCSP ²	3	1	Pass 200mA		

Generic Reference Data:

High Temp Bake	(150°C)	WLBGA ³	77	1	0	0.00	500 Hours
	(150°C)	WLBGA ³	77	1	0	0.00	1000 Hours
	(150°C)	WLCSP ⁴	77	1	0	0.00	1000 Hours
Preconditioning	(PC5/245°C, +0°C/-5°C)	WLBGA ³	231	1	Passed Jedec L1		
	(PC5/245°C, +0°C/-5°C)	WLCSP ⁴	231	1	Passed Jedec L1		
Precon+Temp Cycle	(PC5/245°C, -55°C/125°C)	WLBGA ³	77	1	0	0.00	500 Cycles
	(PC5/245°C, -55°C/125°C)	WLBGA ³	77	1	0	0.00	1000 Cycles
	(PC5/245°C, -55°C/125°C)	WLCSP ⁴	77	1	0	0.00	500 Cycles
	(PC5/245°C, -55°C/125°C)	WLCSP ⁴	77	1	0	0.00	1000 Cycles
Precon+uHAST	(PC5/245°C, Unbiased, 130°C/85% RH)	WLBGA ³	77	1	0	0.00	96 Hours
	(PC5/245°C, Unbiased, 130°C/85% RH)	WLCSP ⁴	77	1	0	0.00	96 Hours

- Notes / Justification:**
- 1) Results from Qual D21699c, CYW4356XKUBG, 40NM LP Bluetooth in 192 Ball WLBGA (4.91 x 7.71 x 0.55mm)
 - 2) Results from Qual I43502UXC2EKWB9GT, CYW4356XKWBG, 40NM LP in 395 Ball WLCSP (7.71 x 4.91 x 0.33mm)
 - 3) Results from Qual PQ03084, BCM4343WKUBG in 74 Ball WLBGA (4.91 x 2.91 x 0.55mm) - Same Process Technology, Package Family, and Assembly Location
 - 4) Results from Qual PQ03059, I4350PVC4KFFBH in 242 Ball WLCSP (x x mm) - Same Process Technology, Package Family, and Assembly Location

Preconditioning Flows: PC5 (JEDEC L1): Bake 125°C, 24hr => Soak @ 85°C/85%RH, 168hr => 3x Reflow

Reliability Tests Performed per Specification Requirements

Stress	Condition	Specification Reference
Early Life Failure Rate	125°C, Vddnom x 1.15	JESD22-A108 / AEC-Q100-008
ESD CDM	N/A	JS002 / AEC-Q100-011
ESD HBM	N/A	JS001 / AEC-Q100-002
ESD MM	N/A	JS001 / AEC-Q100-002
High Temp Bake	(150°C)	JESD22-A103
HTOL (EL)	125°C, Vddnom x 1.15	JESD22-A108
HTOL (IL)	125°C, Vddnom x 1.15	JESD22-A108
HTOL (XL)	125°C, Vddnom x 1.15	JESD22-A108
Latch Up	125°C	JESD78 / AEC Q100-004
Precon+Temp Cycle	(PC5/245°C, -55°C/125°C)	JESD22-A104
Precon+uHAST	(PC5/245°C, Unbiased, 130°C/85% RH)	JESD22-A118
Preconditioning	(PC5/245°C, +0°C/-5°C)	J-STD-020

IV. Revision History

Document Number: 002-18248**Document Title:** QTP #D21699c: CYW4356XKUBGT. Single-Chip 5G WiFi IEEE 802.11ac 2x2
MAC/Baseband/Radio with Integrated Bluetooth 4.1

Rev.	Issue Date	ECN#	Originator	Description
**	12/23/2016	5561295	FCCL	Initial Release.
*A	10/9/2017	5882660	BAKC	Added WLCSP package data
*B	5/10/2018	6170394	EKNG	Rename the Product Naming

Trademarks and Notice

The contents of this document are subject to change without notice. This document may contain information on a Cypress product under development by Cypress. Cypress reserves the right to change or discontinue work on any product without notice. The information in this document is provided as is without warranty or guarantee of any kind as to its accuracy, completeness, operability, fitness for particular purpose, merchantability, non-infringement of third-party rights, or any other warranty, express, implied, or statutory. Cypress assumes no liability for any damages of any kind arising out of the use of the information in this document.

Copyright © 2016- 2018 Cypress Inc. All rights reserved.