

Cypress Semiconductor Reliability Qualification Report

QTP# 190301, 192004 Version *A

CYW20719B2 / CYW20721B2

CYW20719B2 / CYW20721B2, Enhanced Low Power, Bluetooth
5.0/BLE/2 Mbps LE/EDR/Integrated SOC

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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I.A. Product and Package Information

Product Description: CYW20719B2KWB9GT **Cypress Division:** IoT Division
Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps LE/EDR/Integrated SOC

Package: WLCSP	QTP: 190301	Flammability: O2 Index:
Description: (3.31 x 3.22 x 0.33mm) 134 Ball, Wafer Level Chip Scale Package (WLCSP)		UL-V0 >28
Assembly: ASE Taiwan	Molding Compound: N/A	
Electrical Test: ASE Taiwan		
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 98.2Sn / 1.8Ag		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 20 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 27.6 mWatts

Die: 20719YPB2DA	Die Size: 3.35 x 3.26 mm
Process: 40NM LP	Fab: TSMC
Type: Bluetooth	Density: N/A

I.B. Product and Package Information

Product Description: CYW20721B2KUMLG **Cypress Division:** IoT Division
 Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps LE/EDR/Integrated SOC

Package: QFN	QTP: 190301a	
Description: (5 x 5 x 0.6mm) 40 Pin, Quad Flat No Lead Package (QFN)		Flammability: O2 Index:
Assembly: SPIL-TAIWAN	Molding Compound: HITACHI_CEL-9240-HF	UL-V0 >28
Electrical Test: ASE Singapore		
Substrate/Leadframe: Copper Leadframe	Die Attachment: Hitachi EN-4900GC	
Lead Finish: 100% Matte Sn Plating		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 20 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 27.6 mWatts

Die: 20721PB2DA	Die Size: 3.35 x 3.26 mm
Process: 40NM LP	Fab: TSMC
Type: QFN	Density: N/A

I.C. Product and Package Information

Product Description: CYW20721B2KWB9GT **Cypress Division:** IoT Division
 Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps LE/EDR/Integrated SOC

Package: WLCSP	QTP: 190301b	
Description: (3.31 x 3.22 x 0.33mm) 134 Ball, Wafer Level Chip Scale Package (WLCSP)	Flammability: O2 Index:	
Assembly: ASE Taiwan	Molding Compound: N/A	UL-V0 >28
Electrical Test: ASE Taiwan		
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: 98.2Sn / 1.8Ag		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 20 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 27.6 mWatts

Die: 20721YPB2DA	Die Size: 3.35 x 3.26 mm
Process: 40NM LP	Fab: TSMC
Type: Bluetooth	Density: N/A

I.D. Product and Package Information

Product Description: CYW20719B2KUMLG
Cypress Division: IoT Division
 Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps LE/EDR/Integrated SOC

Package: QFN	QTP: 190301c	
Description: (5 x 5 x 0.6mm) 40 Pin, Quad Flat No Lead Package (QFN)		Flammability: O2 Index:
Assembly: SPIL-TAIWAN	Molding Compound: HITACHI_CEL-9240-HF	UL-V0 >28
Electrical Test: ASE Singapore		
Substrate/Leadframe: Copper Leadframe	Die Attachment: Hitachi EN-4900GC	
Lead Finish: 100% Matte Sn Plating		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 20 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 27.6 mWatts

Die: 20719B2DA	Die Size: 3.35 x 3.26 mm
Process: 40NM LP	Fab: TSMC
Type: QFN	Density: N/A

I.E. Product and Package Information

Product Description: CYW20721B2KUMLG **Cypress Division:** IoT Division
 Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps LE/EDR/Integrated SOC

Package: QFN	QTP: 192004	
Description: (5 x 5 x 0.6mm) 40 Lead, Quad Flat No Lead Package (QFN)		Flammability: O2 Index:
Assembly: ASE Taiwan	Molding Compound: Sumitomo EME G700LA	UL-V0 >28
Electrical Test: ASE Taiwan		
Substrate/Leadframe: Copper Leadframe	Die Attachment: Hitachi EN-4900F	
Lead Finish: 100% Matte Sn Plating		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 20 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 27.6 mWatts

Die: 20721PB2DA	Die Size: 3.35 x 3.26 mm
Process: 40NM LP	Fab: TSMC
Type: QFN	Density: N/A

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 190301, 190301a, 192004:							
High Temp Bake	(175°C)	QFN ³	45	1	0	0.00	500 Hours
ESD CDM	N/A	WLCSP ¹	3	1	0	0.00	Passed 500V
	N/A	QFN ²	3	1	0	0.00	Passed 500V
	N/A	QFN ³	3	1	0	0.00	Passed 1.0kV
ESD HBM	N/A	WLCSP ¹	3	1	0	0.00	Passed 2.0kV
	N/A	QFN ²	3	1	0	0.00	Passed 2.0kV
Latch Up	(125°C, +/- 200mA)	WLCSP ¹	3	1	0	0.00	Passed
	(125°C, +/- 200mA)	QFN ²	3	1	0	0.00	Passed
Preconditioning	(PC2/260°C, +0°C/-5°C)	QFN ³	383	3	Passed		
Precon+Temp Cycle	(PC2/260°C, -65°C/150°C)	QFN ³	231	3	0	0.00	500 Cycles
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	QFN ³	75	3	0	0.00	96 Hours
Precon+uHAST	(PC2/260°C, Unbiased, 130°C/85% RH)	QFN ³	77	1	0	0.00	96 hours
Solderability	N/A	QFN ³	9	1	Passed		

Notes / Justification: 1) Results from Qual 190301, CYW20719B2KWB9GT, 40NM LP Bluetooth in 134 Ball WLCSP (3.31 x 3.22 x 0.33mm)
 2) Results from Qual 190301a, CYW20721B2KUMLG, 40NM LP QFN in 40 Pin QFN (5 x 5 x 0.6mm)
 3) Results from Qual 192004, CYW20721B2KUMLG, 40NM LP QFN in 40 Lead QFN (5 x 5 x 0.6mm)

Preconditioning Flows: PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 3x Reflow

Reliability Tests Performed per Specification Requirements

Stress	Condition	Specification Reference
ESD CDM	N/A	JS002 / AEC-Q100-011
ESD HBM	N/A	JS001 / AEC-Q100-002
High Temp Bake	(175°C)	JESD22-A103
Latch Up	(125°C, +/- 200mA)	JESD78 / AEC Q100-004
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	JESD22-A110
Precon+Temp Cycle	(PC2/260°C, -65°C/150°C)	JESD22-A104
Precon+uHAST	(PC2/260°C, Unbiased, 130°C/85% RH)	JESD22-A118
Preconditioning	(PC2/260°C, +0°C/-5°C)	J-STD-020
Solderability	N/A	J-STD-002

IV. Revision History

Document Number: 002-28997**Document Title:** CYW20719B2 / CYW20721B2, Enhanced Low Power, Bluetooth 5.0/BLE/2 Mbps
LE/EDR/Integrated SOC

Rev.	Issue Date	ECN#	Originator	Description
**	11/18/2019	6733035	BAKC	Initial Release.
*A	3/9/2020	6825712	BAKC	Added QFN Package Data

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