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Cypress Semiconductor Reliability Qualification Report

QTP# D18663 Version **

BCM43241

Qualification of: Single-Chip IEEE 802.11 a/b/g/n 2x2 MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS and FM Receiver

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

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I. Product and Package Information

Product Description: BCM43241XFKFFBG
2x2 802.11n with iPA + BT + FM RX device

Cypress Division: IoT Division

Package: FCFBGA
QTP: D18663
Description: (7 x 9 x 1.05mm) 208 Ball, Flip Chip Fine Pitch Ball Grid Array Package (FCFBGA)
Flammability: UL-V0
O2 Index: >28
Assembly: SPIL Taiwan
Molding Compound: N/A
Electrical Test: UTAC Singapore
Theta Ja / Psi Jt: 36 °C/W / 8.8 °C/W
Substrate/Leadframe: Laminate Substrate
Die Attachment: N/A
Lead Finish: 98.25Sn/1.2Ag/0.5Cu/0.05Ni
Bond Wire: N/A
Comments:

Est. Field Temperature: 55 °C
Est. DC Field Current: 125 mA
Est. Field Voltage: 3.3 V
Est. Field Power Dissipation: 412.5mWatts
Est. Field Tj: 69.9 °C

Life Test Temperature: 125 °C
Life Test Dynamic Current: 25 mA
Life Test Voltage: 3.45 V
Est. Stress Power Dissipation: 86.2 mWatts
Est. Stress Tj: 128.1 °C

Die: 4324YB4
Process: 40NM LPRF
Type: Bluetooth
Die Size: 5.91 x 4.43 mm
Fab: TSMC-14

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 D18663:							
Early Life Failure Rate	(125°C, Vddnom x 1.15)	FCFBGA [1]	192	1	0	0.00	24 Hours
HTOL (EL)	(125°C, Vddnom x 1.15)	FCFBGA [1]	96	1	0	0.00	192 Hours
ESD CDM	N/A	FCFBGA [1]	3	1	Pass 500V		
ESD HBM	N/A	FCFBGA [1]	3	1	Pass 1kV		
ESD MM	N/A	FCFBGA [1]	3	1	Pass 75V		
Latch Up	(125°C)	FCFBGA [1]	3	1	Pass 200mA		
Generic Reference Data:							
Preconditioning	(PC2/260°C, +0°C/-5°C)	FCFBGA [2]	415	1	Passed Jedec L3		
Precon+Temp Cycle	(PC2/260°C, -55°C/125°C)	FCFBGA [2]	76	1	0	0.00	500 cycles
	(PC2/260°C, -55°C/125°C)	FCFBGA [2]	76	1	0	0.00	1000 cycles
Precon+Thermal Shock	(PC2/260°C, -55°C/125°C)	FCFBGA [2]	76	1	0	0.00	500 cycles
	(PC2/260°C, -55°C/125°C)	FCFBGA [2]	76	1	0	0.00	300 cycles
	(PC2/260°C, -55°C/125°C)	FCFBGA [2]	76	1	0	0.00	1000 cycles
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	FCFBGA [2]	76	1	0	0.00	96 hours
Temp Humidity Test	(Unbiased, 85°C/85% RH)	FCFBGA [2]	76	1	0	0.00	1000 hours

Notes / Justification: 1) Results from Qual D18663, BCM43241XFKFFBG, 40NM LPRF Bluetooth in 208 Ball FCFBGA (7 x 9 x 1.05mm)
2) Results from Qual PQ01912, 4324YB4A in 90 Ball FCFBGA (8.5 x 8.5 x 1.05mm) - Same Product, Package, and Same Assembly Site

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
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
HTOL (EL)	(125°C, Vddnom x 1.15)	JESD22-A108
Latch Up	(125°C)	JESD78 / AEC Q100-004
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	JESD22-A110
Precon+Temp Cycle	(PC2/260°C, -55°C/125°C)	JESD22-A104
Precon+Thermal Shock	(PC2/260°C, -55°C/125°C)	JESD22-A106
Preconditioning	(PC2/260°C, +0°C/-5°C)	J-STD-020
Temp Humidity Test	(Unbiased, 85°C/85% RH)	JESD22-A101

IV. Revision History

Document Number: 002-19419

Document Title: QTP#D18663: BCM43241, Single-Chip IEEE 802.11 a/b/g/n 2x2 MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS and FM Receiver

Rev.	Issue Date	ECN#	Originator	Description
**	4/11/2017	5693337	BAKC	Initial Release.

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