

# Cypress Semiconductor Reliability Qualification Report

**QTP# D43569 Version \*\***

## **BCM43569**

**Qualification of: BCM43569, Single-Chip 5G Wi-Fi IEEE 802.11ac 2x2  
MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS in 254 Ball,  
Flip Chip Fine Pitch Ball Grid Array Package (FCFBGA)**

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

**Product Description:** BCM43569PKFFBG      **Cypress Division:** IoT Division  
Single-Chip 5G Wi-Fi IEEE 802.11ac 2x2 MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS

**Package:** RFCFBGA      **QTP:** D43569  
**Description:** (10 x 10 x 1mm) 254 Ball, Flip Chip Fine Pitch Ball Grid Array Package (FCFBGA)      **Flammability: O2 Index:**  
**Assembly:** ASE Taiwan      **Molding Compound:** Panasonic CV8710TAC      UL-V0      >28  
**Electrical Test:** ASE      **Theta Ja / Psi Jt:** 39 °C/W / 5 °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      **Life Test Temperature:** 125 °C  
**Est. DC Field Current:** 100 mA      **Life Test Dynamic Current:** 25 mA  
**Est. Field Voltage:** 3.0 V      **Life Test Voltage:** 3.45 V  
**Est. Field Power Dissipation:** 300 mWatts      **Est. Stress Power Dissipation:** 86.2 mWatts  
**Est. Field Tj:** 66.7 °C      **Est. Stress Tj:** 128.3 °C

**Die:** 43569YVA2D      **Die Size:** 7.71 x 4.91 mm  
**Process:** 40NM LP      **Fab:** UMC-12I  
**Type:** Bluetooth      **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)	Early Life	Inherent Life
<b>PLASTIC</b>											
Sample Size	2716	2519	1559	1559							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	71	1	71		88	8
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>					<b>14269</b>	<b>88</b>	<b>8</b>

\* - 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
<b>Data From Qualification D43569:</b>							
<b>Early Life Failure Rate</b>	125°C, Vddnom x 1.15	RFCFBGA <sup>1</sup>	96	1	0	0.00	24 Hours
<b>HTOL (EL)</b>	125°C, Vddnom x 1.15	RFCFBGA <sup>1</sup>	96	1	0	0.00	192 Hours
<b>HTOL (IL)</b>	125°C, Vddnom x 1.15	RFCFBGA <sup>1</sup>	96	1	0	0.00	500 Hours
<b>HTOL (XL)</b>	125°C, Vddnom x 1.15	RFCFBGA <sup>1</sup>	96	1	0	0.00	1000 Hours
<b>ESD CDM</b>	N/A	RFCFBGA <sup>1</sup>	3	1	Pass 300V		
<b>ESD HBM</b>	N/A	RFCFBGA <sup>1</sup>	3	1	Pass 1kV		
<b>ESD MM</b>	N/A	RFCFBGA <sup>1</sup>	3	1	Pass 50V		
<b>Latch Up</b>	125°C	RFCFBGA <sup>1</sup>	3	1	Pass 200mA		

#### Generic Reference Data:

<b>High Temp Bake</b>	(150°C)	RFCFBGA <sup>2</sup>	77	1	0	0.00	1000 hours
<b>Preconditioning</b>	(PC2/260°C, +0°C/-5°C)	RFCFBGA <sup>2</sup>	260	1	Passed Jedec L3		
<b>Precon+Temp Cycle</b>	(PC2/260°C, -55°C/125°C)	RFCFBGA <sup>2</sup>	77	1	0	0.00	500 cycles
	(PC2/260°C, -55°C/125°C)	RFCFBGA <sup>2</sup>	77	1	0	0.00	1000 cycles
<b>Precon+uHAST</b>	(PC2/260°C, Unbiased, 130°C/85% RH)	RFCFBGA <sup>2</sup>	77	1	0	0.00	96 hours

**Notes / Justification:** 1) Results from Qual D43569, BCM43569PKFFBG, 40NM LP Bluetooth in 254 Ball FCFBGA (10 x 10 x 1mm)  
 2) Results from Qual PQ02828, BCM43569PKFFBG in 254 Ball FCFBGA (10 x 10 x 1mm) - Same Product, Fab, Package, and Assembly Location

**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
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	(PC2/260°C, -55°C/125°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
Preconditioning	(PC2/260°C, +0°C/-5°C)	J-STD-020 / EIAJ ED-4701-100 Method 104

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## IV. Revision History

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**Document Number:** 002-18357

**Document Title:** QTP #D43569: BCM43569, Single-Chip 5G Wi-Fi IEEE 802.11ac 2x2 MAC/Baseband/Radio with Integrated Bluetooth 4.0 + HS

Rev.	Issue Date	ECN#	Originator	Description
**	1/4/2017	5574704	FCCL	Initial Release.

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