

**Product Change Notification - GBNG-17FFMD679**


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**Date:**

20 Nov 2019

**Product Category:**

8-bit Microcontrollers

**Affected CPNs:**

**Notification subject:**

CCB 2856 Final Notice: Qualification of Microchip Fabrication site (FAB 4) for selected Atmel tinyAVR 1-series microcontrollers products manufactured with mask 59Bxx.

**Notification text:**
**PCN Status:**

Final notification

**PCN Type:**

Manufacturing Change

**Microchip Parts Affected:**

Please open one of the icons found in the Affected CPNs section above.

NOTE: For your convenience Microchip includes identical files in two formats (.pdf and .xls).

**Description of Change:**

Qualification of Microchip Fabrication site (FAB 4) for selected Atmel tinyAVR 1-series microcontrollers products manufactured with mask 59Bxx.

**Pre Change:**

Fabricated at UMC5 and TPS5 fabrication sites using 8 inch wafers.

**Post Change:**

Fabricated at Microchip Fabrication site (FAB 4) using 8 inch wafers.

**Pre and Post Change Summary:**

Fab Site	Pre Change		Post Change
	UMC5	TPS5	Microchip Fabrication site (FAB 4)
Wafer Size	8 inch wafers	8 inch wafers	8 inch wafers
Quality Certification	ISO/TS16949	ISO/TS16949	ISO/TS16949
Design/Layout	No Change	No Change	No Change
Die Size	No Change	No Change	No Change

**Impacts to Data Sheet:**

None

**Change Impact:**

None

**Reason for Change:**

To improve on time delivery performance by qualifying Microchip Fabrication site (FAB 4)

**Change Implementation Status:**

In progress

**Estimated First Ship Date:**

December 20, 2019 (date code: 1951)

NOTE: Please be advised that after the estimated first ship date customers may receive pre and post change parts



### Time Table Summary:

	November 2019					December 2019			
Workweek	44	45	46	47	48	49	50	51	52
Qualification Report Availability				X					
Final PCN Issue Date				X					
Estimated Implementation Date								X	

### Method to Identify Change:

Traceability code

### Qualification Report:

Please open the attachments included with this PCN labeled as PCN\_#\_Qual\_Report.

### Revision History:

**November 20, 2019:** Issued final notification as PCN number [GBNG-17FFMD679](#) for additional catalog part numbers manufactured with mask 59Bxx. Microchip has issued a separate PCN for selected Atmel products manufactured with mask 59Bxx. To view the additional PCN document click the link below:

[GBNG-06LXXH156](#)

The change described in this PCN does not alter Microchip's current regulatory compliance regarding the material content of the applicable products.

### Attachment(s):

[PCN\\_GBNG-17FFMD679\\_Qual Report.pdf](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

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If you wish to change your PCN profile, including opt out, please go to the [PCN home page](#) select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

Affected Catalog Part Numbers (CPN)

ATTINY3216-SF

ATTINY3217-MF

ATTINY3216-SN

ATTINY3217-MN

ATTINY3216-SNR

ATTINY3217-MNR

ATTINY3216-SFR

ATTINY3217-MFR



## **QUALIFICATION REPORT SUMMARY**

**PCN #: GBNG-17FFMD679**

**Date**  
**March 09, 2018**

**Qualification of Microchip Fabrication site (FAB 4) for  
selected Atmel tinyAVR 1-series microcontrollers products  
manufactured with mask 59Bxx.**

**Purpose: Qualification of Microchip Fabrication site (FAB 4) for selected Atmel tinyAVR 1-series microcontrollers products manufactured with mask 59Bxx.**

**CCB No.: 2856**

## **Package and Assembly Materials Information**

**Table 1: Qualification Vehicle Information QFN32**

<b>Category</b>	<b>Material Reference</b>
Device Type	ATMega168
Package Dimension	5 x 5 mm
Package Thickness	0.9mm (Max)
Wire Bond Material	Cu_Pd_Au wire
Leadframe/ Substrate Material	LF Copper
Marking material	Laser Marking
Plating Material	Plating Matt Sn with 1hr@150C annealing
Mold Compound Material	G700LA

**Table 2: Qualification Vehicle Information TQFP32**

<b>Category</b>	<b>Material Reference</b>
Device Type	ATMega168
Package Dimension	7 x 7 mm
Package Thickness	1.2 mm (Max)
Wire Bond Material	CuPdAu
Leadframe/ Substrate Material	LF Copper C194
Marking material	Laser Marking
Plating Material	Plating Matt Sn with 1hr@150C annealing
Mold Compound Material	G700LA

**Qualification Results Summary**  
**Material Certification, Performance Test Summary**

**TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
PC	A1	Preconditioning [260°C] – JESD22-A113, J-STD-020	285	3	0/1	L3	PASS	
HAST	A2	Biased Highly Accel. Stress Test (post PC) [130°C,85%RH] – JESD22-A101	77	3	0/1	96h	PASS	
UHST	A3	Unbiased High Accel. Stress Test (post PC) [130°C,85RH] – JESD22-A118	77	3	0/1	96h	PASS	
TC	A4	Temp. Cycling (post PC) [-65°C, 150°C] – JESD22 A104	77	3	0/1	500c	PASS	
PTC	A5	Power temperature cycles – JESD22-A105	45	3	0/1	-	-	N/A
HTSL	A6	High Temp. Storage Life [175°C] – JESD22-A103	45	3	0/1	500h	PASS	

**TEST GROUP B – ACCELERATED LIFE TIME SIMULATION TESTS**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
HTOL	B1	High Temp. Operating Life [150°C] – JESD22 – A108	77	3	0/1	500h	PASS	
ELFR	B2	Early Life Failure Rate [150°C] – AEC-Q100-008	800	3	0/1	24h	PASS	
EDR	B3	NVM Endurance (Pg.&Erase) NVM Data Retention [175°C] AEC-Q100-005	77 77	3 3	0/1 0/1	100kc 500h	PASS PASS	10kc Flash/ 100kc EE

**TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
WBS	C1	Wire Bond Shear AEC-Q100-001	5p/30 w	1		-	PASS	
BPS	C2	Bond Pull strength (post TC) MIL-883-2011	5p/30 w	1		-	PASS	
SD	C3	Solderability – JESD22 B102	15	1	0/1	-	PASS	
PD	C4	Physical dimensions – JESD22-B100, JESD22-B108	10	3		-	PASS	Assembly Data
SBS	C5	Solder Ball Shear AECQ100-010	50b/3p	1		-	-	N/A
LI	C6	Lead Integrity – JESD22-B105	50l/3p	1	0/1	-	PASS	Assembly Data

**TEST GROUP D – DIE FABRICATION RELIABILITY TESTS**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
EM	D1	Electromigration – JESD61					PASS	
Tddb	D2	Time Dependent Dielectric Breakdown – JESD35					PASS	
HCI	D3	Hot Carriers Injection – JESD60, JESD28					PASS	
NBTI	D4	Negative Bias Temperature Instability – JESD90					PASS	
SM	D5	Stress Migration – JESD61,87 & 202					PASS	

**TEST GROUP E – ELECTRICAL VERIFICATION**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
HBM / MM	E2	Electrostatic Discharge (HBM & MM) – AEC-Q100-002, 003	3	1	0/1	2kV / 200V	PASS	
CDM	E3	Electrostatic Discharge (CDM) – AEC-Q100-011	3	1	0/1	500V 750V	PASS	
LU	E4	Latch-up [25°C and 125°C] – AEC-Q100-004, JESD78	6	1	0/1	+/- 100mA, 1.5xOV	PASS	
ED	E5	Electrical Distribution – AEC-Q100-009	30	3		-	PASS	
FG	E6	Fault Grading – AEC-Q100-007					PASS	
CHAR	E7	Characterization (VT/Leff/Rpoly corner run)	30	1		-	PASS	
EMC	E9	IEC-61967	1	1	-	-		N/A
SC	E10	Short Circuit Characterization	10	3	0/1	-	-	Not available
SER	E11	Soft Error Rate – JESD89	3	1	-	-	-	N/A

**TEST GROUP F – DEFECT SCREENING TESTS**

Test	#	Test Conditions	ss/lot	Lots	A/R	Step	Status	Comment
PAT	F1	Part Average Testing – AEC-Q001						Implemented
SBA	F2	Statistical Bin Analysis						Implemented

## Product Qualification Reliability Test

Lot	Device Type	Test Description	Step	Result	Comment
37208A8JUP AFY2800000	ATMEGA TQFP32 ASEC QTP-3110 QTP-3286	ELFR 150°C	24h	0/800	
		Endurance 25°C (preconditioning)		0/160	Flash: 1kc EEPROM:10kc
		Data Retention 175°C	500h	0/77	Post Endurance preconditioning
		HTOL 150°C	500h	0/77	Post Endurance preconditioning
		Endurance 85°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM
		Endurance 25°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM
A76P300000 AFY2400000	ATMEGA TQFP32 ASEC QTP-3110 QTP-3286	ELFR 150°C	24h	0/800	
		Endurance 25°C (preconditioning)		0/160	Flash: 1kc EEPROM:10kc
		Data Retention 175°C	500h	0/77	Post Endurance preconditioning
		HTOL 150°C	500h	0/77 0	Post Endurance preconditioning
		Endurance 85°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM
		Endurance 25°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM
A4BQ8C3JUH AFZ4KG9PNF	ATMEGA TQFP32 ASEC QTP-3110 QTP-3301	ELFR 150°C	24h	0/800	
		Endurance 25°C (preconditioning)		0/160	Flash: 1kc EEPROM:10kc
		Data Retention 175°C	500h	0/77	Post Endurance preconditioning
		HTOL 150°C	500h	0/77	Post Endurance preconditioning
		Endurance 85°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM
		Endurance 25°C	10kc	0/77	16Kbytes FLASH 512byte EEPROM



**Table 6: Latch-up Results**

Lot	Device Type	Test Description	Step	Result	Comment
A4BQ8C4D42	ATMEGA TQFP32 ASEC QTP-3110	125°C 25°C	0/6 0/6	Pass AEC- Q100-004	A4BQ8C4D42

**Table 7: ESD Results**

Lot	Device Type	Test Description	Step	Result	Status
A4BQ8C4D42	ATMEGA TQFP32 ASEC QTP-3110	ESD HBM	1000V	0/3	Class H2 AEC Q100-002
		ESD MM	200V	0/3	Class M3 AEC Q100-003
		ESD CDM	500V	0/3	Class C4 AEC Q100-011

**Package Qualification Reliability Test****Table 8: QFN-32 Package Qualification**

Lot	Device Type	Test Description	Step	Result	Comment
A4BQ8C4D43	QFN32 ASEC QTP-3112	Moisture sensitivity JESD20 – level 3 Pb- Free	Elect	0/285	
		Thermal Cycles [-65°C;150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning level 3
		HAST 130°C 85%RH no bias	96h	0/77	Post preconditioning level3
		HAST 130°C 85%RH bias	96h	0/77	Post preconditioning level3
		High Temp. Storage Life [175°C] – JESD22-A103	500h	0/77	
A4BQ8C4D44	QFN32 ASEC QTP-3112	Moisture sensitivity JESD20 – level 3 Pb- Free	Elect	0/285	
		Thermal Cycles [-65°C;150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning level3
		HAST 130°C 85%RH no bias	96h	0/77	Post preconditioning level3
		HAST 130°C 85%RH bias	96h	0/77	Post preconditioning level3
		High Temp. Storage Life [175°C] – JESD22-A103	500h	0/77	
A4BQ8C4D45	QFN32 ASEC QTP-3112	Moisture sensitivity JESD20 – level 3 Pb- Free	Elect	0/285	
		Thermal Cycles [-65°C;+150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning L3
		HAST 130°C 85%RH no bias	96h	0/77	Post preconditioning level3

		HAST 130°C 85%RH bias	96h	0/77	Post preconditioning level3
		High Temp. Storage Life [175°C] – JESD22-A103	500h	0/77	

**Table 9: TQPF-32 Package Qualification**

Lot	Device Type	Test Description	Step	Result	Comment
37208A8JUP	TQFP32 ASEC QTP-3111	Moisture sensitivity JESD20 – level 3 Pb-Free	Elect	0/285	
		Thermal Cycles [-65°C;150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning level 3
		HAST 130°C 85%RH no bias	96h	0/77	Post preconditioning level3
		HAST 130°C 85%RH bias	96h	0/77	Post preconditioning level3
		High Temp. Storage Life [175°C] – JESD22-A103	500h	0/77	
A76P300000	TQFP32 ASEC QTP-3111	Moisture sensitivity JESD20 – level 3 Pb-Free	Elect	0/285	
		Thermal Cycles [-65°C;150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning level3
		HAST 130°C 85%RH no bias	96h	0/77	Post preconditioning level3
		HAST 130°C 85%RH bias	96h	0/77	Post preconditioning level3
		High Temp. Storage Life [175°C] – JESD22-A103	500h	0/77	
A4BQ8C3JUH	TQFP32 ASEC QTP-3111	Moisture sensitivity JESD20 – level 3 Pb-Free	Elect	0/285	
		Thermal Cycles [-65°C;+150°C]	500c WPT BST	0/84 0/7 0/7	Post preconditioning L3