



180110190 EFR32MG12, EFR32BG12 and EFR32FG12 Revision C and Data Sheet Update

PRCN Issue Date: 1/10/2018

Effective Date: 4/13/2018

PCN Type: Datasheet; Product Revision

Description of Change

Silicon Labs is pleased to announce hardware revision C for the EFR32MG12 Mighty Gecko Multi-Protocol, EFR32BG12 Blue Gecko Bluetooth® Low Energy and EFR32FG12 Flex Gecko Proprietary Wireless SoC families. Datasheets and errata have been updated for these products. The new revision is a pin-compatible replacement for the previous revision B devices.

The datasheets are updated to version 1.1. Notable changes from Revision 1.0 are:

- Added high-temperature OPNs and associated specifications
- Updated RF Receiver characteristics for Bluetooth Low Energy 1 Mbps Data Rate to reflect new PHY configuration that fixes interoperability issues identified with previous PHY configuration
- Widened VGAIN error limits for Digital to Analog Converter (VDAC).

See the 1.1 data sheet revision history for a list of changes.

The Errata is updated to Revision 0.5. Revision C eliminated the following errata:

ADC_E224: ADC Warm-Up Ready Can Cause IDAC, ACMP, or CSEN to Not Function

ADC_E225: Using the ADC in High Accuracy Bias Mode Will Force All Analog Peripherals to High Accuracy Bias Mode

RMU_E203: AVDD Ramp Issue.

After the effective date of this PCN, Silicon Labs reserves the right to deliver product revision C for customers ordering product revision B.

Reason for Change

IC revision to fix errata.

Impact on Form, Fit, Function, Quality, Reliability

The new revision is a pin compatible replacement for the previous revision B devices. There have been no changes to device pin-out (fit), quality or reliability.

Product Identification

Existing Part #	Replacement Part #	DropInCompInd.
EFR32BG12P132F1024GM48-B	EFR32BG12P132F1024GM48-C	Yes
EFR32BG12P132F1024GM48-BR	EFR32BG12P132F1024GM48-CR	Yes
EFR32BG12P232F1024GM48-B	EFR32BG12P232F1024GM48-C	Yes
EFR32BG12P232F1024GM48-BR	EFR32BG12P232F1024GM48-CR	Yes
EFR32BG12P332F1024GM48-B	EFR32BG12P332F1024GM48-C	Yes
EFR32BG12P332F1024GM48-BR	EFR32BG12P332F1024GM48-CR	Yes
EFR32BG12P433F1024GM48-B	EFR32BG12P433F1024GM48-C	Yes
EFR32BG12P433F1024GM48-BR	EFR32BG12P433F1024GM48-CR	Yes
EFR32BG12P432F1024GM48-B	EFR32BG12P432F1024GM48-C	Yes
EFR32BG12P432F1024GM48-BR	EFR32BG12P432F1024GM48-CR	Yes
EFR32FG12P232F1024GM48-B	EFR32FG12P232F1024GM48-C	Yes
EFR32FG12P232F1024GM48-BR	EFR32FG12P232F1024GM48-CR	Yes
EFR32FG12P231F1024GM48-B	EFR32FG12P231F1024GM48-C	Yes

EFR32FG12P231F1024GM48-BR	EFR32FG12P231F1024GM48-CR	Yes
EFR32FG12P433F1024GM48-B	EFR32FG12P433F1024GM48-C	Yes
EFR32FG12P433F1024GM48-BR	EFR32FG12P433F1024GM48-CR	Yes
EFR32FG12P432F1024GM48-B	EFR32FG12P432F1024GM48-C	Yes
EFR32FG12P432F1024GM48-BR	EFR32FG12P432F1024GM48-CR	Yes
EFR32FG12P431F1024GM48-B	EFR32FG12P431F1024GM48-C	Yes
EFR32FG12P431F1024GM48-BR	EFR32FG12P431F1024GM48-CR	Yes
EFR32MG12P132F1024GM48-B	EFR32MG12P132F1024GM48-C	Yes
EFR32MG12P132F1024GM48-BR	EFR32MG12P132F1024GM48-CR	Yes
EFR32MG12P232F1024GM48-B	EFR32MG12P232F1024GM48-C	Yes
EFR32MG12P232F1024GM48-BR	EFR32MG12P232F1024GM48-CR	Yes
EFR32MG12P332F1024GM48-B	EFR32MG12P332F1024GM48-C	Yes
EFR32MG12P332F1024GM48-BR	EFR32MG12P332F1024GM48-CR	Yes
EFR32MG12P433F1024GM48-B	EFR32MG12P433F1024GM48-C	Yes
EFR32MG12P433F1024GM48-BR	EFR32MG12P433F1024GM48-CR	Yes
EFR32MG12P432F1024GM48-B	EFR32MG12P432F1024GM48-C	Yes
EFR32MG12P432F1024GM48-BR	EFR32MG12P432F1024GM48-CR	Yes

Last Date of Unchanged Product: 4/13/2018

Qualification Samples

Samples available upon request.

Specific conditions of acceptance of this change will be considered on a case by case basis if written notice is submitted within 30 days of this notice. To request further data or inquire about this notification, please contact your local Silicon Labs sales representative. A list of Silicon Labs sales representatives is available at <http://www.silabs.com>.

In some cases rejection of a change notice may impact Silicon Labs product pricing, delivery, quality, or reliability.

Customer Early Acceptance Sign Off

Customers may approve early PCN acceptance by completing the information below:

Early Acceptance:

Date: _____

Name: _____

Company: _____

Email your early Acceptance approval to: PCNEarlyAcceptance@silabs.com

User Registration

Register today to create your account on Silabs.com. Your personalized profile allows you to receive technical document updates, new product announcements, "how-to" and design documents, product change notices (PCN) and other valuable content available only to registered users. <http://www.silabs.com/profile>

Qualification Data

Please see attached Qualification Report in the Appendix.

EFR32xG12 Qualification Report



SILICON LABS

The information contained in this document is PROPRIETARY to Silicon Laboratories, Inc. and shall not be reproduced or used in part or whole without Silicon Laboratories' written consent. The document is uncontrolled if printed or electronically saved.

Part Rev C, TSMC Fabrication, SPIL Assembly except as noted

Part REV C, Form 1 Publication, 01-12 Assembly Except as noted

Test Name	Test Condition	Qualification	Lot ID or Start	Fail/Pass or End	Notes	Summary	Status
Test Group A – Accelerated Environment Stress Tests - BGA							
HAST	JA110 110°C, 85%RH Vcc=3.8V, 264 hours	3 lots, N=>25	Q039924	0/28	1		
			Q039925	0/28	1	3 lots	Pass
			Q039926	0/28	1	0/84	
UHASt	JA118 130°C, 85%RH 96 hours	3 lots, N=>25	Q039915	0/28	1		
			Q039916	0/28	1	3 lots	Pass
			Q039917	0/28	1	0/84	
Temp Cycle	JA104 Cond C: -65°C to 150°C 500 cycles	3 lots, N=>25	Q039918	0/27	1		
			Q039919	0/28	1	3 lots	Pass
			Q039920	0/28	1	0/83	
HTSL	JA103 150°C, 1000hr	3 lots, N=>25	Q039921	0/27	1		
			Q039922	0/28	1	3 lots	Pass
			Q039923	0/28	1	0/83	
Test Group A – Accelerated Environment Stress Tests - QFN							
HAST	JA110 130°C, 85%RH Vcc=3.8V, 96 hours	3 lots, N=>25	Q039879	1/30	2, 5		
			Q040220	0/30	2	4 lots	Pass
			Q039877	0/30	2		
			Q039878	0/30	2	1/120	
UHASt	JA118 130°C, 85%RH 96 hours	3 lots, N=>25	Q039876	0/30	2		
			Q039875	0/30	2	3 lots	Pass
			Q039874	0/30	2	0/90	
Temp Cycle	JA104 Cond C: -65°C to 150°C 500 cycles	3 lots, N=>25	Q039882	0/30	2		
			Q039881	0/30	2	3 lots	Pass
			Q039880	0/30	2	0/90	
HTSL	JA103 150°C, 1000hr	3 lots, N=>25	Q038038	0/28	2		
			Q038124	0/28	2	3 lots	Pass
			Q037590	0/25	2	0/81	

EFR32xG12 Qualification Report



The information contained in this document is PROPRIETARY to Silicon Laboratories, Inc. and shall not be reproduced or used in part or whole without Silicon Laboratories' written consent. The document is uncontrolled if printed or electronically saved.

Part Rev C, TSMC Fabrication, SPIL Assembly except as noted

Test Name	Test Condition	Qualification	Lot ID or Start	Fail/Pass or End	Notes	Summary	Status
Test Group B – Accelerated Lifetime Simulation Tests							
HTOL	JA108 $T_j \geq 125^\circ\text{C}$, Dynamic $V_{cc}=3.8\text{V}$, 1000 hours	3 lots, $N \geq 77$	Q039946 Q040071 Q040505	0/77 0/77 0/80		3 lots 0/234	Pass
LTOL	JA108 $T_A = -10^\circ\text{C}$, Dynamic $V_{cc}=3.8\text{V}$, 1000 hours	1 lot, $N \geq 32$	Q040261	0/35		1 lots 0/35	Pass
ELFR	JA108 $T_j \geq 125^\circ\text{C}$, Dynamic $V_{cc}=3.8\text{V}$, 48 hours	3 lots, $N \geq 500$	Q039943 Q040035 Q040504	0/500 0/502 0/500		3 lots 0/1502	Pass
NVM Endurance, Retention and Operating Life	JESD22-A117 25°C 500 hours	3 lots, $N \geq 39$	Q040213 Q040274 Q040278	0/40 0/40 0/40	3 3 3	3 lots 0/120	Pass
NVM Endurance, Retention and Operating Life	JESD22-A117 125°C 1000 hours	3 lots, $N \geq 39$	Q040279 Q040275 Q040214	0/40 0/40 0/40	4 4 4	3 lots 0/120	Pass
Test Group E – Electrical Verification							
ESD-HBM	JS-001	1 lot, $N \geq 3$	Q039756			2 kV	Class 2
ESD-CDM	JS-002	1 lot, $N \geq 3$	Q042050 Q042047 Q042046 Q042048		6 7 8 9	500 V 650 V 1000 V 500 V	Class C2A Class C2A Class C3 Class C2A
Latch Up	JESD78 $\pm 100\text{mA}$	1 lot, $N \geq 3$	Q039757	25°C			Pass
Latch Up	JESD78 $\pm 100\text{mA}$	1 lot, $N \geq 3$	Q039764	125°C			Pass

Notes:

- Parts are Pre-conditioned at MSL3/260°C
- Parts are Pre-conditioned at MSL2/260°C
- Preconditioned with 10K write/erase cycles at 25°C
- Preconditioned with 10K write/erase cycles at 125°C
- Failure analysis on the failure was inconclusive. An additional 30 units were stressed from the same assembly lot (Q040220) to reduce the LTPD% below the requirement. JEDEC sample size requirement of 25 units per lot has LTPD% = 9.21 at 90% confidence with 0 fails. With larger sample size = 60, LTPD% = 6.48 at 90% confidence with 1 failure.

EFR32xG12 Qualification Report



SILICON LABS

The information contained in this document is PROPRIETARY to Silicon Laboratories, Inc. and shall not be reproduced or used in part or whole without Silicon Laboratories' written consent. The document is uncontrolled if printed or electronically saved.

Part Rev C, TSMC Fabrication, SPIL Assembly except as noted

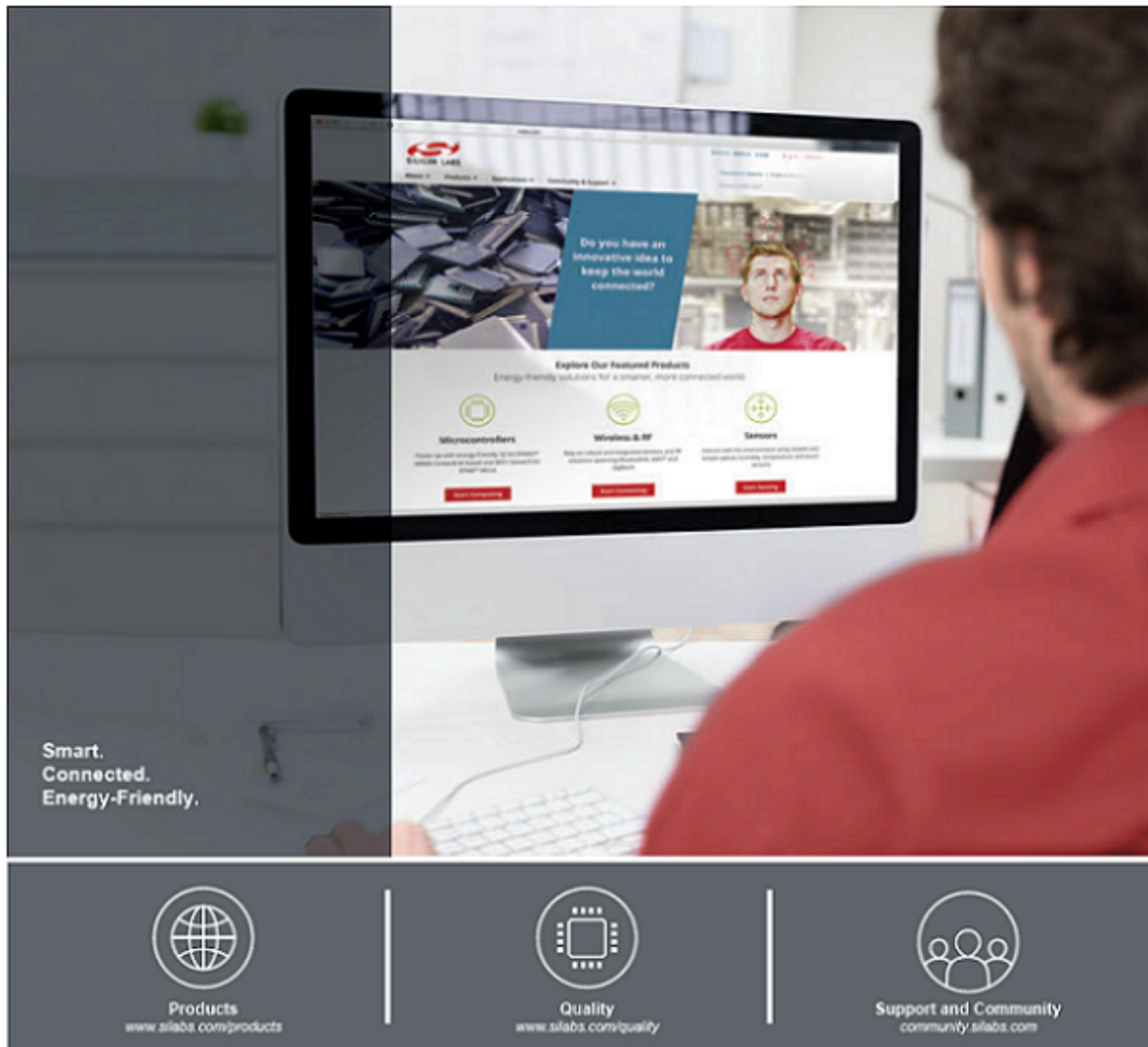
Test Name	Test Condition	Qualification	Lot ID or Start	Fail/Pass or End	Notes	Summary	Status
-----------	----------------	---------------	-----------------	------------------	-------	---------	--------

Notes (Continued):

- 6. BGA Package, dual band
- 7. QFN package, dual band
- 8. QFN Package, sub GHz
- 9. QFN Package, 2.4 GHz

This report applies to the following part numbers:

EFR32BG12P132F1024GL125-C	EFR32FG12P232F1024GL125-C	EFR32MG12P132F1024GL125-C
EFR32BG12P132F1024GM48-C	EFR32FG12P232F1024GM48-C	EFR32MG12P132F1024GM48-C
EFR32BG12P232F1024GL125-C	EFR32FG12P231F1024GL125-C	EFR32MG12P232F1024GL125-C
EFR32BG12P232F1024GM48-C	EFR32FG12P231F1024GM48-C	EFR32MG12P232F1024GM48-C
EFR32BG12P332F1024GL125-C	EFR32FG12P433F1024GL125-C	EFR32MG12P332F1024GL125-C
EFR32BG12P332F1024GM48-C	EFR32FG12P433F1024GM48-C	EFR32MG12P332F1024GM48-C
EFR32BG12P433F1024GL125-C	EFR32FG12P432F1024GL125-C	EFR32MG12P433F1024GL125-C
EFR32BG12P433F1024GM48-C	EFR32FG12P432F1024GM48-C	EFR32MG12P433F1024GM48-C
EFR32BG12P432F1024GL125-C	EFR32FG12P431F1024GL125-C	EFR32MG12P432F1024GL125-C
EFR32BG12P432F1024GM48-C	EFR32FG12P431F1024GM48-C	EFR32MG12P432F1024GM48-C
EFR32BG12P332F1024IM48-C	EFR32FG12P431F1024IM48-C	EFR32MG12P332F1024IM48-C
EFR32MG12P433F1024IL125-C	EFR32MG12P433F1024IM48-C	EFR32MG12P432F1024IM48-C



Disclaimer

Silicon Labs intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Labs products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Labs reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Labs shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any Life Support System without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

Trademark Information

Silicon Laboratories Inc.®, Silicon Laboratories®, Silicon Labs®, SiLabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, Clockbuilder®, CMEMS®, DSPLL®, EFM®, EFM32®, EFR®, Ember®, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, ISOModem®, Micrium®, Precision32®, ProSLIC®, Simplicity Studio®, SiPHY®, Telegesis, the Telegesis Logo®, USBXpress®, Zentri and others are trademarks or registered trademarks of Silicon Labs. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701

<http://www.silabs.com>