Revision Change Notice #1605191

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PCN Date: 5/19/2016	**Effective Date:** 8/24/2016
Title: EFM32GG Transition to Product Revision E	
PCN Type: ☐ **Datasheet** ☒ **Product Revision**	
PCN Details	

Revision Change Notice #1605191

Description of Change:
Silicon Labs is pleased to announce product revision E of the EFM32GGxxx (Giant Gecko) family of 32-bit MCUs and updated datasheets and errata for these products. The new revision is a pin-compatible replacement for the previous revision devices.

The following datasheets are updated to version 1.40: EFM32GG230, EFM32GG232, EFM32GG280, EFM32GG290, EFM32GG295, EFM32GG330, EFM32GG332, EFM32GG380, EFM32GG390, EFM32GG395, EFM32GG840, EFM32GG842, EFM32GG880, EFM32GG890, EFM32GG895, EFM32GG900, EFM32GG940, EFM32GG942, EFM32GG980, EFM32GG990, EFM32GG995.

The EFM32GG reference manual is updated to version 1.20.

Rev E Errata documents and updated Errata History documents are available for: EFM32GG230, EFM32GG232, EFM32GG280, EFM32GG290, EFM32GG295, EFM32GG330, EFM32GG332, EFM32GG380, EFM32GG390, EFM32GG395, EFM32GG840, EFM32GG842, EFM32GG880, EFM32GG890, EFM32GG895, EFM32GG900, EFM32GG940, EFM32GG942, EFM32GG980, EFM32GG990, EFM32GG995.

Revision E eliminates the following errata in product revision D: BU_E106, BURTC_E102, CMU_E114, DI_E101, EMU_E107, and LES_E103.

Revision E includes several updated specifications; the key changes are summarized below (table numbers refer to EFM32GG995 v1.40 datasheet):

- Table 3.4: Reduced I_{EM0} Typ and Max values. Increased all I_{EM2}/I_{EM3}/I_{EM4} Max values. Increased I_{EM2}/I_{EM3} Typ values at 85 °C.
- Table 3.5: Added new specification for $V_{BODextthr-}$ in EM2.
- Table 3.7: Reduced I_{IOLEAK} Max specification.
- Table 3.10: Added Max specification for I_{LFRCO}.
- Table 3.15: Added Max specifications for I_{DAC}. Increased $V_{DACOFFSET}$ Max value.
- Table 3.17: Increased I_{ACMP} Max specification for one test condition. Updated R_{CSRES} Typ specifications based on new revision characterization data.
- Table 3.18: Updated $V_{VCMPOFFSET}$/$V_{VCMPHYST}$ Typ specifications based on new revision characterization data. Added $V_{VCMPOFFSET}$ Min and Max specifications. Removed $V_{VCMPHYST}$ Max specification.

Refer to the datasheet revision history for a complete list.

Revision E incorporates several improvements to the package materials, summarized in the table below (changes are highlighted):

Package	Current Package Materials			New Package Materials		
	Wire Composition	Mold Compound	Die Attach	Wire Composition	Mold Compound	Die Attach
64 QFN	CuPd	Sumitomo EME-G700	Hitachi EN4900GC	AuPdCu	Sumitomo EME-G700	Hitachi EN4900GC
64 TQFP	CuPd	Sumitomo EME-G700L	Henkel Ablebond 3230	AuPdCu	Sumitomo EME-G700LYT-A	Henkel Ablebond 3230
100 LQFP	CuPd	Sumitomo EME-G700LA	Hitachi EN4900G	CuPd	Sumitomo EME-G700LA	Sumitomo CRM-1076WA
112 BGA	CuPd	Sumitomo EME-G760L	Henkel Ablebond 2025D	AuPdCu	Sumitomo EME-G760L	Henkel Ablebond 2025D

120 BGA	CuPd	Sumitomo EME-G760L	Henkel ATB-125	AuPdCu	Sumitomo EME-G760L	Henkel ATB-125

Revision E introduces an updated orderable part number format with enhanced information fields. Specifically, fields specifying temperature grade and product revision are now included. See Product Identification section of this document for further details.

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

Reason for Change:

Revision to die to correct errata. Also updated specifications based on the results of additional silicon characterization. Changed package materials to improve manufacturability and ensure supply continuity.

Impact on Form, Fit, Function, Quality, Reliability:

There is no impact to fit, quality, or reliability.

The following functions are impacted:

- Updated device revision information in ROM Table (PID0 – PID3 registers):
  - Minor Revision will now read 0x04 (Rev E) instead of 0x03 (Rev D).
- Eliminated errata: BU_E106, BURTC_E102, CMU_E114, DI_E101, EMU_E107, and LES_E103
- Minor changes to electrical characteristics.
  - Table 3.4: Reduced I_{EM0} Typ and Max values. Increased all I_{EM2}/I_{EM3}/I_{EM4} Max values. Increased I_{EM2}/I_{EM3} Typ values at 85 °C.
  - Table 3.5: Added new specification for $V_{BODextthr-}$ in EM2.
  - Table 3.7: Reduced I_{IOLEAK} Max specification.
  - Table 3.10: Added Max specification for I_{LFRCO}.
  - Table 3.15: Added Max specifications for I_{DAC}. Increased $V_{DACOFFSET}$ Max value.
  - Table 3.17: Increased I_{ACMP} Max specification for one test condition. Updated R_{CSRES} Typ specifications based on new revision characterization data.
  - Table 3.18: Updated $V_{VCMPOFFSET}$/$V_{VCMPHYST}$ Typ specifications based on new revision characterization data. Added $V_{VCMPOFFSET}$ Min and Max specifications. Removed $V_{VCMPHYST}$ Max specification.

The form has changed as reflected in the bill of material changes above.

Product Identification:

Existing Part Number	Replacement Part Number	Drop In Compatible?
EFM32GG230F512-QFN64	EFM32GG230F512G-E-QFN64R	See datasheet
EFM32GG230F1024-QFN64	EFM32GG230F1024G-E-QFN64R	See datasheet
EFM32GG232F512-QFP64	EFM32GG232F512G-E-QFP64R	See datasheet
EFM32GG232F1024-QFP64	EFM32GG232F1024G-E-QFP64R	See datasheet
EFM32GG280F512-QFP100	EFM32GG280F512G-E-QFP100R	See datasheet
EFM32GG280F1024-QFP100	EFM32GG280F1024G-E-QFP100R	See datasheet
EFM32GG290F512-BGA112	EFM32GG290F512G-E-BGA112R	See datasheet
EFM32GG290F1024-BGA112	EFM32GG290F1024G-E-BGA112R	See datasheet
EFM32GG295F512-BGA120	EFM32GG295F512G-E-BGA120R	See datasheet
EFM32GG295F1024-BGA120	EFM32GG295F1024G-E-BGA120R	See datasheet
EFM32GG330F512-QFN64	EFM32GG330F512G-E-QFN64R	See datasheet
EFM32GG330F1024-QFN64	EFM32GG330F1024G-E-QFN64R	See datasheet
EFM32GG332F512-QFP64	EFM32GG332F512G-E-QFP64R	See datasheet
EFM32GG332F1024-QFP64	EFM32GG332F1024G-E-QFP64R	See datasheet
EFM32GG380F512-QFP100	EFM32GG380F512G-E-QFP100R	See datasheet
EFM32GG380F1024-QFP100	EFM32GG380F1024G-E-QFP100R	See datasheet
EFM32GG390F512-BGA112	EFM32GG390F512G-E-BGA112R	See datasheet
EFM32GG390F1024-BGA112	EFM32GG390F1024G-E-BGA112R	See datasheet
EFM32GG395F512-BGA120	EFM32GG395F512G-E-BGA120R	See datasheet
EFM32GG395F1024-BGA120	EFM32GG395F1024G-E-BGA120R	See datasheet
EFM32GG840F512-QFN64	EFM32GG840F512G-E-QFN64R	See datasheet
EFM32GG840F1024-QFN64	EFM32GG840F1024G-E-QFN64R	See datasheet
EFM32GG842F512-QFP64	EFM32GG842F512G-E-QFP64R	See datasheet
EFM32GG842F1024-QFP64	EFM32GG842F1024G-E-QFP64R	See datasheet
EFM32GG880F512-QFP100	EFM32GG880F512G-E-QFP100R	See datasheet
EFM32GG880F1024-QFP100	EFM32GG880F1024G-E-QFP100R	See datasheet
EFM32GG890F512-BGA112	EFM32GG890F512G-E-BGA112R	See datasheet
EFM32GG890F1024-BGA112	EFM32GG890F1024G-E-BGA112R	See datasheet
EFM32GG895F512-BGA120	EFM32GG895F512G-E-BGA120R	See datasheet
EFM32GG895F1024-BGA120	EFM32GG895F1024G-E-BGA120R	See datasheet
EFM32GG940F512-QFN64	EFM32GG940F512G-E-QFN64R	See datasheet
EFM32GG940F1024-QFN64	EFM32GG940F1024G-E-QFN64R	See datasheet
EFM32GG942F512-QFP64	EFM32GG942F512G-E-QFP64R	See datasheet
EFM32GG942F1024-QFP64	EFM32GG942F1024G-E-QFP64R	See datasheet
EFM32GG980F512-QFP100	EFM32GG980F512G-E-QFP100R	See datasheet
EFM32GG980F1024-QFP100	EFM32GG980F1024G-E-QFP100R	See datasheet

EFM32GG990F512-BGA112	EFM32GG990F512G-E-BGA112R	See datasheet	
EFM32GG990F1024-BGA112	EFM32GG990F1024G-E-BGA112R	See datasheet	
EFM32GG995F512-BGA120	EFM32GG995F512G-E-BGA120R	See datasheet	
EFM32GG995F1024-BGA120	EFM32GG995F1024G-E-BGA120R	See datasheet	
EFM32GG230F512-QFN64T	EFM32GG230F512G-E-QFN64	See datasheet	
EFM32GG230F1024-QFN64T	EFM32GG230F1024G-E-QFN64	See datasheet	
EFM32GG232F512-QFP64T	EFM32GG232F512G-E-QFP64	See datasheet	
EFM32GG232F1024-QFP64T	EFM32GG232F1024G-E-QFP64	See datasheet	
EFM32GG280F512-QFP100T	EFM32GG280F512G-E-QFP100	See datasheet	
EFM32GG280F1024-QFP100T	EFM32GG280F1024G-E-QFP100	See datasheet	
EFM32GG290F512-BGA112T	EFM32GG290F512G-E-BGA112	See datasheet	
EFM32GG290F1024-BGA112T	EFM32GG290F1024G-E-BGA112	See datasheet	
EFM32GG295F512-BGA120T	EFM32GG295F512G-E-BGA120	See datasheet	
EFM32GG295F1024-BGA120T	EFM32GG295F1024G-E-BGA120	See datasheet	
EFM32GG330F512-QFN64T	EFM32GG330F512G-E-QFN64	See datasheet	
EFM32GG330F1024-QFN64T	EFM32GG330F1024G-E-QFN64	See datasheet	
EFM32GG332F512-QFP64T	EFM32GG332F512G-E-QFP64	See datasheet	
EFM32GG332F1024-QFP64T	EFM32GG332F1024G-E-QFP64	See datasheet	
EFM32GG380F512-QFP100T	EFM32GG380F512G-E-QFP100	See datasheet	
EFM32GG380F1024-QFP100T	EFM32GG380F1024G-E-QFP100	See datasheet	
EFM32GG390F512-BGA112T	EFM32GG390F512G-E-BGA112	See datasheet	
EFM32GG390F1024-BGA112T	EFM32GG390F1024G-E-BGA112	See datasheet	
EFM32GG395F512-BGA120T	EFM32GG395F512G-E-BGA120	See datasheet	
EFM32GG395F1024-BGA120T	EFM32GG395F1024G-E-BGA120	See datasheet	
EFM32GG840F512-QFN64T	EFM32GG840F512G-E-QFN64	See datasheet	
EFM32GG840F1024-QFN64T	EFM32GG840F1024G-E-QFN64	See datasheet	
EFM32GG842F512-QFP64T	EFM32GG842F512G-E-QFP64	See datasheet	
EFM32GG842F1024-QFP64T	EFM32GG842F1024G-E-QFP64	See datasheet	
EFM32GG880F512-QFP100T	EFM32GG880F512G-E-QFP100	See datasheet	
EFM32GG880F1024-QFP100T	EFM32GG880F1024G-E-QFP100	See datasheet	
EFM32GG890F512-BGA112T	EFM32GG890F512G-E-BGA112	See datasheet	
EFM32GG890F1024-BGA112T	EFM32GG890F1024G-E-BGA112	See datasheet	
EFM32GG895F512-BGA120T	EFM32GG895F512G-E-BGA120	See datasheet	
EFM32GG895F1024-BGA120T	EFM32GG895F1024G-E-BGA120	See datasheet	
EFM32GG940F512-QFN64T	EFM32GG940F512G-E-QFN64	See datasheet	
EFM32GG940F1024-QFN64T	EFM32GG940F1024G-E-QFN64	See datasheet	
EFM32GG942F512-QFP64T	EFM32GG942F512G-E-QFP64	See datasheet	
EFM32GG942F1024-QFP64T	EFM32GG942F1024G-E-QFP64	See datasheet	
EFM32GG980F512-QFP100T	EFM32GG980F512G-E-QFP100	See datasheet	
EFM32GG980F1024-QFP100T	EFM32GG980F1024G-E-QFP100	See datasheet	

EFM32GG990F512-BGA112T	EFM32GG990F512G-E-BGA112	See datasheet
EFM32GG990F1024-BGA112T	EFM32GG990F1024G-E-BGA112	See datasheet
EFM32GG995F512-BGA120T	EFM32GG995F512G-E-BGA120	See datasheet
EFM32GG995F1024-BGA120T	EFM32GG995F1024G-E-BGA120	See datasheet
EFM32GG900F512G-D-D1I	EFM32GG900F512G-E-D1I	See datasheet
EFM32GG900F1024G-D-D1I	EFM32GG900F1024G-E-D1I	See datasheet

Last Date of Unchanged Product: 8/24/2016

Qualification Samples:

Samples are available now.

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 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: katherine.haggar@silabs.com

Qualification Data:

See qualification report below.

EFM32GG Rev E Qualification Report

Part Rev E, TSMC Fabrication, ASEKR Assembly Except as Noted							
Test Name	**Test Condition**	**Qualification**	**Lot ID**	**Fail/Pass**	**Notes**	**Summary**	**Status**
Test Group A – Accelerated Environment Stress Tests - QFN							
HAST	JA110		Q038204	0/30	1		
	130°C, 85%RH	3 lots, N=>25	Q038205	0/30	1	3 lots	Pass
	Vcc=3.8V, 96 hours		Q038206	0/30	1	0/90	
UHAST	JA118		Q038207	0/30	1		
	130°C, 85%RH	3 lots, N=>25	Q038208	0/30	1	3 lots	Pass
	96 hours		Q038209	0/30	1	0/90	
Temp Cycle	JA104		Q038210	0/30	1		
	Cond C: -65°C to 150°C	3 lots, N=>25	Q038211	0/30	1	3 lots	Pass
	500 cycles		Q038212	0/30	1	0/90	
HTSL	JA103		Q038213	0/30	1		
	150°C, 1000hr	3 lots, N=>25	Q038214	0/30	1	3 lots	Pass
			Q038215	0/30	1	0/90	
Test Group A – Accelerated Environment Stress Tests - TQFP							
HAST	JA110		Q038047	0/30	1		
	130°C, 85%RH	3 lots, N=>25	Q038045	0/30	1	3 lots	Pass
	Vcc=3.8V, 96 hours		Q038044	0/30	1	0/90	
UHAST	JA118		Q038049	0/30	1		
	130°C, 85%RH	3 lots, N=>25	Q038048	0/30	1	3 lots	Pass
	96 hours		Q038046	0/30	1	0/90	
Temp Cycle	JA104		Q038052	0/30	1		
	Cond C: -65°C to 150°C	3 lots, N=>25	Q038051	0/30	1	3 lots	Pass
	500 cycles		Q038050	0/30	1	0/90	
HTSL	JA103		Q038055	0/30	1		
	150°C, 1000hr	3 lots, N=>25	Q038054	0/30	1	3 lots	Pass
			Q038053	0/30	1	0/90	
Test Group A – Accelerated Environment Stress Tests - LQFP - ASECL							
HAST	JA110		Q034908	0/28	1		
	130°C, 85%RH	3 lots, N=>25	Q034611	0/30	1	3 lots	Pass
	Vcc=3.8V, 96 hours		Q034557	0/24	1	0/82	
UHAST	JA118		Q038618	0/30	1		
	130°C, 85%RH	3 lots, N=>25	Q038617	0/30	1	3 lots	Pass
	96 hours		Q038549	0/30	1	0/90	
Temp Cycle	JA104		Q038620	0/30	1		
	Cond C: -65°C to 150°C	3 lots, N=>25	Q038619	0/30	1	3 lots	Pass
	500 cycles		Q038550	0/30	1	0/90	
HTSL	JA103		Q034995	0/30	1		
	150°C, 1000hr	3 lots, N=>25	Q034614	0/30	1	3 lots	Pass
			Q034560	0/30	1	0/90	

Approved by: K. Torres

Prepared on: 14-January-2016

EFM32GG Rev E Qualification Report

Part Rev E, TSMC Fabrication, ASEKR Assembly Except as Noted							
Test Name	**Test Condition**	**Qualification**	**Lot ID**	**Fail/Pass**	**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	Q037514 Q037510 Q037491	0/30 0/30 0/30	1 1 1	3 lots 0/90	Pass
UHAST	JA118 110°C, 85%RH 264 hours	3 lots, N=>25	Q037511 Q037494 Q034891 Q037488	0/30 0/30 0/30 0/30	1 1 1 1	4 lots 0/120	Pass
Temp Cycle	JA104 Cond C: -65°C to 150°C 500 cycles	3 lots, N=>25	Q037512 Q037495 Q037490	0/30 0/30 0/30	1 1 1	3 lots 0/90	Pass
HTSL	JA103 150°C, 1000hr	3 lots, N=>25	Q034885 Q034893 Q038112	0/30 0/30 0/40	1 1 1	3 lots 0/100	Pass
Test Group B – Accelerated Lifetime Simulation Tests							
HTOL	JA108 T_J ≥ 125°C, Dynamic Vcc=3.8V, 1000 hours	3 lots, N=>77	Q038174 Q037711 R1227-13637	0/80 0/80 0/80		3 lots 0/240	Pass
LTOL	JA108 T_A = -10°C, Dynamic Vcc=3.8V, 1000 hours	1 lot, N=>32	Q034510	0/40		1 lots 0/40	Pass
ELFR	JA108 T_J ≥ 125°C, Dynamic Vcc=3.8V, 48 hours	3 lots, N=>500	Q038115 Q038068 Q037513	0/522 0/521 0/510		3 lots 0/1553	Pass
NVM HTDR	JESD22-A117 150°C, 1000 hours	3 lots, N=>39	Q038151 Q038112 Q037807	0/40 0/40 0/40	8 8 8	3 lots 0/120	Pass
NVM LTDR	JESD22-A117 25°C, 500 hours	3 lots, N=>38	Q038152 Q038150 Q037754	0/40 0/40 0/40	9 9 9	3 lots 0/120	Pass

EFM32GG Rev E Qualification Report

Part Rev E, TSMC Fabrication, ASEKR Assembly Except as Noted							
Test Name	**Test Condition**	**Qualification**	**Lot ID**	**Fail/Pass**	**Notes**	**Summary**	**Status**
Test Group E – Electrical Verification							
ESD-HBM	JA114	1 lot, N=>3	Q037675				Class 2
ESD-CDM	JC101	1 lot, N=>3	Q038216 Q037486 Q038043 Q038551 Q037496		2 4 3 7 5		Class C2 Class C2 Class C2 Class C2 Class C2
Latch Up Class I	JESD78 ±200mA Overvoltage = 3.8V	1 lot, N=>3	Q037722	25 °C			Pass
Latch Up Class II	JESD78 +200mA -200mA with exception Overvoltage = 3.8V	1 lot, N=>3	Q038040	85 °C	6		Pass

Notes:
1. Parts are Pre-conditioned at MSL3/260°C
2. 64 VQFN 9X9
3. 64 TQFP 10X10
4. 120 VFBGA 7X7
5. 112 LFBGA 10X10
6. Pin K3 passes -65mA at 85°C
7. 100 LQFP 14x14
8. Preconditioned with 20K write/erase cycles at 85°C
9. Preconditioned with 20K write/erase cycles at 25°C

EFM32GG Rev E Qualification Report

Part Rev E, TSMC Fabrication, ASEKR Assembly Except as Noted							
Test Name	Test Condition	Qualification	Lot ID	Fail/Pass	Notes	Summary	Status

This report applies to the following part numbers:		
EFM32GG230F512G-E-QFN64	EFM32GG380F512G-E-QFP100	EFM32GG895F512G-E-BGA120
EFM32GG230F1024G-E-QFN64	EFM32GG380F1024G-E-QFP100	EFM32GG900F512G-E-D1I
EFM32GG232F512G-E-QFP64	EFM32GG390F512G-E-BGA112	EFM32GG900F1024G-E-D1I
EFM32GG232F1024G-E-QFP64	EFM32GG390F1024G-E-BGA112	EFM32GG940F512G-E-QFN64
EFM32GG280F512G-E-QFP100	EFM32GG395F512G-E-BGA120	EFM32GG940F1024G-E-QFN64
EFM32GG280F1024G-E-QFP100	EFM32GG395F1024G-E-BGA120	EFM32GG942F512G-E-QFP64
EFM32GG290F512G-E-BGA112	EFM32GG840F512G-E-QFN64	EFM32GG942F1024G-E-QFP64
EFM32GG290F1024G-E-BGA112	EFM32GG840F1024G-E-QFN64	EFM32GG980F512G-E-QFP100
EFM32GG295F512G-E-BGA120	EFM32GG842F512G-E-QFP64	EFM32GG980F1024G-E-QFP100
EFM32GG295F1024G-E-BGA120	EFM32GG842F1024G-E-QFP64	EFM32GG990F512G-E-BGA112
EFM32GG330F512G-E-QFN64	EFM32GG880F512G-E-QFP100	EFM32GG990F1024G-E-BGA112
EFM32GG330F1024G-E-QFN64	EFM32GG880F1024G-E-QFP100	EFM32GG995F512G-E-BGA120
EFM32GG332F512G-E-QFP64	EFM32GG890F512G-E-BGA112	EFM32GG995F1024G-E-BGA120
EFM32GG332F1024G-E-QFP64	EFM32GG890F1024G-E-BGA112	EFM32GG895F1024G-E-BGA120

Approved by: K. Torres

Prepared on: 14-January-2016