



Process Change Notice **#1406131**

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PCN Date: 6/13/2014		Effective Date: 9/18/2014									
Title: EFM32LG Transition to Product Revision E											
Originator: Ted Batey	Phone: 512-532-5279	Dept: Marketing									
Customer Contact: Kathy Haggar	Phone: 512-532-5261	Dept: Sales									
PCN Type: <table><tr><td>☒ Datasheet</td><td>☐ Foundry</td><td>☐ Packing</td></tr><tr><td>☒ Product Revision</td><td>☐ Assembly</td><td>☐ Labeling</td></tr><tr><td>☐ Discontinuance</td><td>☐ Test</td><td>☐ Other</td></tr></table>			☒ Datasheet	☐ Foundry	☐ Packing	☒ Product Revision	☐ Assembly	☐ Labeling	☐ Discontinuance	☐ Test	☐ Other
☒ Datasheet	☐ Foundry	☐ Packing									
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☐ Discontinuance	☐ Test	☐ Other									
Last Order Date: N/A											
PCN Details											

Description of Change:

Silicon Labs is pleased to announce product revision E of the EFM32LGxxx (Leopard Gecko) family of 32-bit MCUs and updated datasheets, reference manual 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 1.30: EFM32LG230, EFM32LG232, EFM32LG280, EFM32LG290, EFM32LG295, EFM32LG330, EFM32LG332, EFM32LG380, EFM32LG390, EFM32LG395, EFM32LG840, EFM32LG842, EFM32LG880, EFM32LG890, EFM32LG895, EFM32LG940, EFM32LG942, EFM32LG980, EFM32LG990, EFM32LG995.

The following reference manual is updated to version 1.10: EFM32LG-RM.

Rev E Errata documents and updated Errata History documents are available for: EFM32LG230, EFM32LG232, EFM32LG280, EFM32LG290, EFM32LG295, EFM32LG330, EFM32LG332, EFM32LG380, EFM32LG390, EFM32LG395, EFM32LG840, EFM32LG842, EFM32LG880, EFM32LG890, EFM32LG895, EFM32LG940, EFM32LG942, EFM32LG980, EFM32LG990, EFM32LG995.

Revision E eliminates the following errata in product revision D: ADC_E116, ADC_E117, AES_E101, AES_E102, BU_E106, BURTC_E101, BURTC_E102, CMU_E112, CMU_E113, DI_E102, DMA_E101, EBI_E103, LES_E103, PRS_E101, and USART_E112.

For customers using revision D, the change to revision E introduces some changes to electrical characteristics and reduces the maximum LE peripheral clock from 16 MHz to 12 MHz. Refer to the EFM32 Leopard Gecko Reference Manual "Revision-Specific Behavior" section for more details. Silicon Labs recommends all customers test their designs with revision E samples during the PCN notification period.

Datasheet version 1.30 includes a number of key changes to existing min/max/typ values that more accurately reflect the performance of the part. These changes are summarized in Table 1 at the end of this document. In addition, Table 3.12 HFRCO has a new Footnote 3, ensuring frequency bands above 7MHz will always have some overlap across supply voltage and temperature. Also, new min/max data has been added and other minor updates have been made as follows:

- Removed "preliminary" markings throughout.
- Updated orderable part number format.
- Updated Current Consumption information and figures.
- Updated Power Management information.
- Updated GPIO information.
- Updated HFXO information.
- Updated LFRCO information and figures.
- Updated HFRCO information and figures.
- Updated ULFRCO information.
- Added AUXHFRCO chapter.
- Updated ADC information.
- Updated DAC information.
- Updated OPAMP information.
- Updated ACMP information.
- Updated VCMPI information.
- Updated USART SPI information.

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 supply the new revision E parts for all EFM32LGxxx orders. Customers currently using revision D should work with their local sales representative to create a transition plan prior to the effective date.

Reason for Change:

Revision to die to correct errata. Also updated specifications based on the results of additional silicon characterization.

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

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

The following functions are impacted:

- Updated device revision information in ROM Table (PID0 - PID3 registers):
 - o Family will now read 0x02 instead of 0x03
 - o Major Revision will now read 0x02 instead of 0x01
 - o Minor Revision will now read 0x04 (Rev E) instead of 0x03 (Rev D).
- Eliminated errata: ADC_E116, ADC_E117, AES_E101, AES_E102, BU_E106, BURTC_E101, BURTC_E102, CMU_E112, CMU_E113, DI_E102, DMA_E101, EBI_E103, LES_E103, PRS_E101, and USART_E112
- Added new BOD enable while in backup battery mode.
- Added two new USART modes, Synchronous Master Sample Delay and Synchronous Slave Setup Early. These modes are described in the EFM32 Leopard Gecko Reference Manual.
- Added EBI interface timing to the datasheet.
- Maximum clock frequency for LE peripherals reduced from 16 MHz to 12 MHz.
- Reset value of CMU_CTRL_LFXOBOOST is changed from 0x0 (70% setting) to 0x1 (100% setting).
- Minor changes to electrical characteristics.

Product Identification:
[Click here to enter text.](#)

Existing Part Number	Replacement Part Number	Drop In Compatible?
EFM32LG230F64-QFN64	EFM32LG230F64G-E-QFN64	See datasheet
EFM32LG230F128-QFN64	EFM32LG230F128G-E-QFN64	See datasheet
EFM32LG230F256-QFN64	EFM32LG230F256G-E-QFN64	See datasheet
EFM32LG232F64-QFP64	EFM32LG232F64G-E-QFP64	See datasheet
EFM32LG232F128-QFP64	EFM32LG232F128G-E-QFP64	See datasheet
EFM32LG232F256-QFP64	EFM32LG232F256G-E-QFP64	See datasheet
EFM32LG280F64-QFP100	EFM32LG280F64G-E-QFP100	See datasheet
EFM32LG280F128-QFP100	EFM32LG280F128G-E-QFP100	See datasheet
EFM32LG280F256-QFP100	EFM32LG280F256G-E-QFP100	See datasheet
EFM32LG290F64-BGA112	EFM32LG290F64G-E-BGA112	See datasheet
EFM32LG290F128-BGA112	EFM32LG290F128G-E-BGA112	See datasheet
EFM32LG290F256-BGA112	EFM32LG290F256G-E-BGA112	See datasheet
EFM32LG295F64-BGA120	EFM32LG295F64G-E-BGA120	See datasheet
EFM32LG295F128-BGA120	EFM32LG295F128G-E-BGA120	See datasheet
EFM32LG295F256-BGA120	EFM32LG295F256G-E-BGA120	See datasheet
EFM32LG330F64-QFN64	EFM32LG330F64G-E-QFN64	See datasheet
EFM32LG330F128-QFN64	EFM32LG330F128G-E-QFN64	See datasheet
EFM32LG330F256-QFN64	EFM32LG330F256G-E-QFN64	See datasheet
EFM32LG332F64-QFP64	EFM32LG332F64G-E-QFP64	See datasheet
EFM32LG332F128-QFP64	EFM32LG332F128G-E-QFP64	See datasheet
EFM32LG332F256-QFP64	EFM32LG332F256G-E-QFP64	See datasheet
EFM32LG380F64-QFP100	EFM32LG380F64G-E-QFP100	See datasheet
EFM32LG380F128-QFP100	EFM32LG380F128G-E-QFP100	See datasheet
EFM32LG380F256-QFP100	EFM32LG380F256G-E-QFP100	See datasheet
EFM32LG390F64-BGA112	EFM32LG390F64G-E-BGA112	See datasheet
EFM32LG390F128-BGA112	EFM32LG390F128G-E-BGA112	See datasheet
EFM32LG390F256-BGA112	EFM32LG390F256G-E-BGA112	See datasheet
EFM32LG395F64-BGA120	EFM32LG395F64G-E-BGA120	See datasheet
EFM32LG395F128-BGA120	EFM32LG395F128G-E-BGA120	See datasheet
EFM32LG395F256-BGA120	EFM32LG395F256G-E-BGA120	See datasheet
EFM32LG840F64-QFN64	EFM32LG840F64G-E-QFN64	See datasheet
EFM32LG840F128-QFN64	EFM32LG840F128G-E-QFN64	See datasheet
EFM32LG840F256-QFN64	EFM32LG840F256G-E-QFN64	See datasheet
EFM32LG842F64-QFP64	EFM32LG842F64G-E-QFP64	See datasheet
EFM32LG842F128-QFP64	EFM32LG842F128G-E-QFP64	See datasheet
EFM32LG842F256-QFP64	EFM32LG842F256G-E-QFP64	See datasheet
EFM32LG880F64-QFP100	EFM32LG880F64G-E-QFP100	See datasheet
EFM32LG880F128-QFP100	EFM32LG880F128G-E-QFP100	See datasheet
EFM32LG880F256-QFP100	EFM32LG880F256G-E-QFP100	See datasheet
EFM32LG890F64-BGA112	EFM32LG890F64G-E-BGA112	See datasheet

EFM32LG890F128-BGA112	EFM32LG890F128G-E-BGA112	See datasheet
EFM32LG890F256-BGA112	EFM32LG890F256G-E-BGA112	See datasheet
EFM32LG895F64-BGA120	EFM32LG895F64G-E-BGA120	See datasheet
EFM32LG895F128-BGA120	EFM32LG895F128G-E-BGA120	See datasheet
EFM32LG895F256-BGA120	EFM32LG895F256G-E-BGA120	See datasheet
EFM32LG940F64-QFN64	EFM32LG940F64G-E-QFN64	See datasheet
EFM32LG940F128-QFN64	EFM32LG940F128G-E-QFN64	See datasheet
EFM32LG940F256-QFN64	EFM32LG940F256G-E-QFN64	See datasheet
EFM32LG942F64-QFP64	EFM32LG942F64G-E-QFP64	See datasheet
EFM32LG942F128-QFP64	EFM32LG942F128G-E-QFP64	See datasheet
EFM32LG942F256-QFP64	EFM32LG942F256G-E-QFP64	See datasheet
EFM32LG980F64-QFP100	EFM32LG980F64G-E-QFP100	See datasheet
EFM32LG980F128-QFP100	EFM32LG980F128G-E-QFP100	See datasheet
EFM32LG980F256-QFP100	EFM32LG980F256G-E-QFP100	See datasheet
EFM32LG990F64-BGA112	EFM32LG990F64G-E-BGA112	See datasheet
EFM32LG990F128-BGA112	EFM32LG990F128G-E-BGA112	See datasheet
EFM32LG990F256-BGA112	EFM32LG990F256G-E-BGA112	See datasheet
EFM32LG995F64-BGA120	EFM32LG995F64G-E-BGA120	See datasheet
EFM32LG995F128-BGA120	EFM32LG995F128G-E-BGA120	See datasheet
EFM32LG995F256-BGA120	EFM32LG995F256G-E-BGA120	See datasheet
Last Date of Unchanged Product: 9/18/2014		
Qualification Samples: Samples are available now. Please contact your Silicon Labs sales representative to order samples. A list of Silicon Labs sales representatives is available at www.silabs.com. 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.haggag@silabs.com		
Qualification Data: Qualification Report is available upon request.		

Table 1: EFM32LGxxx Datasheet Rev 1.30 - Summary of Key Changes

Table*	Symbol	Parameter	Condition	Datasheet Rev 1.21			Datasheet Rev 1.30			Unit
				Min	Typ	Max	Min	Typ	Max	
3.2 General Operating Conditions	V _{DDOP}	Operating Supply Voltage		1.85		3.8	1.98		3.8	V
3.4 Current Consumption	I _{EM0}	EM0 Current T _{AMB} = 25 °C	48 MHz					211		µA/MHz
			28 MHz		201	261		212		µA/MHz
			21 MHz		203	263		214		µA/MHz
			14 MHz		204	270		216		µA/MHz
			11 MHz		207	273		218		µA/MHz
			6.6 MHz		212	282		224		µA/MHz
			1.2 MHz		244			257		µA/MHz
	I _{EM1}	EM1 Current T _{AMB} = 25 °C	48 MHz					63	75	µA/MHz
			28 MHz		52	69		64	75	µA/MHz
			21 MHz		53	71		65	76	µA/MHz
			14 MHz		56	77		67	79	µA/MHz
			11 MHz		57	80		68	81	µA/MHz
			6.6 MHz		62	92		74	87	µA/MHz
			1.2 MHz		114			106	120	µA/MHz
	I _{EM2}	EM2 Current	T _{AMB} = 25 °C		1.1			0.95	1.7	µA
			T _{AMB} = 85 °C		4.0	8.0		3.0	4.0	µA
	I _{EM3}	EM3 Current	T _{AMB} = 25 °C		0.9			0.65	1.3	µA
			T _{AMB} = 85 °C		3.8	7.8		2.65	4.0	µA
	I _{EM4}	EM4 Current	T _{AMB} = 25 °C		0.02			0.02	0.055	µA
			T _{AMB} = 85 °C		0.25	0.7		0.44	0.9	µA
3.6 Power Management	V _{BODextthr-}	BOD threshold, falling external supply		1.82		1.85	1.74		1.96	V
	V _{BODextthr+}	BOD threshold, rising external supply			1.85			1.85	1.98	V
3.7 Flash	V _{FLASH}	Flash erase/write supply voltage				3.8			3.8	V
3.8 GPIO	V _{IOOH}	Output high voltage	Sourcing 6 mA, V _{DD} = 1.98V	0.75V _{DD}			0.75V _{DD}			V
			Sourcing 6 mA, V _{DD} = 3.0V	0.95V _{DD}			0.85V _{DD}			V
			Sourcing 20 mA, V _{DD} = 1.98V	0.7V _{DD}			0.6V _{DD}			V
			Sourcing 20 mA, V _{DD} = 3.0V	0.9V _{DD}			0.8V _{DD}			V
	V _{IOOL}	Output low voltage	Sinking 6 mA, V _{DD} = 1.98V			0.25V _{DD}			0.3V _{DD}	V
			Sinking 6 mA, V _{DD} = 3.0V			0.05V _{DD}			0.2V _{DD}	V
			Sinking 20 mA, V _{DD} = 1.98V			0.3V _{DD}			0.35V _{DD}	V
			Sinking 20 mA, V _{DD} = 3.0V			0.1V _{DD}			0.25V _{DD}	V
	I _{IOLAK}	Input leakage current				±25		±0.1	±100	nA
	I _{LFRCO}	Current consumption			190			300		nA
3.12 HFRCO	I _{HFRCO}	Current consumption	28 MHz		106			165	215	µA
			21 MHz		93			134	175	µA
			14 MHz		77			106	140	µA
			11 MHz		72			94	125	µA
			6.6 MHz		63			77	105	µA
			1.2 MHz		22			25	40	µA
3.13 ULFRCO	f _{ULFRCO}	Oscillation frequency		0.8		1.5	0.7		1.75	kHz
3.15 DAC	I _{DAC}	Active current	1 ksp/s, 12 bit NORMAL		38			17		µA
3.16 OPAMP	I _{OPAMP}	Active current	BIASPROG=0xF, HALFBIAS=0x0		400			370	460	µA
			BIASPROG=0x7, HALFBIAS=0x1		100			95	135	µA
			BIASPROG=0x0, HALFBIAS=0x1		13			13	25	µA
	V _{OFFSET}	Input offset voltage	Unity Gain, V _{SS} < V _{IN} < V _{DD} , OPAXHCMDIS=0		6		-13	0	11	mV
3.17 ACMP	V _{ACMPOFFSET}	Offset voltage			10		-12	0	12	mV
3.18 VCMP	I _{VCMP}	Active current	BIASPROG=0b0000, HALFBIAS=1		0.1			0.3	0.6	µA
	V _{VCMPHYST}	VCMP hysteresis	BIASPROG=0b1111, HALFBIAS=0		14.7			22	35	µA
3.19 LCD	V _{BOOST}	Boost voltage	LEVEL0		3.0			3.02		V
			LEVEL1		3.08			3.15		V
			LEVEL2		3.17			3.28		V
			LEVEL3		3.26			3.41		V
			LEVEL4		3.34			3.54		V
			LEVEL5		3.43			3.67		V
			LEVEL6		3.52			3.73		V
			LEVEL7		3.6			3.74		V
3.25 Digital Peripherals	I _{USART}	USART current			7.5			4.0		µA/MHz
	I _{UART}	UART current			5.63			3.8		µA/MHz
	I _{LEUART}	LEUART current			150			194		nA
	I _{I2C}	I2C current			6.25			7.6		µA/MHz
	I _{TIMER}	TIMER current			8.75			6.5		µA/MHz
	I _{LETIMER}	LETIMER current			150			85.8		nA
	I _{PCNT}	PCNT current			100			91.4		nA
	I _{RTC}	RTC current			100			54.6		nA
	I _{LCD}	LCD current			100			72.7		nA
	I _{AES}	AES current			2.5			1.8		µA/MHz
	I _{GPIO}	GPIO current			5.31			3.4		µA/MHz
	I _{EBI}	EBI current			1.56			6.5		µA/MHz
	I _{PRS}	PRS current			2.81			3.9		µA/MHz
	I _{DMA}	DMA current			8.12			10.9		µA/MHz

* Note: Table numbers may vary by datasheet. Numbers listed refer to EFM32LG995.