SILICON LABS

EFM8™

8-bit microcontrollers without compromise

PRODUCT SELECTOR GUIDE

8 **EFM8 MCUs**

Fast, low-power 8-bit solutions featuring fully-integrated analog functionality and peripherals

8 factors that make EFM8 the world's only no-compromise 8-bit microcontroller.

Fast Processor Core

With up to 50 MHz operation and with 70% of the instructions executing in less than 1 or 2 clock cycles, the EFM8 MCUs offer an economical solution that satisfy the performance needs of embedded applications. Also, the efficient architecture reduces memory requirements of the application.
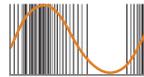
Efficient Digital Peripherals

Autonomous digital peripherals reduce the processor overhead. The EFM8 MCUs include high performance timers, higher resolution PWMs and fast serial communication peripherals including 12 Mbps SPI, 3 Mbps UART and 3.4 Mbps I2C.
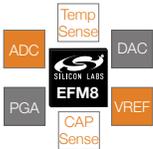
High Performance Analog

The EFM8 family of MCUs offer high performance analog peripherals such as 12-bit ADCs at 200 Ksps and 10-bit ADCs at 800 Ksps, high noise immune Capsense peripherals and temp sensors that reduce the system cost and simplify designs.

Highly Integrated

The EFM8 family features high precision oscillators, integrated on-board voltage regulator, USB charger detect circuitry and high performance peripherals in packages as small as 3x3 mm to reduce the PCB area and BOM cost.
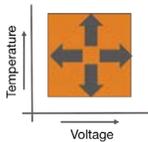
No Performance Compromise

The EFM8 MCUs provide no compromise peripherals that are fully characterized with guaranteed performance over temperature and voltage.
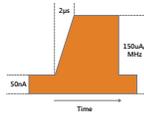
Ultra Low Power

EFM8 extends battery life with ultra-low sleep currents down to 50 nA with Brown out detection, fast wake up times with less than 2 μs, active currents as low as 150 μA/MHz and Low energy USB module for power consumption reduction of up to 90%.

Digital Crossbar and Analog Multiplexer

Silicon Labs' patented crossbar technology enables maximum flexibility and unparalleled ease of development, allowing designers to select any peripherals with no conflicts in pin-out or PCB layout.

Simplicity Studio™ Software

Free Simplicity Studio with integrated IDE, free unlimited code size Keil Compiler, demos, libraries and example codes, energy and Capsense Profiler tools, configurators, easily updated support packages, software and documentation, all at your fingertips.

EFM8 Applications

EFM8 microcontrollers are based on the popular 8051 core. The 8051 architecture ecosystem represents nearly 25% of the existing MCU market.

Select a secure architecture

The EFM8 is based on a Harvard architecture, allowing it to only execute code fetched from program memory, and allows locking of program memory to prevent unauthorized examination. These are two advantages in the EFM8 hardware that protect a product from security attacks.

Select a low latency system

Variations in interrupt response time can cause adverse effects in some applications, causing, for example, audio distortion or motor noise and vibration. With the EFM8 it's easy to work "close to the metal" and have full control over the entire system.

Select a simple solution

The EFM8 microcontroller is ideal for processing 8-bit data that comes from port I/O or sensor inputs. A great many applications don't require complex mathematics processing, and benefit significantly from the code density advantages of an 8-bit processor when not tasked with 16-bit or 32-bit mathematics. Human interface functions, sensor interfaces, and distributed processing functions are examples that easily benefit from the simplicity of the EFM8 solutions.

Despite strong media coverage of the rapid expansion of the ARM ecosystem, the largest ecosystem in MCUs still exists around the mature and tiny 8051 MCU architecture.

IHS, 2013

EFM8

EFM8	Package Type	Flash (kB)	RAM (B)	MHz	GPIO	SPI	UART	I²C	EMIF	ADC 1	Comparator	Internal OSC	Timers	PCA/PWM Channels	RTC	Capacitive Sense	LFO	Operating Voltage
BUSY BEE - GENERAL PURPOSE																		
EFM8BB10F2G-A-QFN20	QFN20	2	256	25	16	1	1	1	-	12-bit, 15-ch.	2	2%	4	3	-	-	Y	2.2V to 3.6V
EFM8BB10F4G-A-QFN20	QFN20	4	512	25	16	1	1	1	-	12-bit, 15-ch.	2	2%	4	3	-	-	Y	2.2V to 3.6V
EFM8BB10F8G-A-SOIC16	SOIC16	8	512	25	13	1	1	1	-	12-bit, 12-ch.	2	2%	4	3	-	-	Y	2.2V to 3.6V
EFM8BB10F8G-A-QFN20	QFN20	8	512	25	16	1	1	1	-	12-bit, 15-ch.	2	2%	4	3	-	-	Y	2.2V to 3.6V
EFM8BB10F8G-A-QSOP24	QSOP24	8	512	25	18	1	1	1	-	12-bit, 16-ch.	2	2%	4	3	-	-	Y	2.2V to 3.6V
EFM8BB21F16G-B-QFN20	QFN20	16	2304	50	16	1	2	2	-	12-bit, 15-ch.	2	2%	5	3	-	-	Y	2.2V to 3.6V
EFM8BB21F16G-B-QSOP24	QSOP24	16	2304	50	21	1	2	2	-	12-bit, 20-ch.	2	2%	5	3	-	-	Y	2.2V to 3.6V
EFM8BB22F16G-B-QFN28	QFN28	16	2304	50	22	1	1	2	-	12-bit, 20-ch.	2	2%	5	3	-	-	Y	2.2V to 3.6V
SLEEPY BEE - LOW POWER																		
EFM8SB10F2G-A-QFN20	QFN20	2	256	25	16	1	1	1	-	12-bit, 9-ch.	1	2%	4	3	Y	13	-	1.8V to 3.6V
EFM8SB10F4G-A-QFN20	QFN20	4	512	25	16	1	1	1	-	12-bit, 9-ch.	1	2%	4	3	Y	13	-	1.8V to 3.6V
EFM8SB10F8G-A-QFN20	QFN20	8	512	25	16	1	1	1	-	12-bit, 9-ch.	1	2%	4	3	Y	13	-	1.8V to 3.6V
EFM8SB10F8G-A-QFN24	QFN24	8	512	25	17	1	1	1	-	12-bit, 10-ch.	1	2%	4	3	Y	14	-	1.8V to 3.6V
EFM8SB10F8G-A-QSOP24	QSOP24	8	512	25	17	1	1	1	-	12-bit, 10-ch.	1	2%	4	3	Y	14	-	1.8V to 3.6V
EFM8SB20F16G-A-QFN24	QFN24	16	4352	25	16	2	1	1	-	12-bit, 15-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F32G-A-QFN24	QFN24	32	4352	25	16	2	1	1	-	12-bit, 15-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F32G-A-QFN32	QFN32	32	4352	25	24	2	1	1	-	12-bit, 23-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F32G-A-LQFP32	LQFP32	32	4352	25	24	2	1	1	-	12-bit, 23-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F64G-A-QFN24	QFN24	64	4352	25	16	2	1	1	-	12-bit, 15-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F64G-A-QFN32	QFN32	64	4352	25	24	2	1	1	-	12-bit, 23-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
EFM8SB20F64G-A-LQFP32	LQFP32	64	4352	25	24	2	1	1	-	12-bit, 23-ch.	2	2%	4	6	Y	-	-	1.8V to 3.6V
UNIVERSAL BEE - USB																		
EFM8UB10F8G-B-QFN20	QFN20	8	2304	48	13	1	2	2	-	12-bit,11-ch.	2	1.5%	5	3	-	-	Y	2.2V to 5.25V
EFM8UB10F16G-B-QFN20	QFN20	16	2304	48	13	1	2	2	-	12-bit,11-ch.	2	1.5%	5	3	-	-	Y	2.2V to 5.25V
EFM8UB11F16G-B-QSOP24	QSOP24	16	2304	48	17	1	2	2	-	12-bit,15-ch.	2	1.5%	5	3	-	-	Y	2.2V to 5.25V
EFM8UB10F16G-B-QFN28	QFN28	16	2304	48	22	1	2	2	-	12-bit, 20-ch.	2	1.5%	5	3	-	-	Y	2.2V to 5.25V
EFM8UB20F32G-A-QFN32	QFN32	32	2304	48	25	1	2	2	Y	10-bit, 20-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V
EFM8UB20F32G-A-LQFP32	LQFP32	32	2304	48	25	1	2	2	Y	10-bit, 20-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V
EFM8UB20F32G-A-TQFP48	TQFP48	32	2304	48	40	1	2	2	Y	10-bit, 32-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V
EFM8UB20F64G-A-QFN32	QFN32	64	4352	48	25	1	2	2	Y	10-bit, 20-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V
EFM8UB20F64G-A-LQFP32	LQFP32	64	4352	48	25	1	2	2	Y	10-bit, 20-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V
EFM8UB20F64G-A-TQFP48	TQFP48	64	4352	48	40	1	2	2	Y	10-bit, 32-ch.	2	1.5%	6	5	-	-	-	2.2V to 5.25V

BUSY BEE

General purpose up to 50 MHz

Flash: 2 - 16 KB

RAM: 0.5 - 2 KB

Highlights

SAR ADC – 12-bit at 200 ksps; 10-bit at 800 ksps

2x low-current comparators with built-in DAC

2x UART (3 Mbps), 1x SPI (12 Mbps), 2x I2C (3.4 Mbps)

"Priority crossbar" – simplifies PCB design

SLEEPY BEE

Low Power up to 25 MHz

Flash: 2 - 64 KB

RAM: 0.5 - 4 KB

Highlights

Energy friendly – 50 nA sleep mode with BOR

Active mode - 150 µA/MHz

Fast wake up - < 2 µs

Capacitive sense - < 1 µA wake on touch average

UNIVERSAL BEE

USB up to 48 MHz

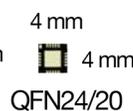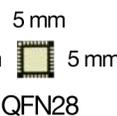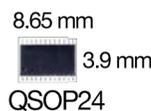**Flash:** 8 - 64 KB

RAM: 2 - 4 KB

Highlights

No external crystal or regulator needed for USB

Low energy USB - up to 90% power reduction

USB charger detect circuit (USB-BCS 1.2)

2x UART (3 Mbps), 1x SPI (12 Mbps), 2x I2C (3.4 Mbps)

Package Options

7 mm × 7 mm	7 mm × 7 mm	9.9 mm × 3.9 mm	8.65 mm × 3.9 mm	5 mm × 5 mm	5 mm × 5 mm	4 mm × 4 mm	3 mm × 3 mm
QFP48	QFP32	SOIC16	QSOP24	QFN32	QFN28	QFN24/20	QFN20
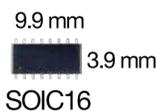
Get started with EFM8 today

Debugger

Integrated debugger provides everything you need for downloading and debugging your code. It can be used as a standalone debugger for other external boards.

Display

A 1.28 inch 128x128 pixel Memory LCD enables interactive applications.

Humidity and Temperature sensor

An integrated Si7021 humidity and temperature sensor to enable data logging applications.

Expansion Header

20-pin expansion header for connection to plug in boards and for future expansion to your design.

Energy Profile

Visualize the energy consumption of your application using the Simplicity Energy Profiler tool.

Easy pin access

Breakout pads at the top and bottom edges of the kit can be soldered to provide easy access to the MCU pins.

Joystick

Analog joystick with eight measurable positions for better demo experience.

Capsense Pads

Capsense pads enable button and slider applications using Capsense Profiler tool.

EFM8 Starter Kits

Silicon Labs offers 6 different starter kits to get started with the EFM8 family of MCUs. All the kits are priced at $29.99.

Part number	Description	Demo Highlights	Tools
SLSTK2020A	EFM8BB1 Family Starter Kit	ADC, Temperature sensor, Fast core	Energy Profiler, Configurator
SLSTK2021A	EFM8BB2 Family Starter Kit	ADC, Temperature sensor, Fast core	Energy Profiler, Configurator
SLSTK2000A	EFM8UB1 Family Starter Kit	Low energy USB, Charger Detect	Energy Profiler, Configurator
SLSTK2001A	EFM8UB2 Family Starter Kit	USB HID, USB-UART bridge	Energy Profiler, Configurator
SLSTK2010A	EFM8SB1 Family Starter Kit	Capsense, Low energy modes	Capsense Profiler, Energy Profiler, Configurator
SLSTK2011A	EFM8SB2 Family Starter Kit	Low energy modes, Temperature sensor	Energy Profiler, Configurator

Silicon Labs Simplicity Studio tools make EFM8 development fast and simple.
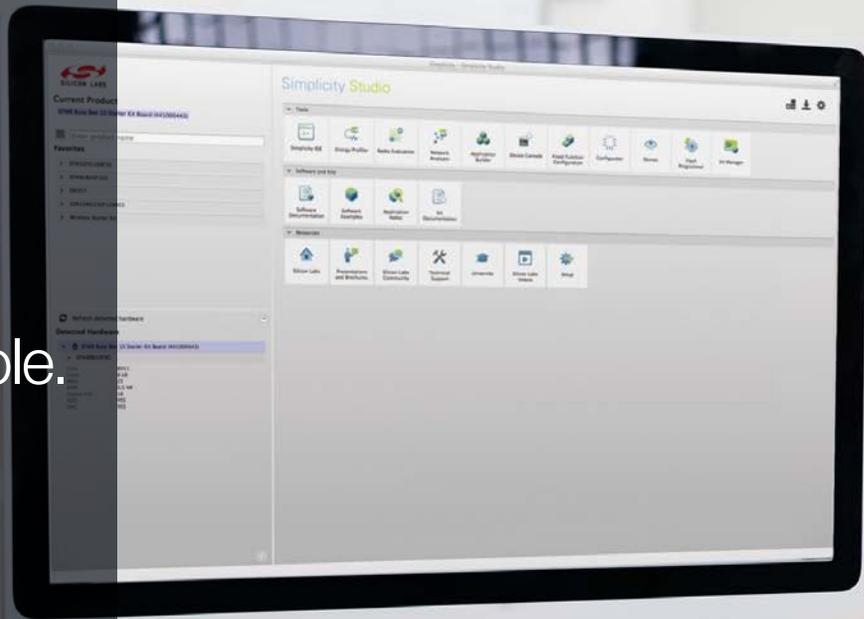
Simplicity Studio

Easy access to the Simplicity IDE, configuration tools, demos, examples, datasheets, application notes, community forum and Silicon Labs support, plus an unlimited code size Keil compiler, all free of charge.
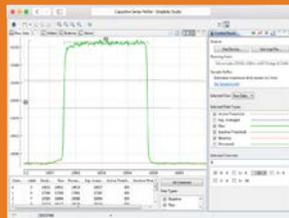**www.silabs.com/simplicity**

EFM8 Starter Kits

This $29.99 kit is an excellent starting point to get familiar with EFM8 microcontrollers.

www.silabs.com/efm8-kits

Capacitive Sense Profiler

This tool simplifies the fine tuning of buttons, sliders, wheels, touch pads and proximity sensors.

Longevity Commitment

Silicon labs is committed to a minimum 10-year life cycle.

Silicon Labs Community

Find the support and answers you need on Silicon Labs community forum.

community.silabs.com

To buy or sample online, or find your nearest distributor, see details at **www.silabs.com/efm8**