

HUMAN INTERFACE SOLUTIONS

SILICON LABS SOLUTIONS GUIDE



QuickSense™ Portfolio

MORE INFORMATION AND DOCUMENTATION DOWNLOADS AT: www.silabs.com/QuickSense

Silicon Labs' Si1120, Si1102, C8051F7xx and C8051F8xx product families are part of the QuickSense™ human interface portfolio. Silicon Labs is uniquely positioned to be able to offer all of these human interface technologies. Capitalizing on our leadership in high-performance, analog-intensive, mixed-signal ICs, the QuickSense family of products offers industry-leading capacitive and infrared sensing devices to meet the demands of advanced user interfaces.



QuickSense Studio :: Silicon Labs' new sensing devices are all easily programmable through the QuickSense Studio development software. The QuickSense Studio Configuration Wizard simplifies the integration of human interface technologies in end products, allowing engineers to set up capacitive buttons, sliders and wheels by using an intuitive software GUI that generates all the C code required for the selected functions.

The studio enables the configuration of infrared proximity and ambient light sensors through a comprehensive library of application programming interfaces (APIs). The QuickSense Studio also provides a real-time monitoring and adjustment tool enabling developers to thoroughly test and optimize user interfaces.

Complete Proximity, Ambient Light and
Capacitive Sensing Solutions



QuickSense Infrared Sensing

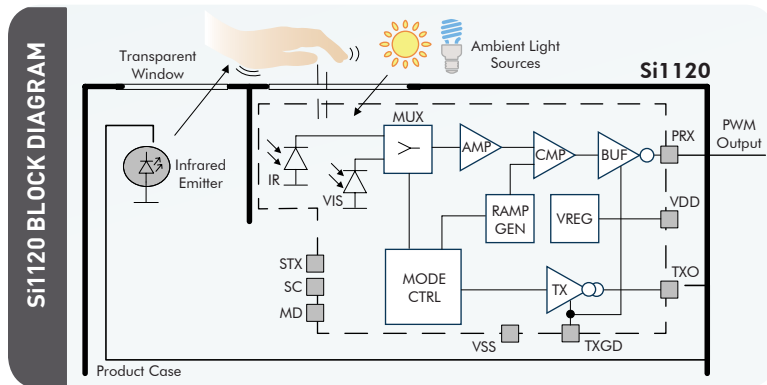
DRAMATIC POWER REDUCTION ENABLES NEW USE CASES :: Optimized for power efficiency, the Si1102 proximity and Si1120 proximity/ambient light sensors enable touchless human interface sensing with superior detection range. These sensors are ideal for applications that can benefit from system power savings, tamper detection/proofing, motion sensing and gesture interpretation.

COMMON APPLICATIONS: • PROXIMITY DETECTION • MOTION DETECTION • OCCUPANCY/USER SENSING FOR POWER SAVINGS • INTRUSION/TAMPER DETECTION • PHOTO-INTERRUPTER • TOUCHLESS SWITCHES • TOUCHLESS SLIDERS

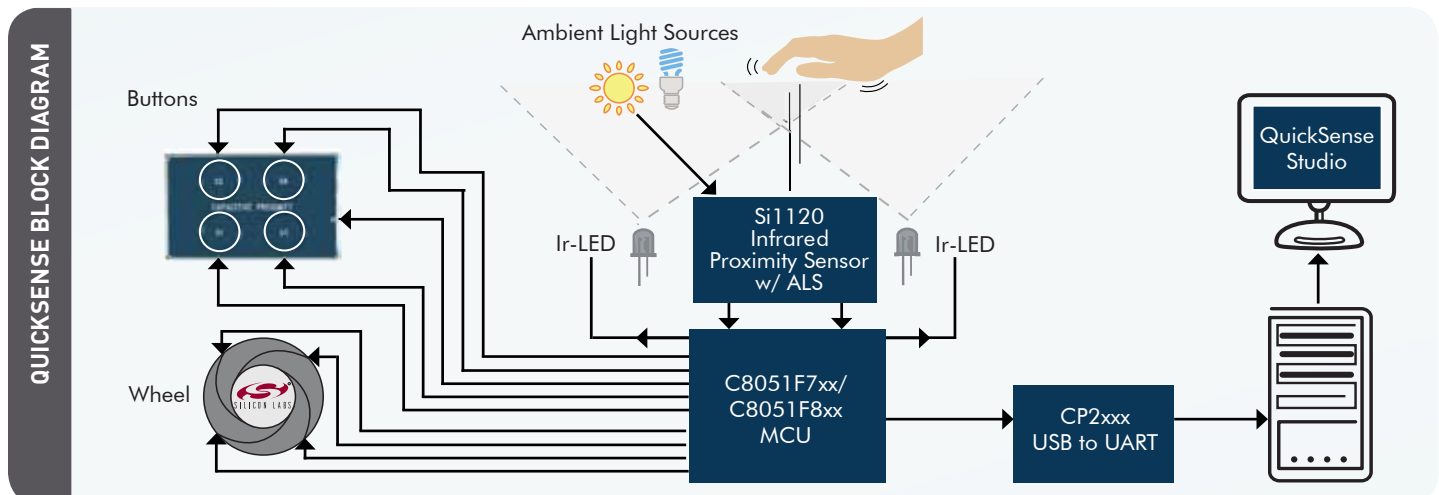
Proximity and Ambient Light Sensor :: The QuickSense Si1102 sensor enables an electronic device to quickly gauge its proximity to the user. For example, it can detect if a handset is near a user's face and adjust the display and lighting accordingly. The Si1120 infrared proximity (PS) and ambient light sensor (ALS) can also detect ambient light in the external environment, allowing screen backlighting to be dimmed to save power. When paired with the F700 and F800 touch sense microcontrollers (MCUs), the QuickSense solution enables smart motion sensing, giving designers a complete array of human interface technologies for their applications to improve the end-user experience.

Si1120 FEATURES ::

- Up to 50 cm proximity range with a single pulse
- Configurable ALS and PS measurement modes for range optimization
- High EMI immunity without shielded packaging
- ALS works in direct sunlight (100 klux)
- Minimum reflectance sensitivity <1 μW/cm²
- Power supply: 2.2–3.7 V
- Operating temperature range: -40 to +85 °C
- Low power typical 10 μA current consumption
- Programmable 400/50 mA LED constant current driver output
- Supports independent LED supply voltage
- Small outline 3 x 3 mm (ODFN) package



Touchless Slider :: The Si1120 device enables an innovative, patent-pending touchless proximity slider for gesturing that allows end users to navigate with simple gestures instead of physical touch. The superior sensitivity offers robust performance under a wide range of lighting conditions and enables the use of low-cost or low-profile LEDs, often resulting in a significant cost savings.

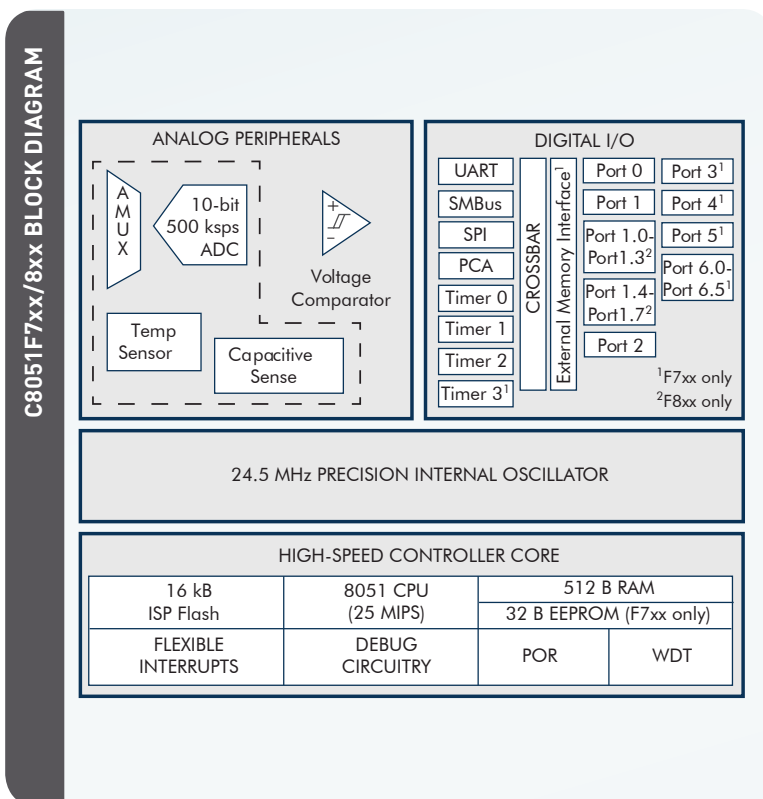


QuickSense Capacitive Sensing

ROBUST, RELIABLE AND EASY TO IMPLEMENT :: The QuickSense™ family of capacitive sensing MCUs has the industry's fastest capacitive touch sense capability. This family provides an easy and reliable solution for capacitive buttons, sliders, wheels and capacitive proximity sensing and is fully supported with the QuickSense Studio common development platform.

COMMON APPLICATIONS: • INSTRUMENTATION PANELS • TOUCH PANELS • INDUSTRIAL INTERFACE • SECURITY • RESIDENTIAL HVAC
• HOME APPLIANCES • TOYS • KEYBOARDS • FAX/PRINTER/SCANNER • FRONT PANELS

C8051F7xx/8xx :: The C8051F800 family builds upon the C8051F700 family of capacitive touch MCUs by adding a lower pin count, small form factor option to the industry's fastest capacitive touch sense solutions. The F800 family enables developers to add sophisticated touch sense interfaces to a wide range of consumer and industrial electronic products, such as set-top boxes, residential light controls, thermostat controls, home security panels, commercial point-of-sale (POS) interfaces, portable electronic devices and small appliances.



C8051F7xx/8xx FEATURES ::

- Supports capacitive buttons, sliders, wheels and capacitive proximity sensing with 16 (F8xx) or 32 (F7xx) channels
- High-speed 25 MIPS CPU allows plenty of power for application code
- 10-bit, 500 ksp/s single-ended ADC
- Integrated temperature sensor
- Precision calibrated 24.5 MHz internal oscillator
- 16 kb of Flash memory
- 512 bytes of RAM
- SMBus/I²C, enhanced UART and enhanced SPI
- Three general-purpose 16-bit timers
- Programmable counter/timer array (PCA) with three capture/compare modules
- On-chip internal voltage reference
- On-chip watchdog timer, power-on reset and supply monitor fail-safe features
- On-chip voltage comparator

Turnkey Support

Silicon Labs makes it easy to add sophisticated user interfaces to any system by offering complete tools to help designers throughout the entire project cycle. In addition to the QuickSense Studio development platform, both the infrared and capacitive sensing solutions offer hardware and software platforms to easily set up and configure, compile and debug a project. Full documentation and application notes are available.



Product Selector Guide

COMPLETE SELECTOR GUIDE AND DOCUMENTATION DOWNLOADS AT: www.silabs.com/QuickSense

C8051F8xx Low-Pin Count Capacitive Sensing MCUs

PART NUMBER	MIPS	FLASH MEMORY	RAM	DIG I/O	SERIAL BUSES	TIMERS (16-BIT)	PWM/PCA CHANNELS	INTERNAL OSC	ADC	CAP SENSE INPUTS	TEMP SENSOR	VREF	COMPARATOR	PACKAGE
C8051F800	25	16 kB	512	17	I ² C, SPI, UART	3	3	±2%	10-bit	16	•	•	1	QSOP24/QFN20
C8051F801	25	16 kB	512	17	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	QSOP24/QFN20
C8051F803	25	16 kB	512	13	I ² C, SPI, UART	3	3	±2%	10-bit	12	•	•	1	SOIC16
C8051F804	25	16 kB	512	13	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	SOIC16
C8051F806	25	16 kB	512	17	I ² C, SPI, UART	3	3	±2%		16			1	QSOP24/QFN20
C8051F807	25	16 kB	512	17	I ² C, SPI, UART	3	3	±2%		8			1	QSOP24/QFN20
C8051F809	25	16 kB	512	13	I ² C, SPI, UART	3	3	±2%		12			1	SOIC16
C8051F810	25	16 kB	512	13	I ² C, SPI, UART	3	3	±2%		8			1	SOIC16
C8051F812	25	8 kB	512	17	I ² C, SPI, UART	3	3	±2%	10-bit	16	•	•	1	QSOP24/QFN20
C8051F813	25	8 kB	512	17	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	QSOP24/QFN20
C8051F815	25	8 kB	512	13	I ² C, SPI, UART	3	3	±2%	10-bit	12	•	•	1	SOIC16
C8051F816	25	8 kB	512	13	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	SOIC16
C8051F818	25	8 kB	512	17	I ² C, SPI, UART	3	3	±2%		16			1	QSOP24/QFN20
C8051F819	25	8 kB	512	17	I ² C, SPI, UART	3	3	±2%		8			1	QSOP24/QFN20
C8051F821	25	8 kB	512	13	I ² C, SPI, UART	3	3	±2%		12			1	SOIC16
C8051F822	25	8 kB	512	13	I ² C, SPI, UART	3	3	±2%		8			1	SOIC16
C8051F824	25	8 kB	256	13	I ² C, SPI, UART	3	3	±2%	10-bit	12	•	•	1	SOIC16
C8051F825	25	8 kB	256	13	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	SOIC16
C8051F827	25	8 kB	256	13	I ² C, SPI, UART	3	3	±2%		12			1	SOIC16
C8051F828	25	8 kB	256	13	I ² C, SPI, UART	3	3	±2%		8			1	SOIC16
C8051F830	25	4 kB	256	13	I ² C, SPI, UART	3	3	±2%	10-bit	12	•	•	1	SOIC16
C8051F831	25	4 kB	256	13	I ² C, SPI, UART	3	3	±2%	10-bit	8	•	•	1	SOIC16
C8051F833	25	4 kB	256	13	I ² C, SPI, UART	3	3	±2%		12			1	SOIC16
C8051F834	25	4 kB	256	13	I ² C, SPI, UART	3	3	±2%		8			1	SOIC16

C8051F7xx High-Pin Count Capacitive Sensing MCUs

PART NUMBER	MIPS	FLASH MEMORY	RAM	DIG I/O	SERIAL BUSES	TIMERS (16-BIT)	PWM/PCA CHANNELS	INTERNAL OSC	ADC	CAP SENSE INPUTS	TEMP SENSOR	VREF	COMPARATOR	PACKAGE
C8051F702	25	16 kB	512	54	I ² C, SPI, UART	4	3	±2%	10-bit	32	•	•	1	QFP64
C8051F706	25	16 kB	512	39	I ² C, SPI, UART	4	3	±2%	10-bit	24	•	•	1	QFN48/QFP48
C8051F700	25	15 kB	512	54	I ² C, SPI, UART	4	3	±2%	10-bit	32	•	•	1	QFP64
C8051F704	25	15 kB	512	39	I ² C, SPI, UART	4	3	±2%	10-bit	24	•	•	1	QFN48/QFP48
C8051F708	25	8 kB	512	54	I ² C, SPI, UART	4	3	±2%	10-bit	32	•	•	1	QFP64
C8051F710	25	8 kB	512	54	I ² C, SPI, UART	4	3	±2%	10-bit	32	•	•	1	QFP64
C8051F712	25	8 kB	512	39	I ² C, SPI, UART	4	3	±2%	10-bit	24	•	•	1	QFN48/QFP48
C8051F714	25	8 kB	512	39	I ² C, SPI, UART	4	3	±2%	10-bit	24	•	•	1	QFN48/QFP48

Infrared Sensors

PART NUMBER	DESCRIPTION	PACKAGE	TEMP. RANGE
Si1120	PMW Proximity Sensor with Ambient Light Sensor	3 x 3 mm 8-pin ODFN	-40 to 85 °C
Si1102	Proximity Sensor		-40 to 85 °C