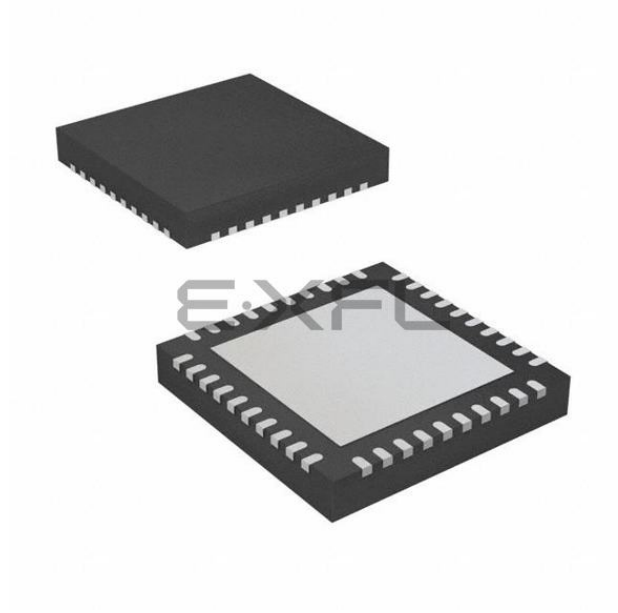

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Details	
Product Status	Not For New Designs
Core Processor	ARM® Cortex®-M3
Core Size	32-Bit Single-Core
Speed	80MHz
Connectivity	I²C, IrDA, SmartCard, SPI, UART/USART
Peripherals	Brown-out Detect/Reset, DMA, I²S, POR, PWM, WDT
Number of I/O	28
Program Memory Size	32KB (32K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	8K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 3.6V
Data Converters	A/D 18x12b; D/A 2x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	40-VFQFN Exposed Pad
Supplier Device Package	40-QFN (6x6)
Purchase URL	https://www.e-xfl.com/product-detail/silicon-labs/sim3c134-b-gm

Table 3.2. Power Consumption (Continued)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Power Mode 9[2,3]—Low Power Shutdown with VREG0 disabled, powered through VDD and VIO	I_{DD}	RTC Disabled, V_{DD} = 1.8 V, T_A = 25 °C	—	85	—	nA
		RTC w/ 16.4 kHz LFO, V_{DD} = 1.8 V, T_A = 25 °C	—	350	—	nA
		RTC w/ 32.768 kHz Crystal, V_{DD} = 1.8 V, T_A = 25 °C	—	620	—	nA
		RTC Disabled, V_{DD} = 3.0 V, T_A = 25 °C	—	145	—	nA
		RTC w/ 16.4 kHz LFO, V_{DD} = 3.0 V, T_A = 25 °C	—	500	—	nA
		RTC w/ 32.768 kHz Crystal, V_{DD} = 3.0 V, T_A = 25 °C	—	800	—	nA
Power Mode 9[2,3]—Low Power Shutdown with VREG0 in low-power mode, VDD and VIO powered through VREG0 (Includes VREG0 current)	I_{VREGIN}	RTC Disabled, VREGIN = 5 V, T_A = 25 °C	—	300	—	nA
		RTC w/ 16.4 kHz LFO, VREGIN = 5 V, T_A = 25 °C	—	650	—	nA
		RTC w/ 32.768 kHz Crystal, VREGIN = 5 V, T_A = 25 °C	—	950	—	nA
VIOHD Current (High-drive I/O disabled)	I_{VIOHD}	HV Mode (default)	—	2.5	5	µA
		LV Mode	—	2	—	nA

Notes:

1. Perhipheral currents drop to zero when peripheral clock and peripheral are disabled, unless otherwise noted.
2. Currents are additive. For example, where I_{DD} is specified and the mode is not mutually exclusive, enabling the functions increases supply current by the specified amount.
3. Includes all peripherals that cannot have clocks gated in the Clock Control module.
4. Includes supply current from internal regulator and PLL0OSC (>20 MHz) or LPOSC0 (<=20 MHz).
5. Flash execution numbers use 2 wait states for 80 MHz and 0 wait states at 20 MHz or less.
6. RAM execution numbers use 0 wait states for all frequencies.
7. IDAC output current and IVC input current not included.
8. Bias current only. Does not include dynamic current from oscillator running at speed.

Table 3.2. Power Consumption (Continued)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Flash Current on VDD						
Write Operation	$I_{FLASH-W}$		—	—	8	mA
Erase Operation	$I_{FLASH-E}$		—	—	15	mA

Notes:
1. Perhipheral currents drop to zero when peripheral clock and peripheral are disabled, unless otherwise noted.
2. Currents are additive. For example, where I_{DD} is specified and the mode is not mutually exclusive, enabling the functions increases supply current by the specified amount.
3. Includes all peripherals that cannot have clocks gated in the Clock Control module.
4. Includes supply current from internal regulator and PLL0OSC (>20 MHz) or LPOSC0 (<=20 MHz).
5. Flash execution numbers use 2 wait states for 80 MHz and 0 wait states at 20 MHz or less.
6. RAM execution numbers use 0 wait states for all frequencies.
7. IDAC output current and IVC input current not included.
8. Bias current only. Does not include dynamic current from oscillator running at speed.

Table 3.3. Power Mode Wake Up Times

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Power Mode 2 Wake Time	t_{PM2}		4	—	5	clocks
Power Mode 3 Fast Wake Time	t_{PM3FW}		—	425	—	µs
Power Mode 9 Wake Time	t_{PM9}		—	12	—	µs

Table 3.6. External Regulator

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Voltage Range (at VREGIN)	V_{REGIN}		3.0	—	3.6	V
Output Voltage (at EXREGOUT)	$V_{EXREGOUT}$	Programmable in 100 mV steps	1.8	—	3.6	V
NPN Current Drive	I_{NPN}	400 mV Dropout	12	—	—	mA
PNP Current Drive	I_{PNP}	$V_{EXREGBD} > V_{REGIN}$- 1.5 V	–6	—	—	mA
EXREGBD Voltage (PNP Mode)	$V_{EXREGBD}$	V_{REGIN} >= 3.5 V	V_{REGIN} – 2.0	—	—	V
		V_{REGIN} < 3.5 V	1.5	—	—	V
Standalone Mode Output Current	$I_{EXTREGBD}$	400 mV Dropout	—	—	11.5	mA
External Capacitance with External BJT	C_{BJT}		4.7	—	—	µF
Standalone Mode Load Regulation	$LR_{STAND-ALONE}$		—	1	—	mV/mA
Standalone Mode External Capacitance	$C_{STAND-ALONE}$		47	—	—	nF
Current Limit Range	I_{LIMIT}	1 Ω Sense Resistor	10	—	720	mA
Current Limit Accuracy			—	—	10	%
Foldback Limit Accuracy			—	—	20	%
Current Sense Resistor	R_{SENSE}		—	—	1	Ω
Internal Pull-Down	R_{PD}		—	5	—	kΩ
Internal Pull-Up	R_{PU}		—	10	—	kΩ
Current Sensor						
Sensing Pin Voltage	$V_{EXTREGSP}$ $V_{EXTREGSN}$	Measured at EXTREGSP or EXTREGSN pin	2.2	—	V_{REGIN}	V
Differential Sensing Voltage	V_{DIFF}	($V_{EXTREGSP}$ – $V_{EXTREGSN}$)	10	—	1600	mV
Current at EXTREGSN Pin	$I_{EXTREGSN}$		—	8	—	µA
Current at EXTREGSP Pin	$I_{EXTREGSP}$		—	V_{DIFF} x 200 + 12	—	µA

Table 3.16. Comparator (Continued)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Positive Hysteresis Mode 3 (CPMD = 11)	HYS_{CP+}	CMPHYP = 00	—	1.4	—	mV
		CMPHYP = 01	—	4	—	mV
		CMPHYP = 10	—	8	—	mV
		CMPHYP = 11	—	16	—	mV
Negative Hysteresis Mode 3 (CPMD = 11)	HYS_{CP-}	CMPHYN = 00	—	1.4	—	mV
		CMPHYN = 01	—	–4	—	mV
		CMPHYN = 10	—	–8	—	mV
		CMPHYN = 11	—	–16	—	mV
Input Range (CP+ or CP–)	V_{IN}		–0.25	—	V_{DD}+0.25	V
Input Pin Capacitance	C_{CP}	PB2 Pins	—	7.5	—	pF
		PB3 Pins	—	10.5	—	pF
Common-Mode Rejection Ratio	$CMRR_{CP}$		—	75	—	dB
Power Supply Rejection Ratio	$PSRR_{CP}$		—	72	—	dB
Input Offset Voltage	V_{OFF}		–10	0	10	mV
Input Offset Tempco	TC_{OFF}		—	3.5	—	µV/°C
Reference DAC Resolution	N_{Bits}			6		bits

Table 3.17. Port I/O

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Standard I/O (PB0, PB1, and PB2), 5 V Tolerant I/O (PB3), and $\overline{\text{RESET}}$						
Output High Voltage*	V_{OH}	Low Drive, I_{OH} = –2 mA	V_{IO} – 0.7	—	—	V
		High Drive, I_{OH} = –5 mA	V_{IO} – 0.7	—	—	V
Output Low Voltage*	V_{OL}	Low Drive, I_{OL} = 3 mA	—	—	0.6	V
		High Drive, I_{OL} = 12.5 mA	—	—	0.6	V
Input High Voltage	V_{IH}	1.8 ≤ V_{IO} ≤ 2.0	0.7 x V_{IO}	—	—	V
		2.0 ≤ V_{IO} ≤ 3.6	V_{IO} – 0.6	—	—	V
Input Low Voltage	V_{IL}		—	—	0.6	V
Pin Capacitance	C_{IO}	PB0, PB1 and PB2 Pins	—	4	—	pF
		PB3 Pins	—	7	—	pF
Weak Pull-Up Current (Input Voltage = 0 V)	I_{PU}	V_{IO} = 1.8	–6	–3.5	–2	µA
		V_{IO} = 3.6	–30	–20	–10	µA
Input Leakage (Pullups off or Analog)	I_{LK}	0 ≤ V_{IN} ≤ V_{IO}	–1	—	1	µA
Input Leakage Current of Port Bank 3 I/O, V_{IN} above V_{IO}	I_L	V_{IO} < V_{IN} < V_{IO}+2.0 V (pins without EXREG functions)	0	5	150	µA
		V_{IO} < V_{IN} < V_{REGIN} (pins with EXREG functions)	0	5	150	µA
High Drive I/O (PB4)						
Output High Voltage	V_{OH}	Standard Mode, Low Drive, I_{OH} = –3 mA	V_{IOHD} – 0.7	—	—	V
		Standard Mode, High Drive, I_{OH} = –10 mA	V_{IOHD} – 0.7	—	—	V
Output Low Voltage	V_{OL}	Standard Mode, Low Drive, I_{OH} = 3 mA	—	—	0.6	V
		Standard Mode, High Drive, I_{OH} = 12.5 mA	—	—	0.6	V
Output Rise Time	t_R	Slew Rate Mode 0, V_{IOHD} = 5 V	—	50	—	ns
		Slew Rate Mode 1, V_{IOHD} = 5 V	—	300	—	ns
		Slew Rate Mode 2, V_{IOHD} = 5 V	—	1	—	µs
		Slew Rate Mode 3, V_{IOHD} = 5 V	—	3	—	µs

***Note:** $\overline{\text{RESET}}$ does not drive to logic high. Specifications for $\overline{\text{RESET}}$ V_{OL} adhere to the low drive setting.

3.2. Thermal Conditions

Table 3.18. Thermal Conditions

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Thermal Resistance*	θ_{JA}	LGA-92 Packages	—	35	—	°C/W
		TQFP-80 Packages	—	40	—	°C/W
		QFN-64 Packages	—	25	—	°C/W
		TQFP-64 Packages	—	30	—	°C/W
		QFN-40 Packages	—	30	—	°C/W
***Note:** Thermal resistance assumes a multi-layer PCB with any exposed pad soldered to a PCB pad.						

3.3. Absolute Maximum Ratings

Stresses above those listed under Table 3.19 may cause permanent damage to the device. This is a stress rating only and functional operation of the devices at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Table 3.19. Absolute Maximum Ratings

Parameter	Symbol	Test Condition	Min	Max	Unit
Ambient Temperature Under Bias	T_{BIAS}		–55	125	°C
Storage Temperature	T_{STG}		–65	150	°C
Voltage on VDD	V_{DD}		V_{SS}–0.3	4.2	V
Voltage on VREGIN	V_{REGIN}	EXTVREG0 Not Used	V_{SS}–0.3	6.0	V
		EXTVREG0 Used	V_{SS}–0.3	3.6	V
Voltage on VIO	V_{IO}		V_{SS}–0.3	4.2	V
Voltage on VIOHD	V_{IOHD}		V_{SS}–0.3	6.5	V
Voltage on I/O pins, non Port Bank 3 I/O	V_{IN}	$\overline{\text{RESET}}$, $V_{IO} \geq 3.3$ V	V_{SS}–0.3	5.8	V
		$\overline{\text{RESET}}$, $V_{IO} < 3.3$ V	V_{SS}–0.3	V_{IO}+2.5	V
		Port Bank 0, 1, and 2 I/O	V_{SS}–0.3	V_{IO}+0.3	V
		Port Bank 4 I/O	V_{SSHD}–0.3	V_{IOHD}+0.3	V
***Note:** VSS and VSSHD provide separate return current paths for device supplies, but are not isolated. They must always be connected to the same potential on board.					

Table 3.19. Absolute Maximum Ratings (Continued)

Parameter	Symbol	Test Condition	Min	Max	Unit
Power Dissipation at T_A = 85 °C	P_D	LGA-92 Package	—	570	mW
		TQFP-80 Package	—	500	mW
		QFN-64 Package	—	800	mW
		TQFP-64 Package	—	650	mW
		QFN-40 Package	—	650	mW
***Note:** VSS and VSSHD provide separate return current paths for device supplies, but are not isolated. They must always be connected to the same potential on board.					

4.1.5. Device Power Modes

The SiM3C1xx devices feature four low power modes in addition to normal operating mode. Several peripherals provide wake up sources for these low power modes, including the Low-Power Timer (LPT0), RTC0 (alarms and oscillator failure notification), Comparator 0, and PMU Pin Wake.

In addition, all peripherals can have their clocks disabled to reduce power consumption whenever a peripheral is not being used using the clock control (CLKCTRL) registers.

4.1.5.1. Normal Mode (Power Mode 0)

Normal Mode is the default mode of the device. The core and peripherals are fully operational, and instructions are executed from flash memory.

4.1.5.2. Power Mode 1

In Power Mode 1 the core and peripherals are fully operational, with instructions executing from RAM. Compared with Normal Mode, the active power consumption of the device in PM1 is reduced. Additionally, at higher speeds in PM1, the core throughput can also be increased because RAM does not require additional wait states that reduce the instruction fetch speed.

4.1.5.3. Power Mode 2

In Power Mode 2 the core halts and any enabled peripherals continue to run at the selected clock speed. The power consumption in PM2 corresponds to the AHB and APB clocks left enabled, thus the power can be tuned to the optimal level for the needs of the application. To place the device in PM2, the core should execute a wait-for-interrupt (WFI) or wait-for-event (WFE) instruction. If the WFI instruction is called from an interrupt service routine, the interrupt that wakes the device from PM2 must be of a sufficient priority to be recognized by the core. It is recommended to perform both a DSB (Data Synchronization Barrier) and an ISB (Instruction Syncronization Barrier) operation prior to the WFI to ensure all bus accesses complete. When operating from the LFOSC0 with the DMACTRL0 AHB clock disabled, PM2 can achieve similar power consumption to PM3, but with the ability to wake on APB-clocked interrupts. For example, enabling only the APB clock to the Ports will allow the firmware to wake on a PMATCH0, PBEXT0 or PBEXT1 interrupt with minimal impact on the supply current.

4.1.5.4. Power Mode 3

In Power Mode 3, the AHB and APB clocks are halted. The device may only wake from enabled interrupt sources which do not require the APB clock (RTC0ALRM, RTC0FAIL, LPTIMER0, VDDLOW and VREGLOW). A special fast wake option allows the device to operate at a very low level from the RTC0TCLK or LFOSC0 oscillator while in PM3, but quickly switch to the faster LPOSC0 when the wake event occurs. Because the current consumption of these blocks is minimal, it is recommended to use the fast wake option.

The device will enter PM3 on a WFI or WFE instruction. Because all AHB master clocks are disabled, the LPOSC will automatically halt and go into a low-power suspended state. If the WFI instruction is called from an interrupt service routine, the interrupt that wakes the device from PM3 must be of a sufficient priority to be recognized by the core. It is recommended to perform both a DSB (Data Synchronization Barrier) and an ISB (Instruction Synchronization Barrier) operation prior to the WFI to ensure all bus access is complete.

4.1.5.5. Power Mode 9

In Power Mode 9, the core and all peripherals are halted, all clocks are stopped, and the pins and peripherals are set to a lower power mode. In addition, standard RAM contents are not preserved, though retention RAM contents are still available after exiting the power mode. This mode provides the lowest power consumption for the device, but requires an appropriate reset to exit. The available reset sources to wake from PM9 are controlled by the Power Management Unit (PMU).

Before entering PM9, the desired reset source(s) should be configured in the PMU. The SLEEPDEEP bit in the ARM System Control Register should be set, and the PMSEL bit in the RSTSRC0_CONFIG register must be set to indicate that PM9 is the desired power mode.

The device will enter PM9 on a WFI or WFE instruction, and remain in PM9 until a reset configured by the PMU occurs. It is recommended to perform both a DSB (Data Synchronization Barrier) and an ISB (Instruction Synchronization Barrier) operation prior to the WFI to ensure all bus access is complete.

4.4. Data Peripherals

4.4.1. 16-Channel DMA Controller

The DMA facilitates autonomous peripheral operation, allowing the core to finish tasks more quickly without spending time polling or waiting for peripherals to interrupt. This helps reduce the overall power consumption of the system, as the device can spend more time in low-power modes.

The DMA controller has the following features:

- Utilizes ARM PrimeCell uDMA architecture.
- Implements 16 channels.
- DMA crossbar supports SARADC0, SARADC1, IDAC0, IDAC1, I2C0, I2S0, SPI0, SPI1, USART0, USART1, AES0, EPCA0, external pin triggers, and timers.
- Supports primary, alternate, and scatter-gather data structures to implement various types of transfers.
- Access allowed to all AHB and APB memory space.

4.4.2. 128/192/256-bit Hardware AES Encryption (AES0)

The basic AES block cipher is implemented in hardware. The integrated hardware support for Cipher Block Chaining (CBC) and Counter (CTR) algorithms results in identical performance, memory bandwidth, and memory footprint between the most basic Electronic Codebook (ECB) algorithm and these more complex algorithms. This hardware accelerator translates to more core bandwidth available for other functions or a power savings for low-power applications.

The AES module includes the following features:

- Operates on 4-word (16-byte) blocks.
- Supports key sizes of 128, 192, and 256 bits for both encryption and decryption.
- Generates the round key for decryption operations.
- All cipher operations can be performed without any firmware intervention for a set of 4-word blocks (up to 32 kB).
- Support for various chained and stream-ciphering configurations with XOR paths on both the input and output.
- Internal 4-word FIFOs to facilitate DMA operations.
- Integrated key storage.
- Hardware acceleration for Cipher-Block Chaining (CBC) and Counter (CTR) algorithms utilizing integrated counterblock generation and previous-block caching.

4.4.3. 16/32-bit CRC (CRC0)

The CRC module is designed to provide hardware calculations for Flash memory verification and communications protocols.

The CRC module supports four common polynomials. The supported 32-bit polynomial is 0x04C11DB7 (IEEE 802.3). The three supported 16-bit polynomials are 0x1021 (CCITT-16), 0x3D65 (IEC16-MBus), and 0x8005 (ZigBee, 802.15.4, and USB).

The CRC module includes the following features:

- Support for four common polynomials (one 32-bit and three 16-bit options).
- Byte-level bit reversal for the CRC input.
- Byte-order reorientation of words for the CRC input.
- Word or half-word bit reversal of the CRC result.
- Ability to configure and seed an operation in a single register write.
- Support for single-cycle parallel (unrolled) CRC computation for 32- or 8-bit blocks.
- Capability to CRC 32 bits of data per peripheral bus (APB) clock.
- Support for DMA writes using firmware request mode.

- Spike suppression up to 2 times the APB period.

4.6.6. I²S (I2S0)

The I²S module receives digital data from an external source over a data line in the standard I²S, left-justified, right-justified, or time domain multiplexing format, de-serializes the data, and generates requests to transfer the data using the DMA. The module also reads stereo audio samples from the DMA, serializes the data, and sends it out of the chip on a data line in the same standard serial format for digital audio. The I²S receive interface consists of 3 signals: SCK (bit clock), WS (word select or frame sync), and SD (data input). The block's transmit interface consists of 3 signals: SCK (bit clock), WS (word select or frame sync) and SD (data output).

The I²S module includes the following features:

- Master or slave capability.
- Flexible 10-bit clock divider with 8-bit fractional clock divider provides support for various common sampling frequencies (16 kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, and 48 kHz) for up to two 32-bit channels.
- Support for DMA data transfers.
- Support for various data formats.
- Time Division Multiplexing

Table 6.1. Pin Definitions and alternate functions for SiM3C1x7 (Continued)

Pin Name	Type	Pin Numbers TQFP-80	Pin Numbers LGA-92	Crossbar Capability (see Port Config Section)	Port Match	External Memory Interface (m = muxed mode)	Port-Mapped Level Shifter	Output Toggle Logic	External Trigger Inputs	Analog or Additional Functions
PB1.9/ TRACECLK	Standard I/O /ETM	46	A28	XBR0	✓					ADC1.9
PB1.10	Standard I/O	43	A26	XBR0	✓	A23m/ A15			DMA0T1	ADC1.8
PB1.11	Standard I/O	42	A25	XBR0	✓	A22m/ A14			DMA0T0	ADC1.7
PB1.12	Standard I/O	41	D3	XBR0	✓	A21m/ A13				ADC1.6
PB1.13	Standard I/O	40	A24	XBR0	✓	A20m/ A12			ADC0T15 WAKE.0	ADC1.5 CS0.10
PB1.14	Standard I/O	39	A23	XBR0	✓	A19m/ A11			ADC1T15 WAKE.1	ADC1.4 CS0.11
PB1.15	Standard I/O	38	A22	XBR0	✓	A18m/ A10			WAKE.2	ADC1.3 CS0.12
PB2.0	Standard I/O	37	B17	XBR1	✓	A17m/ A9	LSI0	Yes	INT0.0 INT1.0 WAKE.3	ADC1.2 CS0.13
PB2.1	Standard I/O	36	A21	XBR1	✓	A16m/ A8	LSI1	Yes	INT0.1 INT1.1 WAKE.4	ADC1.1 CS0.14
PB2.2	Standard I/O	35	B16	XBR1	✓	AD15m/ A7	LSI2	Yes	INT0.2 INT1.2 WAKE.5	ADC1.0 CS0.15 PMU_Asleep
PB2.3	Standard I/O	34	A20	XBR1	✓	AD14m/ A6	LSI3	Yes	INT0.3 INT1.3 WAKE.6	
PB2.4	Standard I/O	31	B14	XBR1	✓	AD13m/ A5	LSI4	Yes	INT0.4 INT1.4 WAKE.7	
PB2.5	Standard I/O	30	A18	XBR1	✓	AD12m / A4	LSI5	Yes	INT0.5 INT1.5	

6.2. SiM3C1x6 Pin Definitions

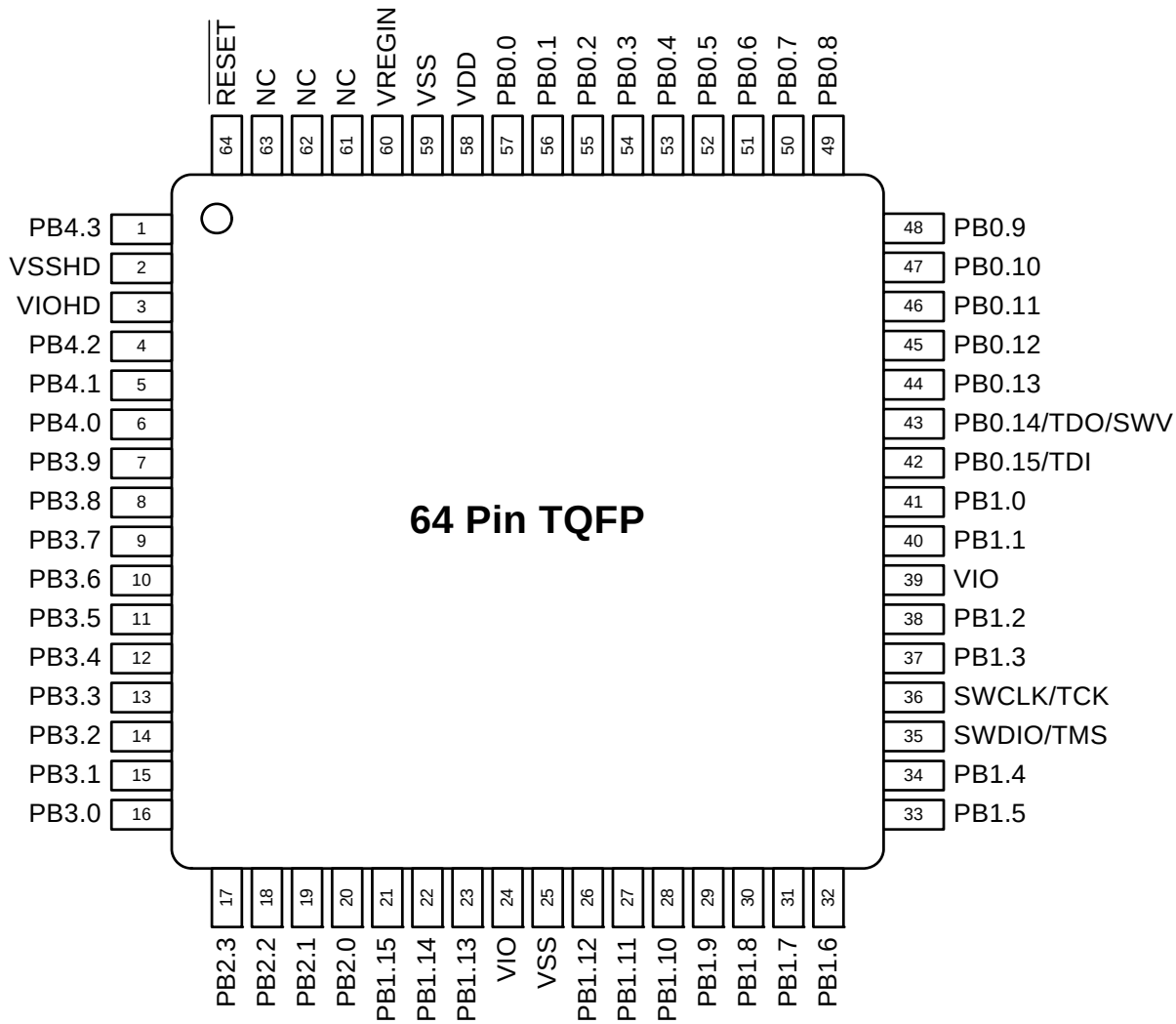

Figure 6.3. SiM3C1x6-GQ Pinout

Table 6.2. Pin Definitions and alternate functions for SiM3C1x6 (Continued)

Pin Name	Type	Pin Numbers	Crossbar Capability (see Port Config Section)	Port Match	External Memory Interface (m = muxed mode)	Port-Mapped Level Shifter	Output Toggle Logic	External Trigger Inputs	Analog or Additional Functions
PB1.8	Standard I/O	30	XBR0	✓	AD14m/ A6			WAKE.2	ADC1.3 CS0.12
PB1.9	Standard I/O	29	XBR0	✓	AD13m/ A5			WAKE.3	ADC1.2 CS0.13
PB1.10	Standard I/O	28	XBR0	✓	AD12m/ A4			DMA0T1 WAKE.4	ADC1.1 CS0.14
PB1.11	Standard I/O	27	XBR0	✓	AD11m/ A3			DMA0T0 WAKE.5	ADC1.0 CS0.15 PMU_Asleep
PB1.12	Standard I/O	26	XBR0	✓	AD10m/ A2			WAKE.6	
PB1.13	Standard I/O	23	XBR0	✓	AD9m/ A1				
PB1.14	Standard I/O	22	XBR0	✓	AD8m/ A0				
PB1.15	Standard I/O	21	XBR0	✓	AD7m/ D7				
PB2.0	Standard I/O	20	XBR1	✓	AD6m/ D6	LSI0	Yes	INT0.0 INT1.0	
PB2.1	Standard I/O	19	XBR1	✓	AD5m/ D5	LSI1	Yes	INT0.1 INT1.1	
PB2.2	Standard I/O	18	XBR1	✓	AD4m/ D4	LSI2	Yes	INT0.2 INT1.2	CMP0N.0 CMP1N.0 RTC0TCLK_OUT
PB2.3	Standard I/O	17	XBR1	✓	AD3m/ D3	LSI3	Yes	INT0.3 INT1.3	CMP0P.0 CMP1P.0
PB3.0	5 V Tolerant I/O	16	XBR1	✓	AD2m/ D2				CMP0P.1 CMP1P.1
PB3.1	5 V Tolerant I/O	15	XBR1	✓	AD1m/ D1				CMP0N.1 CMP1N.1

Table 6.2. Pin Definitions and alternate functions for SiM3C1x6 (Continued)

Pin Name	Type	Pin Numbers	Crossbar Capability (see Port Config Section)	Port Match	External Memory Interface (m = muxed mode)	Port-Mapped Level Shifter	Output Toggle Logic	External Trigger Inputs	Analog or Additional Functions
PB3.9	5 V Tolerant I/O	7	XBR1	✓	$\overline{BE0}$			DAC0T6 DAC1T6 LPT0T2 INT0.10 INT1.10 WAKE.15	CMP0N.5 CMP1N.5 EXREGBD
PB4.0	High Drive I/O	6				LSO0			
PB4.1	High Drive I/O	5				LSO1			
PB4.2	High Drive I/O	4				LSO2			
PB4.3	High Drive I/O	1				LSO3			

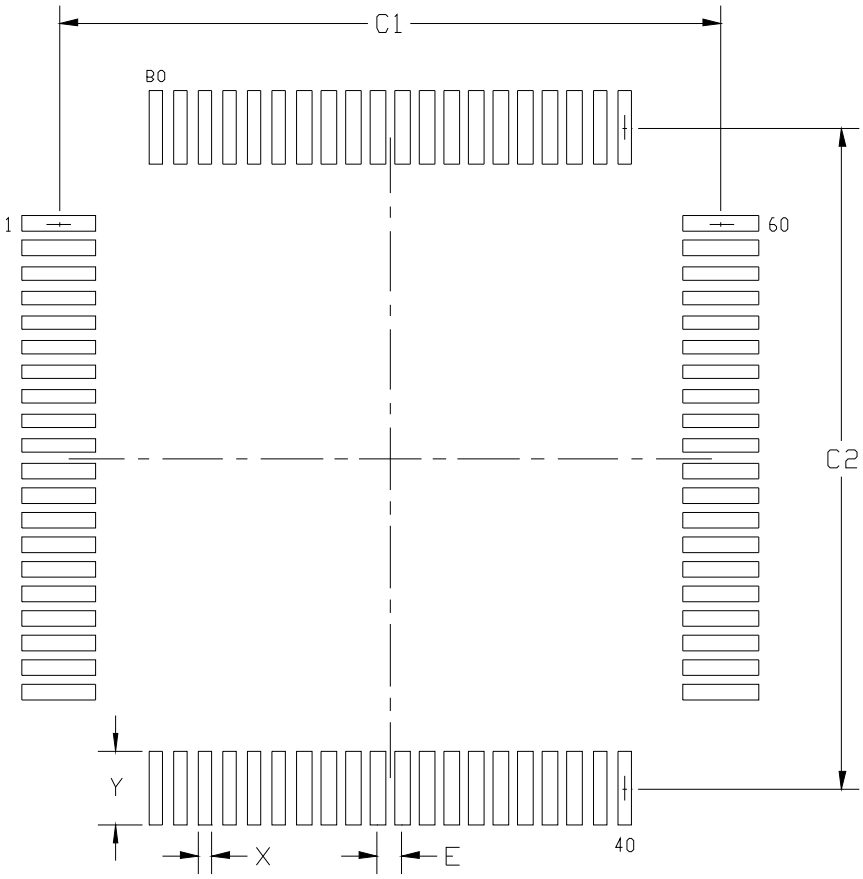

Figure 6.9. TQFP-80 Landing Diagram

Table 6.7. TQFP-80 Landing Diagram Dimensions

Dimension	Min	Max
C1	13.30	13.40
C2	13.30	13.40
E	0.50 BSC	
X	0.20	0.30
Y	1.40	1.50

Notes:
1. All dimensions shown are in millimeters (mm) unless otherwise noted.
2. This land pattern design is based on the IPC-7351 guidelines.

6.6.1. QFN-64 Solder Mask Design

All metal pads are to be non-solder mask defined (NSMD). Clearance between the solder mask and the metal pad is to be 60 µm minimum, all the way around the pad.

6.6.2. QFN-64 Stencil Design

1. A stainless steel, laser-cut and electro-polished stencil with trapezoidal walls should be used to assure good solder paste release.
2. The stencil thickness should be 0.125 mm (5 mils).
3. The ratio of stencil aperture to land pad size should be 1:1 for all pads.
4. A 3x3 array of 1.0 mm square openings on a 1.5 mm pitch should be used for the center ground pad.

6.6.3. QFN-64 Card Assembly

1. A No-Clean, Type-3 solder paste is recommended.
2. The recommended card reflow profile is per the JEDEC/IPC J-STD-020 specification for Small Body Components.

6.7. TQFP-64 Package Specifications

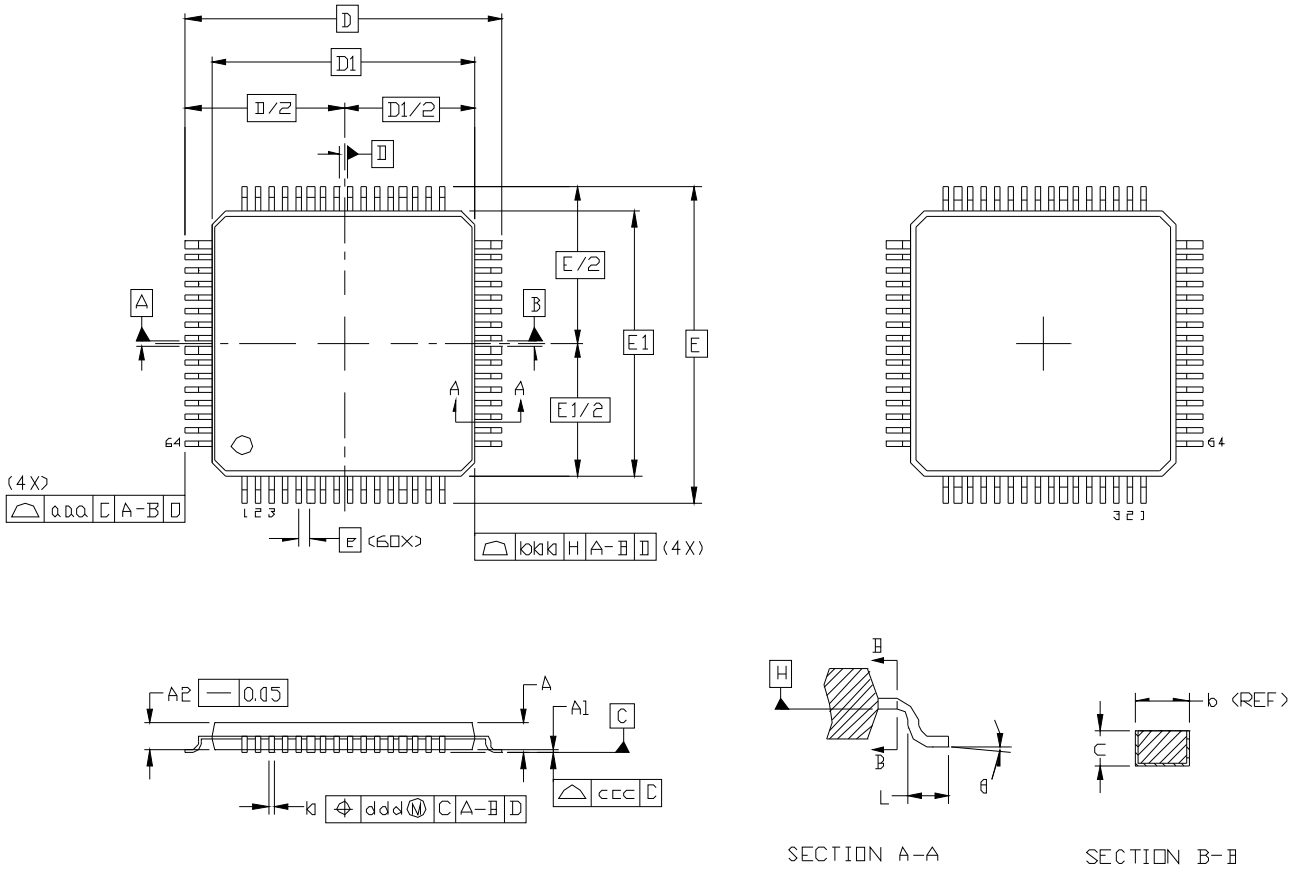

Figure 6.12. TQFP-64 Package Drawing

Table 6.10. TQFP-64 Package Dimensions

Dimension	Min	Nominal	Max
A	—	—	1.20
A1	0.05	—	0.15
A2	0.95	1.00	1.05
b	0.17	0.22	0.27
c	0.09	—	0.20
D	12.00 BSC		
D1	10.00 BSC		
e	0.50 BSC		
E	12.00 BSC		
E1	10.00 BSC		
L	0.45	0.60	0.75
Θ	0°	3.5°	7°

Table 6.10. TQFP-64 Package Dimensions (Continued)

Dimension	Min	Nominal	Max
aaa	—	—	0.20
bbb	—	—	0.20
ccc	—	—	0.08
ddd	—	—	0.08

Notes:

1. All dimensions shown are in millimeters (mm) unless otherwise noted.
2. Dimensioning and Tolerancing per ANSI Y14.5M-1994.
3. This package outline conforms to JEDEC MS-026, variant ACD.
4. Recommended card reflow profile is per the JEDEC/IPC J-STD-020 specification for Small Body Components.

6.8.1. QFN-40 Solder Mask Design

All metal pads are to be non-solder mask defined (NSMD). Clearance between the solder mask and the metal pad is to be 60 µm minimum, all the way around the pad.

6.8.2. QFN-40 Stencil Design

1. A stainless steel, laser-cut and electro-polished stencil with trapezoidal walls should be used to assure good solder paste release.
2. The stencil thickness should be 0.125 mm (5 mils).
3. The ratio of stencil aperture to land pad size should be 1:1 for all pads.
4. A 3x3 array of 1.1 mm square openings on a 1.6 mm pitch should be used for the center ground pad.

6.8.3. QFN-40 Card Assembly

1. A No-Clean, Type-3 solder paste is recommended.
2. The recommended card reflow profile is per the JEDEC/IPC J-STD-020 specification for Small Body Components.

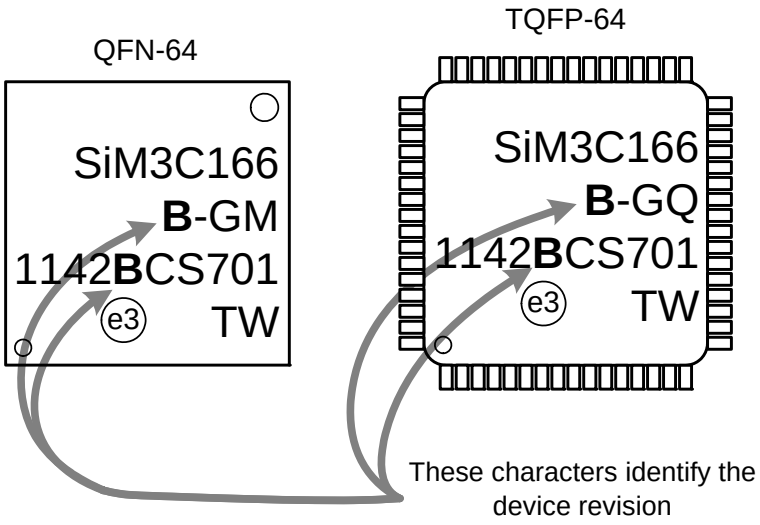

Figure 7.3. SiM3C1x6 Revision Information

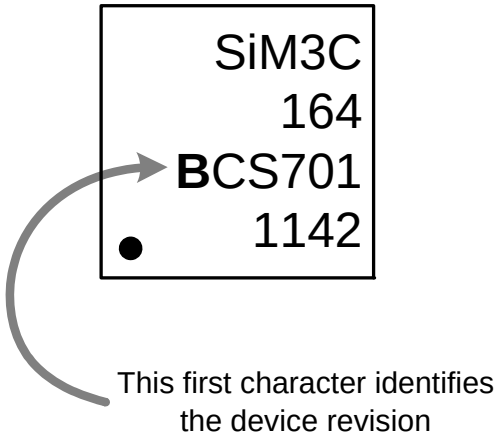

Figure 7.4. SiM3C1x4 Revision Information

7.2. Comparator Rising/Falling Edge Flags in Debug Mode (CMP0, CMP1)

7.2.1. Problem

On Revision A and Revision B devices, if the comparator output is high, the comparator rising and falling edge flags will both be set to 1 upon single-step or exit from debug mode.

7.2.2. Impacts

Firmware using the rising and falling edge flags to make decisions may see a false trigger of the comparator if the output of the comparator is high during a debug session. This does not impact the non-debug operation of the device.

7.2.3. Workaround

There is not a system-agnostic workaround for this issue.

7.2.4. Resolution

This issue exists on Revision A and Revision B devices. It may be corrected in a future device revision.