



4-bit Single Chip Microcomputer

- S1C6200B Core CPU
- Low Voltage and Low Power
- Built-in LCD Driver
- Built-in SVD (Supply Voltage Detector)

DESCRIPTION

The S1C60N16 Series is a single-chip microcomputer made up of the 4-bit core CPU S1C6200C, ROM (4,096 words \times 12 bits), RAM (256 words \times 4 bits), LCD driver, analog comparator, event counter, watchdog timer, and two types of time base counter. Because of its low-voltage operation and low power consumption, this series is ideal for a wide range of battery-driven applications. It is especially suitable for various controller applications such as a clock, game and pager.

■ CONFIGURATION

The S1C60N16 Series is configured as follows, depending on supply voltage and oscillation circuits.

Model	S1C60N16 S1C60L16		S1C60A16		
Supply voltage	3.0V	1.5V	3.0V		
Oscillation	OSC1 only		OSC1 and OSC3		
circuit	(Single clock)		(Twin clock)		
LCD	Supports				
power supply	3.0 V LCD panels				

FEATURES

The main features of the S1C60N16/L16/A16 are listed below.

OSC1 oscillation circuit Crystal oscillation circuit 32.768 kHz (Typ.) OSC3 oscillation circuit - CR or ceranic oscillation circuit (selected by mask option) 1 MHz (Typ.) Instruction set 108 types - Super Circuit (selected by mask option) 1 MHz (Typ.) Instruction execution time 153µsec, 214µsec, 366µsec (CLK=32.768kHz) - Super Circuit (selected by mask option) 1 MHz (Typ.) (CLK: CPU operation frequency) - Super Circuit (selected by mask option) - ROM capacity 4,096 words x 12 bits Super Circuit (selected by mask option) - RAM capacity 256 words x 4 bits - (CLK=1MHz) Not capacity 8 bits (pull-down resistor can be added by mask option) - 0 Output ports 8 bits (pull-down resistor is added during input data read-out) (3 bits can be configured as serial I/O ports by mask option) - I/O ports 8 bits (pull-down resistor is added during input data read-out) - - - Serial interface 1 port (8-bit clock synchronous system) - - - LCD driver 38 segments × 4, 3, or 2 commons (selected by mask option) - - -	Model		S1C60N16	S1C60L16	S1C60A16		
OSC3 oscillation circuit - CR or ceramic oscillation circuit (selected by mask option) 1 MHz (Typ.) Instruction set 108 types - 5µsec, 7µsec, 12µsec (differs depending on instruction) - 5µsec, 7µsec, 12µsec (CLK: CPU operation frequency) (CLK: CPU operation frequency) - 5µsec, 7µsec, 12µsec (CLK: CPU operation frequency) RAM capacity 4,096 words × 12 bits 5µsec, 7µsec, 12µsec (CLK: CPU operation frequency) Output ports 5 bits (pull-down resistor can be added by mask option) 0 (CLK: CPU operation) Output ports 8 bits (BZ, BZ, FOUT and SIOF outputs are available by mask option) (3 bits can be configured as serial I/O ports by mask option) V/O ports 8 bits (pull-down resistor can be added by mask option) V-3 V 1/4, 1/3 or 1/2 duty (voltage regulator and booster circuits built-in) Time base counter 1 port (8-bit clock synchronous system) Event counter Two 8-bit inputs (dial input evaluation or independent) Sound generator Programmable in 8 sounds (8 frequencies) Digital envelope built-in (can be disabled by mask option) Analog comparator Inverted input x 1, non-inverted input x 1 Implemented Supply voltage detection (SVD)	OSC1 oscillation cir	cuit	Crystal oscillation circuit 32.768 kHz (Typ.)				
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$ \begin{array}{c c c c c c c } \hline Watchdog timer & Built-in (can be disabled by mask option) \\ \hline Event counter & Two 8-bit inputs (dial input evaluation or independent) \\ \hline Sound generator & Programmable in 8 sounds (8 frequencies) \\ \hline Digital envelope built-in (can be disabled by mask option) \\ \hline Analog comparator & Digital envelope built-in (can be disabled by mask option) \\ \hline Analog comparator & Inverted input x 1, non-inverted input x 1 \\ \hline Supply voltage detection (SVD) & 2.2V & 1.2V & 2.2V \\ \hline Heavy load protection function & Not m lemented & Implemented \\ \hline External interrupt & Input interrupt: 2 systems \\ \hline Internal interrupt & Input interrupt: 2 systems \\ \hline Internal interrupt & 3.0V(2.2~3.6V) & 1.5V(1.2~1.8V) & 3.0V(2.2~3.6V) \\ \hline Current & CLK=32.768kHz & 0.7\muA & 0.7\muA & 1.5\muA \\ \hline \end{array}$	Time base counter		Two types (timer and stopwatch)				
Event counter Two 8-bit inputs (dial input evaluation or independent) Sound generator Programmable in 8 sounds (8 frequencies) Analog comparator Digital envelope built-in (can be disabled by mask option) Analog comparator Inverted input × 1, non-inverted input × 1 Supply voltage detection (SVD) 2.2V 1.2V 2.2V Heavy load protection function Not implemented Implemented External interrupt Input interrupt: 2 systems Input interrupt: 2 systems Internal interrupt 3.0V(2.2~3.6V) 1.5V(1.2~1.8V) 3.0V(2.2~3.6V) Supply voltage 3.0V(2.2~3.6V) 1.5V(1.2~1.8V) 3.0V(2.2~3.6V) Current CLK=32.768kHz 0.7µA 0.7µA 1.5µA	Watchdog timer		Built-in (can be disabled by mask option)				
Sound generator Programmable in 8 sounds (8 frequencies) Digital envelope built-in (can be disabled by mask option) Analog comparator Inverted input × 1, non-inverted input × 1 Supply voltage detection (SVD) 2.2V 1.2V 2.2V Heavy load protection function Mot implemented Implemented Implemented External interrupt Input interrupt: 2 systems Input interrupt: 2 systems Internal interrupt 3.0V(2.2~3.6V) 1.5V(1.2~1.8V) 3.0V(2.2~3.6V) Supply voltage 3.0V(2.2~3.6V) 1.5V(1.2~1.8V) 3.0V(2.2~3.6V)	Event counter		Two 8-bit inputs (dial input evaluation or independent)				
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Heavy load protection function Not implemented Implemented External interrupt Input interrupt: 2 systems Internal interrupt Time base counter interrupt: 2 systems Supply voltage 3.0V(2.2~3.6V) Current CLK=32.768kHz 0.7µA 0.7µA	Supply voltage detection (SVD)		2.2V	1.2V	2.2V		
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Current CLK=32.768kHz 0.7µA 0.7µA 1.5µA	Supply voltage		3.0V(2.2~3.6V)	1.5V(1.2~1.8V)	3.0V(2.2~3.6V)		
	Current	CLK=32.768kHz	0.7µA	0.7µA	1.5µA		

S1C60N16

consumption	(when halted)			(Normal operation mode)
(Typ. value)	CLK=32.768kHz	1.4µA	1.4µA	2.4µA
	(when executed)			(Normal operation mode)
	CLK=1MHz	-	_	50µA
	(ceramic)			(Normal operation mode)
	(when executed)			
	CLK=1MHz(CR)	-	-	85µA
	(when executed)			(Normal operation mode)
Form when shipped			QFP14-80pin or chip	

S1C60N16

BLOCK DIAGRAM



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