S1C33L01

EPSON

EXCEED YOUR VISION

32-bit Single Chip Microcontroller

● High-speed 32-bit RISC Core
● Multiply Accumulation
● Built-in LCD Controller
● 10-bit ADC
● Built-in ROM and RAM
● Twin-clock Oscillator

■ DESCRIPTIONS

The S1C33L01 is a CMOS 32-bit microcontroller composed of a CMOS 32-bit RISC core, ROM, RAM, DMA, timers, SIO, PLL, LCDC and other circuits. The S1C33L01 can be operated with high speed and spend little current. With the ADC, PWM and the MAC function, the S1C33L01 is suitable for voice applications and PDAs.

■ FEATURES

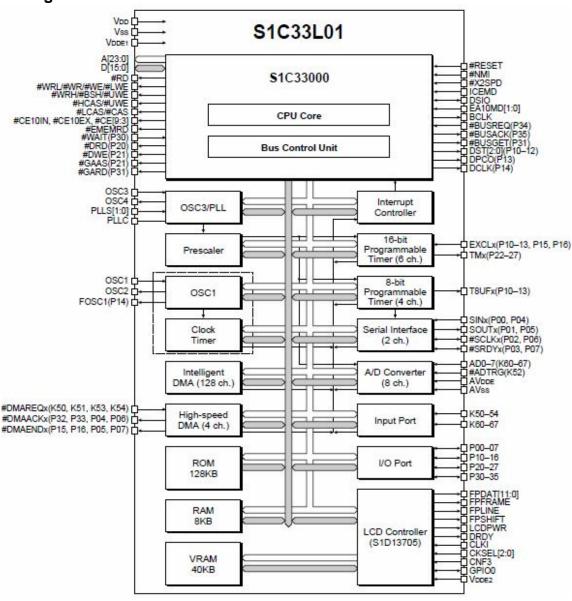|	
● CMOS LSI 32-bit parallel processing	S1C33000 RISC core
● Main clock	50MHz (Max., up to 12.5MHz external clock input)
● Sub clock	32.768kHz (Typ., crystal)
● Instruction set	16-bit fixed length, 105 instructions (MAC instruction is included, 2 cycles)
● Internal ROM size	128K bytes
● Internal RAM size	Data RAM : 8K bytes VRAM : 40K bytes
● LCD controller	4/8-bit monochrome/color LCD interface Active-matrix TFT/D-TFD interface 1, 2 or 4 bits/pixel; 2, 4, or 16-level gray-scale display 1, 2, 4 or 8 bits/pixel; 2, 4, 16 or 256 color display
● Clock timer	1 channel
● Programmable timer	8 bits × 4 channels and 16 bits × 6 channels
● PWM timer	Realized with a 16-bit programmable timer
● Watchdog timer	Realized with a 16-bit programmable timer
● Serial interface	2 channels Clock synchronization type and asynchronization type are selectable. Usable as an infrared ray (IrDA) interface.
● 10-bit A/D converter	Successive approximation type, 8 input channels
● High-speed DMA	4 channels
● Intelligent DMA	128 channels
● I/O port	Input port : 13 bits I/O port : 29 bits Pins are shared with the inputs and outputs of built-in peripheral circuits.
● Interrupt controller	External interrupts : 6 types Internal interrupts : 29 types
● External bus interface	24-bit address bus, 16-bit data bus, 7 chip enable pins DRAM and burst ROM may be connected directly.
● Shipping form	QFP21-176pin or chip
● Supply voltage	Core voltage : 1.8 to 3.6V I/O voltage : 1.8 to 5.5V
● Current consumption	SLEEP state : 10µA (3.3V, 32.768kHz, clock timer run state, Typ.) : 2.5µA (2.0V, 32.768kHz, clock timer run state, Typ.) RUN state : 60mA (3.3V, 50MHz Typ.)

S1C33L01

■ Block Diagram

S1C33L01

S1C33000

CPU Core

Bus Control Unit

VDD
VSS
VDDE1

A[23:0]
D[15:0]
#RD
#WRL/#WR/#WE/#LWE
#WRH/#BSH/#UWE
#HCAS/#UWE
#LCAS/#CAS
#CE10IN, #CE10EX, #CE[9:3]
#EMEMRD
#WAIT(P30)
#DRD(P20)
#DWE(P21)
#GAAS(P21)
#GARD(P31)

OSC3
OSC4
PLLS[1:0]
PLLC

OSC1
OSC2
FOSC1(P14)

#DMAREQx(K50, K51, K53, K54)
#DMAACKx(P32, P33, P04, P06)
#DMAENDx(P15, P16, P05, P07)

#RESET
#NMI
#X2SPD
ICEMD
DSIO
EA10MD[1:0]
BCLK
#BUSREQ(P34)
#BUSACK(P35)
#BUSGET(P31)
DST[2:0](P10–12)
DPCO(P13)
DCLK(P14)

OSC3/PLL

Prescaler

OSC1

Clock Timer

Intelligent DMA (128 ch.)

High-speed DMA (4 ch.)

ROM 128KB

RAM 8KB

VRAM 40KB

Interrupt Controller

16-bit Programmable Timer (6 ch.)

8-bit Programmable Timer (4 ch.)

Serial Interface (2 ch.)

A/D Converter (8 ch.)

Input Port

I/O Port

LCD Controller (S1D13705)

EXCLx(P10–13, P15, P16)
TMx(P22–27)

T8UFx(P10–13)

SINx(P00, P04)
SOUTx(P01, P05)
#SCLKx(P02, P06)
#SRDYx(P03, P07)

AD0–7(K60–67)
#ADTRG(K52)
AVDDE
AVSS

K50–54
K60–67

P00–07
P10–16
P20–27
P30–35

FPDAT[11:0]
FPFRAME
FPLINE
FPSHIFT
LCDPWR
DRDY
CLKI
CKSEL[2:0]
CNF3
GPIO0
VDDE2