Product List

OB38S033W20EP,
OB38S033W20BP,

Description

The OB38S033 is a 1T (one machine cycle per clock) single-chip 8-bit microcontroller. It has 16KB embedded program memory, and executes all ASM51 instructions fully compatible with MCS-51.

OB38S033 contains 512B on-chip RAM, up to 18 GPIOs (20L package), various serial interfaces and many peripheral functions as described below. It can be programmed via writers. Its on-chip ICE is convenient for users in verification during development stage.

The high performance of OB38S033 can achieve complicated manipulation within short time. About one third of the instructions are pure 1T, and the average speed is 8 times of traditional 8051, the fastest one among all the 1T 51-series.Its excellent EMI and ESD characteristics are advantageous for many different applications.

Ordering Information

OB38S033 ihhkL
YWW
i: process identifier { W = 2.4V ~ 5.5V}
hh: pin count
k: package type postfix {as table below }
L:PB Free identifier
{No text is Non-PB free，”P” is PB free}
Y: Year Code
WW: Week Code (01-52)

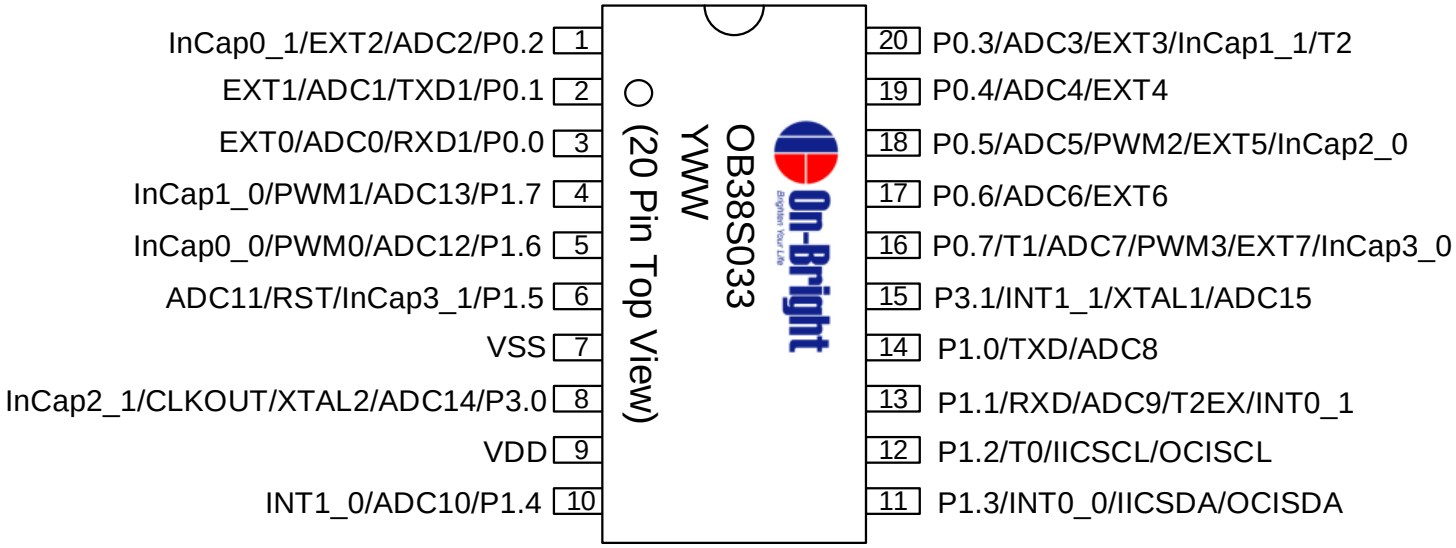
Postfix	Package
E	TSSOP(173mil)
B	QFN(3mmx3mm)

Features

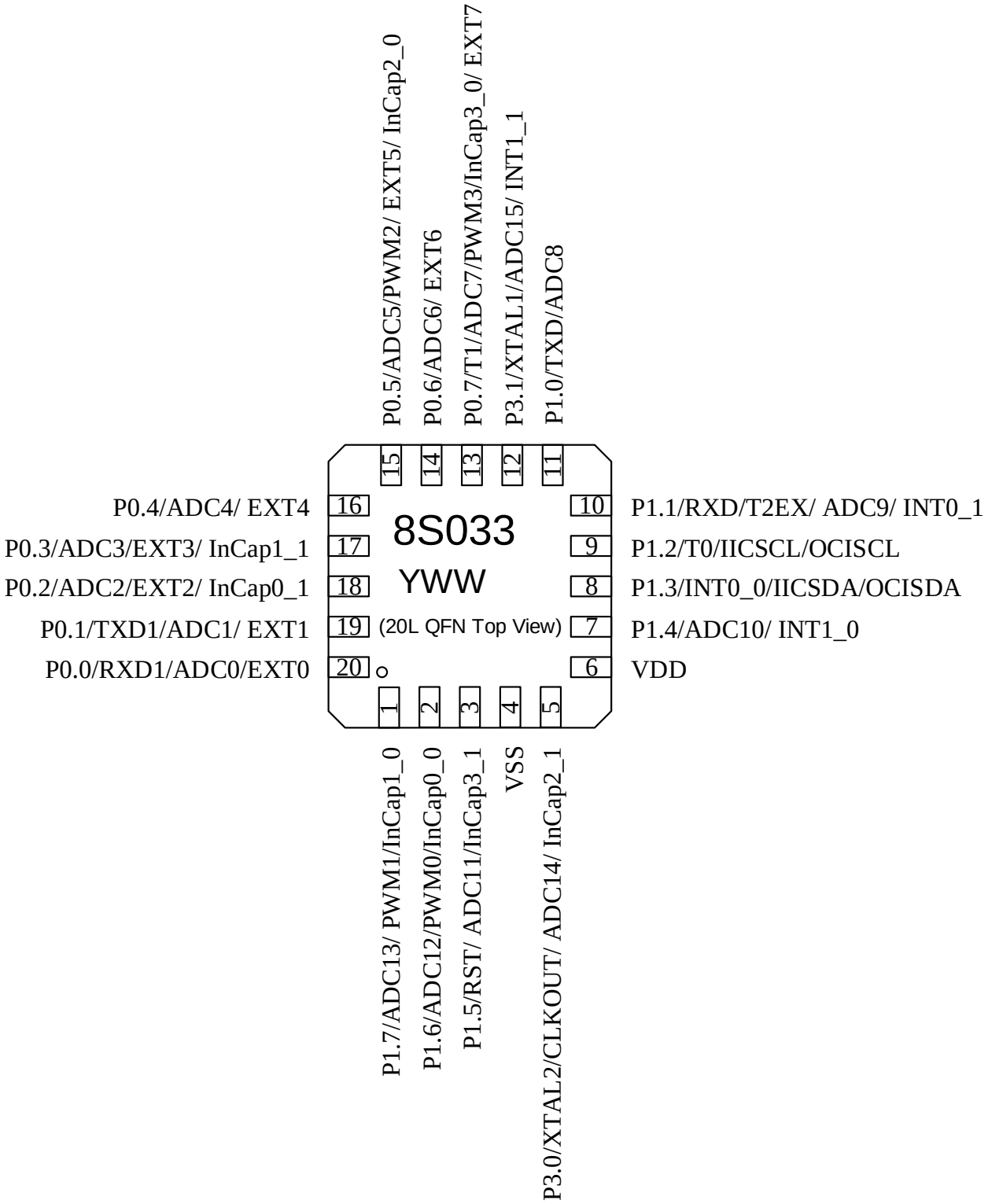
- Operating Voltage: 2.4V ~ 5.5V
  Support the fastest speed 16MHz 1T at 4.0V~5.5V.
  Support the fastest speed 16MHz 2T or 8MHz 1T at 2.4V~4.0V.
- 1~8T can be switched on the fly.
- Instruction-set compatible with MCS-51.
- 16MHz Internal RC oscillator, with programmable clock divider
- 16KB on-chip program memory.
- 512B RAM as standard 8052,
- Dual 16-bit Data Pointers (DPTR0 & DPTR1).
- 16MHz Internal RC oscillator
  ±1% @ Full-range VDD, TA=25℃
  ±3% @ Full-range VDD, TA=-40~105℃
- Clock source: XTAL/IRC, configurable
- Three 16-bit Timer/Counters. (Timer 0,1,2)
- 18 GPIOs(20L package)
- External interrupt 0,1 with four priority levels
- Port 0 External Interrupt (Level detect with one Interrupt ISR)
- Programmable watchdog timer.
- One IIC interface. (Master/Slave mode)
- Two serial peripheral interfaces in full duplex mode (UART0,1)
- 4-channel PWM with dead time
- 16+Int.1 channel 12-bit analog-to-digital converter (ADC).
- ICP functions.
- EEPROM function.
- On-Chip in-circuit emulator (ICE) functions with On-Chip Debugger (OCD).
- LVR/LVI(4.3/4.1/3.9/3.7/3.5/3.3/3.0/2.8V) +/- 5% (LVR deglitch 500ns)
- IO PAD ESD over 4KV
- Enhance user code protection.
- Power management unit for IDLE and power down modes.

Pin Configuration

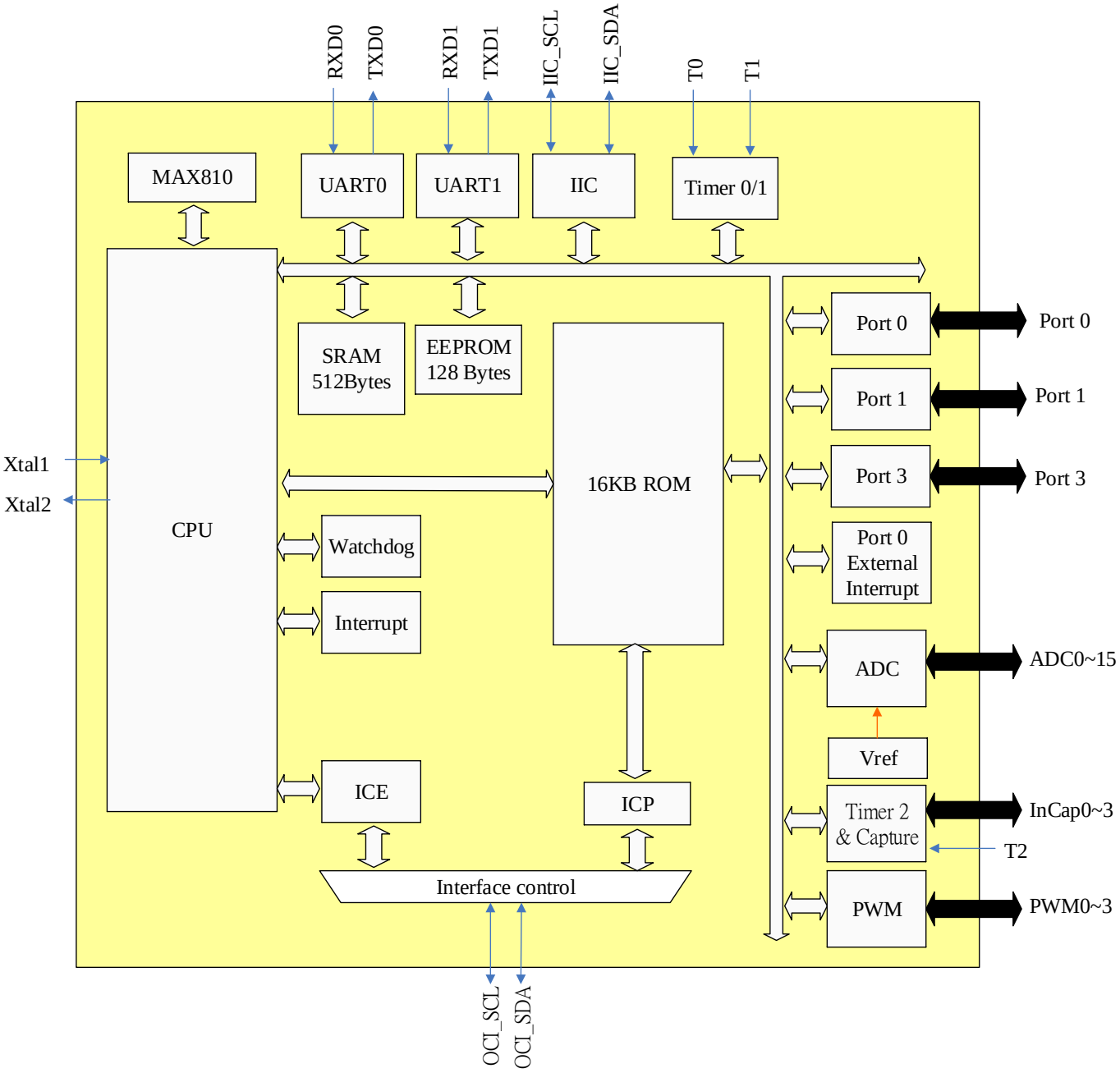
20 Pin TSSOP



20 Pin QFN


P0.5/ADC5/PWM2/ EXT5/ InCap2_0
P0.6/ADC6/ EXT6
P0.7/T1/ADC7/PWM3/InCap3_0/ EXT7
P3.1/XTAL1/ADC15/ INT1_1
P1.0/TXD/ADC8
15
14
13
12
11
P0.4/ADC4/ EXT4
16
P0.3/ADC3/EXT3/ InCap1_1
17
P0.2/ADC2/EXT2/ InCap0_1
18
P0.1/TXD1/ADC1/ EXT1
19
P0.0/RXD1/ADC0/EXT0
20
8S033
YWW
(20L QFN Top View)
10
P1.1/RXD/T2EX/ ADC9/ INT0_1
9
P1.2/T0/IICSCL/OCISCL
8
P1.3/INT0_0/IICSDA/OCISDA
7
P1.4/ADC10/ INT1_0
6
VDD
1
2
3
4
5
P1.7/ADC13/ PWM1/InCap1_0
P1.6/ADC12/PWM0/InCap0_0
P1.5/RST/ ADC11/InCap3_1
VSS
P3.0/XTAL2/CLKOUT/ ADC14/ InCap2_1

Block Diagram



Pin Description

20L TSSOP	20L QFN	Symbol	I/O	Description
1	18	P0.2/ADC2/EXT2/ InCap0_1	I/O	Bit 2 of port 0 & ADC input channel 2 & Timer 2 Input Capture Channel 0_1 & Port0 external interrupt 2
2	19	P0.1/TXD1/ADC1/ EXT1	I/O	Bit 1 of port 0 & Serial interface channel 1 receive/transmit data & ADC input channel 1 & Port0 external interrupt 1
3	20	P0.0/RXD1/ADC0/EXT0	I/O	Bit 0 of port 0 & Serial interface channel 1 receive/transmit data & ADC input channel 0 & Port0 external interrupt 0
4	1	P1.7/ADC13/ PWM1/InCap1_0	I/O	Bit 7 of port 1 & ADC input channel 13 & PWM Channel 1 &Timer 2 Input Capture Channel 1_0
5	2	P1.6/ADC12/PWM0/InCap0_0	I/O	Bit 6 of port 1 & ADC input channel 12 & PWM Channel 0 &Timer 2 Input Capture Channel 0_0
6	12	P3.1/XTAL1/ADC15/ INT1_1	I/O	Bit 1 of port 3 & Crystal input & ADC input channel 15 & External interrupt 1_1
7	4	VSS	I	Power supply
8	5	P3.0/XTAL2/CLKOUT/ ADC14/ InCap2_1	I/O	Bit 0 of port 3 & Crystal output & Clock Output & ADC input channel 14 & Timer 2 Input Capture Channel 2_1
9	6	VDD	I	Power supply
10	7	P1.4/ADC10/ INT1_0	I/O	Bit 4 of port 1 & ADC input channel 10 & External interrupt 1_0
11	8	P1.3/INT0_0/IICSDA/OCISDA	I/O	Bit 3 of port 1 & External interrupt 0_0 & IIC SDA pin & On-Chip Instrumentation Command and data I/O pin synchronous to OCI_SCL in ICE and ICP functions
12	9	P1.2/T0/IICSCL/OCISCL	I/O	Bit 2 of port 1 & Timer 0 external input & IIC SCL pin & On-Chip Instrumentation Clock I/O pin of ICE and ICP functions
13	10	P1.1/RXD/T2EX/ ADC9/ INT0_1	I/O	Bit 1 of port 1 & Serial interface channel 0 receive/transmit data & Timer 2 capture trigger & ADC input channel 9 & External interrupt 0_1
14	11	P1.0/TXD/ADC8	I/O	Bit 0 of port 1 & Serial interface channel 0 receive /transmit data & ADC input channel 8
15	3	P1.5/RST/ ADC11//InCap3_1	I/O	Bit 5 of port 1 & Reset pin & ADC input channel 11 & Timer 2 Input Capture Channel 3_1
16	13	P0.7/T1/ADC7/PWM3/InCap3_0/ EXT7	I/O	Bit 7 of port 0 & Timer 1 external input & ADC input channel 7 & PWM Channel 3 &Timer 2 Input Capture Channel 3_0 & Port0 external interrupt 7

17	14	P0.6/ADC6/ EXT6	I/O	Bit 6 of port 0 & ADC input channel 6 & Port0 external interrupt 6
18	15	P0.5/ADC5/PWM2/ EXT5/ InCap2_0	I/O	Bit 5 of port 0 & ADC input channel 5 & PWM Channel 2 & Timer 2 Input Capture Channel 2_0 & Port0 external interrupt 5
19	16	P0.4/ADC4/ EXT4	I/O	Bit 4 of port 0 & ADC input channel 4 & Port0 external interrupt 4
20	17	P0.3/ADC3/EXT3/ InCap1_1	I/O	Bit 3 of port 0 & ADC input channel 3 & Timer 2 Input Capture Channel 1_1 & Port0 external interrupt 3