

# □ MN102H950F

Type	MN102H950F
Internal ROM type	External
ROM (byte)	—
RAM (byte)	10K
Package (Lead-free)	LQFP100-P-1414
Minimum Instruction Execution Time	[With main clock operated] 58 ns (at 3.0 V to 3.6 V, 34 MHz)

## ■ Interrupts

/RST pin, Watchdog, /NMI pin, Timer counter 0 to 9 underflow, Timer counter 10 to 14 underflow, Timer counter 10 to 14 compare capture A, Timer counter 10 to 14 compare capture B, ATC ch.0 to ch.3 transfer finish, External 0 to 4, Serial ch.0 to ch.4 transmission, Serial ch.0 to ch.4 reception, A/D conversion finish

## ■ Timer Counter

Timer counter 0 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM0IO pin; system clock (BOSC)  
Interrupt source ..... underflow of timer counter 0

Timer counter 1 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8, 9; timer counter 0 output  
Interrupt source ..... underflow of timer counter 1

Timer counter 2 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM2IO pin; timer counter 1 output  
Interrupt source ..... underflow of timer counter 2

Timer counter 3 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM3IO pin; timer counter 2 output  
Interrupt source ..... underflow of timer counter 3

Timer counter 4 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM4IO pin; system clock (BOSC)  
Interrupt source ..... underflow of timer counter 4

Timer counter 5 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8, 9; timer counter 4 output  
Interrupt source ..... underflow of timer counter 5

Timer counter 6 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM6IO pin; timer counter 5 output  
Interrupt source ..... underflow of timer counter 6

Timer counter 7 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 9; TM7IO pin; timer counter 6 output  
Interrupt source ..... underflow of timer counter 7

Timer counter 8 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; system clock (BOSC); 1/4 of system clock (XI) frequency;  
TM8IO pin  
Interrupt source ..... underflow of timer counter 8

Timer counter 9 : 8-bit × 1

Clock source ..... 1/2 of system clock (BOSC) frequency; underflow of timer counter 8; TM9IO pin; timer counter 8 output  
Interrupt source ..... underflow of timer counter 9

Timer counter 10 : 16-bit × 1

(timer output, event count, input capture, PWM output, 2-phase encoder input)

Clock source ..... underflow of timer counter 8, 9; TM10IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM10IOA pin/TM10IOB pin (1 ×, 4 ×)  
Interrupt source ..... underflow of timer counter 10; timer counter 10 compare capture A; timer counter 10 compare capture B

## Timer counter 11 : 16-bit × 1

(timer output, event count, input capture, PWM output, 2-phase encoder input)

Clock source..... underflow of timer counter 8, 9; TM11IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM11IOA pin/TM11IOB pin (1 ×, 4 ×)

Interrupt source ..... underflow of timer counter 11; timer counter 11 compare capture A; timer counter 11 compare capture B

## Timer counter 12 : 16-bit × 1

(timer output, event count, input capture, PWM output, 2-phase encoder input)

Clock source..... underflow of timer counter 8, 9; TM12IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM12IOA pin/TM12IOB pin (1 ×, 4 ×)

Interrupt source ..... underflow of timer counter 12; timer counter 12 compare capture A; timer counter 12 compare capture B

## Timer counter 13 : 16-bit × 1

(timer output, event count, input capture, PWM output, 2-phase encoder input)

Clock source..... underflow of timer counter 8, 9; TM13IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM13IOA pin/TM13IOB pin (1 ×, 4 ×)

Interrupt source ..... underflow of timer counter 13; timer counter 13 compare capture A; timer counter 13 compare capture B

## Timer counter 14 : 16-bit × 1

(timer output, event count, input capture, PWM output, 2-phase encoder input)

Clock source..... underflow of timer counter 8, 9; TM14IOB pin; 1/2 of system clock (BOSC) frequency; 2-phase encode of TM14IOA pin/TM14IOB pin (1 ×, 4 ×)

Interrupt source ..... underflow of timer counter 14; timer counter 14 compare capture A; timer counter 14 compare capture B

## ■ Serial interface

Serial 0, 1 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)

Clock source..... 1/8 of timer counter 6 underflow frequency; 1/8, 1/2 of timer counter 0 underflow frequency; external pin

Serial 2, 3 : 8-bit × 1 (transfer direction of MSB / LSB selectable, transmission / reception of 7, 8-bit length)

Clock source..... 1/8 of timer counter 2 underflow frequency; 1/8, 1/2 of timer counter 4 underflow frequency; external pin

UART × 4 (common use with serial 0 to 3)

I<sup>2</sup>C × 2 (common use with serial 1,3; single master)

## ■ I/O Pins

I/O	63	Common use : 43 (use of full address, address data separate 16-bit mode) Common use : 57 (use of address 16-bit, address data separate 8-bit mode) Common use : 56 (use of full address, address data multiplex 16-bit mode) Common use : 63 (use of address 16-bit, address data multiplex 8-bit mode)
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## ■ A/D converter

10-bit × 12-ch. (with S/H)

## ■ D/A converter

8-bit × 4-ch.

## ■ PWM

16-bit × 5-ch. (timer counter 10 to 14)

## ■ ICR

16-bit × 5-ch. (timer counter 10 to 14)

## ■ OCR

16-bit × 5-ch. (timer counter 10 to 14)

## ■ Notes

Address / data separate bus interface; 8 / 16-bit bus width selectable; SRAM interface

Address / data multiplex bus interface support

## ■ Electrical Characteristics (Supply current)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDDopr	VI = VDD or VSS, output open f = 34 MHz, VDD = 3.3 V			60	mA
Supply current at STOP	IDDS	Pin with pull-up resistor is open all other input pins and Hi-Z state input/output pins are simultaneously applied VDD or VSS level			70	µA
Supply current at HALTO	IDDH	f = 34 MHz, VDD = 3.3 V, output open			30	mA

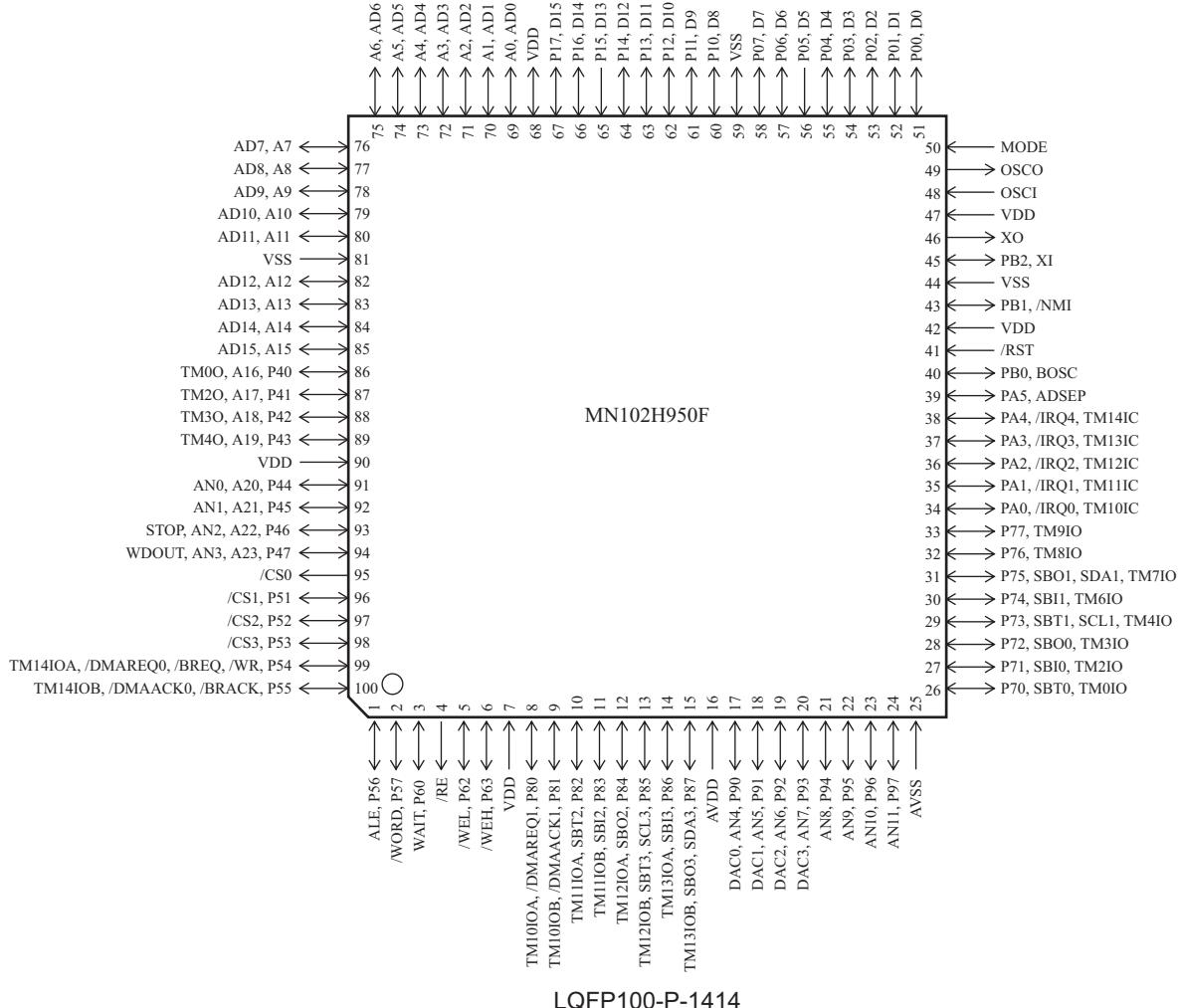
(Ta = -40°C to +85°C, VDD = AVDD = 3.3 V, VSS = AVSS = 0 V)

## ■ Development tools

In-circuit Emulator

PX-ICE102H930F-LQFP100-P-1414

## ■ Pin Assignment



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