

MN102H60G / HF60G

Type	MN102H60G (under development) / HF60G (under development)	
ROM (×8-Bit)	128 K / 128 K (Flash)	
RAM (×8-Bit)	4 K / 4 K	
Minimum Instruction Execution Time	With Main Clock operated	58 ns (at 3.0 V to 3.6 V, 34 MHz)
Interrupts	• $\overline{\text{RST}}$ Pin • Watchdog • NMI Pin • Timer Counter 0 to 7 Underflow • Timer Counter 8 to 12 Underflow • Timer Counter 8 to 12 Compare Capture A • Timer Counter 8 to 12 Compare Capture B • ATC ch 0 to 3 Transfer finish • ETC ch 0 to 1 Transfer finish • External 0 to 4 • Serial ch 0 to 4 Transmission • Serial ch 0 to 4 Reception • $\overline{\text{KI}}$ Pin (OR) • A/D Conversion finish	
Timer Counter	Timer Counter 0 : 8-Bit × 1 (Prescaler, Timer Output, Event Count, Clock Supply for 16-Bit Timer, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), 1/4 of System Clock (XI), System Clock (BOSC), TM0IO Pin Interrupt Source . . . Underflow of Timer Counter 0 Timer Counter 1 : 8-Bit × 1 (Serial Clock Generator, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, 4 Interrupt Source . . . Underflow of Timer Counter 1 Timer Counter 2 : 8-Bit × 1 (Serial Clock Generator, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, 4 Interrupt Source . . . Underflow of Timer Counter 2 Timer Counter 3 : 8-Bit × 1 (A/D Conversion Start up, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, 4 Interrupt Source . . . Underflow of Timer Counter 3 Timer Counter 4 : 8-Bit × 1 (Serial Clock Generator, Timer Output, Event Count, Clock Supply for 16-Bit Timer, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, TM4IO Pin Interrupt Source . . . Underflow of Timer Counter 4 Timer Counter 5 : 8-Bit × 1 (Serial Clock Generator, Timer Interrupts) Clock Source . . . 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, System Clock (BOSC) Interrupt Source . . . Underflow of Timer Counter 5 Timer Counter 6 : 8-Bit × 1 (Timer Interrupts) Clock Source . . . 1/4 of System Clock (XI), Underflow of Timer Counter 0, 4 Interrupt Source . . . Underflow of Timer Counter 6 Timer Counter 7 : 8-Bit × 1 (Timer Output, Event Count, Timer Interrupts) Clock Source . . . 1/4 of System Clock (XI), Underflow of Timer Counter 0, TM7IO Pin Interrupt Source . . . Underflow of Timer Counter 7 Connectable . . . Timer Counter 0 to 7 Timer Counter 8 : 16-Bit × 1 (Timer Output, Event Count, Input Capture, PWM Output, 2-Phase Encoder Input) Clock Source . . . Underflow of Timer Counter 0, 4, TM8IB Pin, 1/2 of System Clock (BOSC), TM8IA Pin, 2-Phase Encode of TM8IB Pin (1×, 4×) Interrupt Source . . . Underflow of Timer Counter 8, Timer Counter 8 Compare Capture A, Timer Counter 8 Compare Capture B Timer Counter 9 : 16-Bit × 1 (Timer Output, Event Count, Input Capture, PWM Output, 2-Phase Encoder Input) Clock Source . . . Underflow of Timer Counter 0, 4, TM9IB Pin, 1/2 of System Clock (BOSC), TM9IA Pin, 2-Phase Encode of TM9IB Pin (1×, 4×), TM9IC Pin Interrupt Source . . . Underflow of Timer Counter 9, Timer Counter 9 Compare Capture A, Timer Counter 9 Compare Capture B Timer Counter 10 : 16-Bit × 1 (Timer Output, Event Count, Input Capture, PWM Output, 2-Phase Encoder Input) Clock Source . . . Underflow of Timer Counter 0, 4, TM10IB Pin, 1/2 of System Clock (BOSC), TM10IA Pin, 2-Phase Encode of TM10IB Pin (1×, 4×) Interrupt Source . . . Underflow of Timer Counter 10, Timer Counter 10 Compare Capture A, Timer Counter 10 Compare Capture B	

Timer Counter (Continue)			Timer Counter 11 : 16-Bit × 1 (Timer Output, Event Count, Input Capture, PWM Output, 2-Phase Encoder Input) Clock Source Underflow of Timer Counter 0, 4, TM11IB Pin, 1/2 of System Clock (BOSC), TM11IA Pin, 2-Phase Encode of TM11IB 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 0, 4, 1/2 of System Clock (BOSC), TM12IA Pin, 2-Phase Encode of TM12IB Pin (1×, 4×), TM12IC Pin Interrupt Source Underflow of Timer Counter 12, Timer Counter 12 Compare Capture A, Timer Counter 12 Compare Capture B Timer Counter 13, 14 : 8-Bit × 2 (Simple PWM Output) Clock Source .. 1/2 of System Clock (BOSC), Underflow of Timer Counter 0 Timer Counter 15 : 16-Bit × 1 (Pulse Width Measurement) Clock Source .. System Clock (BOSC), 1/2 of System Clock (BOSC), Underflow of Timer Counter 0, TM15IB Pin Connectable Timer Counter 13, 14
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 1 Underflow, 1/8, 1/2 of Timer Counter 2 Underflow, 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 4 Underflow, 1/8, 1/2 of Timer Counter 5 Underflow, External Pin Serial 4 : 8-Bit × 1 (Transfer direction of MSB / LSB selectable, Transmission / Reception of 7, 8-Bit length) Clock Source 1/8 of Timer Counter 1 Underflow, 1/8, 1/2 of Timer Counter 5 Underflow, External Pin UART × 2 (Common use with Serial 3, 4) I²C × 2 (Common use with Serial 3,4, Single Master)
I/O Pins	I/O	82	• Common use 46 (Address Data Separate 8-Bit Mode) • Common use : 53 (Address Data Multiplex 8-Bit Mode)
A/D			10-Bit × 8ch (with S/H)
PWM			16-Bit × 5ch (Timer Counter 8 to 12)
ICR			16-Bit × 5ch (Timer Counter 8 to 12)
OCR			16-Bit × 5ch (Timer Counter 8 to 12)
Notes			Address / Data Multiplex Bus Interface, Address / Data Separate Bus Interface, 8-Bit / 16-Bit Bus Width selectable, DRAM Refresh Controller built-in
Package			LQFP100-P-1414

Electrical Characteristics

A/D Characteristics

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Non-linear Error		10-Bit			±4	LSB
A/D Conversion Time		at 34 MHz	3.73			μs
Analog Input Voltage	VIA		VSS		VDD	V

(Ta = 25 °C, VDD = AVDD = 3.3 V, VSS = AVSS = 0 V)

Supply Current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDDopr	VI = VDD or VSS, Output release f = 34 MHz, VDD = 3.3 V			50	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 HALT	IDDH	f = 34 MHz, VDD = 3.3 V Output release			25	mA

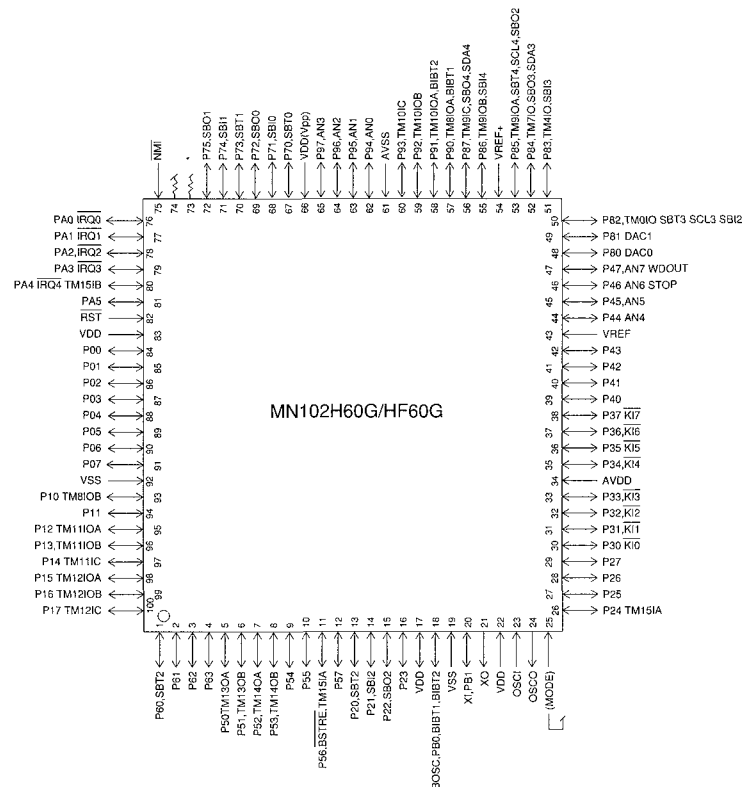
(Ta = -40 °C to +85 °C, VDD = AVDD = 3.3 V, VSS = AVSS = 0 V)

Support Tool

In Circuit Emulator

PX-ICE102H60G

Pin Assignment



LQFP100-P-1414

* Use 33 kΩ to 50 kΩ.