

MN103004J / 04K / F04K

Type	MN103004J / 04K / F04K	
Command ROM (×64-Bit)	192 KB / 128 KB / 256 KB (Flash)	
Data RAM (×32-Bit)	4 KB / 10 KB / 12 KB	
Minimum Instruction Execution Time	MN103004J / 04K: MN103004J / 04K: MN1030F04K:	30 ns (at 2.2 V, 33 MHz) 25 ns (at 3.0 V, 40 MHz) 36 ns (at 3.0 V, 28 MHz, 40 MHz (under development))
Interrupts	• RESET • IRQ × 8 • NMI × 1 • Timer × 22 • Input Capture × 14 • PWM × 4 • SIF × 16 • DMAC × 4 • WDT • A/D • System error	
Timer Counter	Timer Counter 0 to 3: 32-Bit × 1 (Interval Timer, Event Count, Toggle Output, Interrupt, A/D Conversion Trigger) Clock Source IOCLK, IOCLK/8, IOCLK/32, External Clock Input, Underflow of Timer Counter Interrupt Source Underflow of Timer Counter 0, 1, 2, 3 Timer Counter 4 to 7: 32-Bit × 1 (Interval Timer, Event Count, Toggle Output, Interrupt, Clock Source for Serial I/F, Generation of Timer Synchronous Output Timing) Clock Source IOCLK, IOCLK/8, IOCLK/32, External Clock Input, Underflow of Timer Counter Interrupt Source Underflow of Timer Counter 4, 5, 6, 7 Timer Counter 8 to B: 32-Bit × 1 (Interval Timer, Event Count, Toggle Output, Interrupt, Clock Source for Serial I/F, Generation of Timer Synchronous Output Timing) Clock Source IOCLK, IOCLK/8, IOCLK/32, External Clock Input, Underflow of Timer Counter Interrupt Source Underflow of Timer Counter 8, 9, A, B * Each of Timer Counters 0 to 3, 4 to 7, and 8 to B can be Changed to an 8-, 16-, or 24-Bit Timer Counter Timer Counter 10 to 13: 16-Bit × 4 (Interval Timer, Event Count, Toggle Output, Interrupt, DMA Start) Clock Source IOCLK, IOCLK/8, IOCLK/32, External Clock Input, Underflow of Timer Counter 0, 1, 2 Interrupt Source Underflow of Timer Counter 10, 11, 12, 13 Timer Counter 14, 15: 16-Bit × 2 (Interval Timer, Event Count, Toggle Output, PMW Output, Interrupt, Input Capture (2 Lines), One-Shot Output, External Trigger Start, Generation of Timer Synchronous Output Timing, DMA Start) Clock Source IOCLK, IOCLK/8, External Clock Input (2 Lines), Underflow of Timer Counter 0, 1, 2-Phase Encode Interrupt Source Overflow of Timer 14, 15, Underflow of Timer 14, 15, Coincidence of Compare Register with Binary Counter or at Capture Watchdog Timer: 16- to 25-Bit × 1ch	
DMA Controller	Number of Channels 2 Unit of Transfer 8/16/32 bits Max Transfer Cycles 65535 Starting Factor External Interrupt, Timer Factor, PNM Factor, Serial Transmission/Reception Factor, A/D Conversion finish, Software Factor Transfer Method 2-Bus Cycle Transfer Addressing Modes Fixed, Increment, Decrement Transfer Modes Word Transfer, Burst Transfer, Intermittent Transfer	
Serial Interface	Serial 0, 1: 7-, 8-Bit × 2 (Clock Synchronous Mode, Start-Stop Synchronous Mode, I²C Mode) Serial 2: 7-, 8-Bit × 1 (Start-Stop Synchronous Mode) Serial 3 to 7: 7-, 8-Bit × 5 (Clock Synchronous Mode) Clock Source (Clock Synchronous Mode, Start-Stop Synchronous Mode) IOCLK, Underflow of Timer Counter, External Clock (I²C Mode) IOCLK, Underflow of Timer Counter	

I/O Pins	I/O	155	• Common use 137
	Input	16	• Common use 16
A/D Inputs 10-Bit × 16ch			
PWM 12-, 14-Bit resolution × 4ch (dedicated), 16-Bit resolution × 2ch (Common with Timer)			
ICR 28-Bit × 13ch + 16-Bit × 4ch (Common with Timer)			
OCR 16-Bit × 4ch (Common with Timer)			
Timer Synchronous Output 4-Bit (Synchronous Output) × 2ch			
Package QFP208-P-2828A (MN103004J / 04K / F04K), FLGA239-C-1313 (MN103004K / F04K)			

Electrical Characteristics

MN103004J / 04K

Supply Current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDD1	VDDH, VDDB, VDD, PVDD, AVDD = 3.0 V VI = VDDH (VDDB) or VSS At internal = 40 MHz Output released			150	mA
Supply current at stopping	IDD4	VDD, PVDD, AVDD = 3.6 V VI = VDDH (VDDB) or VSS Fosc = Oscillation stopped Output released			150*	μA

*FLGA239-C-1313 (Ta = -20 °C to +85 °C)

A/D Conversion Performance

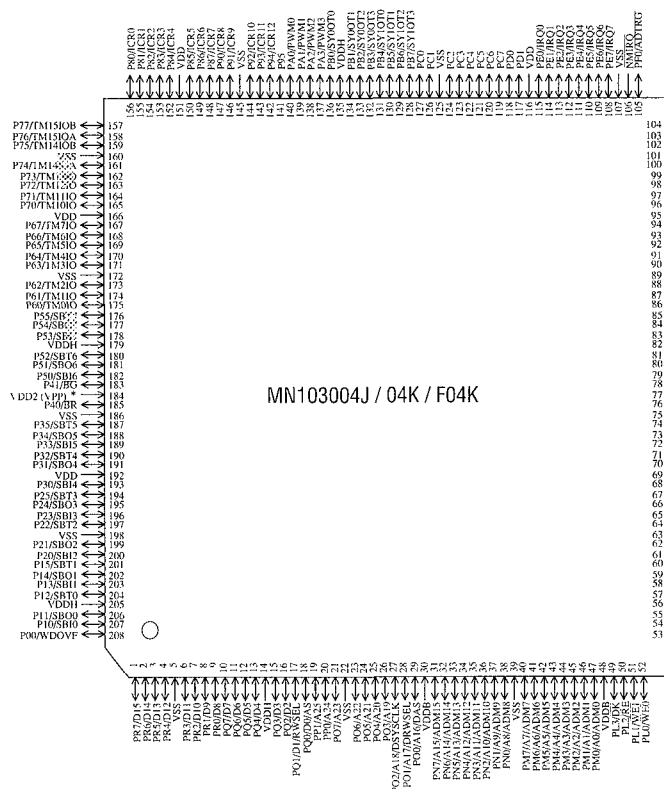
Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Resolution					10	Bits
A/D conversion absolute Error		VREF+ = 3.0 V A/D conversion clock = 5 MHz			±7	LSB
A/D conversion relative Error					±5	LSB
A/D conversion time			2.8			μs

(Ta = -20 °C to +85 °C, AVDD = 3.0 V, AVSS = 0.0 V)

Support Tool

In-Circuit Emulator	PX-ICE103004
---------------------	--------------

Pin Assignment

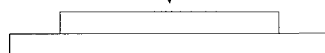


MN103004J / 04K / F04K

QFP208-P-2828A

* VDD2 for MN103004K or MN103004J and VPP for MN1030E04K

Perspective



			P67 IRQ7	NMI/RQ	PE1 IRQ1	PD0	PC4	PC1	PB1, SY0/T1	PA2, PWM2	P94 ICR12	P91, ICR9	P84 ICR4	P80, ICR0			
				PE5 IRQ5	PE3 IRQ3	VDD	PC2	PB7, SY1/T3	PB3, SY0/T3	PA0, PWM0	P92, ICR10	P85, ICR5	ICR2, ICR2				
AVDD			P77, VREFRG	VSS	PE4 IRQ4	PC6	PC5	VSS	PB5, SY1/T1	PB0 SY0/T0	VSS	VDD	P87, ICR7	P77 TM1SIOB		P76, TM1SIOA	
PG2 AN2	PG0 AN0	VREFH	PE6, IRQ6	PE2, IRQ2	PD1	PC3	PB6, SY1/T2	VDDH	PA1, PWM1	P90, ICR8	P83, ICR3	P74, TM14IO	P75, TM14IOB	P73, TM13IO	VSS		
PG3, AN3	PG5 AN5	PG1 AN1	PG4, AN4	PE0, IRQ0	PC7	PC0	PB2, SY0/T2	PA3 PWM3	P95	P86, ICR6	P81, ICR1	P70, TM10IO	P72, TM12IO	VDD		P71, TM11IO	
PG7 AN7	PH1 AN9	PH2, AN10	PG6 AN6	PH3, AN11	PH0 AN8	PB4, SY1/T0			P93 ICR11	P67 TM7IO	P63, TM3IO	P65, TM5IO	VSS	P66 IM6IO	P64 IM4IO		
PH7, AN15	PH5, AN13	PH6, AN14	AVSS	PI0	PI4, AN12					P60 IM0IO	P54, SBOT	P62, TM2IO	P55, SBT7	P61, TM1IO	P53, SB17		
PI2	PI3	PI4	VDDH	PI1							P41 IG	VDDH	P51 SDO6	P52, SBT6	P50, SB16		
PIO, DWE	PI7	VSS	PI5	PI6									P35, SBT5	P34, SBT5	P40 TR	VDD2 (VPP)	VSS
PK2 CS2, RAS2	PK0 CS0	PK1 CS1, RAS1	VDD	PI4	PJ2, DCAS1						P31 SBO4	P33, SB15	P30, SB14	P32, SBT4	VDD	P25, SBT3	
OSCO	PK4 SYSCLK	VDDH	PK3 CS3	PJ3, CAS	PJ1, DCAS0	PN5 A13, ADM13				P05 A21	P24, SH03	P21, SH02	P22, SBT2	P15, SBT1	P23, SB13	VSS	
OSC1	VSS	PK7, FRQS	PK6, EXMOD1	PK5, EXMOD0	PN1 A9, ADM9	PN3 A11, ADM11	P09 A16 DAS	P02 A18, DSY SCLR	PP0 A24	PQ2 D2	PR1 D9	PI3, SB11	P20, SB12	P14 SBO1	PI2, SBT0		
MMOD1	RST	MMOD0	PVSS	PM4 A4, ADM4	PN0 A8, ADM8	PN4 A12, ADM12	P07 A23	PQ3 A19	PQ0 D0, AS	PQ5 D5	PQ7 D7	PI0, SB10	VDDH	P11, SBO0	P00 WDOVF		
PVDD		PL1, WE1	PL3 DR	PM2 A2, ADM2	PM6 A6, ADM6	VSS	PN7 A15 ADM15	VSS	PQ3 D3	VDDH	PR3 D11	PR4 D12	PR6 D14				
		PL2 RE	PM0 A0, ADM0	PM1 A1, ADM1	PM5 A5, ADM5	PN6 A14, ADM14	VDDB	PQ6 A22	PP1 A25	PQ6 D6	PR0 D8	PR5 D13					
		PL0, WE0	VDDB	PM3 A3, ADM3	PM7 A7, ADM7	PN2 A10, ADM10	PO1 A17, DRWSLE	PQ4 A20	PQ1 D1, RWSEL	PQ4 D4	PR2 D10	VSS	PR7 D15				
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		

FLGA239-C-1313

B * H2 is VDD2 for MN103004K and VPP for MN1030F04K