Panasonic

Product News

Single-chip microcomputer integrates system control and inverter control functions for energy-efficient, low-noise

32-bit Microcomputers for Inverter Control MN103SA5K/A7D

■ Overview

MN103SA5K/MN103SA7D 32-bit microcomputers are single-chip configurations that integrate a high-performance inverter control function offering energy conservation and noise reduction for household appliances with a conventional system control function. The microcomputers feature an easy-to-use C language programming-oriented AM32 series 32-bit CPU core having a high-speed arithmetic calculation function. Also included are standard peripheral circuits including a timer and serial interface, two 3-phase PWM circuits for inverter control of two motors, two dedicated A/D converters (minimum 1.0µs conversion time) for PWM-synchronous motor position detection (for both PWMs), and a multi-channel A/D converter for different sensors.

■ Feature

- Internal 60MHz operation for reinforced arithmetic calculation function
- Two built-in high-performance inverter control circuits to simultaneously control two motors
- Two dedicated high-speed A/D converters (minimum 1.0µs conversion time) allow simultaneous position detection for two motors

■ Applications

Inverter-controlled household appliances ranging from air conditioners, refrigerators, to washers, dish washers and air purifiers.

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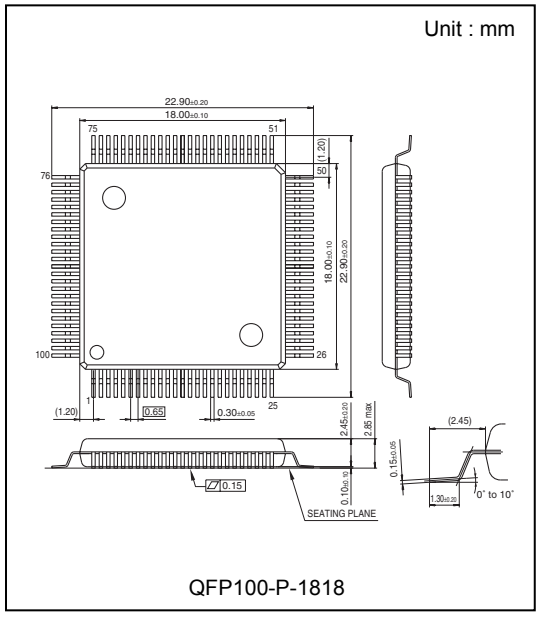
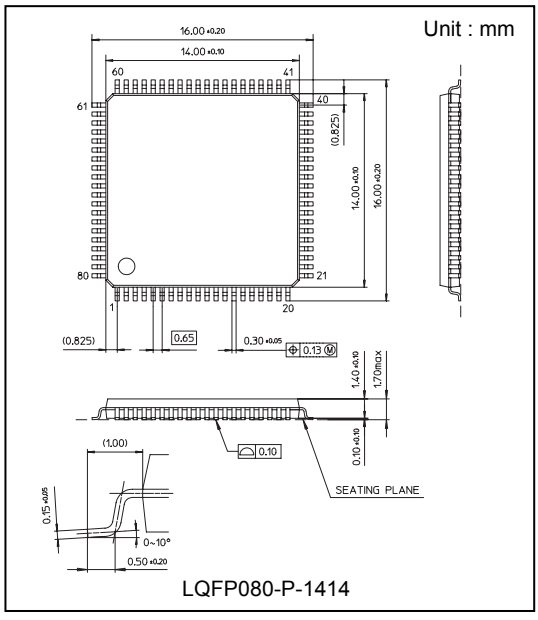
■ Specification

Parameter	MN103SA5K (under development)	MN103SA7D (under development)
Operating voltage	4.5V to 5.5V	
Operating frequency	Internal 60MHz at external 10MHz (minimum instruction execution time: 16.7ns)	
ROM/RAM	256 KB/8 KB	64 KB/4 KB
External Interrupts	9	9
Inverter Control Circuits	3-phase PWM output (16-bit counter, triangular wave, sawtooth wave and dead time setting possible) × 2 channels	
Multi-function Timer	8-bit timer: 12 (interval timer, event counter, cascade connection possible) 16-bit timer: 6 (interval timer, event counter, PWM output, double buffer configuration)	
10-bit A/D Converter	4 inputs × 2, 12 inputs × 1	4 inputs × 2, 8 inputs × 1
Serial Interface	UART/sync common use: 3	
I/O Port	In/Out common use: 82	In/Out common use: 62
Package	100-pin QFP (18mm × 18mm, 0.65mm pitch)	80-pin LQFP (14mm × 14mm, 065mm pitch)

Note: In addition to the previously mentioned mask ROM versions MN103SA5K and MN103SA7D, flash memory versions are also available as models MN103SFA5K and MN103SFA7K, respectively.

■ Package





■ Specifications

description		MN103S52G	MN103S65G	MN103S83D	MN103S92A	MN103S927
Instruction execute time		minimum 25ns (external 10MHz oscillation)				
Operation voltage		4.3V to 5.5V (internal voltage 3.0V to 3.6V)			3.0V to 3.6V	
Oscillation		Internal 4x-speed clock generator				
ROM		128K		64K	32K	16K
RAM		4K		2K		
Interrupts		external interrupt : 9			external interrupt : 8	
Inverter Control		6 phase PWM output (16bit counter, triangular/asymmetric, dead-time control)				
Multifunctional timer	8bit	8-ch		8-ch	4-ch	
	16bit	4-ch			2-ch	
10bit A/D converter		2-ch × 2 unit		2-ch × 2 unit	2-ch × 1 unit	
		12-ch × 1 unit	6-ch × 1 unit	6-ch × 1 unit	6-ch × 1 unit	
Serial Interface (UART / synchronous)		3-ch		2-ch	1-ch	
I/O Pins		I/O : 6 (exclusive) 50 (shared)	I/O : 2 (exclusive) 48 (shared)	I/O : 5 (exclusive) 45 (shared)	I/O : 10 (exclusive) 31 (shared)	
		Input : 16 (shared)	Input : 10 (shared)	Input : 10 (shared)	Input : 8 (shared)	
Operating temperature		-20℃ to 85℃				
Package		100pin QFP, 18mm square, 0.65mm pitch	80pin LQFP, 14mm square, 0.65mm pitch	84pin QFP, 18mm square, 0.8mm pitch	64pin LQFP, 14mm square, 0.8mm pitch	
Flash Memory Built-in TYPE		MN103SF52GAF	MN103SF65GAL	MN103SF65GBF	MN103SF92GBL	

■ Pin Configuration