☐ MN101C56A , MN101C56C

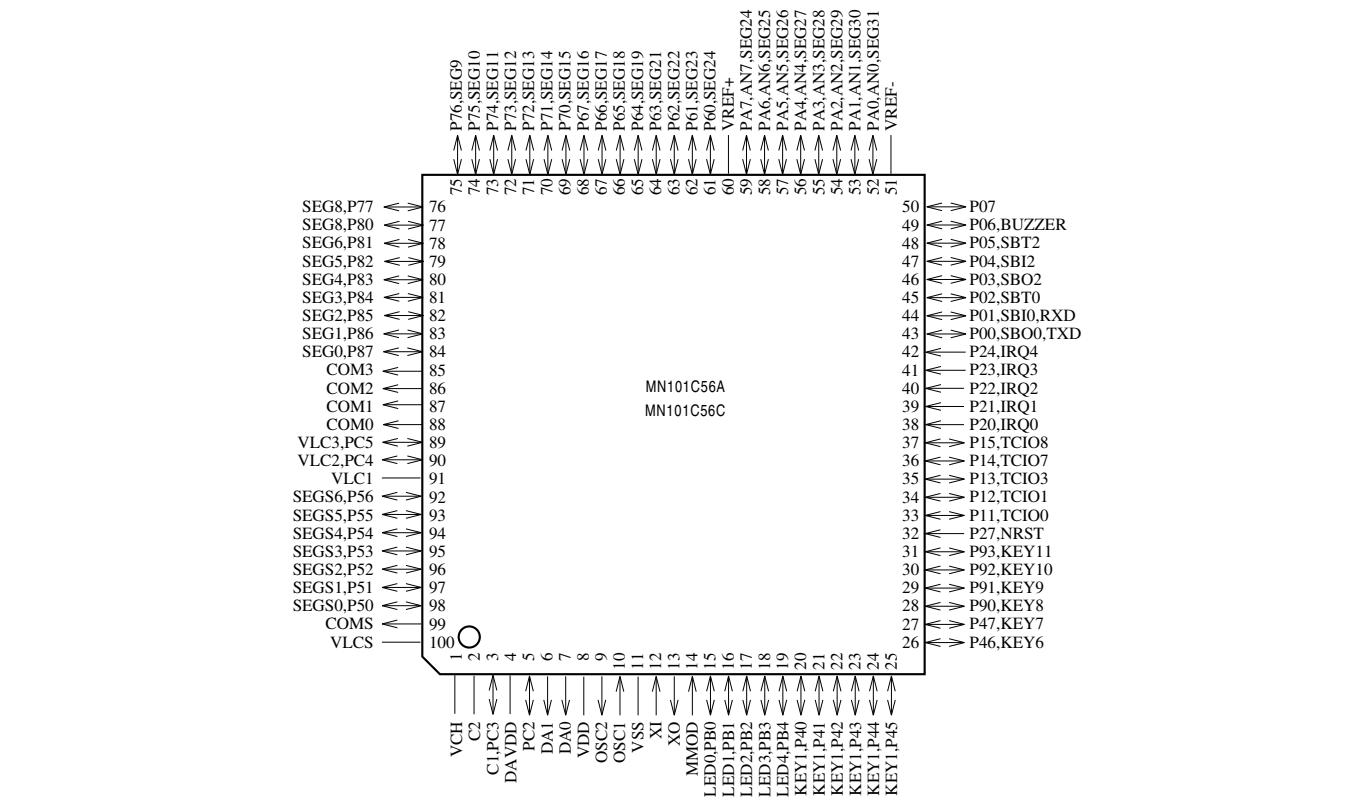| Type	MN101C56A (under planning)	MN101C56C
ROM (×8-bit) External memory can be expanded	32 K	48 K
RAM (×8-bit) External memory can be expanded	1.5 K	1.79 K
Package	TQFP100-P-1414E *Pb free	
Minimum Instruction Execution Time	0.1 μs (at 4.5 V to 5.5 V, 20 MHz) 0.25 μs (at 2.7 V to 5.5 V, 8 MHz) 62.5 μs (at 2.0 V to 5.5 V, 32 kHz)* * The lower limit for operation guarantee for flash memory built-in type is 2.3 V.	
Interrupts	• RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • Timer 0 • Timer 1 • Timer 3 • Timer 6 • Timer 7 • Timer 8 (2 systems) • Time base • Serial 0 (2 systems) • Serial 2 • A/D conversion finish	

Timer Counter	Timer counter 0 : 8-bit × 1
	(square-wave/8-bit PWM output, event count, generation of remote control carrier, pulse width measurement)
	    Clock source ···················· 1/2, 1/4 of system clock frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input
	    Interrupt source ·············· coincidence with compare register 0
	
	Timer counter 1 : 8-bit × 1 (square-wave output, event count, synchronous output event)
	    Clock source ···················· 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; external clock input
	    Interrupt source ·············· coincidence with compare register 1
	
	Timer counter 0, 1 can be cascade-connected.
	
	Timer counter 3 : 8-bit × 1 (square-wave output, event count, generation of remote control carrier)
	    Clock source ···················· 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input
	    Interrupt source ·············· coincidence with compare register 3
	
	Timer counter 6 : 8-bit freerun timer
	    Clock source ···················· 1/1 of system clock frequency; 1/1, 1/4096, 1/8192 of OSC oscillation clock frequency; 1/1, 1/4096, 1/8192 of XI oscillation clock frequency
	    Interrupt source ·············· coincidence with compare register 6
	
	Timer counter 7 : 16-bit × 1
	(square-wave/16-bit PWM output, cycle/duty continuous variable, event count, synchronous output event,
	pulse width measurement, input capture)
	    Clock source ···················· 1/1, 1/2, 1/4, 1/16 of system clock frequency; 1/1, 1/2, 1/4, 1/16 of OSC oscillation clock frequency;
	        1/1, 1/2, 1/4, 1/16 of external clock input frequency
	    Interrupt source ·············· coincidence with compare register 7 (2 lines)
	
	Timer counter 8 : 16-bit × 1
	(square-wave/16-bit PWM output, event count, pulse width measurement, input capture)
	    Clock source ···················· 1/1, 1/2, 1/4, 1/16 of system clock frequency; 1/1, 1/2, 1/4, 1/16 of OSC oscillation clock frequency;
	        1/1, 1/2, 1/4, 1/16 of external clock input frequency
	    Interrupt source ·············· coincidence with compare register 8
	
	Time base timer (one-minute count setting)
	    Clock source ···················· 1/1 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency
	    Interrupt source ············· 1/128, 1/256, 1/512, 1/1024, 1/8192, 1/32768 of clock source frequency	

■	**Timer Counter (continue)**	Watchdog timer

Interrupt source ·············· 1/65536, 1/262144, 1/1048576 of system clock frequency

■ **Serial Interface**

Serial 0 : synchronous type / UART (full-duplex) × 1

Clock source ···················· 1/2, 1/4 of system clock frequency; pulse output of timer counter 3;
1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency

Serial 2 : synchronous type × 1

Clock source ···················· 1/2, 1/4 of system clock frequency; pulse output of timer counter 3;
1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency

■	**I/O Pins**	**I/O**	65	• Common use • Specified pull-up resistor available • Input/output selectable (bit unit)
		Input	13	• Common use • Specified pull-up resistor available

■ **A/D Inputs** 10-bit × 8-ch. (with S/H)

■ **D/A Inputs** 8-bit × 2-ch. (independent 2 systems)

■ **LCD**

Function1 • 39 segments (Max.) • 4 Commons • Static • 1/2, 1/3, or 1/4 duty

Function2 • 7 segments • 1 Common • Independent static (operational independently of function 1)

LCD step-up power usable

LCD power step-up circuit contained

(step-up to twice larger, reference voltage VLCS externally supplied, 1/2 VDD ≤ VLCS ≤ 2.75 V usable)

LCD power shunt resistance contained

■ **Special Ports** Buzzer Output, remote control carrier signal output, high-current drive port (N-ch open-drain type)

■ **Electrical Characteristics**

Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 20 MHz, VDD = 5 V		25	60	mA
	IDD2	fosc = 8 MHz, VDD = 5 V		10	25	mA
	IDD3	fx = 32.768 kHz, VDD = 3 V		30	100	μA
Supply current at HALT	IDD4	fx = 32.768 kHz, VDD = 3 V, Ta = 25°C			8	μA
	IDD5	fx = 32.768 kHz, VDD = 3 V, Ta = −40°C to +85°C			30	μA
Supply current at STOP	IDD6	VDD = 5 V, Ta = 25°C			2	μA
		VDD = 5 V, Ta = −40°C to +85°C			50	μA

Pin Assignment

Top pins (left to right, 75 down to 51):
- 75 P76,SEG9
- 74 P75,SEG10
- 73 P74,SEG11
- 72 P73,SEG12
- 71 P72,SEG13
- 70 P71,SEG14
- 69 P70,SEG15
- 68 P67,SEG16
- 67 P66,SEG17
- 66 P65,SEG18
- 65 P64,SEG19
- 64 P63,SEG21
- 63 P62,SEG22
- 62 P61,SEG23
- 61 P60,SEG24
- 60 VREF+
- 59 PA7,AN7,SEG24
- 58 PA6,AN6,SEG25
- 57 PA5,AN5,SEG26
- 56 PA4,AN4,SEG27
- 55 PA3,AN3,SEG28
- 54 PA2,AN2,SEG29
- 53 PA1,AN1,SEG30
- 52 PA0,AN0,SEG31
- 51 VREF–

Left pins:
- SEG8,P77 — 76
- SEG8,P80 — 77
- SEG6,P81 — 78
- SEG5,P82 — 79
- SEG4,P83 — 80
- SEG3,P84 — 81
- SEG2,P85 — 82
- SEG1,P86 — 83
- SEG0,P87 — 84
- COM3 — 85
- COM2 — 86
- COM1 — 87
- COM0 — 88
- VLC3,PC5 — 89
- VLC2,PC4 — 90
- VLC1 — 91
- SEGS6,P56 — 92
- SEGS5,P55 — 93
- SEGS4,P54 — 94
- SEGS3,P53 — 95
- SEGS2,P52 — 96
- SEGS1,P51 — 97
- SEGS0,P50 — 98
- COMS — 99
- VLCS — 100

Center: MN101C56A / MN101C56C

Right pins:
- 50 — P07
- 49 — P06,BUZZER
- 48 — P05,SBT2
- 47 — P04,SBI2
- 46 — P03,SBO2
- 45 — P02,SBT0
- 44 — P01,SBI0,RXD
- 43 — P00,SBO0,TXD
- 42 — P24,IRQ4
- 41 — P23,IRQ3
- 40 — P22,IRQ2
- 39 — P21,IRQ1
- 38 — P20,IRQ0
- 37 — P15,TCIO8
- 36 — P14,TCIO7
- 35 — P13,TCIO3
- 34 — P12,TCIO1
- 33 — P11,TCIO0
- 32 — P27,NRST
- 31 — P93,KEY11
- 30 — P92,KEY10
- 29 — P91,KEY9
- 28 — P90,KEY8
- 27 — P47,KEY7
- 26 — P46,KEY6

Bottom pins (left to right, 1 to 25):
- 1 VCH
- 2 C2
- 3 C1,PC3
- 4 DAVDD
- 5 PC2
- 6 DA1
- 7 DA0
- 8 VDD
- 9 OSC2
- 10 OSC1
- 11 VSS
- 12 XI
- 13 XO
- 14 MMOD
- 15 LED0,PB0
- 16 LED1,PB1
- 17 LED2,PB2
- 18 LED3,PB3
- 19 LED4,PB4
- 20 KEY1,P40
- 21 KEY1,P41
- 22 KEY1,P42
- 23 KEY1,P43
- 24 KEY1,P44
- 25 KEY1,P45

TQFP100-P-1414E *Pb free

Support Tool

In-circuit Emulator	PX-ICE101C / D + PX-PRB101C56-TQFP100-P-1414E	
EPROM Built-in Type	Type	MN101CP56C [ES (Engineering Sample) available]
	ROM (× 8-bit)	48 K
	RAM (× 8-bit)	1.79 K
	Minimum instruction execution time	0.1 µs (at 4.5 V to 5.5 V, 20 MHz)
		0.25 µs (at 2.7 V to 5.5 V, 8 MHz)
		125 µs (at 2.3 V to 5.5 V, 32 kHz)
	Package	TQFP100-P-1414E *Pb free