

☐ **MN101C399 , MN101C39C**

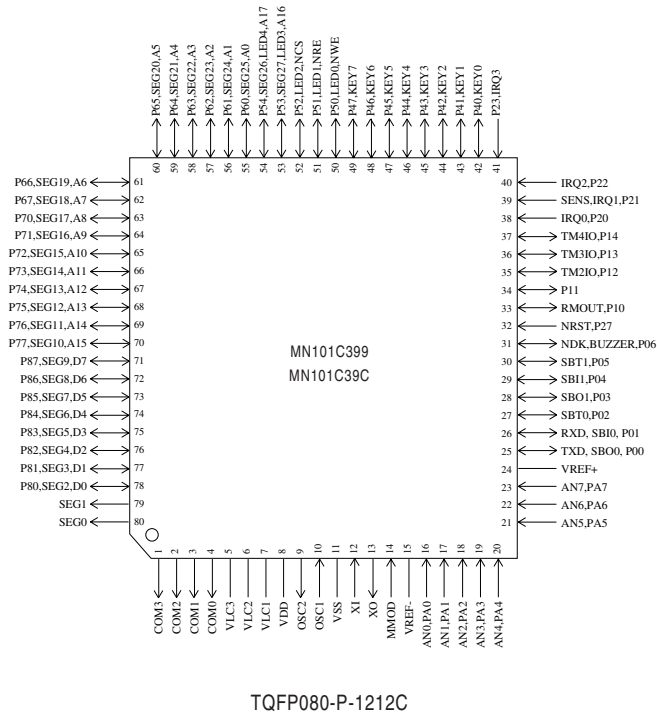
|                                                 |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                 |           |  |
|-------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--|
| Type                                            |       | MN101C399 (under planning)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                 | MN101C39C |  |
| ROM (×8-bit)<br>External memory can be expanded |       | 24 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 | 48 K      |  |
| RAM (×8-bit)<br>External memory can be expanded |       | 1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                 | 2 K       |  |
| Package                                         |       | TQFP080-P-1212C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                 |           |  |
| Minimum Instruction Execution Time              |       | 0.10 μs (at 4.5 V to 5.5 V, 20 MHz)<br>0.25 μs (at 2.7 V to 5.5 V, 8 MHz)<br>125 μs (at 2.0 V to 5.5 V, 32 kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                 |           |  |
| Interrupts                                      |       | • RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Time base • Serial 0 • Serial 1 • A/D conversion finish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |           |  |
| Timer Counter                                   |       | Timer counter 2 : 8-bit × 1 (square-wave/8-bit PWM output, event count, synchronous output event)<br>Clock source ..... 1/1, 1/4 of system clock frequency; 1/1 of XI oscillation clock frequency; external clock input<br>Interrupt source ..... coincidence with compare register 2<br><br>Timer counter 3 : 8-bit × 1<br>(square-wave output, event count, generation of remote control carrier, serial 0 baud rate timer)<br>Clock source ..... 1/4, 1/16 of system clock frequency; 1/1 of OSC oscillation clock frequency; external clock input<br>Interrupt source ..... coincidence with compare register 3<br><br>Timer counter 2, 3 can be cascade-connected.<br><br>Timer counter 4 : 16-bit × 1<br>(square-wave/16-bit PWM output, event count, synchronous output event, input capture)<br>Clock source ..... 1/4, 1/16 of system clock frequency; 1/1 of OSC oscillation clock frequency; external clock input<br>Interrupt source ..... coincidence with compare register 4<br><br>Time base timer (one-minute count setting, independently operable 8-bit timer counter 5)<br>Clock source ..... 1/4 of system clock frequency; 1/1, 1/8192 of OSC oscillation clock frequency; 1/1, 1/8192 of XI oscillation clock frequency<br>Interrupt source ..... coincidence with compare register 5; 1/8192 prescaler overflow<br><br>Watchdog timer<br>Interrupt source ..... 1/65536, 1/262144, 1/1048576 of system clock frequency (ROM option) |                                                                                                                                                 |           |  |
| Serial Interface                                |       | Serial 0 : synchronous type/simple UART (half-duplex) × 1<br>Clock source ..... 1/2, 1/4, 1/16 of system clock frequency; 1/2 of timer counter 3 frequency<br><br>Serial 1 : synchronous type × 1<br>Clock source ..... 1/2, 1/8, 1/64 of system clock frequency; 1/2 of timer counter 3 frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                 |           |  |
| I/O Pins                                        | I/O   | 49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | • Common use • Specified pull-up resistor available • Input/output selectable (bit unit)<br>• Specified pull-down resistor partially selectable |           |  |
|                                                 | Input | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | • Common use • Specified pull-up resistor available • Specified pull-down resistor partially selectable                                         |           |  |
| A/D Inputs                                      |       | 10-bit × 8-ch. (with S/H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                 |           |  |
| LCD                                             |       | • 28 segments • 4 commons • Static • 1/2, 1/3, or 1/4 duty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                 |           |  |
| Special Ports                                   |       | Buzzer output, remote control carrier signal output, high-current drive port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                 |           |  |

## Electrical Characteristics

### Supply current

| Parameter                | Symbol | Condition                                   | Limit |     |     | Unit |
|--------------------------|--------|---------------------------------------------|-------|-----|-----|------|
|                          |        |                                             | min   | typ | max |      |
| Operating supply current | IDD1   | fosc = 8 MHz, VDD = 5 V                     |       | 10  | 25  | mA   |
|                          | IDD2   | fx = 32 kHz, VDD = 3 V                      |       | 15  | 100 | μA   |
| Supply current at HALT   | IDD3   | fx = 32 kHz, VDD = 3 V, Ta = 25°C           |       |     | 8   | μA   |
|                          | IDD4   | fx = 32 kHz, VDD = 3 V, Ta = -40°C to +85°C |       |     | 30  | μA   |
| Supply current at STOP   | IDD5   | VDD = 5 V, Ta = 25°C                        |       |     | 1   | μA   |
|                          |        | VDD = 5 V, Ta = -40°C to +85°C              |       |     | 25  | μA   |

## Pin Assignment



## Support Tool

|                     |                                    |                                                                                                                 |
|---------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| In-circuit Emulator | PX-ICE101C / D + PX-PRB101C24      |                                                                                                                 |
| EPROM Built-in Type | Type                               | MN101CP39C                                                                                                      |
|                     | ROM (× 8-bit)                      | 48 K                                                                                                            |
|                     | RAM (× 8-bit)                      | 2 K                                                                                                             |
|                     | Minimum instruction execution time | 0.10 μs (at 4.5 V to 5.5 V, 20 MHz)<br>0.25 μs (at 2.7 V to 5.5 V, 8 MHz)<br>125 μs (at 2.3 V to 5.5 V, 32 kHz) |
|                     | Package                            | TQFP080-P-1212C                                                                                                 |