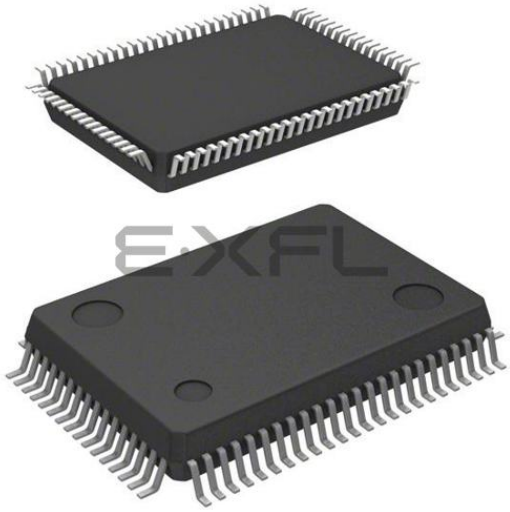
# Rohm Semiconductor - ML610Q174-NNNGAZWAX Datasheet



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## What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

## Applications of "Embedded - Microcontrollers"

| Details | |
|---|---|
| Product Status | Last Time Buy |
| Core Processor | nX-U8/100 |
| Core Size | 8-Bit |
| Speed | 8MHz |
| Connectivity | I²C, SSP, UART/USART |
| Peripherals | LCD, POR, PWM, WDT |
| Number of I/O | 61 |
| Program Memory Size | 128KB (64K x 16) |
| Program Memory Type | FLASH |
| EEPROM Size | - |
| RAM Size | 4K x 8 |
| Voltage - Supply (Vcc/Vdd) | 2.2V ~ 5.5V |
| Data Converters | A/D 12x10b |
| Oscillator Type | Internal |
| Operating Temperature | -40°C ~ 85°C (TA) |
| Mounting Type | Surface Mount |
| Package / Case | 80-BQFP |
| Supplier Device Package | 80-QFP (14x20) |
| Purchase URL | https://www.e-xfl.com/product-detail/rohm-semi/ml610q174-nnngazwax |

- PWM
  - Resolution 16 bits × 3 channel(IGBT control)

- Synchronous serial port
  - 2ch
  - Master/slave selectable
  - LSB first/MSB first selectable
  - 8-bit length/16-bit length selectable

- UART
  - Half-duplex
  - TXD/RXD × 2 channels
  - Bit length, parity/no parity, odd parity/even parity, 1 stop bit/2 stop bits
  - Positive logic/negative logic selectable
  - Built-in baud rate generator

- $I^2C$ bus interface
  - Master function only
  - Fast mode (400kbit/s@8MHz), Standard mode (100kbit/s@8MHz)

- Successive approximation type A/D converter
  - 10-bit A/D converter
  - Input: 12ch（Maximum）
  - Conversion time: 12.75μs per channel

- Analog Comparator
  - 2ch
  - Interrupt allow edge selection and sampling selection

- General-purpose ports ×61（Maximum）
  - Input-only port × 6ch
  - Output-only port × 6ch (including secondary functions)
  - Input/output × 19ch (including secondary functions)
  - Input/output × 30ch (including LCD driver functions)

- LCD driver
  - 128 dots max. (32 seg × 4 com), 1/1 to 1/4 duty
  - Frame frequency selectable (approx. 64Hz, 73Hz, 85Hz, 102Hz, 32Hz, 128Hz, 171Hz, and 256Hz)
  - LCD drive stop mode, LCD display mode, all LCDs on mode, and all LCDs off mode selectable
  - LCD drive voltage generation：external or internal selectable

- Power supply voltage detect function
  - Judgment voltages: One of 4 levels
  - Judgment accuracy: ±2% (Typ.)

- Reset
  - Reset through the RESET_N pin
  - Reset by the watchdog timer (WDT) overflow

- Clock
  - Low-speed clock (This LSI can not guarantee the operation withoug low-speed clock)
    Crystal oscillation (32.768 kHz) or Built-in RC oscillation (32.7kHz)
  - High-speed clock
    Built-in oscillation (8.192MHz/8MHz), Crystal/Ceramic oscillation (8MHz), external clock

- Power management
  - HALT mode: Instruction execution by CPU is suspended (peripheral circuits are in operating states).
  - STOP mode: Stop of low-speed oscillation and high-speed oscillation (Operations of CPU and peripheral circuits are stopped.)
  - Clock gear: The frequency of high-speed system clock can be changed by software (1/1, 1/2, 1/4, or 1/8 of the oscillation clock)
  - Block control function: Operation of an intact functional block circuit is powerd down. (register reset and clock stop)

- Shipment
  - 80-pin QFP (QFP80-P-1420-0.80)
  - ML610Q174-xxxGA (blank product: ML610Q174-NNNGA)

    xxx: ROM code number

- Guaranteed operating range
  - Operating temperature: –40°C to 85°C
  - Operating voltage: $V_{DD}$ = 2.2V to 5.5V, $V_{REF}$ = 4.5V to 5.5V