

CMOS 8-BIT MICROCONTROLLER

**TMP87C447U, TMP87C847U, TMP87CH47U,  
TMP87C847LU, TMP87CH47LU**

87C447/847/H47 are high speed and high performance 8-bit single chip microcomputers. These MCU contain CPU core, ROM, RAM, input/output ports, an A/D converter, six multi-function timer/counters, a serial interface, a high speed serial output, and two clock generators on a chip.

PART No.	ROM	RAM	PACKAGE	OTP MCU
TMP87C447U	4K x 8-bit	512 x 8-bit	QFP44-P-1010-0.80	TMP87PH47U
TMP87C847U	8K x 8-bit			
TMP87CH47U	16K x 8-bit			
TMP87C847LU	8K x 8-bit			
TMP87CH47LU	16K x 8-bit			TMP87PH47LU

**FEATURES**

- ◆ 8-bit single chip microcomputer TLCS-870 Series
- ◆ Instruction execution time : 0.5  $\mu$ s (at 8 MHz), 122  $\mu$ s (at 32.768 kHz)
- ◆ 412 basic instructions
  - Multiplication and Division (8bits x 8bits , 16bits  $\div$  8bits)
  - Bit manipulations (Set/Clear/Complement/Move/Test/Exclusive or)
  - 16-bit data operations
  - 1-byte jump/subroutine-call (Short relative jump / Vector call)
- ◆ 14 interrupt sources (External : 6, Internal : 8)
  - All sources have independent latches each, and nested interrupt control is available.
  - 4 edge-selectable external interrupts with noise reject
  - High-speed task switching by register bank changeover
- ◆ Input/Output ports (37 pins)
  - I/O 5ports 35pins
  - Output 1port 2pins
- ◆ High current output
  - LED direct drive capability (typ. 20 mA x 8bits)
- ◆ Two 16-bit Timer/Counters
  - Timer, Event counter, Programmable pulse generator output, Pulse width measurement, External trigger timer, Window modes
- ◆ Two 8-bit Timer/Counters
  - Timer, Event counter, Capture (Pulse width/duty measurement), PWM output, Programmable divider output modes
- ◆ Time Base Timer (Interrupt frequency : 1 Hz to 16 kHz)
- ◆ Divider output function (frequency : 1 kHz to 8 kHz)
- ◆ Watchdog Timer
- ◆ 8-bit Serial Interface
  - With 8 bytes transmit/receive data buffer
  - Internal/external serial clock, and 4/8-bit mode
- ◆ 8-bit High Speed Serial Output (rate : max. 1bit/ $\mu$ s)
- ◆ 8-bit successive approximate type A/D converter with sample and hold
  - 8 analog inputs
  - Conversion time: 23  $\mu$ s/92  $\mu$ s at 8MHz programmable selectable
- ◆ Dual clock operation
- ◆ Five Power saving operating modes
  - STOP mode : Oscillation stops. Battery/Capacitor back-up. Port output hold/high-impedance.
  - SLOW mode: Low power consumption operation using low-frequency clock (32.768kHz).
  - IDLE1 mode : CPU stops, and Peripherals operate using high-frequency clock. Release by interrupts.
  - IDLE2 mode : CPU stops, and Peripherals operate using high and low frequency clock. Release by interrupts.
  - SLEEP mode: CPU stops, and Peripherals operate using low-frequency clock. Release by interrupts.
- ◆ Wide operating voltage : 2.7 to 5.5 V at 4.2 MHz/32.768 kHz, 4.5 to 5.5 V at 8 MHz/32.768 kHz (TMP87C447/847/H47)
- ◆ Low voltage operation available : 1.8 to 4.0 V at 4.2 MHz/32.768 kHz (TMP87C847L/H47L)
- ◆ Emulation Pod BM87CH47U0A

