CMOS 4-Bit Microcontroller

TMP47C222N, TMP47C422N
TMP47C222F, TMP47C422F
TMP47C222U, TMP47C422U

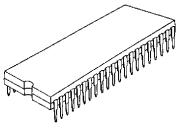
The TMP47C222/422 are high speed and high performance 4-bit single chip micro computers, integrating AD converter, pulse output, zero-cross detector and LCD driver based on the TLCS-470 series.

Part No.	ROM	RAM	Rackage	OTP
TMP47C222N	2048 × 8-bit	192 × 4-bit	P-SDIP42-600-1.78	TMP47P422VN
TMP47C222F			P-QFP44-1414-0.80D	TMP47P422VF
TMP47C222U			P-QFP44-1010-0.80	TMP47P422VU
TMP47C422N	4096 × 8-bit	256 × 4-bit	P-SDIP42-600-1.78	TMP47P422VN
TMP47C422F			P-QFP44-1414-0.80D	TMP47P422VF
TMP47C422U			P-QFP44-1010-0.80	TMP47P422VU

Features

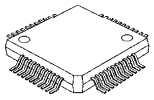
- ◆4-bit single chip microcomputer
- ◆Instruction execution time: 1.0 μs (at 8 MHz)
- ◆Low voltage operation: 2.2 V (at 4.2 MHz)
- ◆92 basic instructions
  - Table look-up instructions
- ◆Subroutine nesting: 15 levels max
- ◆6 interrupt sources (External: 2, Internal: 4)
  All sources have independent latches each, and multiple interrupt control is available.
- ◆I/O port (SDIP: 20 pins, QFP: 22 pins)
- ◆Interval Timer
- ◆Two 12-bit Timer/Counters
  Timer, event counter,and pulse width measurement mode
- ◆Watchdog Timer
- ◆Serial Interface with 8-bit buffer
  - Simultaneous transmission and reception capability
  - 8/4-bit transfer, external/internal clock, and leading/trailing edge shift mode

P-SDIP42-600-1.78



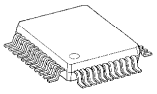
TMP47C222N
TMP47C422N
TMP47P422VN

P-QFP44-1414-0.80D



TMP47C222F
TMP47C422F
TMP47P422VF

P-QFP44-1010-0.80



TMP47C222U
TMP47C422U
TMP47P422VU

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◆8-bit successive approximate type AD converter
- With sample and hold
- 4 analog inputs
- Conversion time: 24 μs (at 8 MHz)

◆Pulse output
Buzzer drive/Remocon carrier

◆Zero-cross detector

◆LCD driver
- LCD direct drive capability (max 10-digit display at 1/4 duty LCD)
- 1/4, 1/3, 1/2 duties or static drive are programmably selectable.

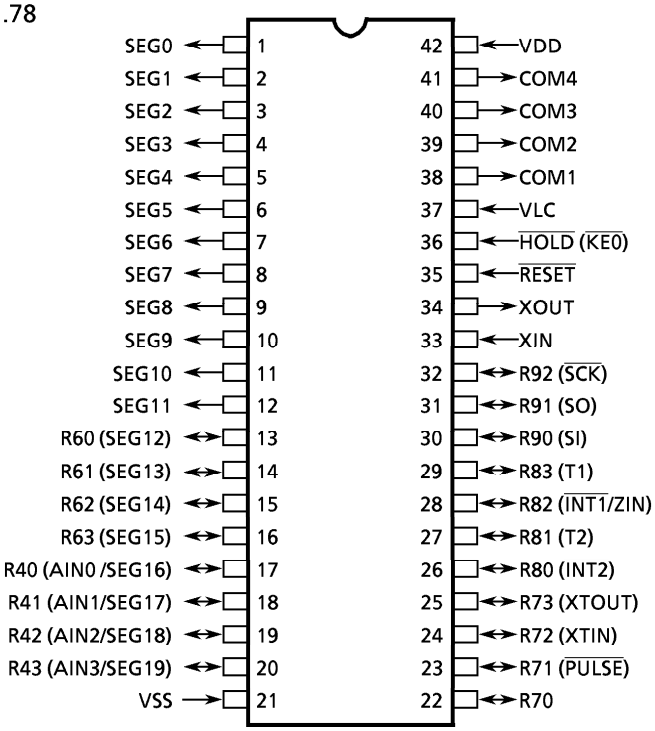
◆Dual-clock operation
High-speed / Low-power-consumption operating mode

◆Hold function
Battery/Capacitor back-up

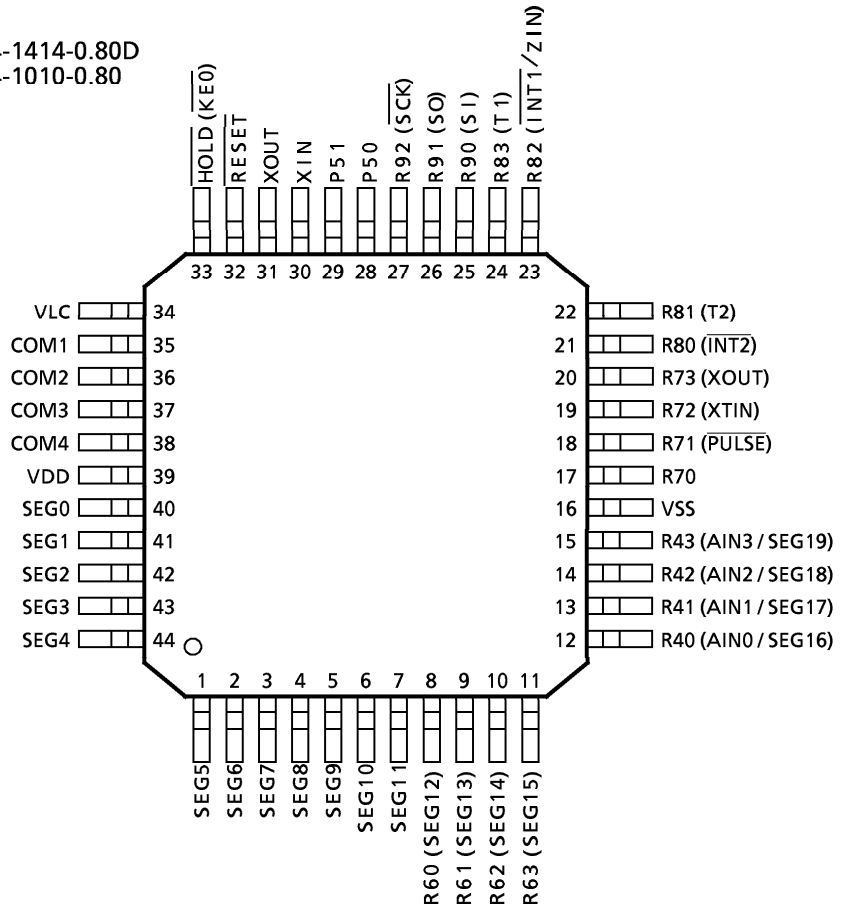
◆Emulation pod: BM47C422

Pin Assignments (Top View)

P-SDIP42-600-1.78



P-QFP44-1414-0.80D
P-QFP44-1010-0.80



Pin Function

Pin Name	Input / Output	Function	
R43 (AIN3/SEG19) to R40 (AIN0/SEG16)	I/O (I /O)	4-bit I/O ports with latch (P5 port has only 2-bit). These ports can be set, cleared and tested for each bit as specified by L-register indirect addressing bit manipulation instruction.	AD converter analog input / LCD segment drive output
P51, P50	Output		(Note)
R63 (SEG15) to R60 (SEG12)	I/O (Output)		LCD segment drive output
R73 (XTOUT)	I/O (Output)		Resonator connecting pins (Low-frequency).
R72 (XTIN)	I/O (Input)		
R71 ($\overline{\text{PULSE}}$)	I/O (Output)		Pulse output
R70	I/O		
R83 (T1)	I/O (Input)	4-bit I/O ports with latch When used as input port, external interrupt input pin, or timer/counter external input pin, the latch must be set to "1".	Timer / Counter1 external input
R82 ($\overline{\text{INT1}}$/ZIN)			External interrupt1 and zero-cross input
R81 (T2)			Timer / Counter2 external input
R80 ($\overline{\text{INT2}}$)			External interrupt2 input
R92 ($\overline{\text{SCK}}$)	I/O (I/O)	3-bit I/O ports with latch When used as input port or serial port, the latch must be set to "1".	Serial clock I/O
R91 (SO)	I/O (Output)		Serial data output
R90 (SI)	I/O (Input)		Serial data input
SEG11 to SEG0	Output	LCD segment drive output	
COM4 to COM1		LCD Common drive output	
XIN	Input	Resonator connecting pins (High-frequency). For inputting external clock, XIN is used and XOUT is opened	
XOUT	Output		
$\overline{\text{RESET}}$	Input	Reset signal input	
$\overline{\text{HOLD}}$ ($\overline{\text{KE0}}$)	I/O (Input)	HOLD request/release signal input	sense input
VDD (VAREF)	Power Supply	+ 5 V	AD converter analog reference voltage
VSS (VASS)		0 V (GND)	AD converter analog reference voltage (GND)
VLC		LCD drive power supply	

Note: TMP47C222/422N (SDIP) do not have port P5.