DATA SHEET

80C51/87C51/80C52/87C52

80C51 8-bit microcontroller family

4 K/8 K OTP/ROM low voltage (2.7 V–5.5 V), low power, high speed (33 MHz), 128/256 B RAM

Product specification 2000 Aug 07
Replaces datasheet 80C51/87C51/80C31 of 2000 Jan 20

Philips Semiconductors

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DESCRIPTION

The Philips 80C51/87C51/80C52/87C52 is a high-performance static 80C51 design fabricated with Philips high-density CMOS technology with operation from 2.7 V to 5.5 V.

The 8xC51 and 8xC52 contain a 128 × 8 RAM and 256 × 8 RAM respectively, 32 I/O lines, three 16-bit counter/timers, a six-source, four-priority level nested interrupt structure, a serial I/O port for either multi-processor communications, I/O expansion or full duplex UART, and on-chip oscillator and clock circuits.

In addition, the device is a low power static design which offers a wide range of operating frequencies down to zero. Two software selectable modes of power reduction—idle mode and power-down mode are available. The idle mode freezes the CPU while allowing the RAM, timers, serial port, and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator, causing all other chip functions to be inoperative. Since the design is static, the clock can be stopped without loss of user data and then the execution resumed from the point the clock was stopped.

SELECTION TABLE

For applications requiring more ROM and RAM, see the 8XC54/58 and 8XC51RA+/RB+/RC+/80C51RA+ data sheet.

Note: 80C31/80C32 is specified in separate data sheet.

ROM/EPROM Memory Size (X by 8)	RAM Size (X by 8)	Programmable Timer Counter (PCA)	Hardware Watch Dog Timer
80C31*/80C51/87C51			
0K/4K	128	No	No
80C32*/80C52/87C52			
0K/8K/16K/32K	256	No	No
80C51RA+/8XC51RA+/RB+/RC+			
0K/8K/16K/32K	512	Yes	Yes
8XC51RD+			
64K	1024	Yes	Yes

FEATURES

- 8051 Central Processing Unit
  - 4k × 8 ROM (80C51)
  - 8k × 8 ROM (80C52)
  - 128 × 8 RAM (80C51)
  - 256 × 8 RAM (80C52)
  - Three 16-bit counter/timers
  - Boolean processor
  - Full static operation
  - Low voltage (2.7 V to 5.5 V@ 16 MHz) operation
- Memory addressing capability
  - 64k ROM and 64k RAM
- Power control modes:
  - Clock can be stopped and resumed
  - Idle mode
  - Power-down mode
- CMOS and TTL compatible
- TWO speed ranges at V_{CC} = 5 V
  - 0 to 16 MHz
  - 0 to 33 MHz
- Three package styles
- Extended temperature ranges
- Dual Data Pointers
- Security bits:
  - ROM (2 bits)
  - OTP/EPROM (3 bits)
- Encryption array – 64 bytes
- 4 level priority interrupt
- 6 interrupt sources
- Four 8-bit I/O ports
- Full–duplex enhanced UART
  - Framing error detection
  - Automatic address recognition
- Programmable clock out
- Asynchronous port reset
- Low EMI (inhibit ALE and slew rate controlled outputs)
- Wake-up from Power Down by an external interrupt

80C51/87C51 ORDERING INFORMATION

	MEMORY SIZE 4K × 8	TEMPERATURE RANGE °C AND PACKAGE	VOLTAGE RANGE	FREQ. (MHz)	DWG. #
ROM	P80C51SBPN	0 to +70, Plastic Dual In-line Package	2.7 V to 5.5 V	0 to 16	SOT129-1
OTP	P87C51SBPN				
ROM	P80C51SBAA	0 to +70, Plastic Leaded Chip Carrier	2.7 V to 5.5 V	0 to 16	SOT187-2
OTP	P87C51SBAA				
ROM	P80C51SBBB	0 to +70, Plastic Quad Flat Pack	2.7 V to 5.5 V	0 to 16	SOT307-2
OTP	P87C51SBBB				
ROM	P80C51SFPN	–40 to +85, Plastic Dual In-line Package	2.7 V to 5.5 V	0 to 16	SOT129-1
OTP	P87C51SFPN				
ROM	P80C51SFAA	–40 to +85, Plastic Leaded Chip Carrier	2.7 V to 5.5 V	0 to 16	SOT187-2
OTP	P87C51SFAA				
ROM	P80C51SFBB	–40 to +85, Plastic Quad Flat Pack	2.7 V to 5.5 V	0 to 16	SOT307-2
OTP	P87C51SFBB				
ROM	P80C51UBAA	0 to +70, Plastic Leaded Chip Carrier	5 V	0 to 33	SOT187-2
OTP	P87C51UBAA				
ROM	P80C51UBPN	0 to +70, Plastic Dual In-line Package	5 V	0 to 33	SOT129-1
OTP	P87C51UBPN				
ROM	P80C51UFAA	–40 to +85, Plastic Leaded Chip Carrier	5 V	0 to 33	SOT187-2
OTP	P87C51UFAA				

PART NUMBER DERIVATION

DEVICE NUMBER	DEVICE NUMBER	OPERATING FREQUENCY, MAX (S)	TEMPERATURE RANGE (B)	PACKAGE (AA)
ROM	P80C51	S = 16 MHz	B = 0° to +70°C	AA = PLCC
ROM	P80C52	S = 16 MHz	B = 0° to +70°C	AA = PLCC
OTP	P87C51	U = 33 MHz	F = –40°C to +85°C	BB = PQFP
OTP	P87C52	U = 33 MHz	F = –40°C to +85°C	BB = PQFP