



# Z86E23

## CMOS Z8<sup>®</sup> OTP MICROCONTROLLER

### GENERAL DESCRIPTION

The Z86E23 microcontroller introduces the next level of sophistication to single-chip architecture. The Z86E23 is a member of the Z8 single-chip microcontroller family with 8 Kbytes of EPROM and 236 bytes of general-purpose RAM.

The Z86E23 is a pin compatible, One-Time-Programmable (OTP) version of the Z8614 and Z8602 Keyboard Controller (KBC).

Zilog's CMOS microcontroller offers fast execution, efficient use of memory, sophisticated interrupts, input/output bit manipulation capabilities, and easy hardware/software system expansion along with low cost and low power consumption.

The Z86E23 architecture is based on Zilog's 8-bit microcontroller core. The device offers a flexible I/O scheme, an efficient register and address space structure, and a number of ancillary features that are useful in many industrial and advanced scientific applications.

There are two basic address spaces available to support this wide range of configurations: program memory and 236 general-purpose registers.

To unburden the program from coping with real-time problems such as counting/timing, the Z86E23 offers two on-chip counter/timers with a large number of user selectable modes (Block Diagram).

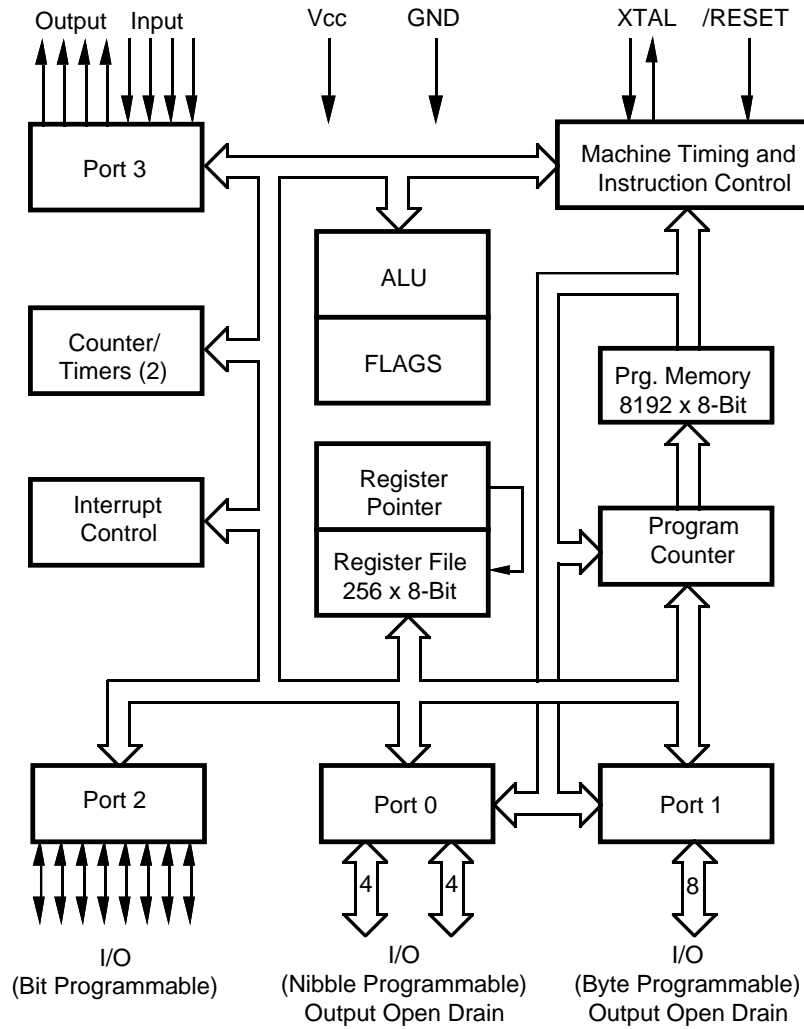
#### Notes:

All Signals with a preceding front slash, "/", are active Low, e.g., B/W (WORD is active Low); /B/W (BYTE is active Low, only).

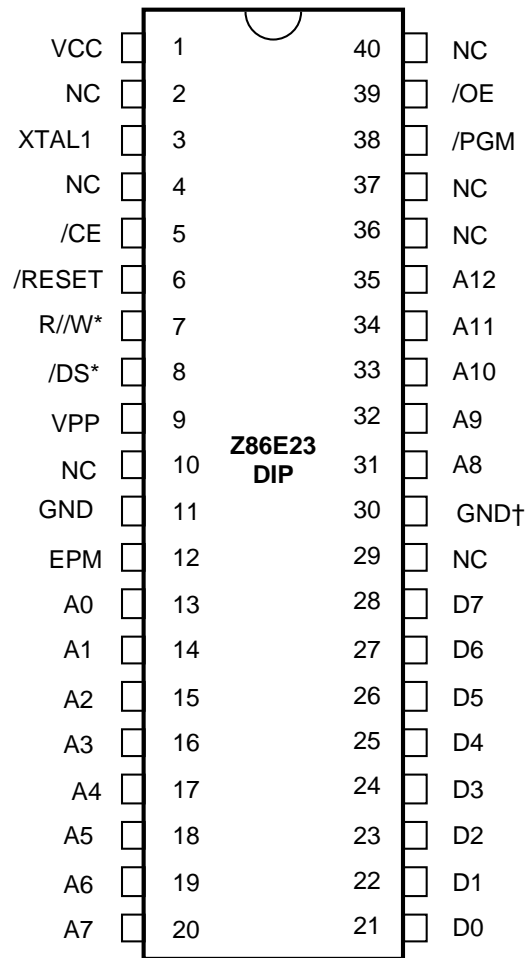
Power connections follow conventional descriptions below:

Connection	Circuit	Device
Power Ground	$V_{CC}$ GND	$V_{DD}$ $V_{SS}$

GENERAL DESCRIPTION (Continued)

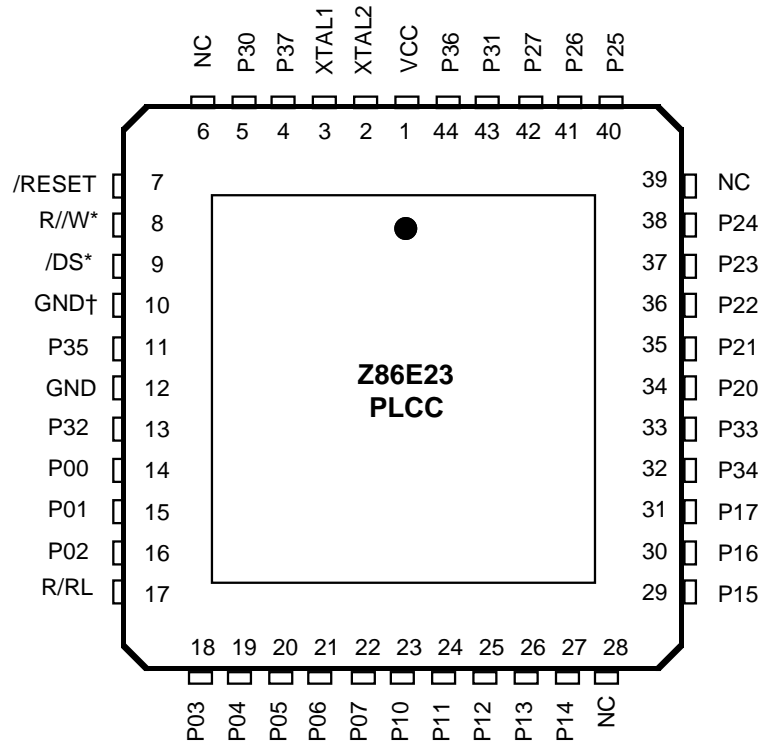


Functional Block Diagram



40-Pin DIP Pin Assignments

PIN DESCRIPTIONS



44-Pin PLCC Pin Assignments

## ABSOLUTE MAXIMUM RATINGS

Symbol	Description	Min	Max	Units
$V_{CC}$	Supply Voltage*	-0.3	+7.0	V
$T_{STG}$	Storage Temp	-65	+150	C
$T_A$	Oper Ambient Temp		†	C

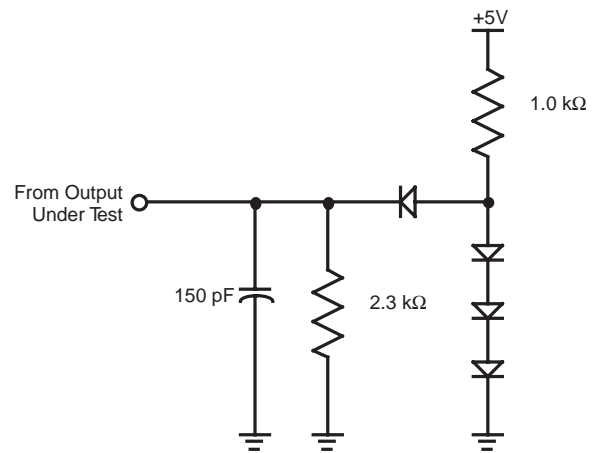
**Notes:**

- \* Voltages on all pins with respect to GND.  
13.0 V Maximum on P33-P30.
- † See Ordering Information

Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; operation of the device at any condition above those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for an extended period may affect device reliability.

## STANDARD TEST CONDITIONS

The characteristics listed below apply for standard test conditions as noted. All voltages are referenced to GND. Positive current flows into the referenced pin (Standard Test Load).



**Test Load Diagram**

## DC CHARACTERISTICS

 $V_{CC} = 4.5 \text{ V to } 5.5\text{V @ } 0^\circ\text{C to } +70^\circ\text{C}$ 

Sym	Parameter	Min	Max	Typ*	Unit	Condition
$V_{CH}$	Clock Input High Voltage	3.8	$V_{CC}$		V	Driven by External Clock Generator
$V_{CL}$	Clock Input Low Voltage	-0.3	0.8		V	Driven by External Clock Generator
$V_{IH}$	Input High Voltage	2.0	$V_{CC}$		V	
$V_{IL}$	Input Low Voltage	-0.3	0.8		V	
$V_{RH}$	Reset Input High Voltage	3.8	$V_{CC}$		V	
$V_{RL}$	Reset Input Low Voltage	-0.3	0.8		V	
$V_{OH}$	Output High Voltage	2.0			V	$I_{OH} = -250 \mu\text{A}$ (Port 2 only)
	Output High Voltage	2.4			V	$I_{OH} = -250 \mu\text{A}$ (Port 3 only)
$V_{OL}$	Output Low Voltage		0.8		V	$I_{OL} = +4.0 \text{ mA}$ (See Note (1) below.)
$I_{IL}$	Input Leakage	-10	10		$\mu\text{A}$	$V_{IN} = 0\text{V}, 5.5\text{V}$
$I_{OL}$	Output Leakage	-10	10		$\mu\text{A}$	$V_{IN} = 0\text{V}, 5.5\text{V}$
$I_{IR}$	Reset Input Current		-50		$\mu\text{A}$	$V_{IN} = 0\text{V}, 5.5\text{V}$
$I_{CC}$	$V_{CC}$ Supply Current		50	25	mA	

### Notes:

\* Typical @ 25°C

1. A combined total of six I/O pins from Ports 2 and 3 may be used to sink 10 mA each at 0.8V  $V_{OL}$  (max. three pins per port). These may be used for LEDs or as general-purpose outputs requiring high sink current.

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