

# DATA SHEET

For a complete data sheet, please also download:

- The IC06 74HC/HCT/HCU/HCMOS Logic Family Specifications
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Information
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Outlines

## **74HC/HCT280** 9-bit odd/even parity generator/checker

Product specification  
File under Integrated Circuits, IC06

December 1990

## 9-bit odd/even parity generator/checker

## 74HC/HCT280

## FEATURES

- Word-length easily expanded by cascading
- Similar pin configuration to the "180" for easy system up-grading
- Generates either odd or even parity for nine data bits
- Output capability: standard
- I<sub>CC</sub> category: MSI

## GENERAL DESCRIPTION

The 74HC/HCT280 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT280 are 9-bit parity generators or checkers commonly used to detect errors in high-speed data

transmission or data retrieval systems. Both even and odd parity outputs are available for generating or checking even or odd parity up to 9 bits.

The even parity output ( $\Sigma_E$ ) is HIGH when an even number of data inputs ( $I_0$  to  $I_8$ ) are HIGH. The odd parity output ( $\Sigma_O$ ) is HIGH when an odd number of data inputs are HIGH.

Expansion to larger word sizes is accomplished by tying the even outputs ( $\Sigma_E$ ) of up to nine parallel devices to the data inputs of the final stage. For a single-chip 16-bit even/odd parity generator/checker, see PC74HC/HCT7080.

## APPLICATIONS

- 25-line parity generator/checker
- 81-line parity generator/checker

## QUICK REFERENCE DATA

GND = 0 V; T<sub>amb</sub> = 25 °C; t<sub>r</sub> = t<sub>f</sub> = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay	C <sub>L</sub> = 15 pF; V <sub>CC</sub> = 5 V			
	I <sub>n</sub> to $\Sigma_E$		17	18	ns
	I <sub>n</sub> to $\Sigma_O$		20	22	ns
C <sub>I</sub>	input capacitance		3.5	3.5	pF
C <sub>PD</sub>	power dissipation capacitance per package	notes 1 and 2	65	65	pF

## Notes

1. C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in  $\mu$ W):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f<sub>i</sub> = input frequency in MHz

f<sub>o</sub> = output frequency in MHz

$\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs

C<sub>L</sub> = output load capacitance in pF

V<sub>CC</sub> = supply voltage in V

2. For HC the condition is V<sub>I</sub> = GND to V<sub>CC</sub>  
For HCT the condition is V<sub>I</sub> = GND to V<sub>CC</sub> – 1.5 V

## ORDERING INFORMATION

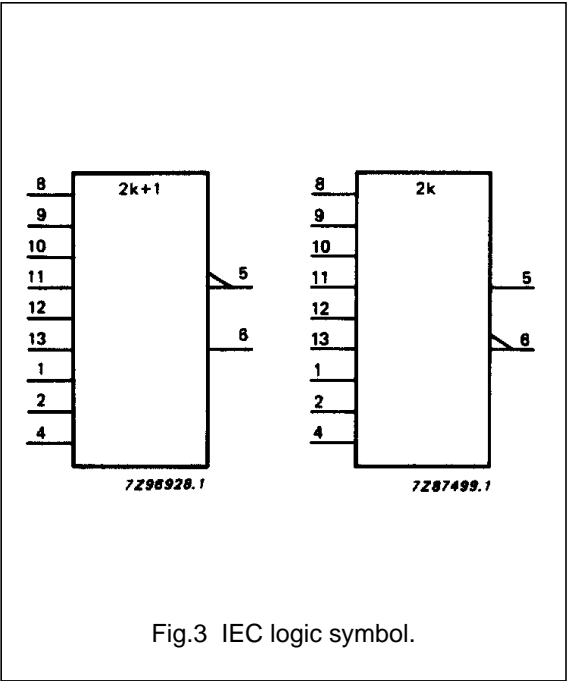
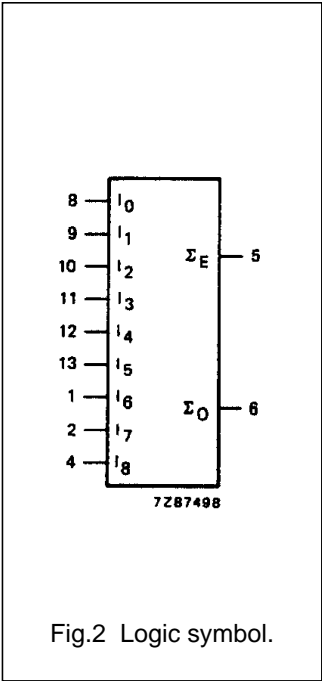
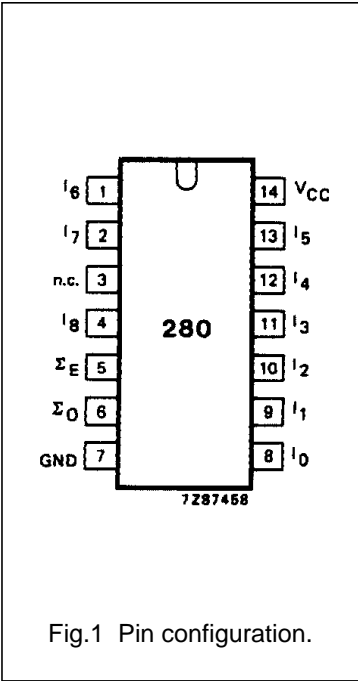
See "74HC/HCT/HCU/HCMOS Logic Package Information".

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PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
8, 9, 10, 11, 12, 13, 1, 2, 4	$I_0$ to $I_8$	data inputs
5, 6	$\Sigma_E$ , $\Sigma_O$	parity outputs
7	GND	ground (0 V)
14	$V_{CC}$	positive supply voltage



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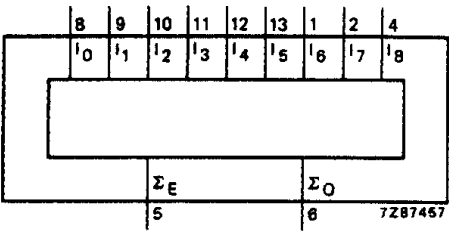


Fig.4 Functional diagram.

FUNCTION TABLE

INPUTS	OUTPUTS	
number of HIGH data inputs ( $I_0$ to $I_8$ )	$\Sigma_E$	$\Sigma_O$
even	H	L
odd	L	H

**Note**  
1. H = HIGH voltage level  
L = LOW voltage level

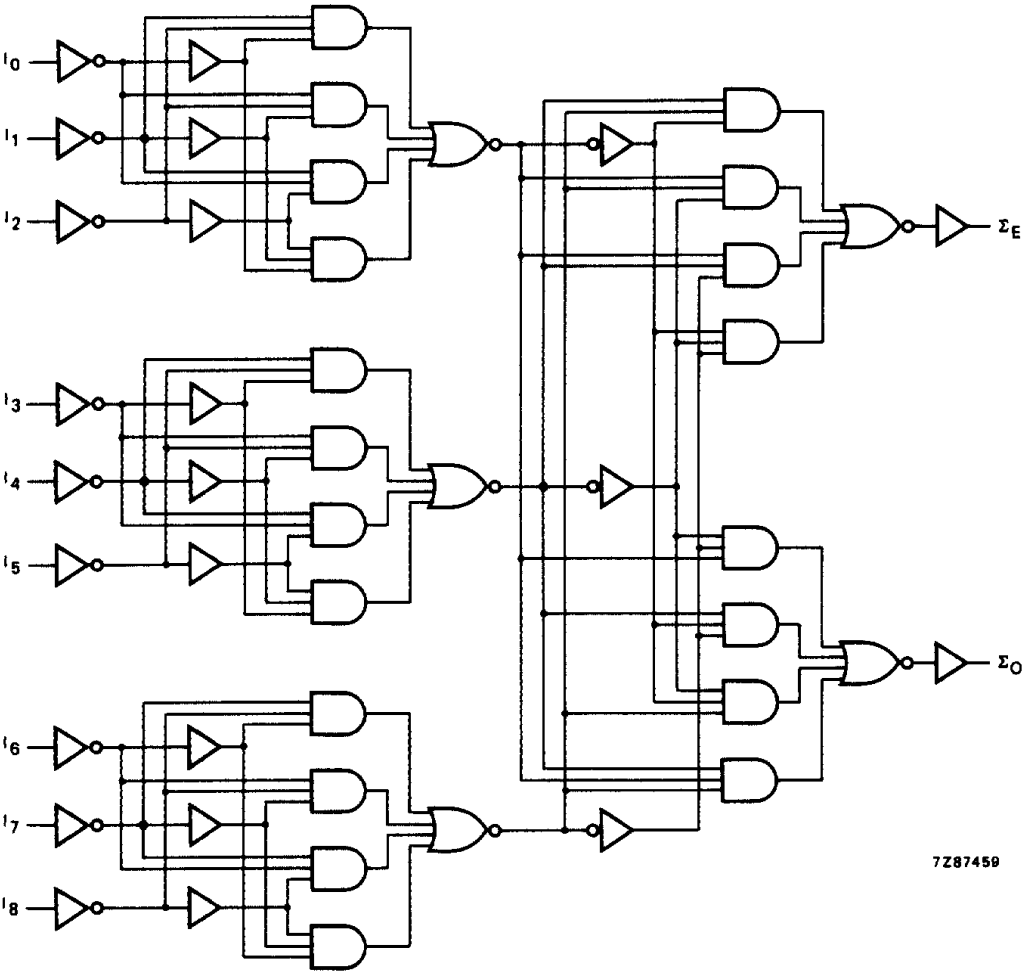


Fig.5 Logic diagram.

## 9-bit odd/even parity generator/checker

## 74HC/HCT280

**DC CHARACTERISTICS FOR 74HC**

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Out put capability: standard

I<sub>CC</sub> category: MSI

**AC CHARACTERISTICS FOR 74HC**

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)							UNIT	TEST CONDITIONS	
		74HC								V <sub>CC</sub> (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay I <sub>n</sub> to Σ <sub>E</sub>		55 20 16	200 40 34		250 50 43		300 60 51	ns	2.0 4.5 6.0	Fig.6
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay I <sub>n</sub> to Σ <sub>O</sub>		63 23 18	200 40 34		250 50 43		300 60 51	ns	2.0 4.5 6.0	Fig.6
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		19 7 6	75 15 13		95 19 16		110 22 19	ns	2.0 4.5 6.0	Fig.6

## 9-bit odd/even parity generator/checker

## 74HC/HCT280

**DC CHARACTERISTICS FOR 74HCT**

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: standard

I<sub>CC</sub> category: MSI

**Note to HCT types**

The value of additional quiescent supply current ( $\Delta I_{CC}$ ) for a unit load of 1 is given in the family specifications. To determine  $\Delta I_{CC}$  per input, multiply this value by the unit load coefficient shown in the table below.

INPUT	UNIT LOAD COEFFICIENT
I <sub>n</sub>	1.0

**AC CHARACTERISTICS FOR 74HCT**

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)							UNIT	TEST CONDITIONS	
		74HCT								V <sub>CC</sub> (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay I <sub>n</sub> to Σ <sub>E</sub>		21	42		53		63	ns	4.5	Fig.6
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay I <sub>n</sub> to Σ <sub>O</sub>		26	45		56		68	ns	4.5	Fig.6
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		7	15		19		22	ns	4.5	Fig.6

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## AC WAVEFORMS

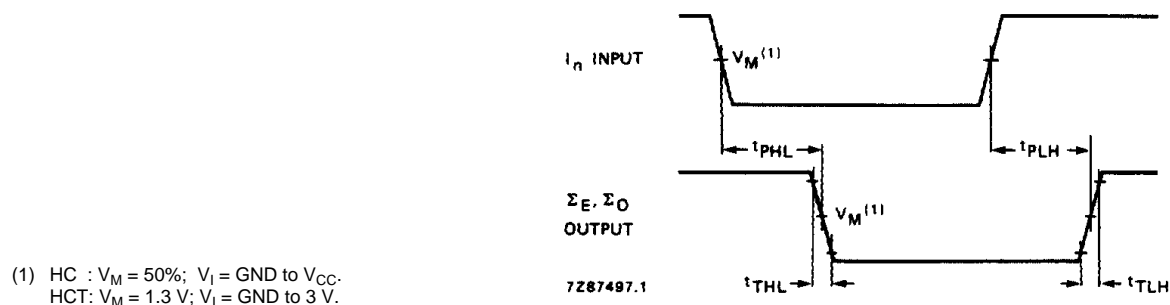


Fig.6 Waveforms showing the data input ( $I_n$ ) to parity outputs ( $\Sigma_E, \Sigma_O$ ) propagation delays and the output transition time.

## APPLICATION INFORMATION

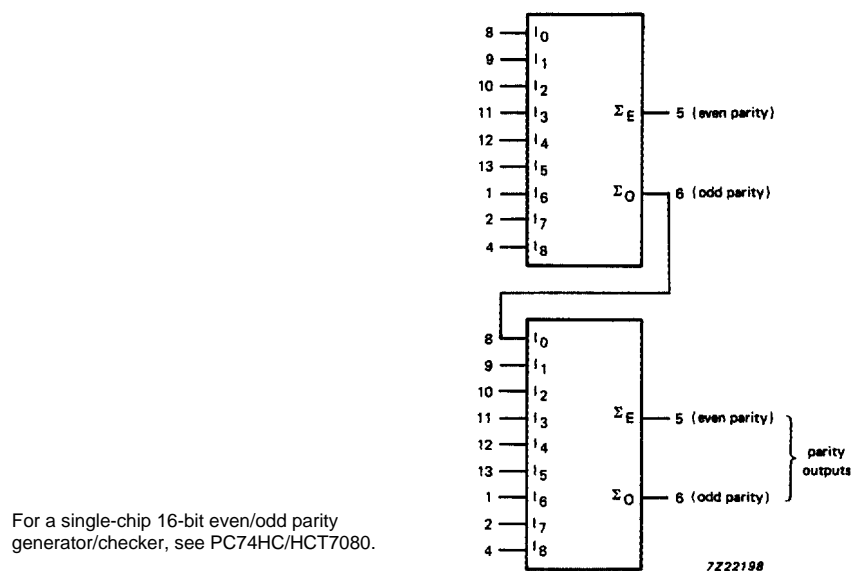


Fig.7 Cascaded 17-bit odd/even parity generator/checker.

## PACKAGE OUTLINES

See "74HC/HCT/HCU/HCMOS Logic Package Outlines".