

9-BIT PARITY GENERATOR

- **HIGH SPEED**
 $t_{PD} = 26 \text{ ns (TYP.)}$ at $V_{CC} = 5V$
- **LOW POWER DISSIPATION**
 $I_{CC} = 4 \mu\text{A (MAX.)}$ at $T_A = 25^\circ\text{C}$ 6V
- **HIGH NOISE IMMUNITY**
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN).
- **OUTPUT DRIVE CAPABILITY**
 10 LSTTL LOADS
- **SYMMETRICAL OUTPUT IMPEDANCE**
 $|I_{OH}| = I_{OL} = 4 \text{ mA (MIN.)}$
- **BALANCED PROPAGATION DELAYS**
 $t_{PLH} = t_{PHL}$
- **WIDE OPERATING VOLTAGE RANGE**
 $V_{CC} \text{ (opr)} = 2V \text{ to } 6V$
- **PIN AND FUNCTION COMPATIBLE**
 WITH 54/74LS280

DESCRIPTION

The M54/74HC280 is a high speed CMOS 9-BIT PARITY GENERATOR fabricated in silicon gate C²MOS technology. It has the same high speed performance of LSTTL combined with true CMOS low consumption.

It is composed of nine data inputs (A to I) and odd/even parity outputs (Σ ODD and Σ EVEN).

The nine data inputs control the output conditions. When the number of high level inputs is odd, Σ ODD output is kept high and Σ EVEN output low. Conversely, when the number is even, Σ EVEN output is kept high and Σ ODD low.

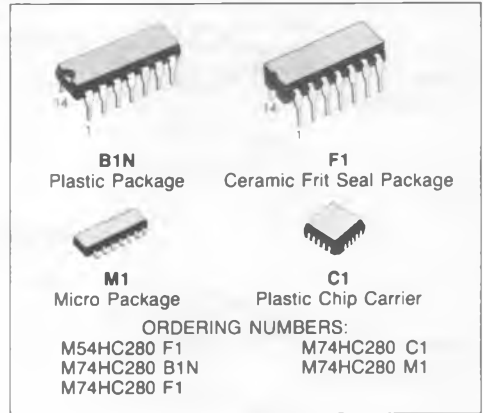
This IC generates either odd or even parity making it flexible application.

The word-length capability is easily expanded by cascading.

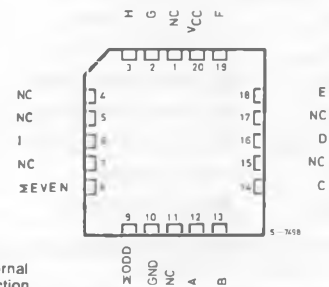
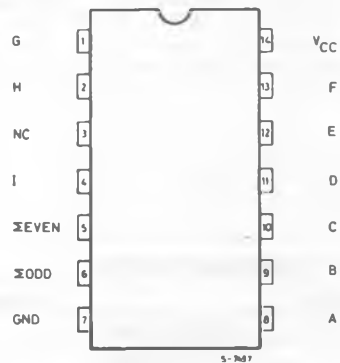
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

TRUTH TABLE

NUMBER OF INPUTS A THRU I THAT ARE HIGH	OUTPUTS	
	Σ EVEN	Σ ODD
0, 2, 4, 6, 8,	H	L
1, 3, 5, 7, 9,	L	H

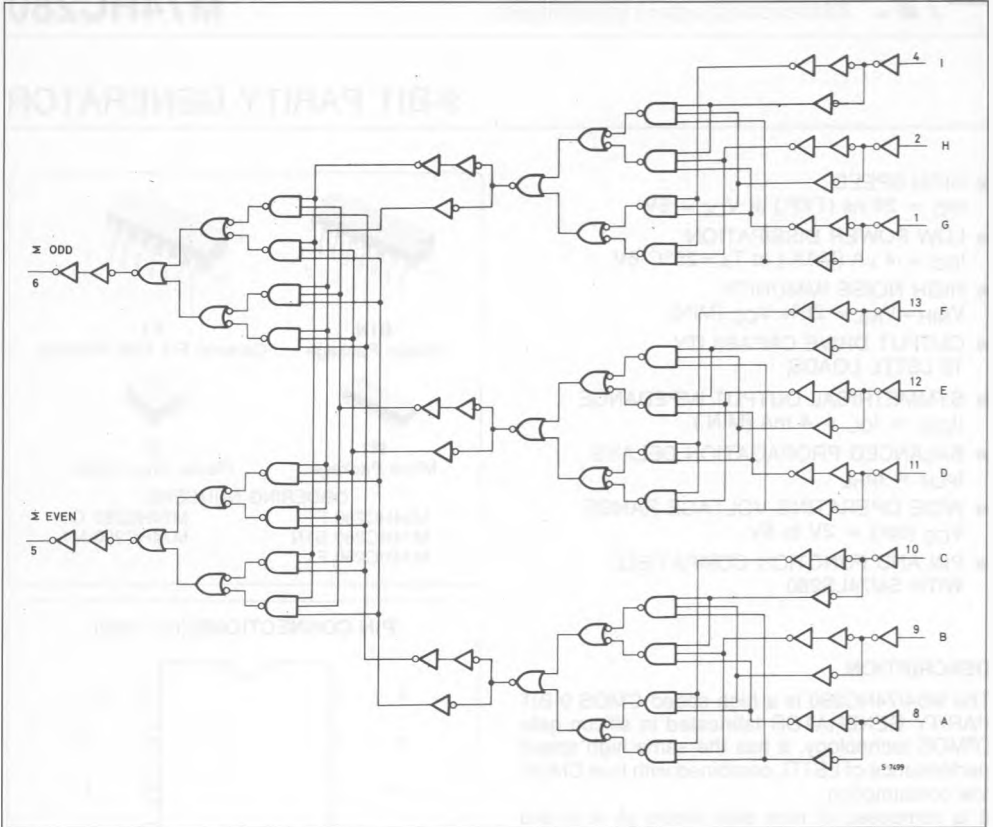


PIN CONNECTIONS (top view)



NC =
 No Internal
 Connection

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	- 0.5 to 7	V
V_I	DC Input Voltage	- 0.5 to $V_{CC} + 0.5$	V
V_O	DC Output Voltage	- 0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Source Sink Current Per Output Pin	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	- 65 to 150	$^{\circ}C$

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

(*) 500 mW: \cong 65 $^{\circ}C$ derate to 300 mW by 10 mW/ $^{\circ}C$: 65 $^{\circ}C$ to 85 $^{\circ}C$.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	2 to 6	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_A	Operating Temperature 74HC Series 54HC Series	-40 to 85 -55 to 125	°C
t_r, t_f	Input Rise and Fall Time	$V_{CC} \begin{cases} 2 \text{ V} & 0 \text{ to } 1000 \\ 4.5 \text{ V} & 0 \text{ to } 500 \\ 6 \text{ V} & 0 \text{ to } 400 \end{cases}$	ns

DC SPECIFICATIONS

Symbol	Parameter	V_{CC}	Test Condition	$T_A = 25^\circ\text{C}$ 54HC and 74HC			-40 to 85°C 74HC		-55 to 125°C 54HC		Unit	
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
V_{IH}	High Level Input Voltage	2.0		1.5	—	—	1.5	—	1.5	—	V	
		4.5		3.15	—	—	3.15	—	3.15	—		
		6.0		4.2	—	—	4.2	—	4.2	—		
V_{IL}	Low Level Input Voltage	2.0		—	—	0.5	—	0.5	—	0.5	V	
		4.5		—	—	1.35	—	1.35	—	1.35		
		6.0		—	—	1.8	—	1.8	—	1.8		
V_{OH}	High Level Output Voltage	2.0	V_I	I_O	1.9	2.0	—	1.9	—	1.9	—	V
		4.5			V_{IH} or V_{IL}	-20 μA	4.4	4.5	—	4.4	—	
		6.0	-4.0 mA -5.2 mA	4.18	4.31	—	4.13	—	4.10	—	—	
		4.5		5.68	5.8	—	5.63	—	5.60	—		
V_{OL}	Low Level Output Voltage	2.0	V_{IH} or V_{IL}	20 μA	—	0.0	0.1	—	0.1	—	0.1	V
		4.5			—	0.0	0.1	—	0.1	—	0.1	
		6.0	4.0 mA 5.2 mA	—	0.17	0.26	—	0.33	—	0.40		
		4.5		—	0.18	0.26	—	0.33	—	0.40		
6.0	—	—	—	—	—	—	—	—				
I_I	Input Leakage Current	6.0	$V_I = V_{CC}$ or GND	—	—	± 0.1	—	± 1.0	—	± 1.0	μA	
I_{CC}	Quiescent Supply Current	6.0	$V_I = V_{CC}$ or GND	—	—	4	—	40	—	80	μA	

AC ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V$, $T_A = 25^\circ C$, $C_L = 15pF$, Input $t_r = t_f = 6ns$)

Symbol	Parameter	54HC and 74HC			Unit
		Min.	Typ.	Max.	
t_{TLH} t_{THL}	Output Transition Time		4	8	ns
t_{PLH} t_{PHL}	Propagation Delay Time		26	41	ns

AC ELECTRICAL CHARACTERISTICS ($C_L = 50pF$, Input $t_r = t_f = 6ns$)

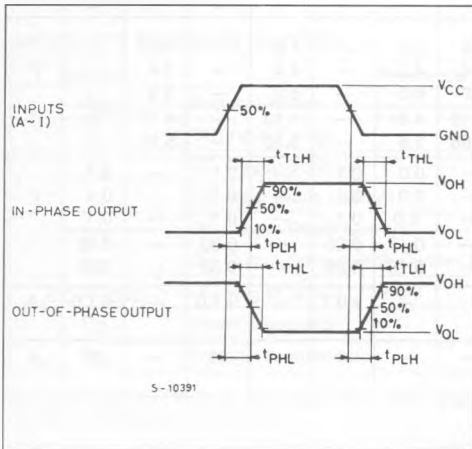
Symbol	Parameter	V_{CC}	Test Condition	$T_A = 25^\circ C$ 54HC and 74HC			-40 to $85^\circ C$ 74HC		-55 to $125^\circ C$ 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{TLH} t_{THL}	Output Transition Time	2.0 4.5 6.0		— — —	30 8 7	75 15 13	— — —	95 19 16		110 22 19	ns
t_{PLH} t_{PHL}	Propagation Delay Time	2.0 4.5 6.0		— — —	124 31 26	235 47 40	— — —	295 59 50		355 71 60	ns
C_{IN}	Input Capacitance			—	5	10	—	10		10	pF
$C_{PD} (*)$	Power Dissipation Capacitance			—	110	—	—	—		—	pF

Note (*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the following equation.

$$I_{CC (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

SWITCHING CHARACTERISTICS TEST WAVEFORM



TEST CIRCUIT I_{CC} (Opr.)

