SGS-THOMSON MICROELECTRONICS

M54HC280
M74HC280

9-BIT PARITY GENERATOR

- HIGH SPEED
  t_{PD} = 26 ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION
  I_{CC} = 4 μA (MAX.) at T_A = 25°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 mA (MIN.)
- BALANCED PROPAGATION DELAYS
  $t_{PLH} = t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE
  V_{CC} (opr) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE
  WITH 54/74LS280

B1N
Plastic Package

F1
Ceramic Frit Seal Package

M1
Micro Package

C1
Plastic Chip Carrier

ORDERING NUMBERS:
M54HC280 F1
M74HC280 B1N
M74HC280 F1
M74HC280 C1
M74HC280 M1

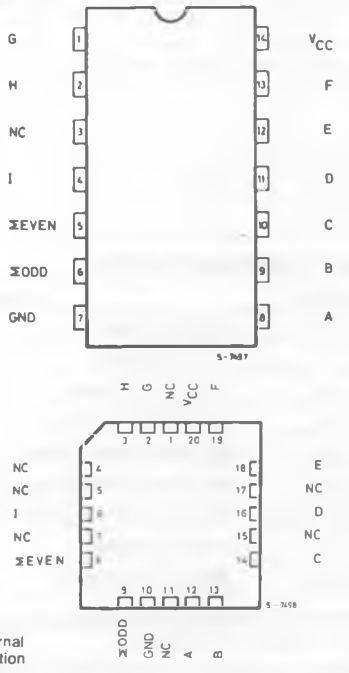
DESCRIPTION

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, ΣODD output is kept high and ΣEVEN output low. Conversely, when the number is even, ΣEVEN output is kept high and ΣODD 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

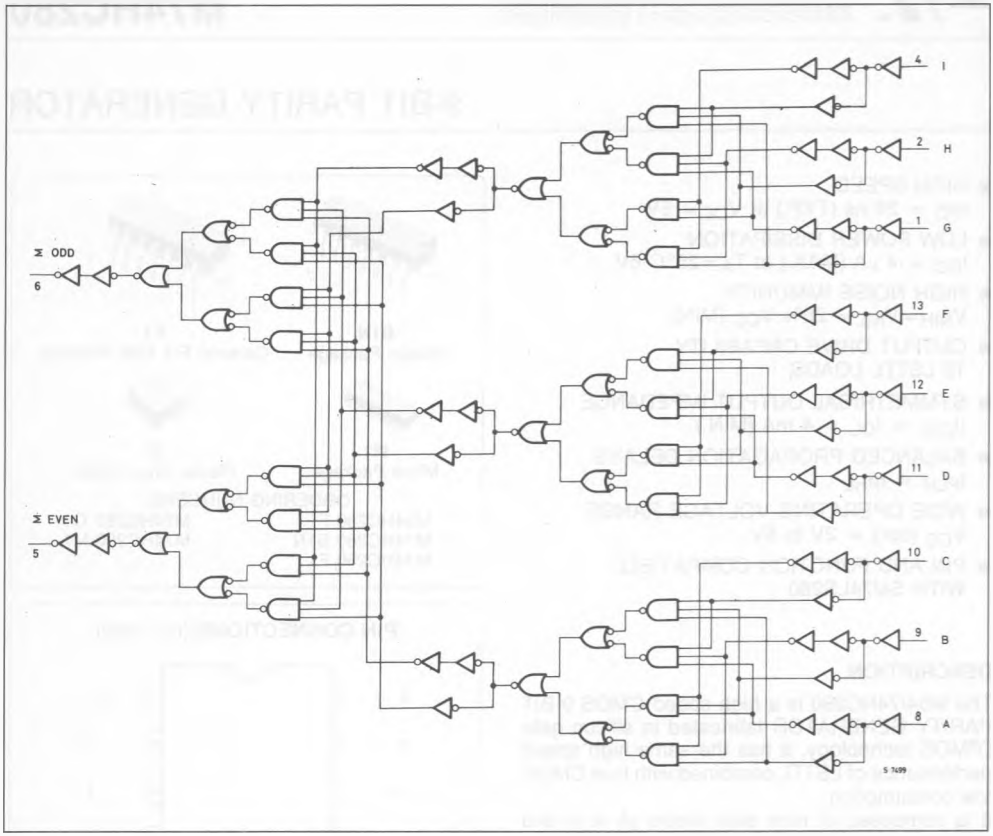
NUMBER OF INPUTS A THRU I THAT ARE HIGH	OUTPUTS	
	ΣEVEN	ΣODD
0, 2, 4, 6, 8,	H	L
1, 3, 5, 7, 9,	L	H

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	°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: ≅ 65°C derate to 300 mW by 10 mW/°C: 65°C to 85°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} = 2 V	0 to 1000	ns
			V_{CC} = 4.5V	0 to 500	
			V_{CC} = 6 V	0 to 400	

DC SPECIFICATIONS

Symbol	Parameter	V_{CC}	Test Condition		T_A = 25°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	—	4.4	—	
		6.0			5.9	6.0	—	5.9	—	5.9	—	
		4.5		−4.0 mA	4.18	4.31	—	4.13	—	4.10	—	
		6.0		−5.2 mA	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			—	0.0	0.1	—	0.1	—	0.1	
		4.5		4.0 mA	—	0.17	0.26	—	0.33	—	0.40	
		6.0		5.2 mA	—	0.18	0.26	—	0.33	—	0.40	
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°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)

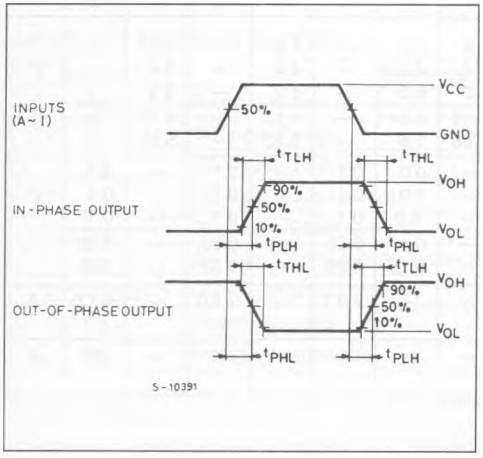
Symbol	Parameter	V_{CC}	Test Condition	T_A = 25°C 54HC and 74HC			−40 to 85°C 74HC		−55 to 125°C 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{TLH} t_{THL}	Output Transition Time	2.0		—	30	75	—	95		110	ns
		4.5		—	8	15	—	19		22	
		6.0		—	7	13	—	16		19	
t_{PLH} t_{PHL}	Propagation Delay Time	2.0		—	124	235	—	295		355	ns
		4.5		—	31	47	—	59		71	
		6.0		—	26	40	—	50		60	
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.

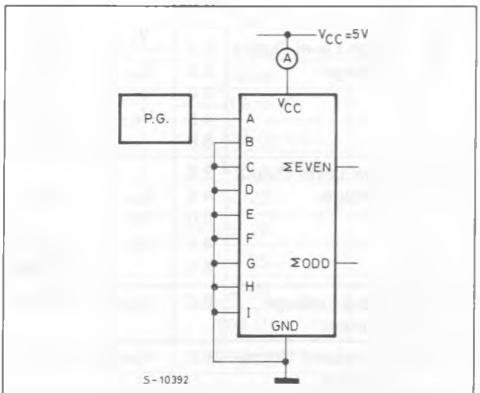
Average operating current can be obtained by the following equation.

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

SWITCHING CHARACTERISTICS TEST WAVEFORM



TEST CIRCUIT I_{CC} (Opr.)



INPUT WAVEFORM IS THE SAME AS THAT IN CASE OF SWITCHING CHARACTERISTICS TEST.