National Semiconductor

DM74AS280 9-Bit Parity Generator/Checker

General Description

These universal, 9-bit parity generators/checkers utilize advanced Schottky high performance circuitry and feature odd/even outputs to facilitate operation of either odd or even parity applications. The word length capability is easily expanded by cascading.

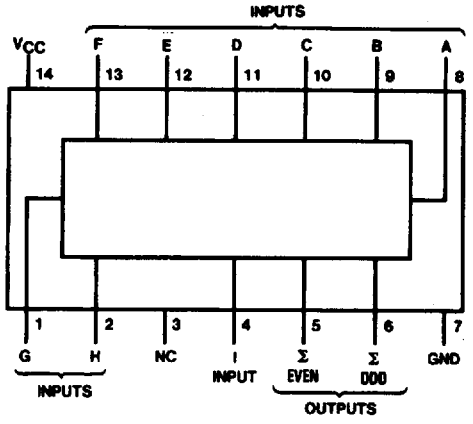
The AS280 can be used to upgrade the performance of most systems utilizing the '180 parity generator/checker. Although the AS280 is implemented without expander inputs, the corresponding function is provided by the availability of an input at pin 4 and no internal connection at pin 3. This permits the AS280 to be substituted for the '180 in existing designs to produce identical function even if 'AS280s are mixed with existing '180s.

Features

- Generates either odd or even parity for nine data lines
- Inputs are buffered to lower the drive requirements
- Can be used to upgrade existing systems using MSI parity circuits
- Cascadable for N-bits
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range

Connection Diagram

Dual-In-Line Package



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Order Number DM74AS280M
or DM74AS280N
See NS Package Number M14A or N14A

Function 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

L = Low State
H = High State

Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	77.0°C/W
M Package	108.0°C/W

Note: *The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			V
V_{IL}	Low Level Input Voltage			0.8	V
I_{OH}	High Level Output Current			−2	mA
I_{OL}	Low Level Output Current			20	mA
T_A	Free-Air Operating Temperature	0		70	°C

Electrical Characteristics

Over recommended free-air temperature range. All typical values are measured at V_{CC} = 5V, T_A = 25°C.

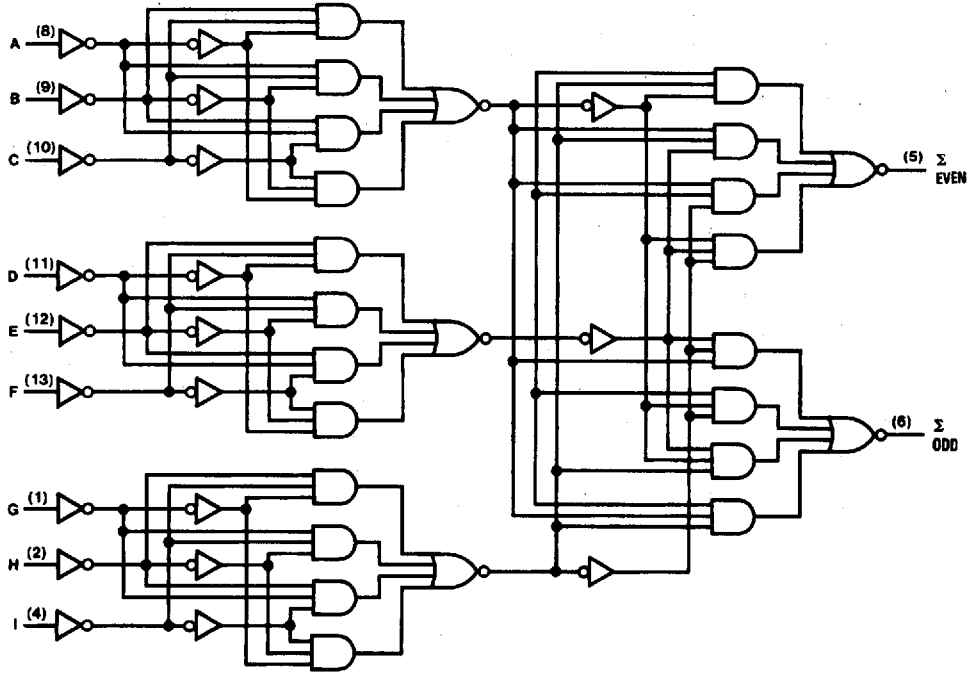
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_I = −18 mA			−1.2	V
V_{OH}	High Level Output Voltage	I_{OH} = −2 mA, V_{CC} = 4.5V to 5.5V	V_{CC} − 2			V
V_{OL}	Low Level Output Voltage	V_{CC} = 4.5V, I_{OL} = Max		0.35	0.5	V
I_I	Input Current @ Max Input Voltage	V_{CC} = 5.5V, V_{IH} = 7V			0.1	mA
I_{IH}	High Level Input Current	V_{CC} = 5.5V, V_{IH} = 2.7V			20	μA
I_{IL}	Low Level Input Current	V_{CC} = 5.5V, V_{IL} = 0.4V			−0.5	mA
I_O	Output Drive Current	V_{CC} = 5.5V, V_O = 2.25V	−30		−112	mA
I_{CC}	Supply Current	V_{CC} = 5.5V		25	40	mA

Switching Characteristics over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	From	To	Min	Max	Units
t_{PLH}	Propagation Delay Time, Low to High Level Output	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R_L = 500Ω	Data	ΣEven	3	12	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output				3	11	ns
t_{PLH}	Propagation Delay Time, Low to High Level Output		Data	ΣOdd	3	12	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output				3	11.5	ns

Note 1: See Section 5 for test waveforms and output load.

Logic Diagram



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Typical Applications

Three AS280s can be used to implement a 25-line parity generator/checker.

As an alternative, the outputs of two or three parity generators/checkers can be decoded with a 2-input (AS86) or 3-input (S135) exclusive-OR gate for 18 or 27-line parity applications.

Longer word lengths can be implemented by cascading AS280s. As shown in *Figure 2*, parity can be generated for word lengths up to 81 bits.

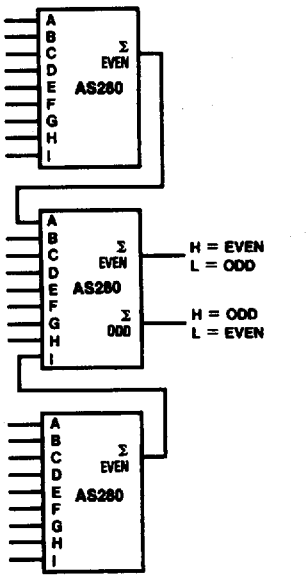

FIGURE 1. 25-Line Parity/Generator Checker

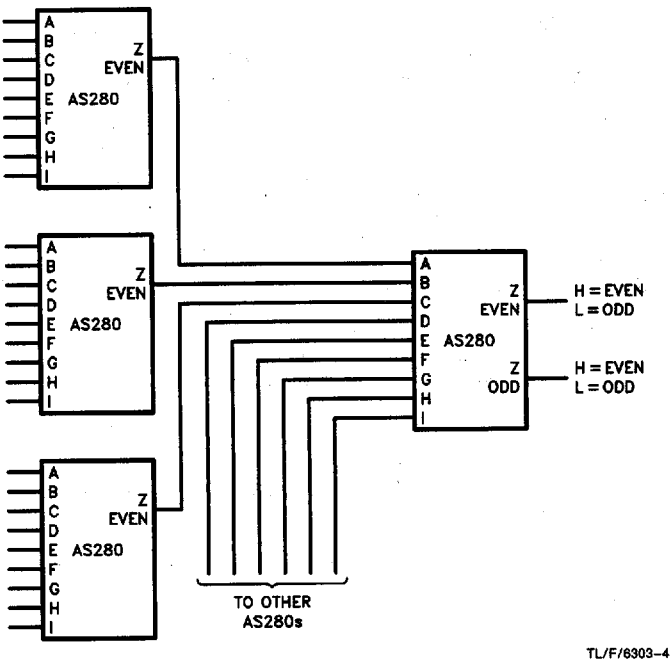

FIGURE 2. 81-Line Parity/Generator Checker