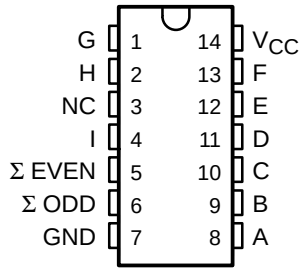
SDAS038C – DECEMBER 1982 – REVISED DECEMBER 1994

- **Generate Either Odd or Even Parity for Nine Data Lines**
- **Cascadable for n-Bit Parity**
- **Can Be Used to Upgrade Existing Systems Using MSI Parity Circuits**
- **Package Options Include Plastic Small-Outline (D) Packages and Standard Plastic (N) 300-mil DIPs**

D OR N PACKAGE
(TOP VIEW)



NC – No internal connection

description

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

These devices can be used to upgrade the performance of most systems utilizing the SN74ALS180 and SN74AS180 parity generators/checkers. Although the SN74ALS280 and SN74AS280 are implemented without expander inputs, the corresponding function is provided by the availability of an input (I) at terminal 4 and the absence of any internal connection at terminal 3. This permits the SN74ALS280 and SN74AS280 to be substituted for the SN74ALS180 and SN74AS180 in existing designs to produce an identical function even if the devices are mixed with existing SN74ALS180 and SN74AS180 devices.

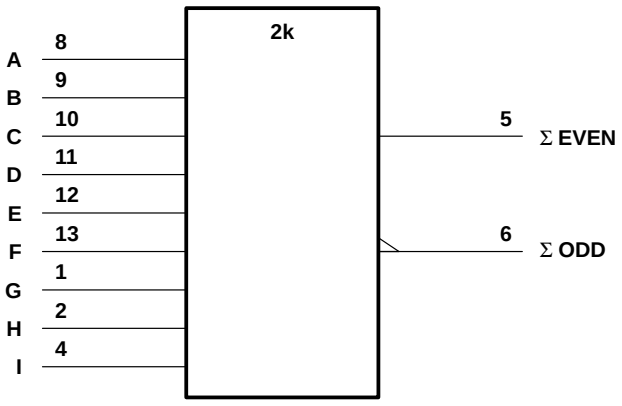
All SN74AS280 inputs are buffered to lower the drive requirements.

The SN74ALS280 and SN74AS280 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

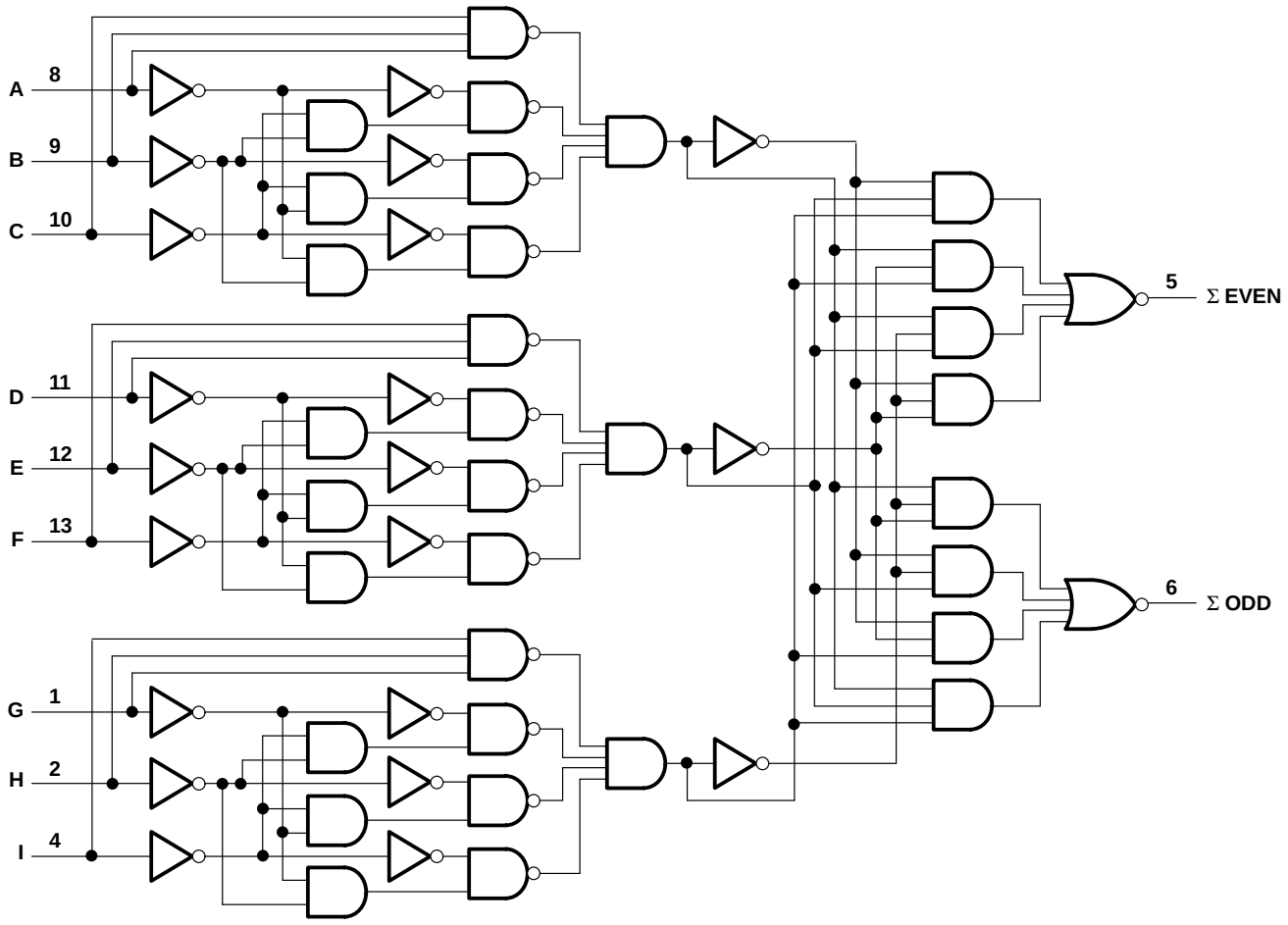
NO. OF INPUTS A – I THAT ARE HIGH	OUTPUTS	
	Σ EVEN	Σ ODD
0, 2, 4, 6, 8	H	L
1, 3, 5, 7, 9	L	H

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC} . . . . . 7 V
Input voltage, V_I . . . . . 7 V
Operating free-air temperature range, T_A: SN74ALS280 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN74ALS280			UNIT
		MIN	NOM	MAX	
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			–2.6	mA
I_{OL}	Low-level output current			24	mA
T_A	Operating free-air temperature	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		SN74ALS280			UNIT
			MIN	TYP†	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.5	V
V_{OH}	V_{CC} = 4.5 V to 5.5 V,	I_{OH} = –0.4 mA	V_{CC} –2			V
	V_{CC} = 4.5 V,	I_{OH} = –2.6 mA	2.4	3.3		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 12 mA		0.25	0.4	V
		I_{OL} = 24 mA		0.35	0.5	
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.4 V			–0.1	mA
I_O‡	V_{CC} = 5.5 V,	V_O = 2.25 V	–30		–112	mA
I_{CC}	V_{CC} = 5.5 V			10	16	mA

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX§		UNIT
			SN74ALS280		
			MIN	MAX	
t_{PLH}	Any	Σ EVEN	3	20	ns
t_{PHL}			3	20	
t_{PLH}	Any	Σ ODD	3	20	ns
t_{PHL}			4	22	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC} . . . . . 7 V
Input voltage, V_I . . . . . 7 V
Operating free-air temperature range, T_A: SN74AS280 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN74AS280			UNIT
		MIN	NOM	MAX	
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	Operating free-air temperature	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		SN74AS280			UNIT
			MIN	TYP‡	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.5	V
V_{OH}	V_{CC} = 4.5 V to 5.5 V,	I_{OH} = –2 mA	V_{CC} –2			V
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 20 mA		0.35	0.5	V
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.4 V			–0.5	mA
I_O§	V_{CC} = 5.5 V,	V_O = 2.25 V	–30		–112	mA
I_{CC}	V_{CC} = 5.5 V			25	35	mA

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

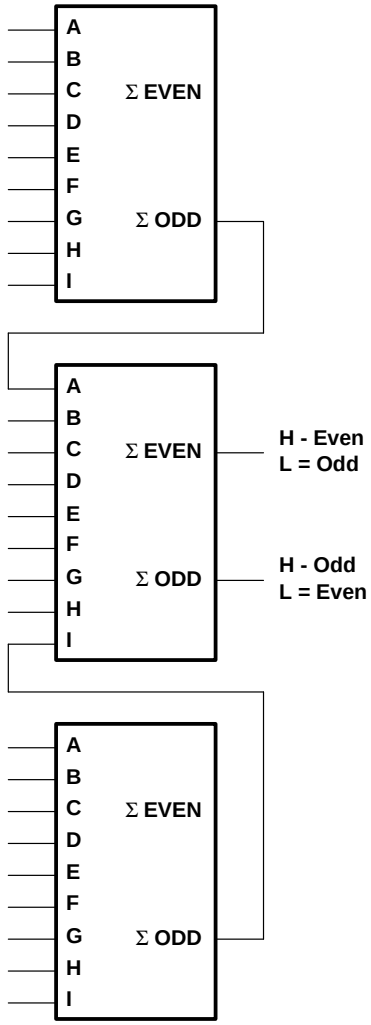
switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX¶		UNIT
			SN74AS280		
			MIN	MAX	
t_{PLH}	Any	Σ EVEN	3	12	ns
t_{PHL}			3	11	
t_{PLH}	Any	Σ ODD	3	12	ns
t_{PHL}			3	11.5	

¶ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

APPLICATION INFORMATION

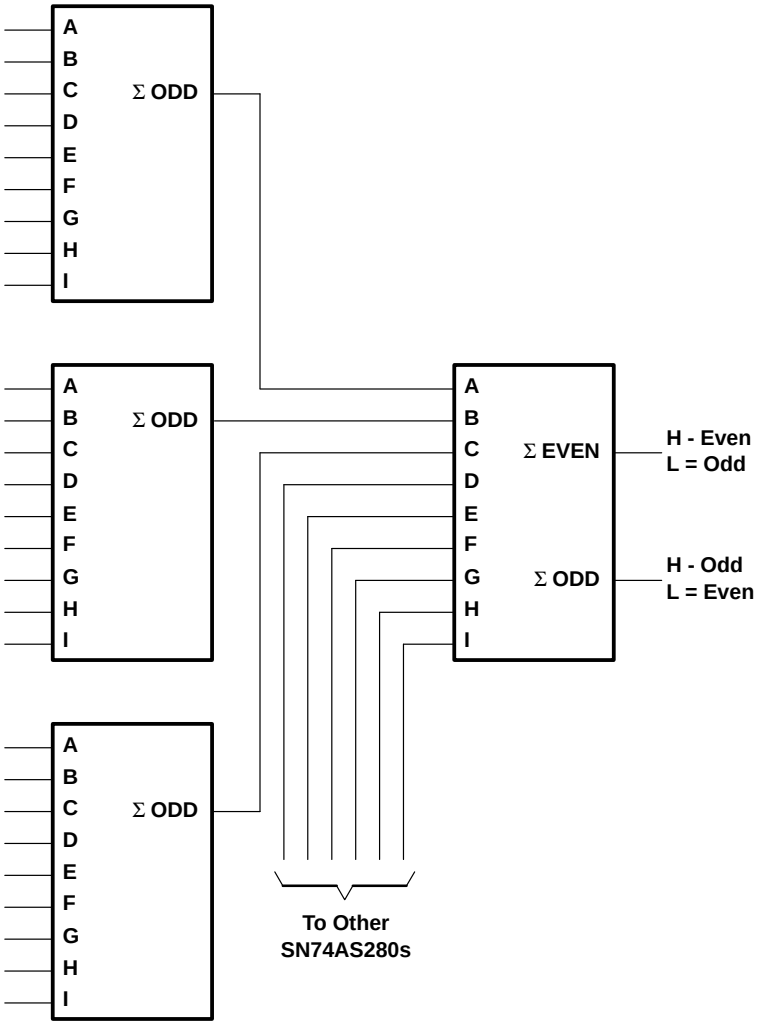
**25-LINE
PARITY GENERATOR/CHECKER**



Three SN74ALS280/SN74AS280 devices can be used to implement a 25-line parity generator/checker.

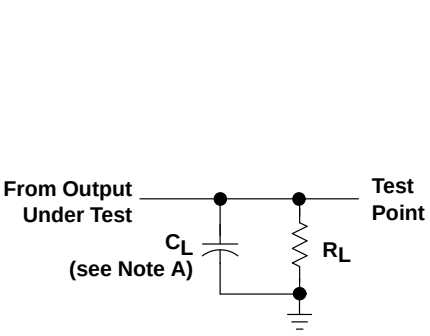
As an alternative, the Σ ODD outputs of two or three parity generators/checkers can be decoded with a 2-input (′AS86A or ′ALS86) exclusive-OR gate for 18- or 27-line parity applications.

**81-LINE
PARITY GENERATOR/CHECKER**

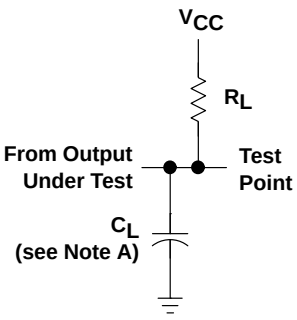


Longer word lengths can be implemented by cascading SN74ALS280/SN74AS280 devices. Parity can be generated for word lengths up to 81 bits.

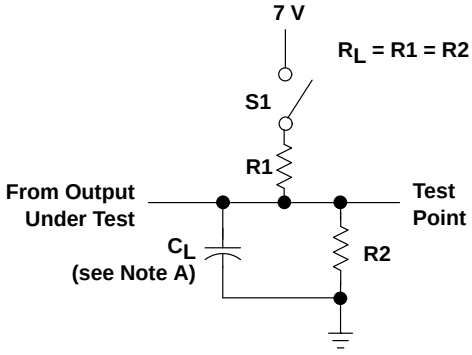
PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



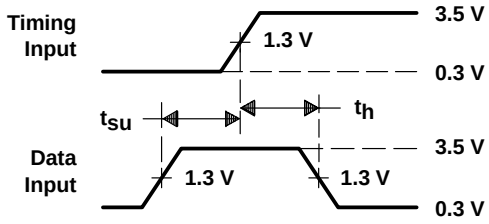
LOAD CIRCUIT FOR
BI-STATE
TOTEM-POLE OUTPUTS



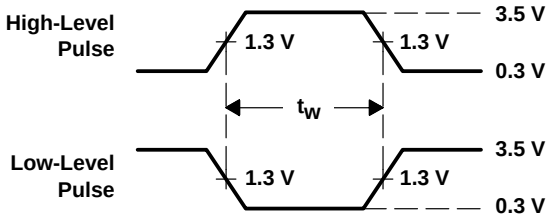
LOAD CIRCUIT
FOR OPEN-COLLECTOR OUTPUTS



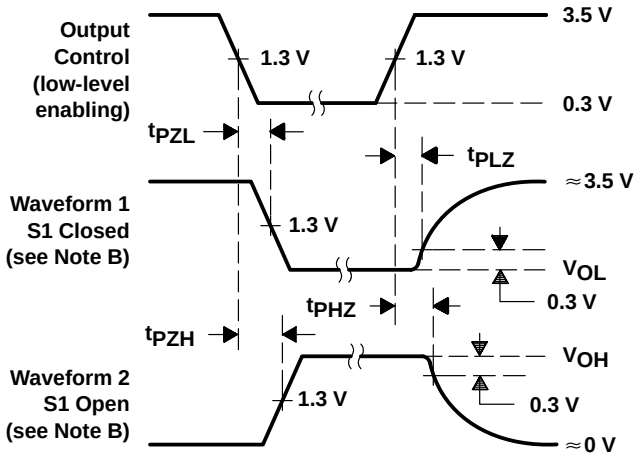
LOAD CIRCUIT
FOR 3-STATE OUTPUTS



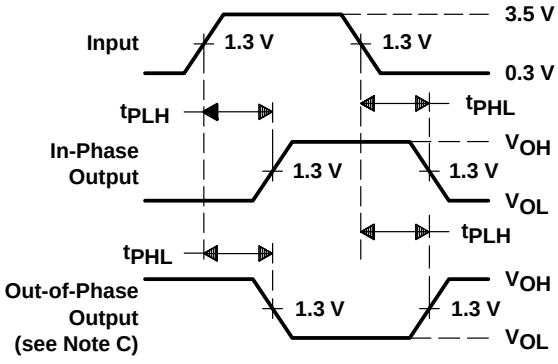
VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PULSE DURATIONS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
D. All input pulses have the following characteristics: PRR ≤ 1 MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

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