D2661, DECEMBER 1982–REVISED AUGUST 1985

- Generates Either Odd or Even Parity for Nine Data Lines

- Cascadable for n-Bits Parity

- Can Be Used to Upgrade Existing Systems Using MSI Parity Circuits

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs

- Dependable Texas Instruments Quality and Reliability

description

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

These devices can be used to upgrade the performance of most systems utilizing the '180 parity generator/checker. Although the 'ALS280 and 'AS280 are implemented without expander inputs, the corresponding function is provided by the availability of an input at pin 4 and the absence of any internal connection at pin 3. This permits the 'ALS280 and 'AS280 to be substituted for the '180 in existing designs to produce an identical function even if the devices are mixed with existing '180's.

All 'AS280 inputs are buffered to lower the drive requirements.

The SN54' family is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74' family is characterized for operation from 0°C to 70°C.

SN54ALS280, SN54AS280 . . . J PACKAGE
SN74ALS280, SN74AS280 . . . D OR N PACKAGE
(TOP VIEW)

```
        G [ 1  U 14 ] VCC
        H [ 2    13 ] F
       NC [ 3    12 ] E
        I [ 4    11 ] D
   Σ EVEN [ 5    10 ] C
   Σ ODD  [ 6     9 ] B
      GND [ 7     8 ] A
```
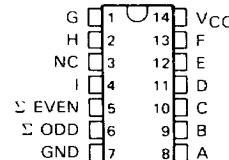
SN54ALS280, SN54AS280 . . . FK PACKAGE
SN74ALS280, SN74AS280 . . . FN PACKAGE
(TOP VIEW)

```
           H  G  NC VCC F
           3  2  1  20 19
   NC [ 4              18 ] E
   NC [ 5              17 ] NC
    I [ 6              16 ] D
   NC [ 7              15 ] NC
 Σ EVEN[ 8             14 ] C
           9 10 11 12 13
          ODD GND NC A B
           Σ
```
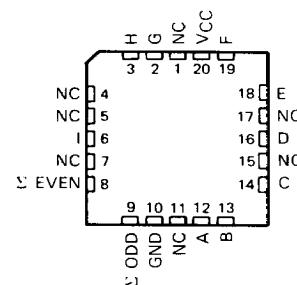
NC – No internal connection

FUNCTION 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

logic symbol[†]

```
       (8)  ┌─────────2k──┐
   A ───────┤             │
       (9)  │             │
   B ───────┤             │
       (10) │             │
   C ───────┤             │
       (11) │          (5)│   Σ
   D ───────┤          ───┤  EVEN
       (12) │             │
   E ───────┤             │
       (13) │          (6)│   Σ
   F ───────┤          ───┤  ODD
       (1)  │             │
   G ───────┤             │
       (2)  │             │
   H ───────┤             │
       (4)  │             │
   I ───────┤             │
            └─────────────┘
```
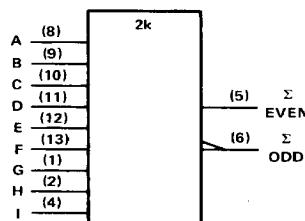
[†]This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, and N packages.

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LSI Devices

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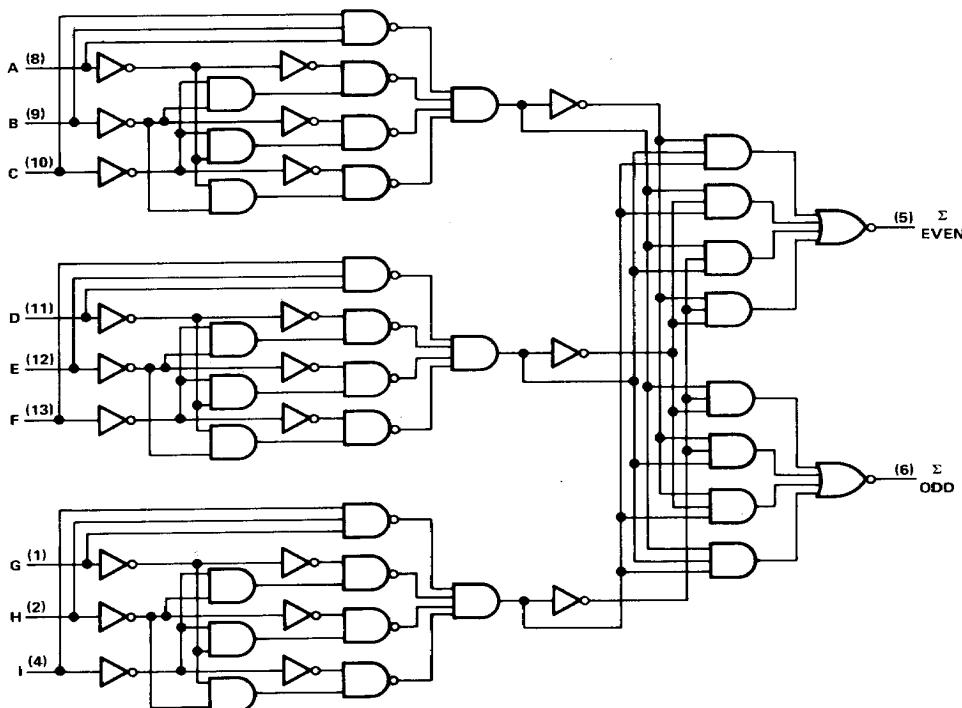
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} . . . . 7 V

Input voltage . . . . 7 V

Operating free-air temperature range: SN54ALS280 . . . . $-55\,°C$ to $125\,°C$

SN74ALS280 . . . . $0\,°C$ to $70\,°C$

Storage temperature range . . . . $-65\,°C$ to $150\,°C$

recommended operating conditions

		SN54ALS280			SN74ALS280			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			−1			−2.6	mA
I_{OL}	Low-level output current			12			24	mA
T_A	Operating free-air temperature	−55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS		SN54ALS280 MIN	TYP†	MAX	SN74ALS280 MIN	TYP†	MAX	UNIT
V_{IK}	$V_{CC} = 4.5$ V,	$I_I = -18$ mA			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5$ V to 5.5 V,	$I_{OH} = -0.4$ mA	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5$ V,	$I_{OH} = -1$ mA	2.4	3.3					
	$V_{CC} = 4.5$ V,	$I_{OH} = -2.6$ mA				2.4	3.2		
V_{OL}	$V_{CC} = 4.5$ V,	$I_{OL} = 12$ mA		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5$ V,	$I_{OL} = 24$ mA					0.35	0.5	
I_I	$V_{CC} = 5.5$ V,	$V_I = 7$ V			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			20			20	μA
I_{IL}	$V_{CC} = 5.5$ V,	$V_I = 0.4$ V			-0.1			-0.1	mA
I_O‡	$V_{CC} = 5.5$ V,	$V_O = 2.25$ V	-30		-112	-30		-112	mA
I_{CC}	$V_{CC} = 5.5$ V			10	16		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 Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $C_L = 50$ pF, $R_L = 500$ Ω, $T_A = 25\,°C$ 'ALS280 MIN	TYP	MAX	$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, $R_L = 500$ Ω, $T_A = $ MIN to MAX SN54ALS280 MIN	MAX	SN74ALS280 MIN	MAX	UNIT
t_{PLH}	Any	Σ Even	12	16		3	24	3	20	ns
t_{PHL}			12	17		3	24	3	20	
t_{PLH}	Any	Σ Odd	12	16		3	24	3	20	ns
t_{PHL}			13	18		4	26	4	22	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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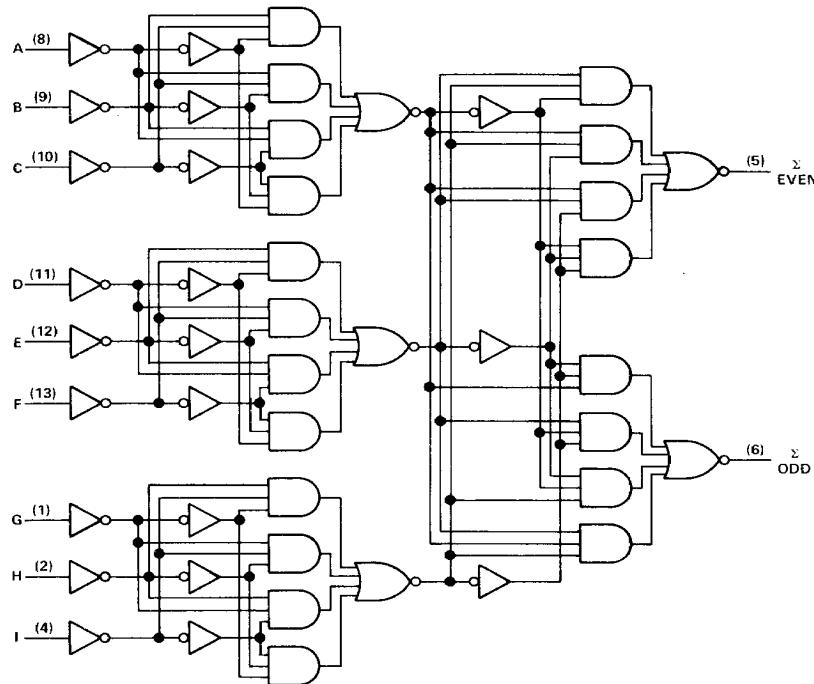
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} . . . . 7 V
Input voltage . . . . 7 V
Operating free-air temperature range: SN54AS280 . . . . −55°C to 125°C
                              SN74AS280 . . . . 0°C to 70°C
Storage temperature range . . . . −65°C to 150°C

recommended operating conditions

		SN54AS280			SN74AS280			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			−2			−2	mA
I_{OL}	Low-level output current			20			20	mA
T_A	Operating free-air temperature	−55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS		SN54AS280			SN74AS280			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5$ V,	$I_I = -18$ mA			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5$ V to 5.5 V,	$I_{OH} = -2$ mA	$V_{CC}-2$			$V_{CC}-2$			V
V_{OL}	$V_{CC} = 4.5$ V,	$I_{OL} = 20$ mA		0.35	0.5		0.35	0.5	V
I_I	$V_{CC} = 5.5$ V,	$V_I = 7$ V			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			20			20	μA
I_{IL}	$V_{CC} = 5.5$ V,	$V_I = 0.4$ V			-0.5			-0.5	mA
I_O‡	$V_{CC} = 5.5$ V,	$V_O = 2.25$ V	-30		-112	-30		-112	mA
I_{CC}	$V_{CC} = 5.5$ V			25	40		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 Note 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
			SN54AS280		SN74AS280		
			MIN	MAX	MIN	MAX	
t_{PLH}	Any	Σ Even	3	13	3	12	ns
t_{PHL}			3	12.5	3	11	
t_{PLH}	Any	Σ Odd	3	13	3	12	ns
t_{PHL}			3	12.5	3	11.5	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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LSI Devices

TYPICAL APPLICATION DATA

25-LINE PARITY/GENERATOR CHECKER

81-LINE PARITY/GENERATOR CHECKER
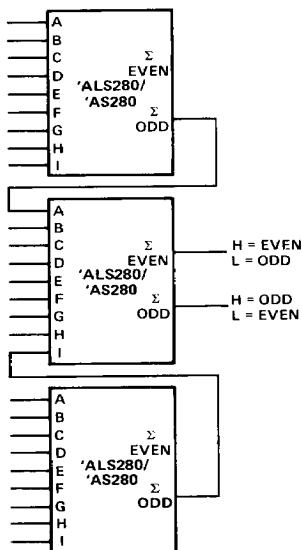
Three 'ALS280/'AS280 can be used to implement a 25-line parity generator/checker.

As an alternative, the Σ ODD outputs of two or three parity generators/checkers can be decoded with a 2-input ('S86 or 'LS86) or 3-input ('S135) exclusive-OR gate for 18- or 27-line parity applications.
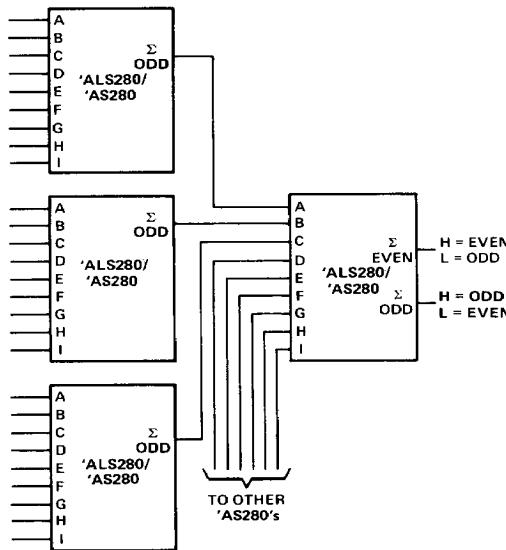
Longer word lengths can be implemented by cascading 'ALS280/'AS280. As shown here, parity can be generated for word lengths up to 81 bits.

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