

9-Bit odd/even generator/checker

54F280A/B

FEATURES

- High-impedance NPN base inputs for reduced loading (20 μ A in Low and High states)
- Buffered inputs — one normalized load
- Word length easily expanded by cascading

DESCRIPTION

The 54F280A, 54F280B are 9-bit parity generators or checkers commonly used to detect errors in high-speed data transmission or data retrieval systems. Both Even and Odd parity outputs are available for generating or checking even or odd parity on up to 9 bits.

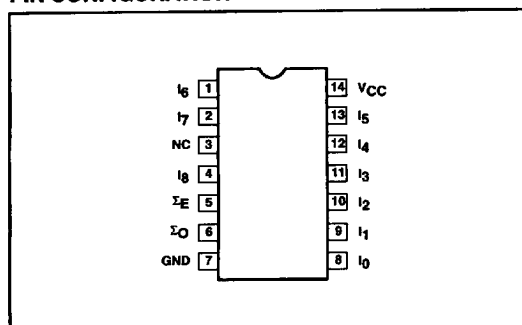
The Even parity output (Σ_E) is High when an even number of Data inputs ($I_0 - I_8$) are High. The odd parity output (Σ_O) is High when an odd number of Data inputs are High.

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

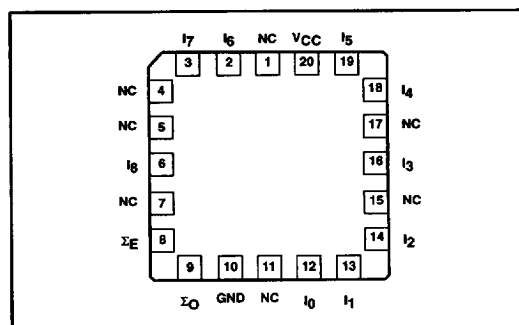
PINS	DESCRIPTION	54F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$I_0 - I_8$	Data inputs	1.0/0.033	20 μ A/20 μ A
Σ_E, Σ_O	Parity outputs	50/33	1.0mA/20mA

NOTE: One (1.0) FAST Unit Load (U.L.) is defined as: 20 μ A in the High state and 0.6mA in the Low state.

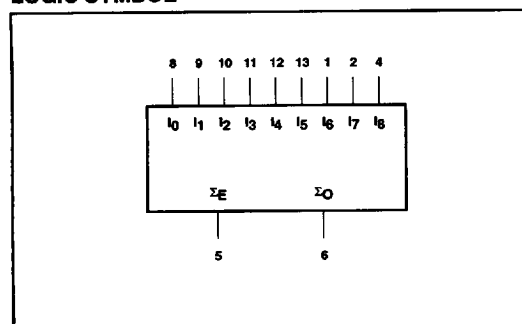
PIN CONFIGURATION



LLCC LEAD CONFIGURATION



LOGIC SYMBOL



Expansion to larger word sizes is accomplished by tying the Even outputs (Σ_E) of up to nine parallel devices to the Data inputs of the final stage. This expansion scheme allows an 81-bit data word to be checked in less than 25ns with the 54F280A, 54F280B.

The 54F280B is a speed enhanced version with better t_{PLH} to t_{PHL} matching.

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
14-Pin Ceramic DIP	54F280A/BCA 54F280B/BCA	GDIP1-T14
14-Pin Ceramic FlatPack	54F280A/BDA 54F280B/BDA	GDFP1-F14
20-Pin Ceramic LLCC	54F280A/B2A 54F280B/B2A	CQCC2-N20

* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

FUNCTION TABLE

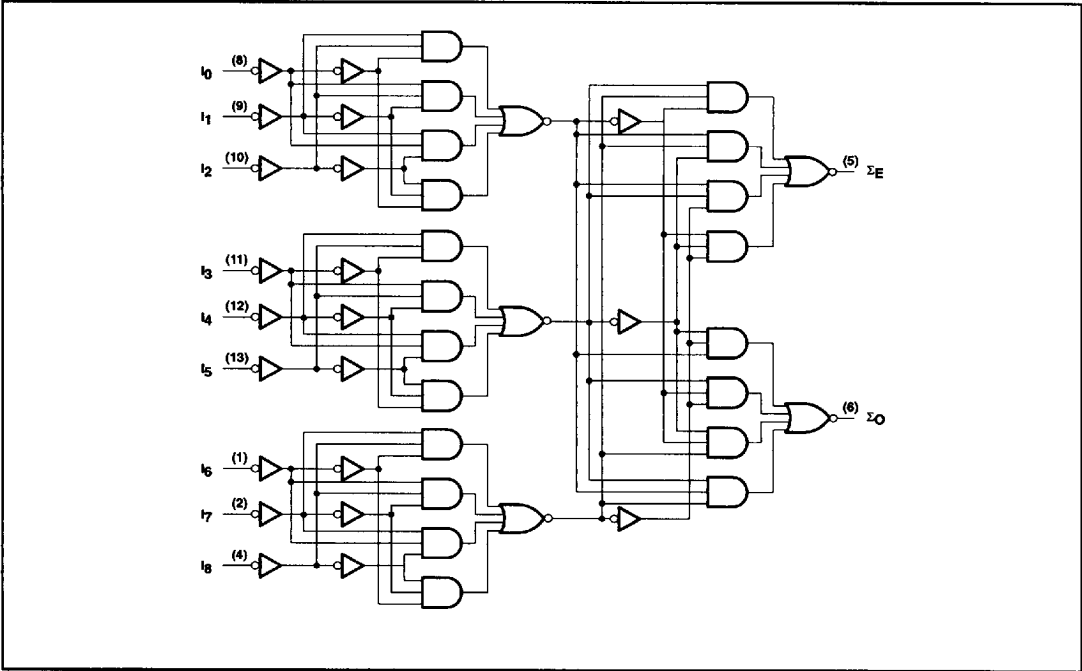
INPUTS	OUTPUTS	
Number of High Data Inputs ($I_0 - I_8$)	Σ_E	Σ_O
Even — 0, 2, 4, 6, 8	H	L
Odd — 1, 3, 5, 7, 9	L	H

H = High voltage level
L = Low voltage level

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LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V _{CC}	Supply voltage range	-0.5 to +7.0	V
V _I	Input voltage range	-0.5 to +7.0	V
I _I	Input current range	-30 to +5	mA
V _O	Voltage applied to output in High output state range	-0.5 to V _{CC}	V
I _O	Current applied to output in Low output state	40	mA
T _{STG}	Storage temperature range	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Nom	Max	
V _{CC}	Supply voltage	4.5	5.0	5.5	V
V _{IH}	High-level input voltage	2.0			V
V _{IL}	Low-level input voltage			0.8	V
I _{IK}	Input clamp current			-18	mA
I _{OH}	High-level output current			-1	mA
I _{OL}	Low-level output current			20	mA
T _A	Operating free-air temperature range	-55		+125	°C

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DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS ¹	LIMITS			UNIT
			Min	Typ ²	Max	
V _{OH}	High-level output voltage	V _{CC} = Min, V _{IL} = Max, V _{IH} = Min, I _{OH} = Max	2.5			V
V _{OL}	Low-level output voltage	V _{CC} = Min, V _{IL} = Max, V _{Ih} = Min, I _{OL} = Max		.35	.50	V
V _{IK}	Input clamp voltage	V _{CC} = Min, I _I = I _{IK}		-0.73	-1.2	V
I _{IH2}	Input current at maximum input voltage	V _{CC} = 0.0V, V _I = 7.0V			100	μA
I _{IH1}	High-level input current	V _{CC} = Max, V _I = 2.7V		4.0	20	μA
I _{IL}	Low-level input current	V _{CC} = Max, V _I = 0.5V		-0.1	-20	μA
I _{OS}	Short-circuit output current ³	V _{CC} = Max, V _O = 0.0V	-60	-114	-150	mA
I _{CC}	Supply current ⁴ (total)	V _{CC} = Max		26	35	mA

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS – 54F280A						UNIT
			T _A = +25°C			T _A = -55°C to +125°C			
			V _{CC} = +5.0V			V _{CC} = +5.0V ± 10%			
			C _L = 50pF, R _L = 500Ω			C _L = 50pF, R _L = 500Ω			
Min	Typ	Max	Min	Max					
t _{PLH} t _{PHL}	Propagation delay I _O - I _S to Σ _E	Waveform 1, 2	5.0 4.0	7.0 11.1	9.0 13.0	4.0 4.0	11.0 17.0	ns ns	
t _{PLH} t _{PHL}	Propagation delay I _O - I _S to Σ _O	Waveform 1, 2	5.0 5.0	8.6 9.1	10.5 11.0	4.0 4.0	12.0 16.0	ns ns	

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS – 54F280B						UNIT
			T _A = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _A = -55°C to +125°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω			
			Min	Typ	Max	Min	Max		
t _{PLH} t _{PHL}	Propagation delay I _O - I _S to Σ _E	Waveform 1, 2	4.0 4.0	6.5 7.0	9.0 10.0	3.0 3.5	11.0 12.0	ns ns	
t _{PLH} t _{PHL}	Propagation delay I _O - I _S to Σ _O	Waveform 1, 2	4.0 4.0	6.5 7.0	9.0 10.0	3.0 3.5	11.0 12.0	ns ns	

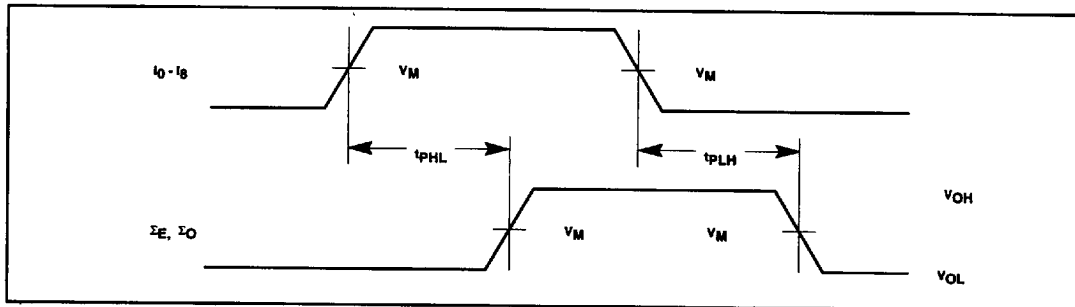
NOTES:

- For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type and function table for operating mode.
- All typical values are at V_{CC} = 5V, T_A = 25°C.
- Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.
- I_{CC} is measured with all outputs open.

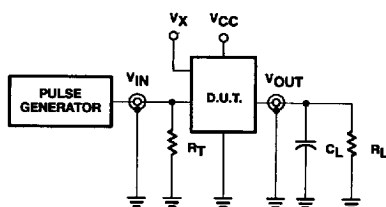
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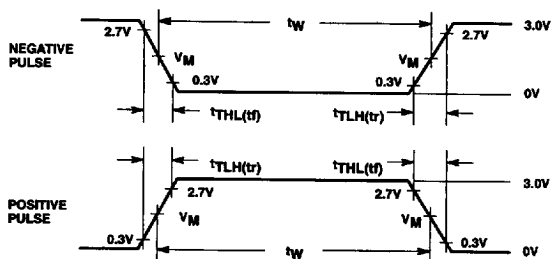
AC WAVEFORMS



TEST CIRCUIT AND WAVEFORM



Test Circuit for Totem-Pole Outputs

 $V_M = 1.5V$

Input Pulse Definition

DEFINITIONS:

- R_L = Load Resistor; see AC Characteristics for value.
 C_L = Load capacitance includes jig and probe capacitance; see AC Characteristics for value.
 R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.
 V_X = Unlocked pins must be held at: $\leq 0.8V$; $\geq 2.7V$ or open per Function Table.

INPUT PULSE CHARACTERISTICS				
Family	Rep. Rate	Pulse Width	t_{TLH}	t_{THL}
54F	1MHz	500ns	$\leq 2.5ns$	$\leq 2.5ns$