Philips Semiconductors-Signetics

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Status	Product Specification
FAST Products	

FAST 74F280A, 74F280B
Parity Checker Generator

9-Bit Odd/Even Parity Generator/Checker

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F280A	6.5ns	26mA
74F280B	5.5ns	26mA

FEATURES

- **High impedance NPN base inputs for reduced loading (20μA in Low and High states)**
- **Buffered inputs–one normalized load**
- **Word length easily expanded by cascading**
- **Industrial temperature range available (-40°C to +85°C) for 74F280B**

DESCRIPTION

The 74F280A is a 9-bit Parity Generator or Checker commonly used to detect errors in high speed data transmission or data retreival systems. Both Even (Σ_E) and Odd (Σ_O) parity outputs are available for generating and checking even or odd parity on up to 9 bits.

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

Expansion to larger word sizes is accomplished by tying the Even (Σ_E) outputs 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 20 ns.

The 74F280B is a faster version of 74F280A

ORDERING INFORMATION

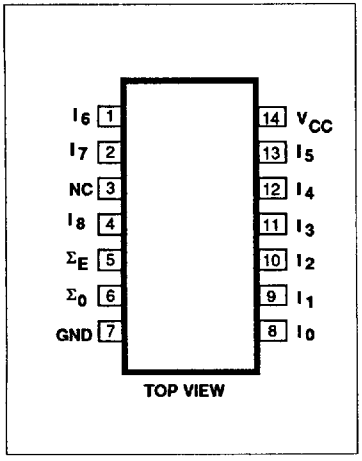
PACKAGES	COMMERCIAL RANGE V_{CC} = 5V±10% T_A = 0°C to +70°C	INDUSTRIAL RANGE V_{CC} = 5V±10% T_A = -40°C to +85°C
14-Pin Plastic DIP	N74F280AN, N74F280BN	I74F280BN
14-Pin Plastic SO	N74F280AD, N74F280BD	I74F280BD

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
I_0-I_8	Data inputs	1.0/0.033	20μA/20μA
Σ_E, Σ_O	Parity outputs	50/33	1.0mA/20mA

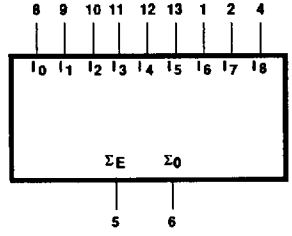
NOTE:
One (1.0) FAST Unit Load is defined as: 20μA in the High state and 0.6mA in the Low state.

PIN CONFIGURATION



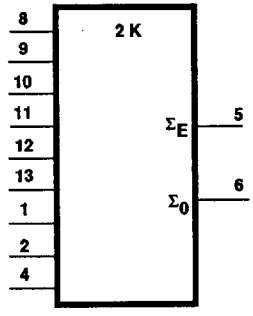
TOP VIEW

LOGIC SYMBOL



V_{CC} =Pin 14
GND=Pin 7

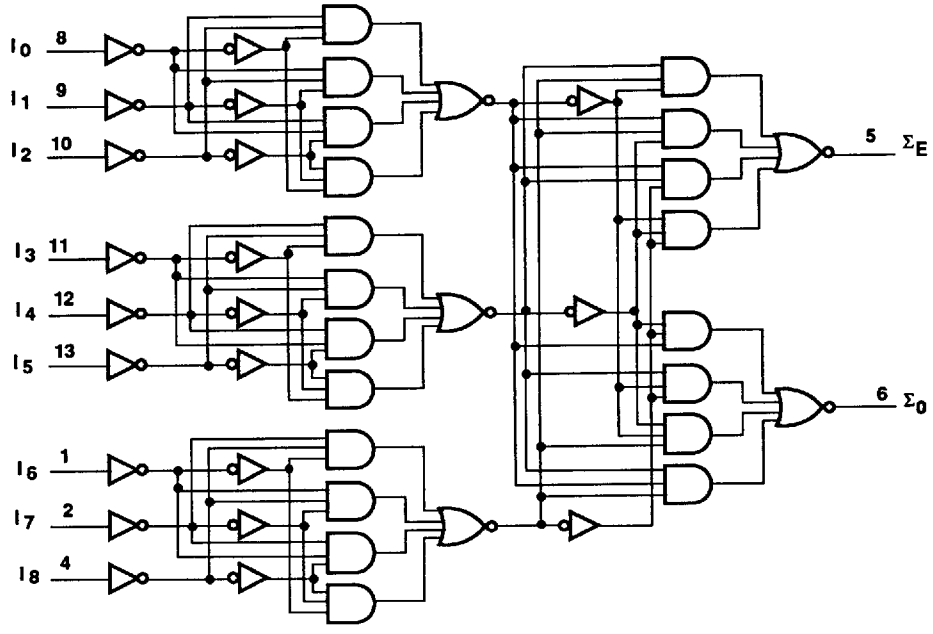
LOGIC SYMBOL(IEEE/IEC)



Parity Generator Checker

FAST 74F280A, 74F280B

LOGIC DIAGRAM



V_{CC} = pin 14
GND = pin 7

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

ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER		RATING	UNIT
V_{CC}	Supply voltage		-0.5 to +7.0	V
V_{IN}	Input voltage		-0.5 to +7.0	V
I_{IN}	Input current		-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state		-0.5 to +V_{CC}	V
I_{OUT}	Current applied to output in Low output state		40	mA
T_A	Operating free-air temperature range	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°C
T_{STG}	Storage temperature		-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	Commercial range	0		70	°C
		Industrial range	-40		85	°C

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	±10%V_{CC}	2.5			V
			V_{IH} = MIN, I_{OH} = MAX	±5%V_{CC}	2.7	3.4		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IL} = MAX	±10%V_{CC}		0.35	0.50	V
	Input clamp voltage		V_{IH} = MIN, I_{OL} = MAX	±5%V_{CC}		0.35	0.50	V
V_{IK}	Input current at maximum input voltage		V_{CC} = MIN, I_I = I_{IK}			-0.73	-1.2	V
I_I			V_{CC} = 0.0V, V_I = 7.0V				100	µA
I_{IH}	High-level input current	Commercial range	V_{CC} = MAX, V_I = 2.7V				20	µA
	Low-level input current	Industrial range					40	µA
I_{IL}	Short-circuitoutput current[3]		V_{CC} = MAX, V_I = 0.5V				-20	µA
I_{OS}	Supply current (total)		V_{CC} = MAX		-60		-150	mA
I_{CC}			V_{CC} = MAX			26	35	mA

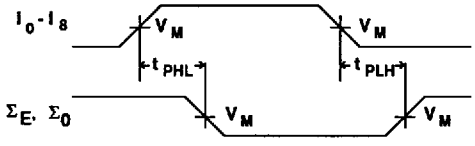
NOTES:

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_A = 25°C.
3. 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.

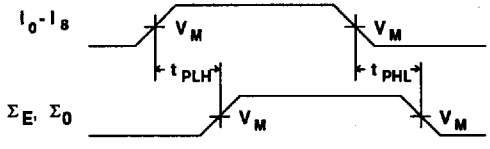
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER		TEST CONDITION	LIMITS							UNIT
				T_A = +25°C, V_{CC} = 5V, C_L = 50pF, R_L = 500Ω			T_A = 0°C to +70°C, V_{CC} = 5V ±10%, C_L = 50pF, R_L = 500Ω		T_A = -40°C to +85°C, V_{CC} = 5V ±10%, C_L = 50pF, R_L = 500Ω		
				Min	Typ	Max	Min	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay I_0 - I_8 to Σ_E	'F280A	Waveform 1,2	5.0 7.5	7.0 10.0	9.0 13.0	5.0 7.5	10.0 14.5			ns
t_{PLH} t_{PHL}	Propagation delay I_0 - I_8 to Σ_O	'F280A	Waveform 1,2	6.5 7.0	8.6 9.1	10.5 12.0	6.5 6.0	11.0 13.0			ns
t_{PLH} t_{PHL}	Propagation delay I_0 - I_8 to Σ_E	'F280B	Waveform 1,2	4.0 4.0	6.5 7.0	9.0 10.0	3.5 3.5	10.0 11.1	3.0 3.5	11.0 12.0	ns
t_{PLH} t_{PHL}	Propagation delay I_0 - I_8 to Σ_O	'F280B	Waveform 1,2	4.0 4.0	6.5 7.0	9.0 10.0	3.5 3.5	10.0 11.0	3.0 3.5	11.0 12.0	ns

AC WAVEFORMS



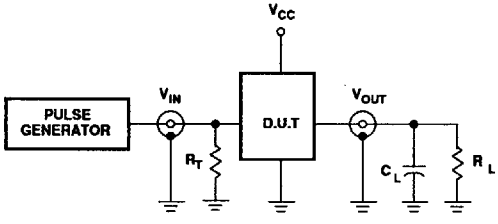
Waveform 1. Propagation Delay For Inverting Outputs



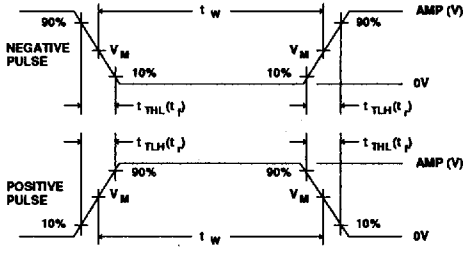
Waveform 2. Propagation Delay For Non-Inverting Outputs

NOTE: For all waveforms, V_M = 1.5V.

TEST CIRCUIT AND WAVEFORMS



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.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_W	t_{TLH}	t_{THL}
74F	3.0V	1MHz	500ns	2.5ns	2.5ns