National Semiconductor

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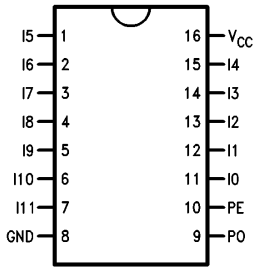
9348
12-Input Parity Checker/Generator

General Description

The 9348 is a 12-input parity checker/generator generating odd and even parity outputs. It can be used in high speed error detection applications.

Connection Diagram

Dual-In-Line Package



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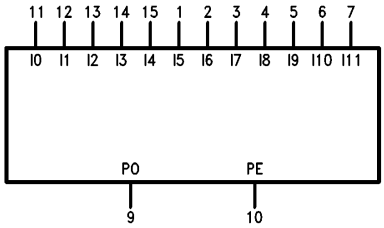
Order Number 9348DMQB or 9348FMQB
See NS Package Number J16A or W16A

Logic Symbol



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V_{CC} = Pin 16
GND = Pin 8

Pin Names	Description
I0–I11	Parity Inputs
PO	Odd Parity Output
PE	Even Parity Output

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Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	
Military	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C

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	9348			Units
		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			−0.8	mA
I_{OL}	Low Level Output Current			16	mA
T_A	Free Air Operating Temperature	−55		125	°C

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −12 mA			−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max	2.4			V
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min			0.4	V
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 5.5V			1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.4V			80	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V			−3.2	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	−20		−70	mA
I_{CC}	Supply Current	V_{CC} = Max			82	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time.

Switching Characteristics

V_{CC} = +5.0V, T_A = +25°C (See Section 1 for waveforms and load configuration)

Symbol	Parameter	Conditions	C_L = 15 pF, R_L = 400Ω		Units
			Min	Max	
t_{PLH} t_{PHL}	Propagation Delay I4 to PO	I2, I3, I7, I8 = GND; Other Inputs (except I4) HIGH		46 42	ns
t_{PLH} t_{PHL}	Propagation Delay I4 to PE	I2, I3, I7, I8 = GND; Other Inputs (except I4) HIGH		51 48	ns
t_{PLH}	Propagation Delay I3 to PO	I7 = HIGH; Other Inputs (except I3) = GND		27	ns
t_{PHL}	Propagation Delay I4 to PO	All Inputs (except I4) = GND		25	ns

Functional Description

The 9348 is a 12-input parity generator. It provides odd and even parity for up to 12 data bits. The Even Parity output (PE) will be HIGH if an even number of logic ones are present on the inputs. The Odd Parity output (PO) will be HIGH if an odd number of logic ones are present on the inputs. The logic equations for the outputs are shown below.

$$\begin{aligned} PO &= \overline{I0 \oplus I1 \oplus I2 \oplus I3 \oplus I4 \oplus I5 \oplus I6 \oplus I7 \oplus I8 \oplus I9 \oplus I10 \oplus I11} \\ PE &= I0 \oplus I1 \oplus I2 \oplus I3 \oplus I4 \oplus I5 \oplus I6 \oplus I7 \oplus I8 \oplus I9 \oplus I10 \oplus I11 \end{aligned}$$

Note: Less through delay is encountered from the I0, I1, I2 and I3 inputs than I4 thru I11 inputs. Therefore, if some signals are slower than others, the slower signals should be applied to these four inputs for maximum speed.

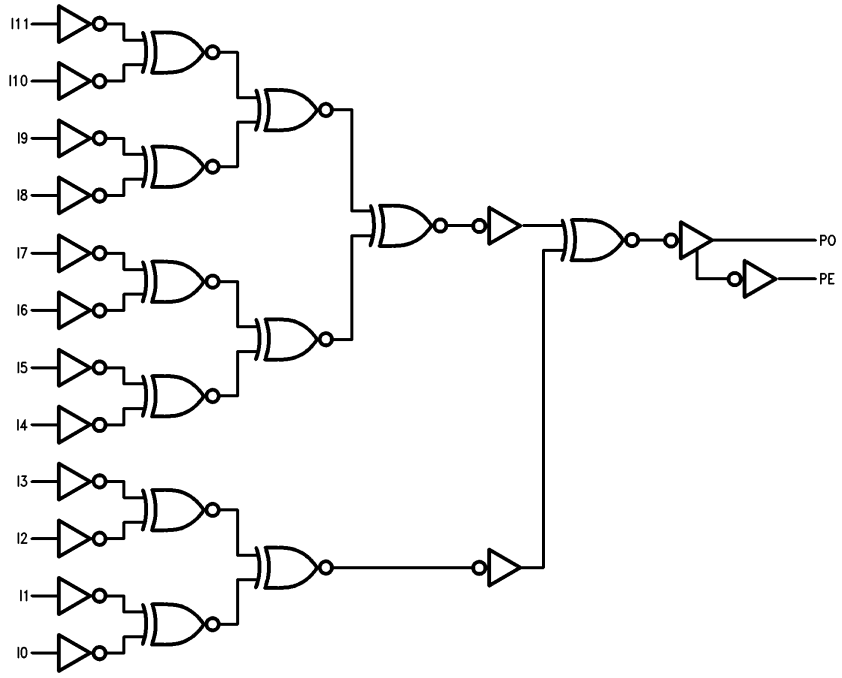
Truth Table

Inputs		Outputs	
I0–I11		PO	PE
All Twelve	Inputs LOW	L	H
Any One	Inputs HIGH	H	L
Any Two	Inputs HIGH	L	H
Any Three	Inputs HIGH	H	L
Any Four	Inputs HIGH	L	H
Any Five	Inputs HIGH	H	L
Any Six	Inputs HIGH	L	H
Any Seven	Inputs HIGH	H	L
Any Eight	Inputs HIGH	L	H
Any Nine	Inputs HIGH	H	L
Any Ten	Inputs HIGH	L	H
Any Eleven	Inputs HIGH	H	L
Any Twelve	Inputs HIGH	L	H

H = HIGH Voltage Level

L = LOW Voltage Level

Logic Diagram



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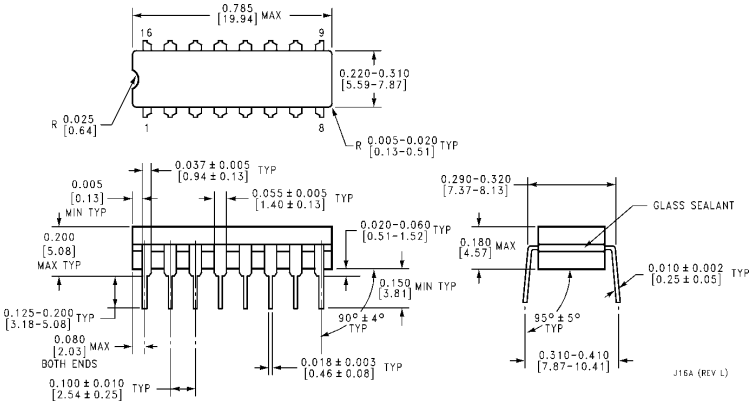
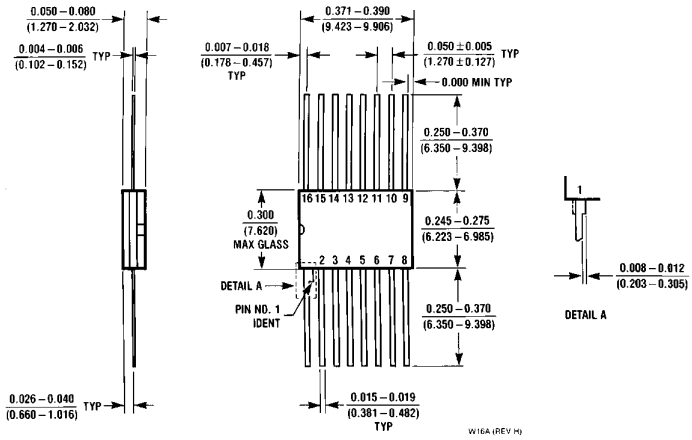
Physical Dimensions inches (millimeters)



16-Lead Ceramic Dual-In-Line Package (J)
Order Number 9348DMQB
NS Package Number J16A



16-Lead Ceramic Flat Package (W)
Order Number 9348FMQB
NS Package Number W16A

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