



CD74AHC1G86

Single-channel 2-input, 2V to 5.5V XOR (Exclusive OR) gate

Version: Rev 1.0.0 Date: 2025-6-25

Features ■■

- Operating Range 2 V to 5.5 V
- Maximum t_{pd} of 8 ns at 5 V
- Low Power Consumption, 10- μ A Maximum I_{CC}
- ± 8 -mA Output Drive at 5 V
- Schmitt-Trigger Action at All Inputs Makes the Circuit Tolerant for Slower Input Rise and Fall
- Latch-Up Performance Exceeds 250 mA Per JESD 17

Application ■■

- Cameras
- Programmable Logic Controllers
- Telecom Infrastructure
- Wireless Headsets
- Motor Drives and Controls
- TVs
- Set-top-boxes
- Audio

Description ■■

The CD74AHC1G86 is a single 2-input exclusive-OR gate. The device performs the Boolean function $Y = A \oplus B$ or $Y = \bar{A}B + A\bar{B}$ in positive logic.

The CD74AHC1G86 are available in SOT23-5 packages.

Contents

Features.....

- 1 -

Application.....

- 1 -

Description.....

- 1 -

Pin Configurations.....

- 3 -

Pin Description.....

- 3 -

Functional Block diagram.....

- 3 -

Absolute Maximum Ratings.....

- 5 -

Operating Temperatures Range.....

- 5 -

Electrical Characteristics.....

- 6 -

Typical Electrical Characteristics.....

- 7 -

Typical Application.....

- 8 -

Package Outline Dimensions.....

- 8 -

Package/Ordering Information.....

- 9 -

Revision Log.....

- 10 -

Pin Configurations

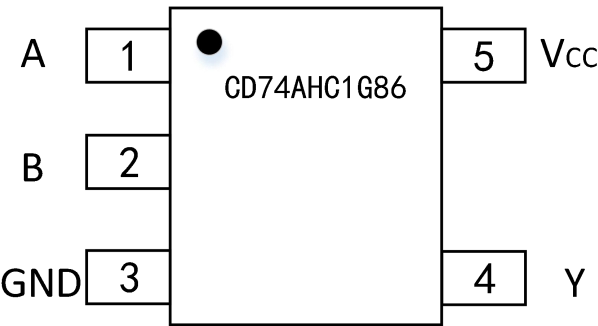


Figure 1. SOT23-5 Pin Configuration

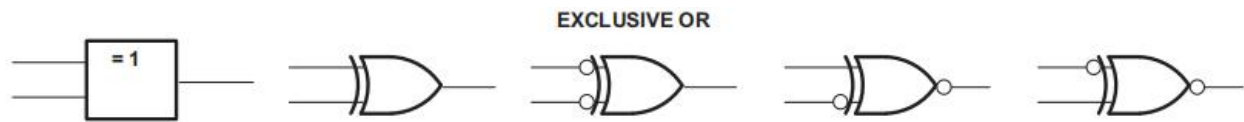
Pin Description

Table 1. Pin description

Pin No.	Pin Name		Description
1	A	I	Input A
2	B	I	Input B
3	GND	--	Ground Pin
4	Y	O	Output Y
5	V _{CC}	--	Power Pin

Functional Block diagram

An exclusive-OR gate has many applications, some of which can be represented better by alternative logic symbols.



These are five equivalent exclusive-OR symbols valid for an SN74AHC1G86 gate in positive logic; negation may be shown at any twoports.

LOGIC-IDENTITY ELEMENT



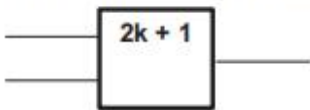
The output is active (low) if all inputs stand at the same logic level (that is, $A = B$).

EVEN-PARITY ELEMENT



The output is active (low) if an even number of inputs (that is, 0 or 2) are active.

ODD-PARITY ELEMENT



The output is active (high) if an odd number of inputs (that is, only 1 of the 2) are

active.

Figure 2. Exclusive-OR Logic

Table 2. Truth Table

Truth Table

Inputs		Output Y
A	B	
L	L	L
L	H	H
H	L	H

Absolute Maximum Ratings

Parameter	Range
Supply Voltage(V_{CC})	-0.5 V to +7 V
Input Voltage(V_I)	-0.5 V to +7 V
Output Voltage(V_O)	-0.5 V to $V_{CC}+0.5$ V
Input Clamp Current(I_{IK})	-20mA(Max),@ $V_I < 0$
Output Clamp Current(I_{OK})	± 20 mA(Max),@ $V_O < 0$ or $V_O > V_{CC}$
Continuous Output Current(I_O)	± 25 mA(Max),@ $V_O=0$ to V_{CC}
Continuous Current Through V_{CC} or GND	± 50 mA(Max)
Junction Temperature(T_J)	150°C(Max)
Storage Temperature(T_{stg})	-40°C~150°C
ESD	2 kV(HBM) ,1kV(CDM),200V(MM)

Operating Temperatures Range

Parameter	Range
Supply Voltage(V_{CC})	2 V to +5.5 V
High Level Input Voltage(V_{IH})	1.5 V(min) @ $V_{CC}=2$ V ,2.1 V(min) @ $V_{CC}=3$ V ,3.85 V(min) @ $V_{CC}=5.5$ V
Low Level Input Voltage(V_{IL})	0.5 V(max) @ $V_{CC}=2$ V ,0.9 V(max) @ $V_{CC}=3$ V,1.65 V(max) @ $V_{CC}=5.5$ V
Input Voltage(V_I)	0 V to +5.5 V
Output Voltage(V_O)	0 V to + V_{CC} V
High Level Output Current	-50 μ A(max) @ $V_{CC}=2$ V,-4mA(max) @ $V_{CC}=3.3$ V ± 0.3 V , -8mA(max) @ $V_{CC}=5$ V ± 0.5 V
Low Level Output Current(I_{OL})	50 μ A(max) @ $V_{CC}=2$ V ,4mA(max) @ $V_{CC}=3.3$ V ± 0.3 V ,8mA(max) @ $V_{CC}=5$ V ± 0.5 V
Input transition rise or fall rate($\Delta t/\Delta v$)	100ns/v@ $V_{CC}=3.3$ v ± 0.3 v,20ns/v@ $V_{CC}=5$ v ± 0.5 v
Operating Free Air Temperature(T_A)	-40°C to + 125°C

Electrical Characteristics

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

Table 3.

Parameter	+25°C			-40° C to +125° C			Test Conditions	UNIT
	Min	Typ	Max	Min	Typ	Max		
Output Characteristics								
VOH	1.9	2	--	1.9	--	--	IOH = -50 μA,V _{CC} =2V	V
	2.9	3	--	2.9	--	--	IOH = -50 μA,V _{CC} =3V	
	4.4	4.5	--	4.4	--	--	IOH = -50 μA,V _{CC} =4.5V	
	2.58	--	--	2.4	--	--	IOH = -4mA,V _{CC} =3V	
	3.94	--	--	3.8	--	--	IOH = -8mA,V _{CC} =4.5V	
VOL	--	--	0.1	--	--	0.1	IOH = 50 μA,V _{CC} =2V	V
	--	--	0.1	--	--	0.1	IOH = 50 μA,V _{CC} =3V	
	--	--	0.1	--	--	0.1	IOH = 50 μA,V _{CC} =4.5V	
	--	--	0.36	--	--	0.44	IOH = 4mA,V _{CC} =3V	
	--	--	0.36	--	--	0.44	IOH = 8mA,V _{CC} =4.5V	
I _I	--	--	±0.1	--	--	±1	VI = 5.5 V or GND,V _{CC} =0V to 5.5V	μA
I _{CC}	--	--	1	--	--	10	VI = VCC or GND, IO = 0,V _{CC} = 5.5V	μA
C _I	--	4	10	--	--	10	VI = VCC or GND,V _{CC} = 5V	pF

Switching Characteristics, V_{CC} = 3.3 V $\pm$ 0.3 V; over recommended operating free-air temperature range (unless otherwise noted)

Table 4.

Parameter	From (Input)	To (Output)	Output Capacitance	+25°C			−40° C to +85° C			−40° C to +125° C			UNIT
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Switching Characteristics													
t _{PLH}	A or B	Y	CL = 15 pF	--	7	11	1	--	13	1	--	14	ns
t _{PHL}				--	7	11	1	--	13	1	--	14	
t _{PLH}	A or B	Y	CL = 50 pF	--	9.5	14.5	1	--	16.5	1	--	17.5	ns
t _{PHL}				--	7	11	1	--	13	1	--	14	

Switching Characteristics, V_{CC} = 5 V $\pm$ 0.5 V; over recommended operating free-air temperature range (unless otherwise noted)

Table 5.

Parameter	From (Input)	To (Output)	Output Capacitance	+25°C			-40° C to +85° C			-55° C to +125° C			UNIT
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	

e													
Switching Characteristics													
t _{PLH}	A or B	Y	CL = 15 pF	--	4.8	6.8	1	--	8	1	--	8.6	ns
t _{PHL}				--	4.8	6.8	1	--	8	1	--	8.6	
t _{PLH}	A or B	Y	CL = 50 pF	--	6.3	8.8	1	--	10	1	--	11	ns
t _{PHL}				--	6.3	8.8	1	--	10	1	--	11	

Operating Characteristics(VCC = 5 V, TA = 25°C)

Parameter	Test Conditions	TYP	UNIT
Cpd Power dissipation capacitance	No load, f = 1 MHz	18	pF

Typical Electrical Characteristics

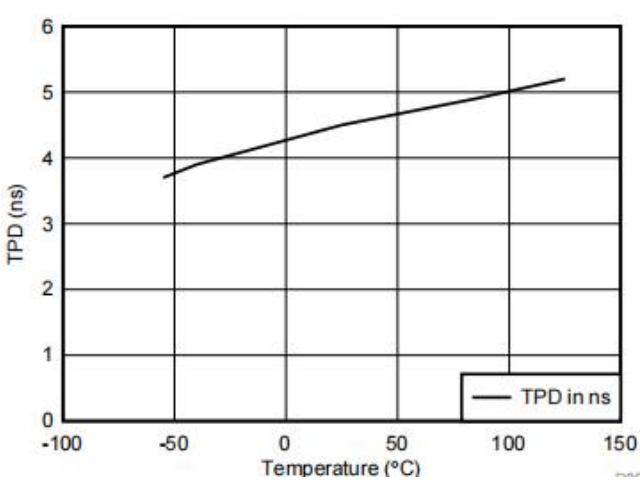


Figure 3. T_{PD} vs Temperature

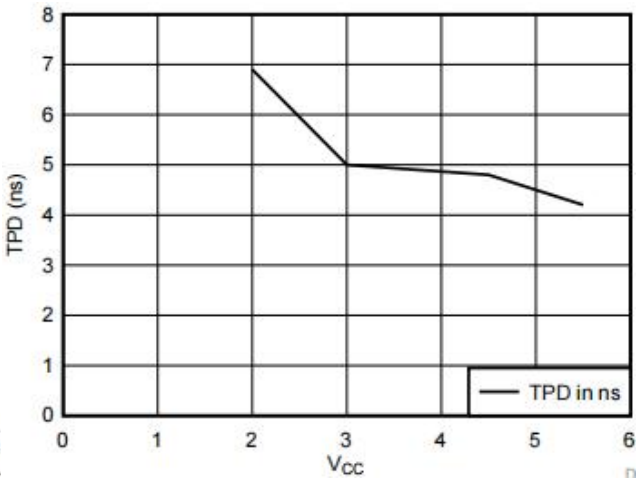


Figure 4. T_{PD} vs V_{CC} at 25°C

Typical Application

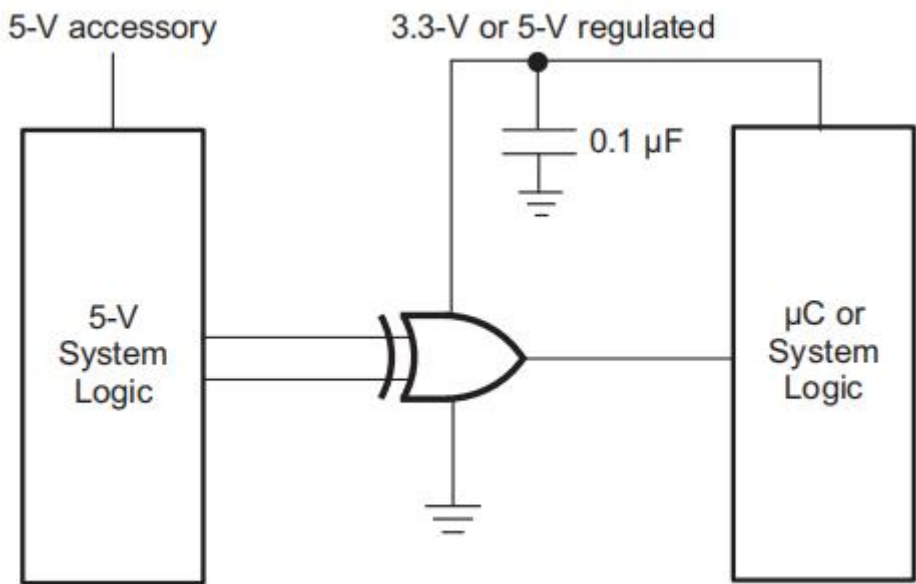


Figure 5. Typical Application Schematic

Package Outline Dimensions

SOT23-5

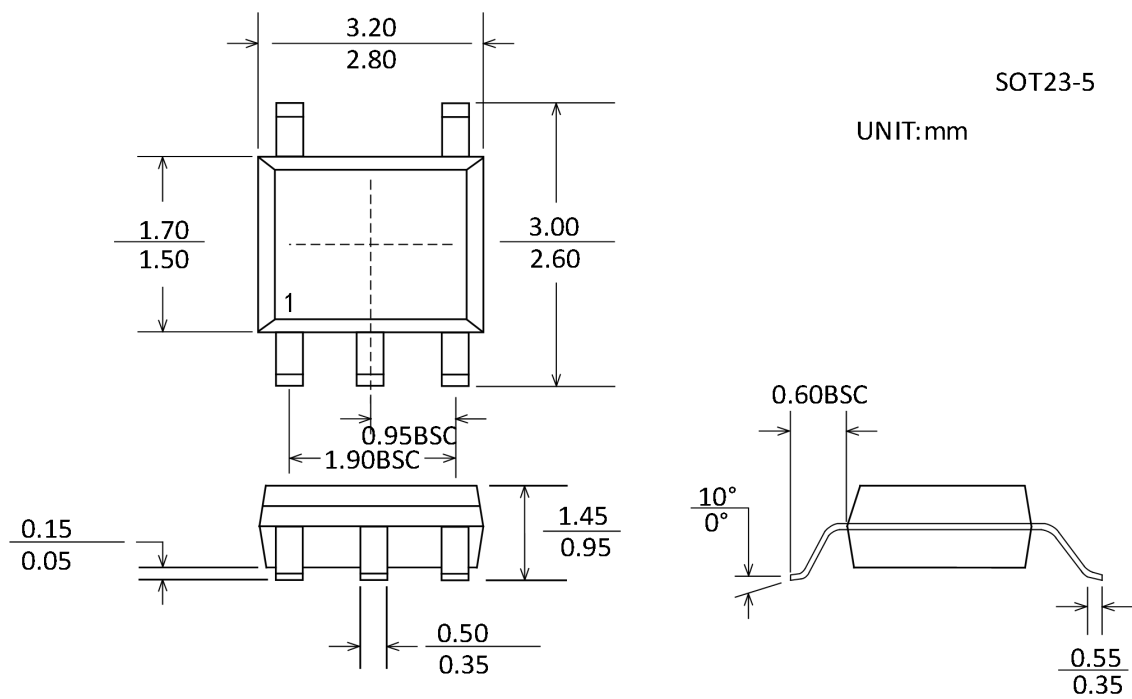


Figure 5.

5-Lead Small Outline Package [SOT23-5]

Package/Ordering Information

MODEL	TEMPERATURE	PACKAGE DESCRIPTION	PACKAGE OPTION
CD74AHC1G86AST	-40°C~125°C	SOT23-5	Tape and Reel,3000

Revision Log

Version	Revision date	Change content	Reason for Change	Modified by	Reviewed By	Note
V1.0	2025.6.25	Initial version	Regular update	WW	LYL	