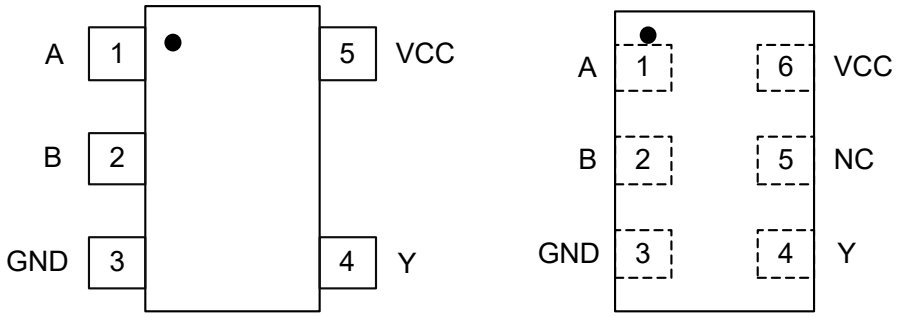
1.Description

The SN74AHCT1G86 is a single 2-input exclusive-OR gate. The device performs the Boolean functionY=A ⊕ B or Y=$\bar{A}$B+A$\bar{B}$ in positive logic.

2.Features

- Operating Range of 4.5V to 5.5V
- Max t_{pd} of 8ns at 5V
- Low Power Consumption, 10μA Maximum I_{CC}
- 8mA Output Drive at 5V
- Inputs Are TTL-Voltage Compatible
- Packages are SC70-5,SOT23-5 or small DFN6
- MSL3(SC70-5,SOT23-5,DFN6(1*1.5)

3.Pinning information



SOT23-5/SC70-5 **DFN6(1*1.5)**

Figure1. Top View

4.Pin Function

SC70-5/ SOT23-5

Pin No.	Pin Name	Function
1	A	Input A
2	B	Input B
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

DFN6

Pin No.	Pin Name	Function
1	A	Input A
2	B	Input B
3	GND	Ground
4	Y	Output
5	NC	No connect
6	VCC	Supply Voltage

5.Block Diagram

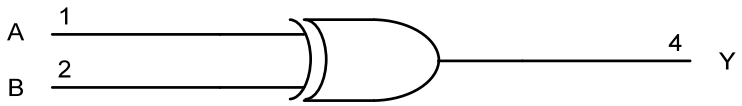


Figure2. Logic Symbol

Function Table

Input		Output
A	**B**	**Y**
L	L	L
L	H	H
H	L	H
H	H	L

6.Absolute Maximum Ratings

Parameter		Symbol	Value	Units
DC Supply Voltage		V_{CC}	−0.5 to 7.0	V
DC Input Voltage (1)		V_I	$-0.5 \le V_I \le +7.0$	V
DC Output Voltage Output in Higher or Low State		V_O	−0.5 to V_{CC}+0.5	V
DC Input Diode Current V_I<GND		I_{IK}	-20	mA
DC Output Diode Current V_O<GND, V_O>V_{CC}		I_{OK}	±20	mA
DC Output Sink Current		I_O	±25	mA
DC Supply Current per Supply Pin		I_{CC}	±50	mA
DC Ground Current per Supply Pin		I_{GND}	±50	mA
Storage Temperature Range		T_{STG}	-65 to 150	°C
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Junction Temperature Under Bias		T_J	150	°C
ESD Classification	Human Body Model (2)	V_{ESD}	±4000	V
	Charged Device Model (3)		±1000	V
Latch-up Current Above V_{CC} and GND at 125°C (4)		I_{LU}	±100	mA

7.Thermal Characteristics

Ratings	Package	Symbol	Value	Units
Thermal Characteristics, Thermal Resistance, Junction-to-Air	SC70-5	$R_{\theta JA}$	300	°C/W
	SOT23-5		250	
	DFN6(1.0x1.5)		440	
Power Dissipation in Still Air at 85°C	SC70-5	P_D	215	mW
	SOT23-5		260	
	DFN6(1.0x1.5)		150	

8.Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	4.5	5.5	V
High-level input Voltage	V_{IH}	2		V
Low-level input Voltage	V_{IL}		0.8	V
Input Voltage	V_I	0	5.5	V
Output Voltage	V_O	0	V_{CC}	V
High-level Output Current	I_{OH}		-8	mA
Low-level Output Current	I_{OL}		8	mA
Input Transition Rise and Fall Rate	t/v		20	ns/V
Operating Temperature Range	T_A	-40	125	°C

Notes:

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

9.Electrical Characteristics

DC Electrical Characteristics

Parameter	Condition	Symbol	V_{CC}(V)	T_A=25°C			-40°C≤T_A≤85°C		−40°C≤T_A≤125°C		Units
				Min	Typ	Max	Min	Max	Min	Max	
High−Level Output Voltage	I_{OH}=−50μA	V_{OH}	4.5	4.4	4.5		4.4		4.4		V
	I_{OH}=−8mA			3.94			3.8		3.8		V
Low−Level Output Voltage	I_{OL}=50μA	V_{OL}	4.5			0.1		0.1		0.1	V
	I_{OL}=8mA					0.36		0.44		0.44	V
Input Current	V_{IN}=5.5V or GND	I_I	0V to 5.5			±0.1		±1		±1	μA
Supply Current	V_{IN}=V_{CC} or GND I_O=0	I_{CC}	5.5			1		10		10	μA
Change in Supply Current	One input at 3.4 V, Other Inputs at V_{CC} or GND	ΔI_{CC} (5)	5.5			1.35		1.5		1.5	mA
Input Capacitance	V_{IN}=V_{CC} or GND	C_I	5		3	10		10		10	pF

Notes:

(5) This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or V_{CC}.

10.Switching Characteristics

Over recommended operating free-air temperature range, V_{CC}=5V±0.5V (unless otherwise noted) (see Figure 3)

Parameter	Condition	Symbol	T_A=25°C			−40°C≤T_A≤85°C		−40°C≤T_A≤125°C		Units
			Min	Typ	Max	Min	Max	Min	Max	
Propagation Delay	C_L=15pF	t_{PLH}		2.5	6.2	1	8	1	9	ns
	C_L=15pF	t_{PHL}		5.5	6.2	1	8	1	9	ns
	C_L=50pF	t_{PLH}		2.5	7.9	1	9	1	10	ns
	C_L=50pF	t_{PHL}		6	8.3	1	9	1	10	ns

11.Operating Characteristics

V_{CC}=5 V, T_A=25°C

Parameter	Symbol	Condition	Typ	Units
Power Dissipation Capacitance (6)	C_{PD}	No load, f=1MH	13	pF

Notes:

(6) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)}=C_{PD}\times V_{CC}\times f_{in}+I_{CC}\times C_{PD}$ is used to determine the no−load dynamic power consumption; $P_D=C_{PD}\times V_{CC}^2\times f_{in}+I_{CC}\times V_{CC}\times$Fig.

12.Waveform and Test Circuit

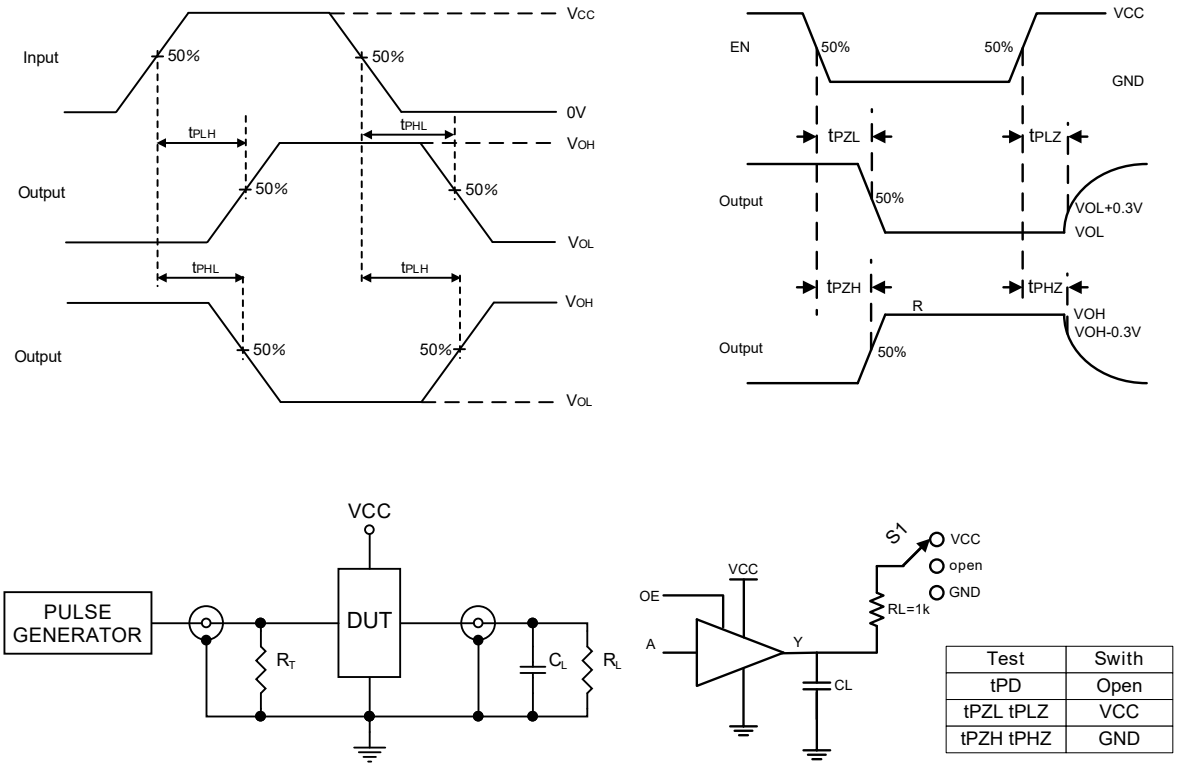


Figure3. Load Circuit and Voltage Waveforms

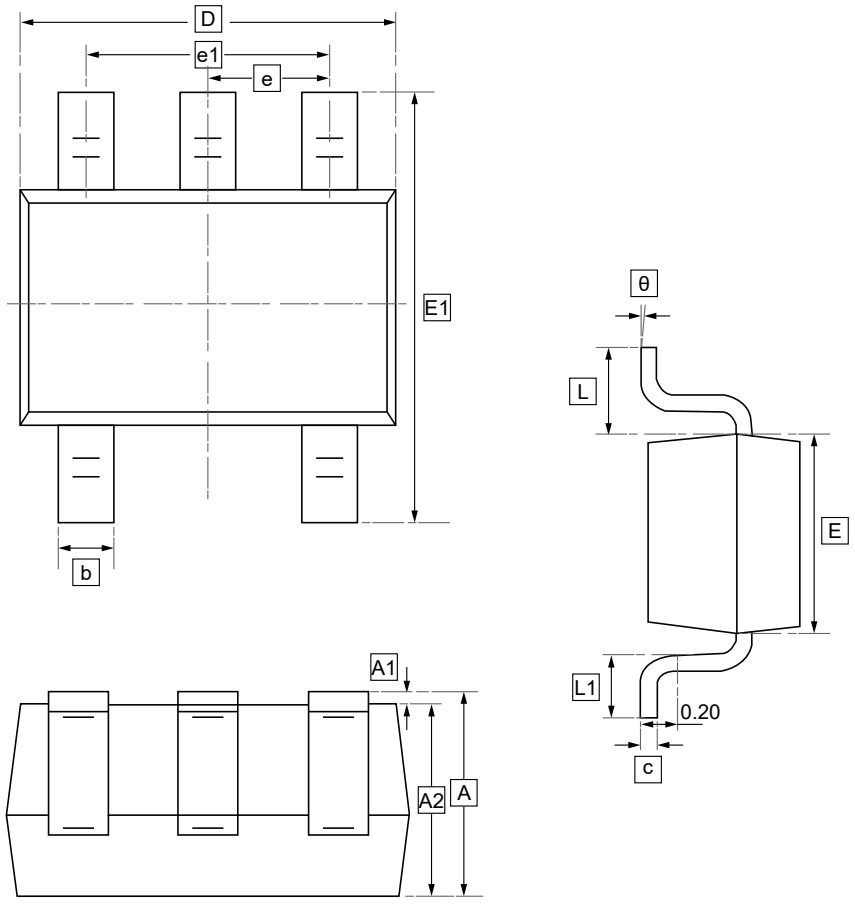
C_L includes probe and jig capacitance

All input pulses are supplied by generators having the following characteristics:PRR≤1MHz, Z_O=50Ω, t_r≤ 3ns, t_f≤3ns.

The outputs are measured one at a time with one input transition per measurement.

All parameters and waveforms are not applicable to all devices.

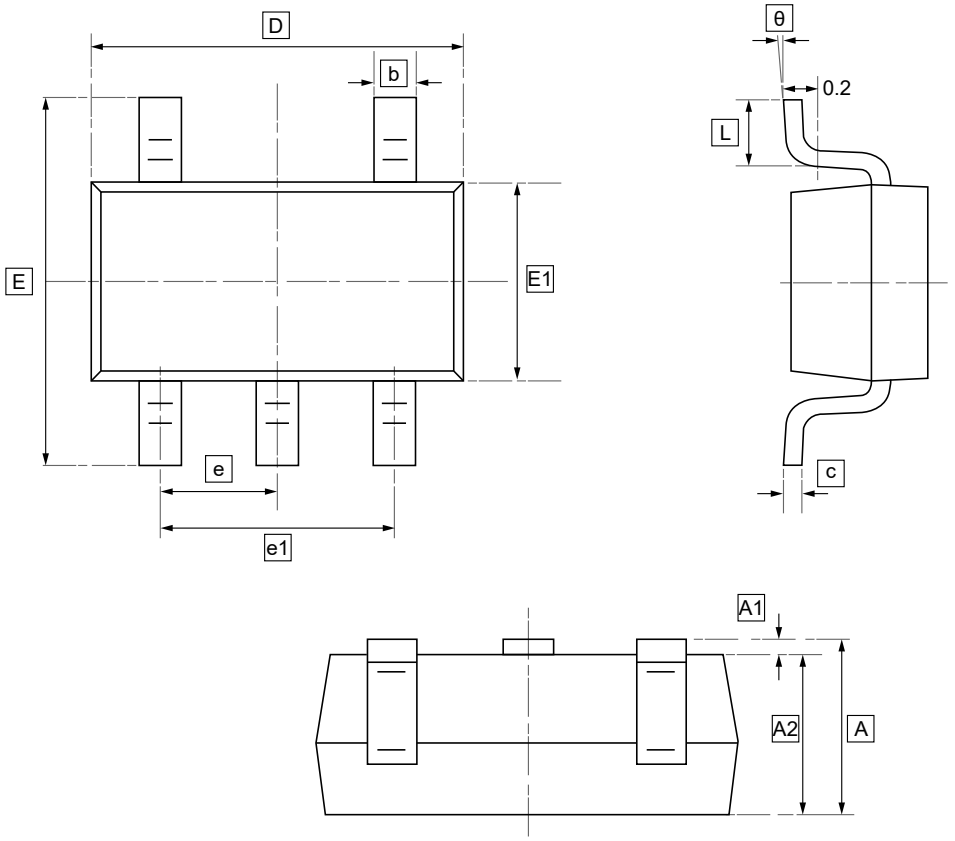
13.1 SC70-5 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	θ
Min	0.90	0.00	0.90	0.15	0.08	1.80	1.15	2.15	0.65	1.20	0.26	7°
Max	1.10	0.10	1.00	0.35	0.15	2.25	1.35	2.45	TYP	1.40	0.46	REF.

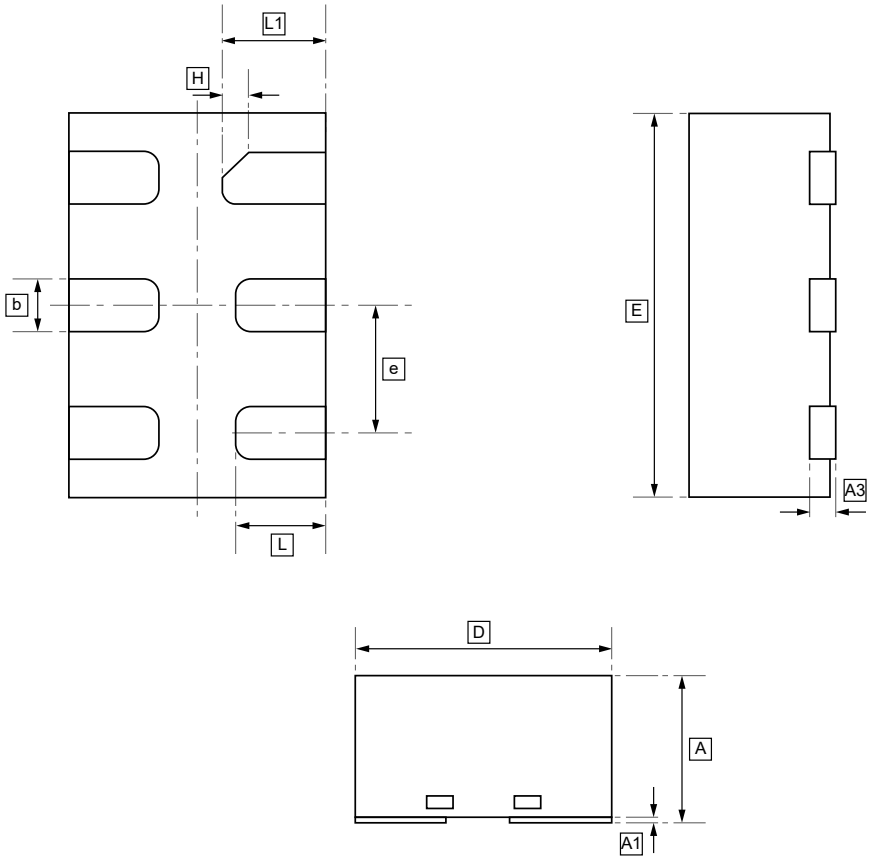
13.2 SOT-23-5 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°

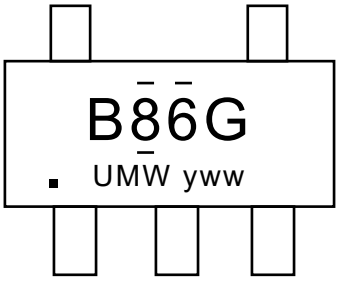
13.3 DFN6(1*1.5) Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A3	b	D	E	e	H	L	L1
Min	0.50	0	0.10	0.15	0.90	1.40	0.40	0.10	0.30	0.35
Max	0.60	0.05	REF	0.25	1.10	1.60	0.60	REF	0.40	0.45

14.Ordering Information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW SN74AHCT1G86DBVR	B86G	SOT23-5	3000	Tape and reel
UMW SN74AHCT1G86DCKR	BHJ	SC70-5	3000	Tape and reel
UMW SN74AHCT1G86DRYR -	BH_	DFN6(1*1.5)	5000	Tape and reel

15.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.