

Features

- Operation voltage range: 2 ~ 5.5V
- Low power current: $I_{CC}=10\text{Ma}$ (Max)
- High speed: $t_{PD}=4.3\text{ns}$ (Typ)
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 1000-V Charged-Device Model (C101)
- SOT23-5 Package Available
- SOT353 Package Available

General Description

The 74AHC1G86 2-input EXCLUSIVE-OR gate, it provides the Function $Y=A \oplus B$.

Applications

- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
 - PCs, Networking, Notebooks, Netbooks, PDAs
 - Tablet Computers, E-readers
 - Computer Peripherals, Hard Drives, CD/DVD ROM
 - TV, DVD, DVR, Set-Top Box
 - Cell Phones, Personal Navigation / GPS
 - MP3 Players, Cameras, Video Recorders

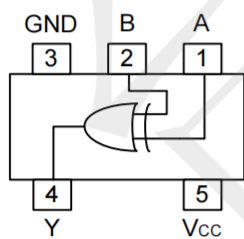
Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
74AHC1G86W5-TP	SOT23-5	Tape and Reel,3000
74AHC1G86SE-TP	SOT353	Tape and Reel,3000

Logic Diagram



Pin Configuration



SOT23-5/ SOT353

Function Table

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

Absolute Maximum Ratings

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~7	V
Input Voltage	V_{IN}	-0.5~7	V
Output Voltage	V_{OUT}	-0.5~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}	-20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Thermal Data

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	θ_{JC}	280	°C/W
	SOT-353		350	

Recommended Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=3.3+0.3V$			100	ns/V
		$V_{CC}=5.0+0.5V$			20	
Operating Temperature	T_A		-40		+125	°C

Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=3.0V$	2.1			
		$V_{CC}=5.5V$	3.85			
Low-Level Input Voltage	V_{IL}	$V_{CC}=2.0V$			0.5	V
		$V_{CC}=3.0V$			0.9	
		$V_{CC}=5.5V$			1.65	
High-Level Output Voltage	V_{OH}	$V_{CC}=2.0V, I_{OH}=-50\mu A$	1.9	2.0		V
		$V_{CC}=3.0V, I_{OH}=-50\mu A$	2.9	3.0		
		$V_{CC}=4.5V, I_{OH}=-50\mu A$	4.4	4.5		
		$V_{CC}=3.0V, I_{OH}=-4mA$	2.58			
		$V_{CC}=4.5V, I_{OH}=-8mA$	3.94			
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.0V, I_{OL}=50\mu A$			0.1	V
		$V_{CC}=3.0V, I_{OL}=50\mu A$			0.1	
		$V_{CC}=4.5V, I_{OL}=50\mu A$			0.1	
		$V_{CC}=3.0V, I_{OL}=4mA$			0.36	
		$V_{CC}=4.5V, I_{OL}=8mA$			0.36	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0 \sim 5.5V, V_{IN}=V_{CC}$ or GND			± 0.1	μA
Quiescent Supply Current	I_Q	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			1	μA
Input Capacitance	C_{IN}	$V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND		4	10	pF

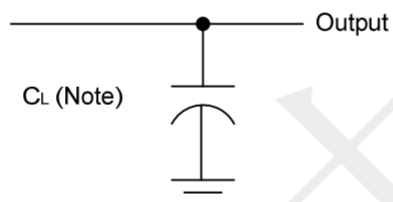
Dynamic Characteristics (Input: $t_R, t_F \leq 3ns$; $P_{RR} \leq 1MHz$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A and B) to output(Y)	t_{PLH}	$V_{CC} = 3.3V \pm 0.3V, C_L = 15pF$		7	11	ns
	t_{PHL}			7	11	
	t_{PLH}	$V_{CC} = 3.3V \pm 0.3V, C_L = 50pF$		9.5	14.5	
	t_{PHL}			9.5	14.5	
Propagation delay from input (A and B) to output(Y)	t_{PLH}	$V_{CC} = 5V \pm 0.5V, C_L = 15pF$		4.8	6.8	ns
	t_{PHL}			4.8	6.8	
	t_{PLH}	$V_{CC} = 5V \pm 0.5V, C_L = 50pF$		6.3	8.8	
	t_{PHL}			6.3	8.8	

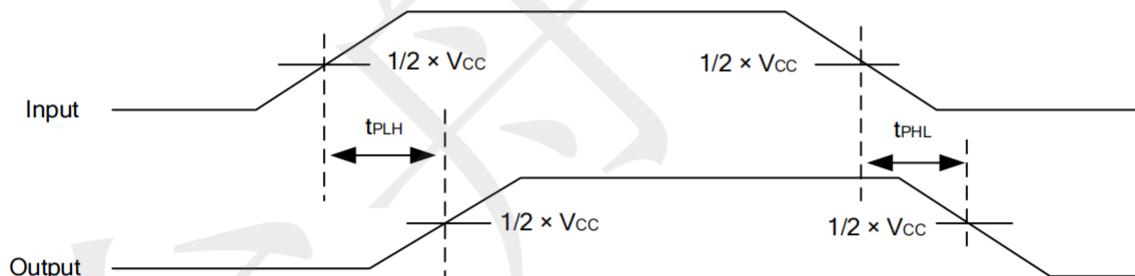
Operating Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, $f=1\text{MHz}$, $V_{CC}=5\text{V}$		18		pF

Test Circuit And Waveforms

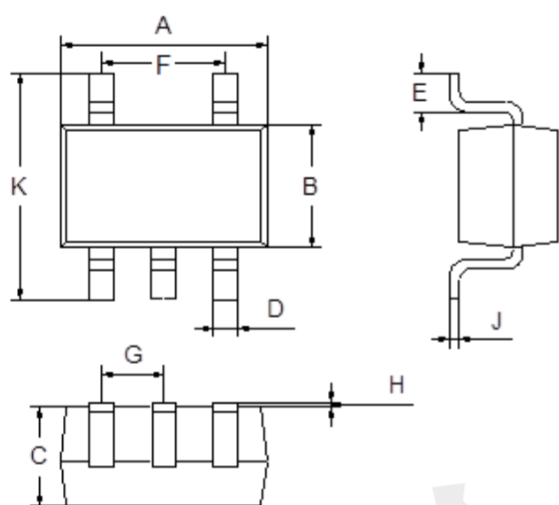


Note: C_L includes probe and jig capacitance.



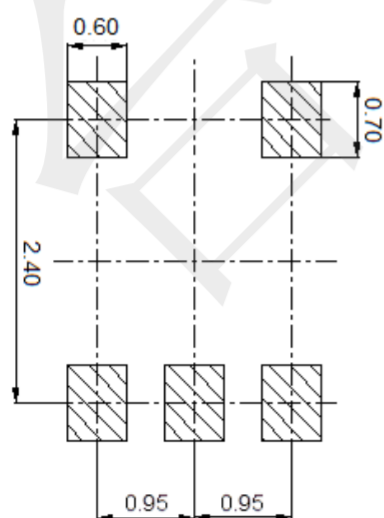
Package Outline Dimensions (Unit: mm)

SOT23-5



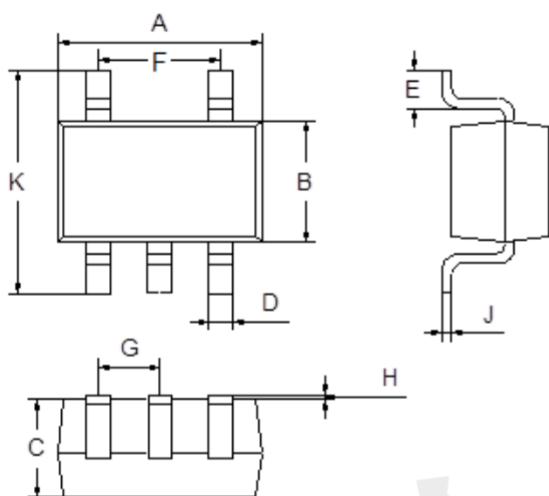
Dimension	Min.	Max.
A	2.80	3.00
B	1.50	1.70
C	1.00	1.20
D	0.35	0.45
E	0.35	0.55
F	1.80	2.00
G	0.90	1.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00

Mounting Pad Layout (Unit: mm)



Package Outline Dimensions (Unit: mm)

SOT353



Dimension	Min.	Max.
A	2.00	2.20
B	1.15	1.35
C	0.85	1.05
D	0.15	0.35
E	0.25	0.40
F	1.20	1.40
G	0.60	0.70
H	0.02	0.10
J	0.05	0.15
K	2.20	2.40

Mounting Pad Layout (Unit: mm)

