

### 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

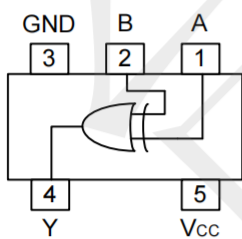
### Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
74AHC1G86GV-TP	SOT23-5	Tape and Reel,3000
74AHC1G86GW-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	$\theta_{JC}$	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			$\pm 0.1$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			1	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND		4	10	pF

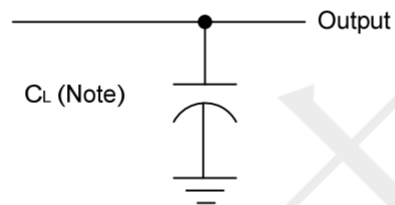
### Dynamic Characteristics (Input: $t_R, t_F \leq 3ns$ ; $P_{RR} \leq 1MHz$ )

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	

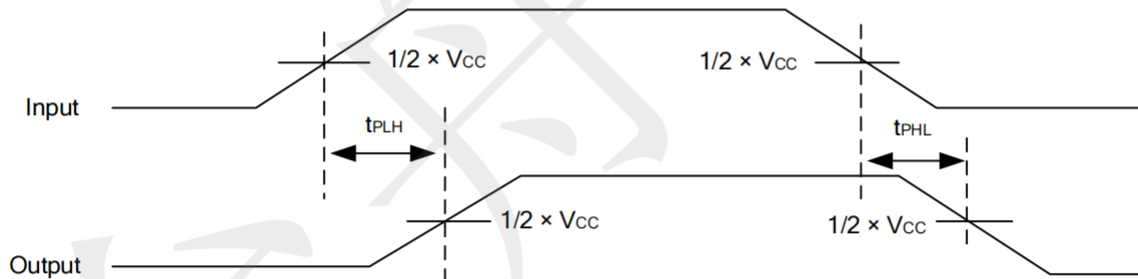
## Operating Characteristics

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



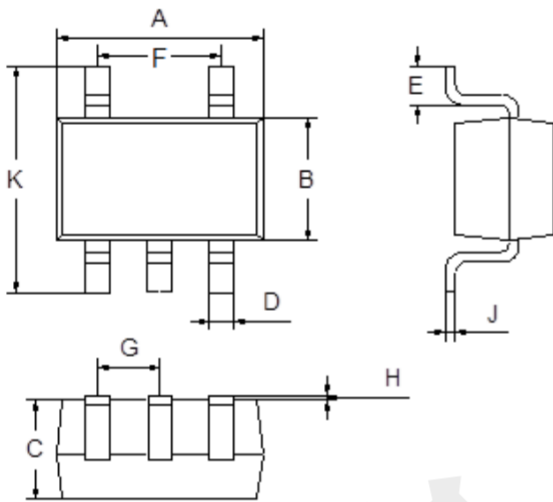
Note:  $C_L$  includes probe and jig capacitance.





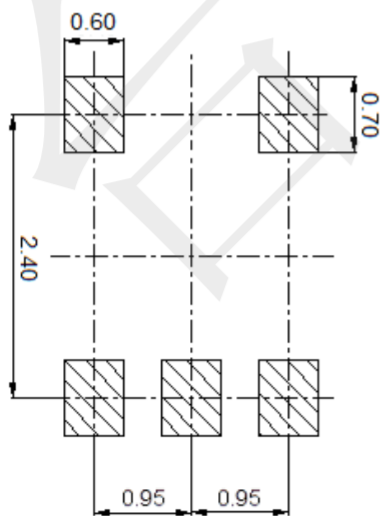
## Package Outline Dimensions (Unit: mm)

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

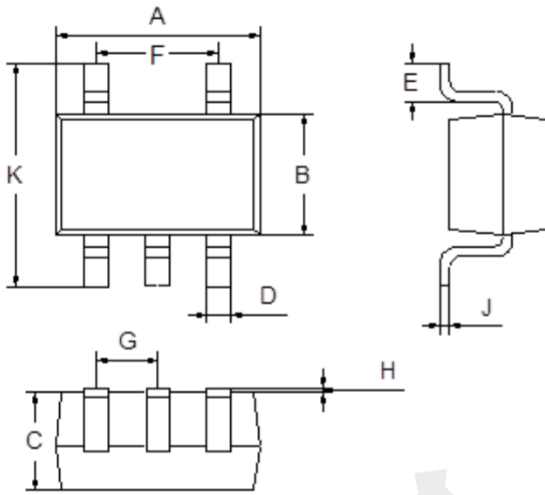
## Mounting Pad Layout (Unit: mm)





### 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)

