

Features

- Wide supply voltage range from 0.8V to 3.6V
- Inputs accept voltages up to 3.6V
- I_{OFF} supports partial-power-down mode
- Low static power consumption; I_{CC}=0.5μA (Max.)
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

General Description

The TP74AUP1G08 is a 2-input AND gate which provides the Function $Y = A \cdot B$ or $Y = \overline{A} + \overline{B}$ in positive logic.

This device ensures a very low static and dynamic power consumption across the entire VCC range from 0.8V to 3.6V.

Applications

- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- Embedded PC
- Personal Digital Assistant(PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive(SSD): Client and Enterprise
- Wireless Headset, Keyboard, and Mouse

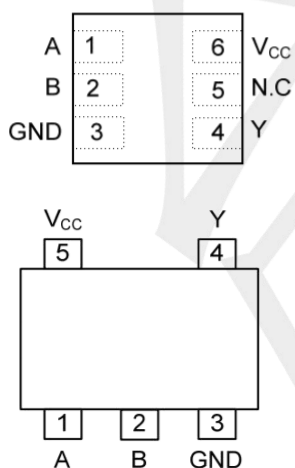
Logic Diagram



Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
TP74AUP1G08S5	SOT23-5	Tape and Reel, 3000
TP74AUP1G08C5	SOT353	Tape and Reel, 3000
TP74AUP1G08X5	SOT553	Tape and Reel, 4000
TP74AUP1G08D6	DFN1X1-6	Tape and Reel, 5000
TP74AUP1G08N6	DFN1510-6	Tape and Reel, 5000

Pin Configuratio (TOP VIEW)



DFN1X1-6
DFN1510-6

SOT23-5
SOT353
SOT553

Function Table (each gate)

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

Note: H: HIGH voltage level; L: LOW voltage level.

Absolute Maximum Ratings

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V _{CC}		-0.5 ~ +4.6	V
Input Voltage	V _{IN}		-0.5 ~ +4.6	V
Output Voltage	V _{OUT}	Output in the high or low state	-0.5 ~ +V _{CC} +0.5V	V
		Output in the power-off state	-0.5 ~ +4.6	V
V _{CC} or GND Current	I _{CC}		±50	mA
Continuous Output Current	I _{OUT}	V _{OUT} =0~V _{CC}	±20	mA
Input Clamp Current	I _{IK}	V _{IN} <0	-50	mA
Output Clamp Current	I _{OK}	V _{OUT} <0	-50	mA
Storage Temperature Range	T _{STG}		-65 ~ +150	°C
Junction to Ambient	θ _{JA}	SOT-23-5	230	°C/W
		SOT353	280	°C/W
		SOT553	250	°C/W
		DFN1X1-6	460	°C/W
		DFN1510-6	440	°C/W

Note: 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.

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}	Operating	0.8	--	3.6	V
Input Voltage	V _{IN}		0	--	3.6	V
Output Voltage	V _{OUT}	High or low state	0	--	V _{CC}	V
Input Transition Rise or Fall Rate	Δt/Δv	V _{CC} =0.8V ~ 3.6V	--	--	200	ns/V
Operating Temperature	T _A		-40	--	+125	°C

Electrical Characteristics (T_A=25°C ,unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
High-level Input Voltage	V _{IH}	V _{CC} =0.8V	V _{CC}	--	--	V	
		V _{CC} =1.1V ~ 1.95V	0.65×V _{CC}	--	--	V	
		V _{CC} =2.3V ~ 2.7V	1.6	--	--	V	
		V _{CC} =3V ~ 3.6V	2	--	--	V	
Low-level Input Voltage	V _{IL}	V _{CC} =0.8V	--	--	0	V	
		V _{CC} =1.1V ~ 1.95V	--	--	0.35×V _{CC}	V	
		V _{CC} =2.3V ~ 2.7V	--	--	0.7	V	
		V _{CC} =3V ~ 3.6V	--	--	0.9	V	
High-Level Output voltage	V _{OH}	V _{CC} =0.8 ~ 3.6V, I _{OH} =-20μA	V _{CC} -0.1	--	--	V	
		V _{CC} =1.1V, I _{OH} =-1.1mA	0.75×V _{CC}	--	--	V	
		V _{CC} =1.4V, I _{OH} =-1.7mA	1.11	--	--	V	
		V _{CC} =1.65V, I _{OH} =-1.9mA	1.32	--	--	V	
		V _{CC} =2.3V	I _{OH} =-2.3mA	2.05	--	--	V
			I _{OH} =-3.1mA	1.9	--	--	V
		V _{CC} =3V	I _{OH} =-2.7mA	2.72	--	--	V
			I _{OH} =-4mA	2.6	--	--	V
Low-Level Output voltage	V _{OL}	V _{CC} =0.8 ~ 3.6V, I _{OL} =20μA	--	--	0.1	V	
		V _{CC} =1.1V, I _{OL} =1.1mA	--	--	0.3×V _{CC}	V	
		V _{CC} =1.4V, I _{OL} =1.7mA	--	--	0.31	V	
		V _{CC} =1.65V, I _{OL} =1.9mA	--	--	0.31	V	
		V _{CC} =2.3V	I _{OL} =2.3mA	--	--	0.31	V
			I _{OL} =3.1mA	--	--	0.44	V
		V _{CC} =3V	I _{OL} =2.7mA	--	--	0.31	V
			I _{OL} =4mA	--	--	0.44	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0 ~ 3.6V, V _{IN} =GND ~ 3.6V	--	--	±0.1	μA	
Power OFF Leakage Current	I _{OFF}	V _{CC} =0 V, V _{IN} or V _{OUT} =0 ~ 3.6V	--	--	±0.2	μA	
Additional Power OFF Leakage Current	ΔI _{OFF}	V _{CC} =0 V~0.2V, V _{IN} or V _{OUT} =0 ~ 3.6V	--	--	±0.2	μA	
Quiescent Supply Current	I _{CC}	V _{CC} =0.8 ~3.6V, V _{IN} =V _{CC} or GND, I _{OUT} =0	--	--	0.5	μA	
Additional Quiescent Supply Current	ΔI _{CC}	V _{CC} =3.3 V, V _{IN} =V _{CC} -0.6V, I _{OUT} =0	--	--	40	μA	
Input Capacitance	C _I	V _{CC} =0V-3.6V, V _{IN} =V _{CC} or GND	--	1.5	--	pF	
Output Capacitance	C _{OUT}	V _{CC} =0V, V _{OUT} =GND	--	3	--	pF	

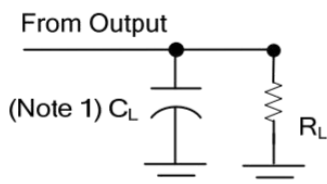
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =0.8V	--	4	--	pF
		V _{CC} =1.2±0.1V	--	4	--	pF
		V _{CC} =1.5±0.1V	--	4	--	pF
		V _{CC} =1.8±0.15V	--	4	--	pF
		V _{CC} =2.5±0.2V	--	4.1	--	pF
		V _{CC} =3.3±0.3V	--	4.3	--	pF

SWITCHING CHARACTERISTICS (TA =25°C, unless otherwise specified)

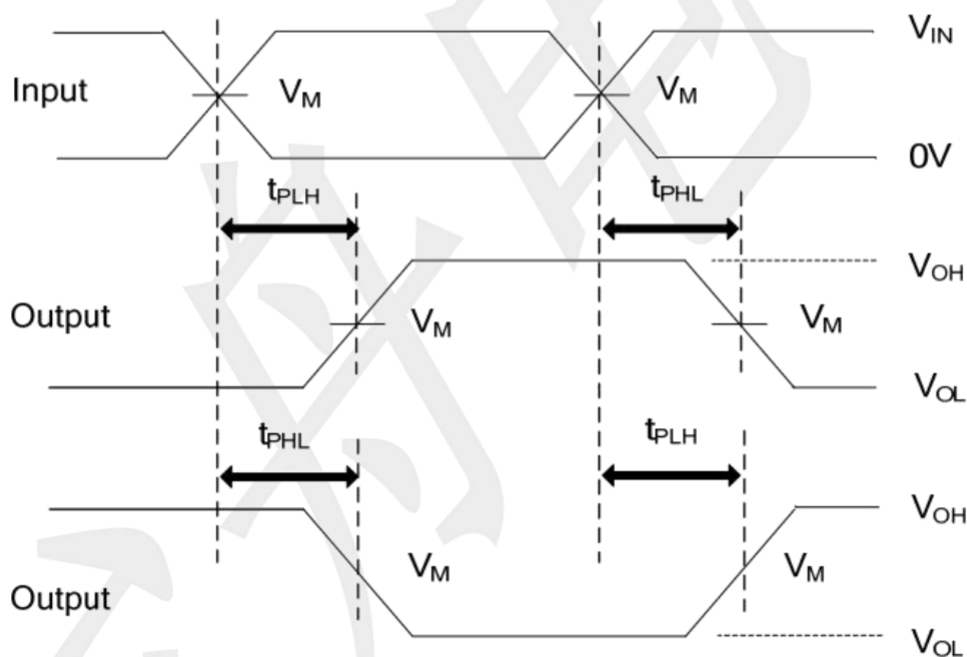
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from inputs (A or B) to output(Y)	t _{PD}	CL=5pF, RL=1MΩ	V _{CC} =0.8V	--	18	--	ns
			V _{CC} =1.2±0.1V	2.6	7.3	--	ns
			V _{CC} =1.5±0.1V	1.4	5.2	--	ns
			V _{CC} =1.8±0.15V	1	4.2	--	ns
			V _{CC} =2.5±0.2V	1	3	--	ns
			V _{CC} =3.3±0.3V	1	2.4	--	ns
		CL=10pF, RL=1MΩ	V _{CC} =0.8V	--	21	--	ns
			V _{CC} =1.2±0.1V	1.5	8.5	--	ns
			V _{CC} =1.5±0.1V	1	6.2	--	ns
			V _{CC} =1.8±0.15V	1	5	--	ns
			V _{CC} =2.5±0.2V	1	3.6	--	ns
			V _{CC} =3.3±0.3V	1	2.9	--	ns
		CL=15pF, RL=1MΩ	V _{CC} =0.8V	--	24	--	ns
			V _{CC} =1.2±0.1V	3.6	9.9	--	ns
			V _{CC} =1.5±0.1V	2.3	7.2	--	ns
			V _{CC} =1.8±0.15V	1.6	5.8	--	ns
			V _{CC} =2.5±0.2V	1	4.3	--	ns
			V _{CC} =3.3±0.3V	1	3.4	--	ns
		CL=30pF, RL=1MΩ	V _{CC} =0.8V	--	32.8	--	ns
			V _{CC} =1.2±0.1V	4.9	13.1	--	ns
			V _{CC} =1.5±0.1V	3.4	9.5	--	ns
			V _{CC} =1.8±0.15V	2.5	7.7	--	ns
			V _{CC} =2.5±0.2V	1.8	5.7	--	ns
			V _{CC} =3.3±0.3V	1.5	4.7	--	ns

TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	V_{IN}	t_R / t_F	V_M	C_L	R_L
0.8V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.2V $\pm$ 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.5V $\pm$ 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
1.8V $\pm$ 0.15V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
2.5V $\pm$ 0.2V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω
3.3V $\pm$ 0.3V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5, 10, 15, 30pF	1M Ω



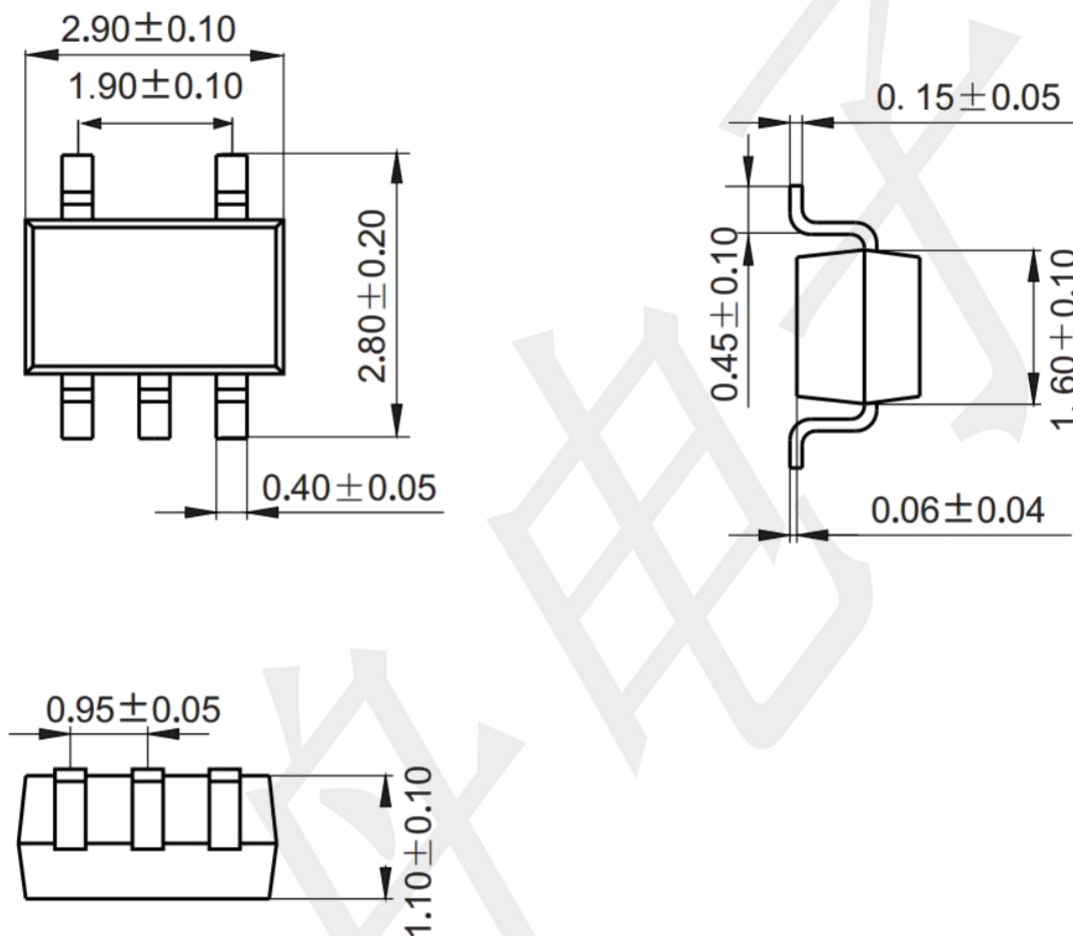
PROPAGATION DELAY TIMES

Notes:

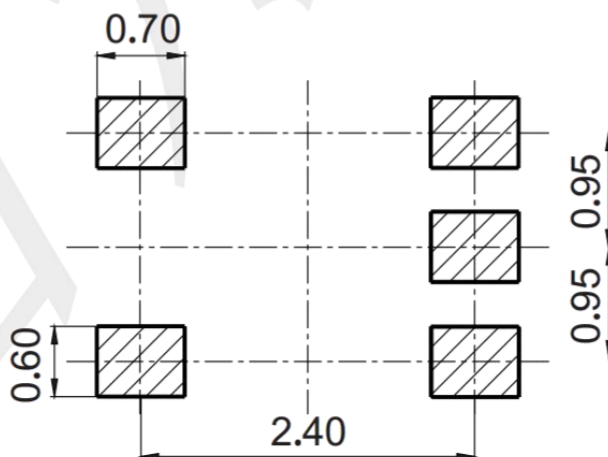
1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\text{MHz}$, $Z_O = 50\Omega$.

Package information (Unit: mm)

SOT23-5

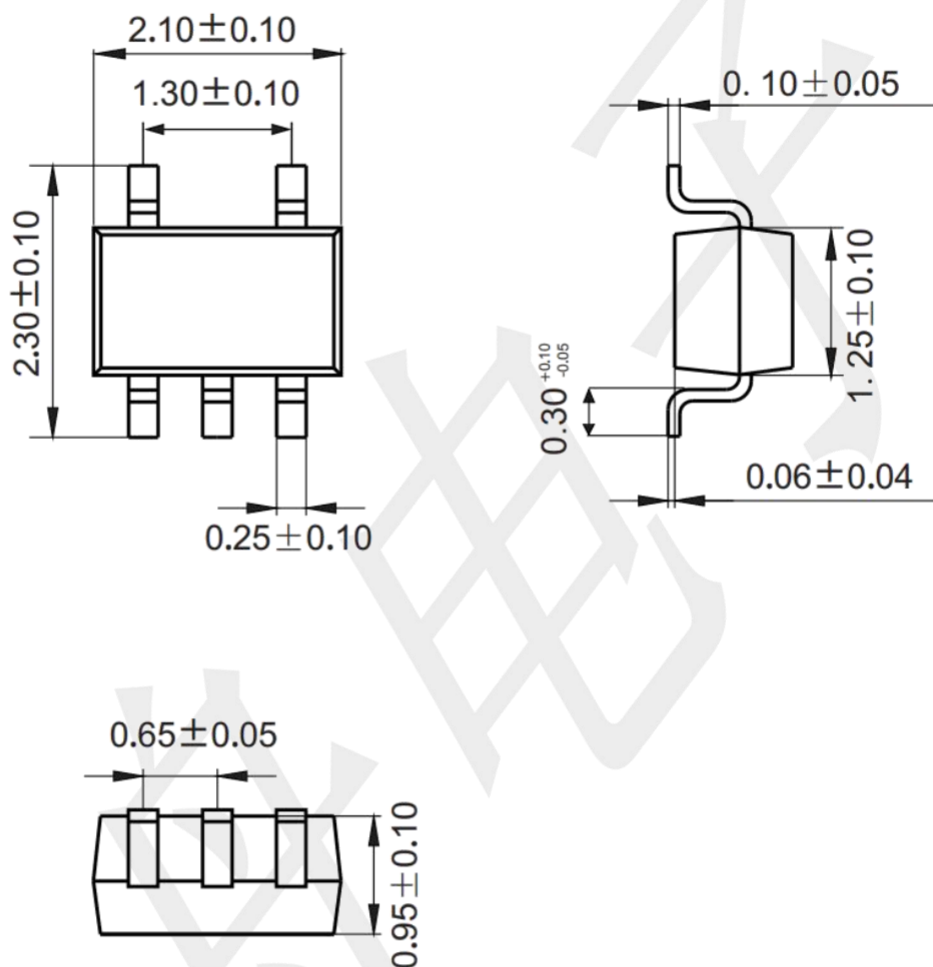


Mounting Pad Layout (unit: mm)

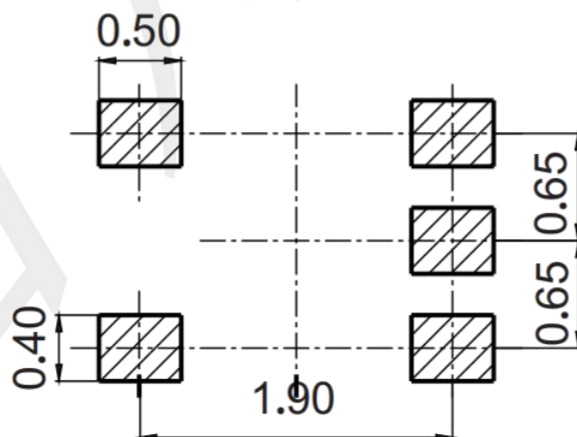


Package information (Unit: mm)

SOT353

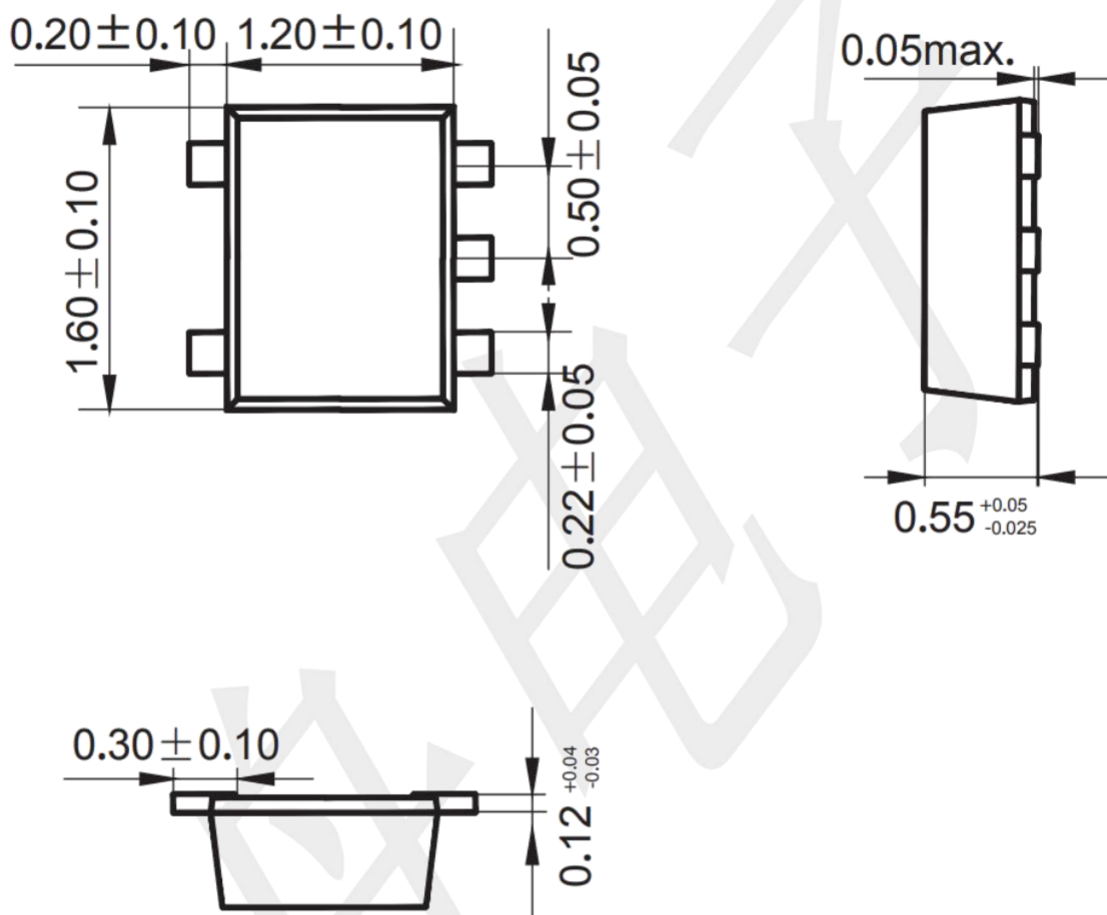


Mounting Pad Layout (unit: mm)

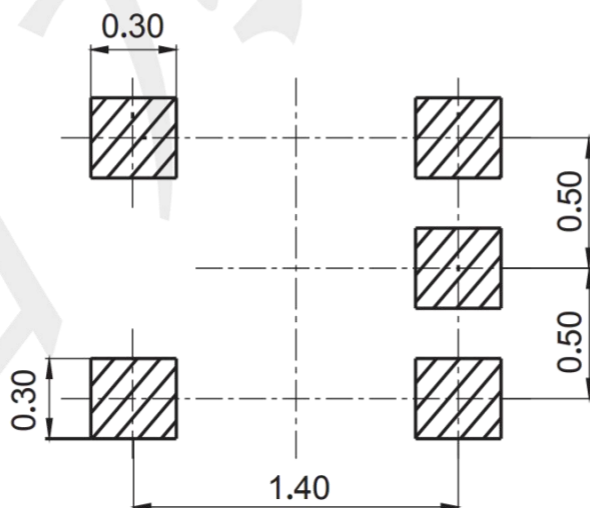


Package information (unit: mm)

SOT553

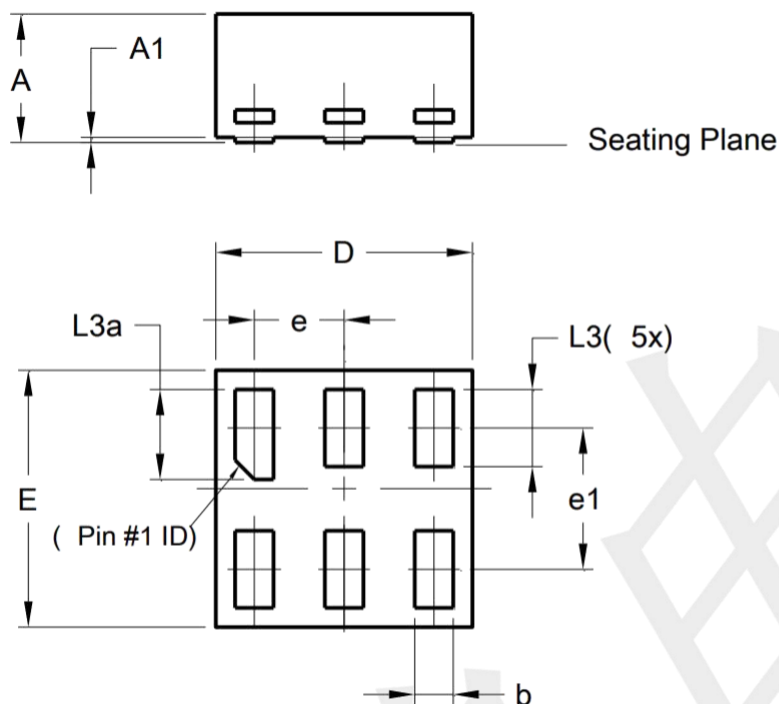


Mounting Pad Layout (unit: mm)



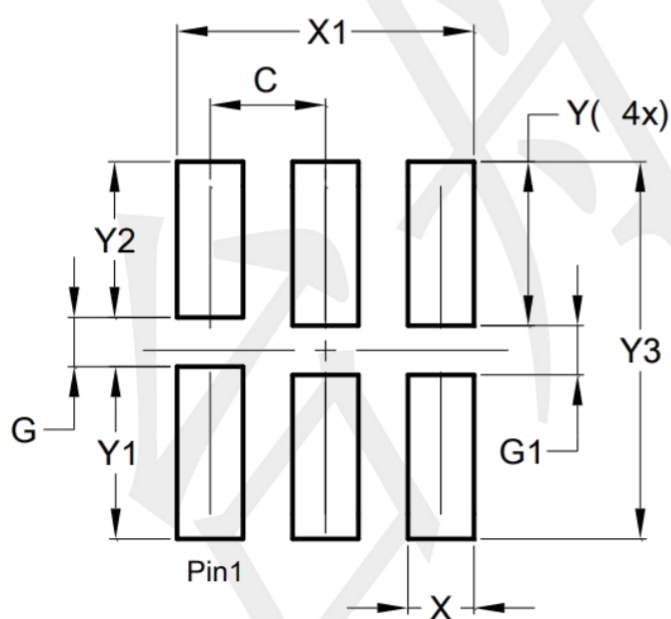
Package information (unit: mm)

DFN1X1-6



DFN1010-6 (Type B)			
Dim	Min	Max	Typ
A	-	0.50	0.39
A1	-	0.04	-
b	0.12	0.20	0.15
D	0.95	1.050	1.00
E	0.95	1.050	1.00
e	0.35 BSC		
e1	0.55 BSC		
L3	0.27	0.30	0.30
L3a	0.32	0.40	0.35
All Dimensions in mm			

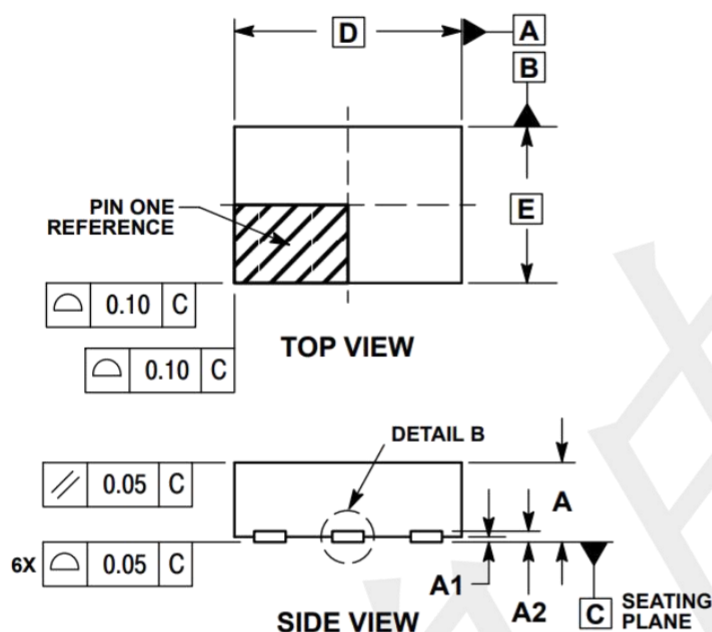
Mounting Pad Layout (unit: mm)



Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

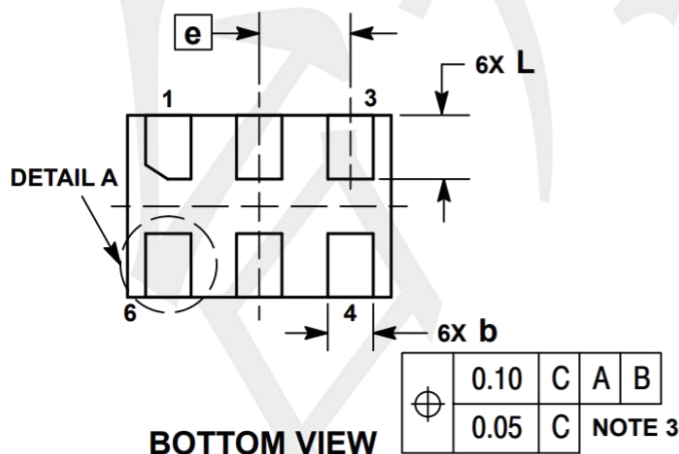
Package information (unit: mm)

DFN1510-6

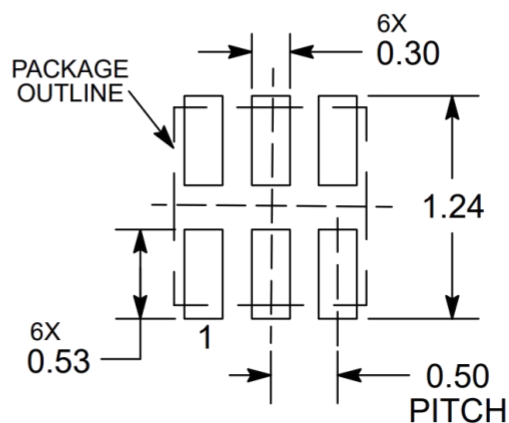


DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A2	0.07 REF	
b	0.20	0.30
D	1.45 BSC	
E	1.00 BSC	
e	0.50 BSC	
L	0.30	0.40
L1	---	0.15

Mounting Pad Layout (unit: mm)



MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS