TP74LVC1G00 Series
SINGLE 2-INPUT NAND GATE

Features

- Operate from 1.65V to 5.5V
- Inputs Accept Voltages To 5.5V
- High Noise Immunity
- Low Power Dissipation
- ESD Protection Exceeds JESD 22
  -2000-V Human-Body Model (A114-A)
  -1000-V Charged-Device Model (C101)

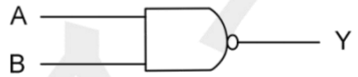
Applications

- 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

General Description

The TP74LVC1G00 is a 2-input NAND gate device which provides the Function $Y=\overline{A \bullet B}$ or $Y=\overline{A}+\overline{B}$ in positive logic. This device has power-down protective circuit preventing device from destruction when it is powered down.

Logic Diagram



Logic symbol

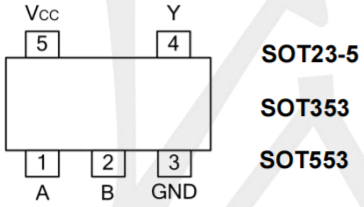


IEC logic symbol

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	Marking
TP74LVC1G00S5	SOT23-5	Tape and Reel,3000	S100
TP74LVC1G00C5	SOT353	Tape and Reel,3000	C100
TP74LVC1G00X5	SOT553	Tape and Reel,4000	CA7
TP74LVC1G00D6	DFN1X1-6	Tape and Reel,5000	CA
TP74LVC1G00N6	DFN1510-6	Tape and Reel,5000	CA
TP74LVC1G00P5	DFN0808-4	Tape and Reel,3000	H4

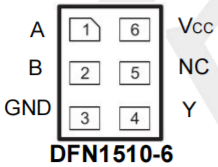
Pin Configuratio



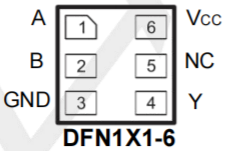
SOT23-5

SOT353

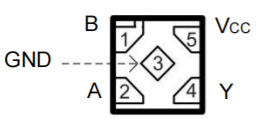
SOT553



DFN1510-6



DFN1X1-6



DFN0808-4

Function Table

INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	H
L	H	H
L	L	H

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

Absolute Maximum Ratings

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the Power-off state	-0.5 ~ +6.5	V
		Output in the High or Low state	-0.5 ~ $V_{CC+0.5}$	V
VCC or GND Current	I_{CC}	Output in the Power-off state	±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0~V_{CC}	±50	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	℃
Junction to Ambient	θ_{JA}	SOT-23-5	230	℃/W
		SOT353	280	℃/W
		SOT553	250	℃/W
		DFN1X1-6	460	℃/W
		DFN1510-6	440	℃/W
		DFN0808-4	340	℃/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	1.65	--	5.5	V
		Data retention only	1.5	--	--	V
Input Voltage	V_{IN}		0	--	5.5	V
Output Voltage	V_{OUT}	High or low state	0	--	VCC	V
Input Transition Rise or Fall ate	$\Delta t/\Delta v$	VCC=1.8V±0.15V, 2.5V±0.2V	--	--	20	ns/V
		VCC=3.3V±0.3V	--	--	10	ns/V
		VCC=5V±0.5V	--	--	5	ns/V
Operating Temperature	T_A		-40	--	125	℃

Electrical Characteristics (unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	TA =25°C			TA =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	V_{CC}=1.65V ~ 1.95V	0.65×V_{CC}	--	--	0.65×V_{CC}	--	--	V
		V_{CC}=2.3V ~ 2.7V	1.7	--	--	1.7	--	--	V
		V_{CC}=3V ~ 3.6V	2	--	--	2	--	--	V
		V_{CC}=4.5V ~ 5.5V	0.7×V_{CC}	--	--	0.7×V_{CC}	--	--	V
Low-Level Input Voltage	V_{IL}	V_{CC}=1.65V ~ 1.95V	--	--	0.35×V_{CC}	--	--	0.35×V_{CC}	V
		V_{CC}=2.3V ~ 2.7V	--	--	0.7	--	--	0.7	V
		V_{CC}=3V ~ 3.6V	--	--	0.8	--	--	0.8	V
		V_{CC}=4.5V ~ 5.5V	--	--	0.3×V_{CC}	--	--	0.3×V_{CC}	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 ~ 5.5V, I_{OH}=-100μA	V_{CC}-0.1	--	--	V_{CC}-0.1	--	--	V
		V_{CC}=1.65V, I_{OH}=-4mA	1.2	--	--	0.95	--	--	V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9	--	--	1.7	--	--	V
		V_{CC}=3.0V,I_{OH}=-16mA	2.4	--	--	1.9	--	--	V
		V_{CC}=3.0V,I_{OH}=-24mA	2.3	--	--	2.0	--	--	V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8	--	--	3.4	--	--	V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65 ~ 5.5V, I_{OL}=100μA	--	--	0.1	--	--	0.1	V
		V_{CC}=1.65V, I_{OL}=4mA	--	--	0.45	--	--	0.7	V
		V_{CC}=2.3V, I_{OL}=8mA	--	--	0.3	--	--	0.45	V
		V_{CC}=3.0V,I_{OH}=16mA	--	--	0.4	--	--	0.6	V
		V_{CC}=3.0V,I_{OH}=24mA	--	--	0.55	--	--	0.8	V
		V_{CC}=4.5V, I_{OH}=32mA	--	--	0.55	--	--	0.8	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 5.5V, V_{IN}=5.5V or GND	--	--	±5	--	--	±5	uA
Power OFF Leakage Current	I_{OFF}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V	--	--	±10	--	--	±10	uA
Quiescent Supply Current	I_Q	V_{CC}=1.65 ~ 5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0A	--	--	10	--	--	10	uA
Additional Quiescent Supply ent Per Input Pin	ΔI_Q	V_{CC}=3 ~ 5.5V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND	--	--	500	--	--	500	uA

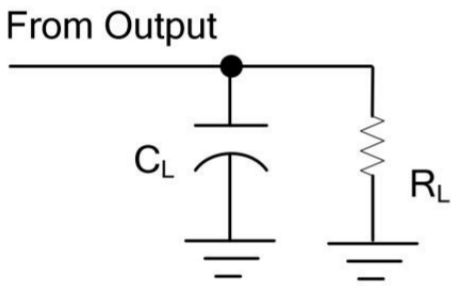
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Input Capacitance	C_I	V_{CC}=3.3V, V_{IN}=V_{CC} or GND	--	4	--	pF
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V	--	22	--	pF
		V_{CC}=2.5V	--	22	--	pF
		V_{CC}=3.3V	--	23	--	pF
		V_{CC}=5.0V	--	25	--	pF

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

PARAMETER	SYMBOL	TEST Conditions		TA =25°C			TA =-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A or B) to output(Y)	t_{PLH} / t_{PHL}	C_L=15pF R_L=1MΩ	V_{CC}=1.8±0.15V	1.0	--	8.2	1.0	--	9.7	nS
			V_{CC}=2.5±0.2V	0.5	--	5.4	0.5	--	6.9	nS
			V_{CC}=3.3±0.3V	0.5	--	4.8	0.5	--	6.3	nS
			V_{CC}=5±0.5V	0.5	--	4.4	0.5	--	5.9	nS
	t_{PLH} / t_{PHL}	C_L=30pF	V_{CC}=1.8±0.15V, R_L=1KΩ	1.0	--	11	1.0	--	12	nS
			V_{CC}=2.5±0.2V, R_L=500Ω	0.5	--	7	0.5	--	9	nS
			V_{CC}=3.3±0.3V,R_L=500Ω	0.5	--	6.2	0.5	--	8.2	nS
			V_{CC}=5±0.5V ,R_L=500Ω	0.5	--	5.1	0.5	--	6.5	nS

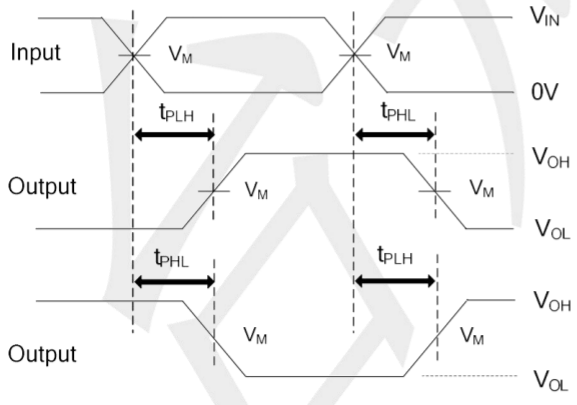
TEST CIRCUIT AND WAVEFORMS



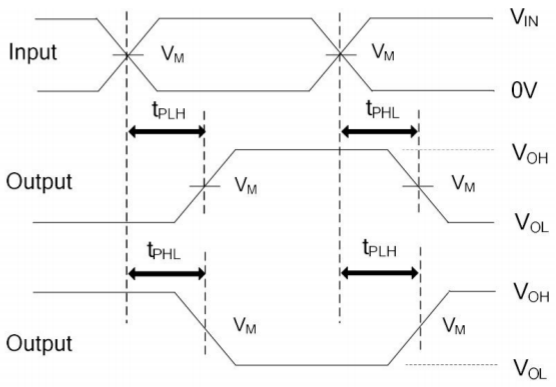
TEST CIRCUIT

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	V_{CC}/2	15pF	1MΩ
2.5V±0.2V	V_{CC}	≤2ns	V_{CC}/2	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V_{CC}	≤2.5ns	V_{CC}/2	15pF	1MΩ

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	V_{CC}/2	30pF	1KΩ
2.5V±0.2V	V_{CC}	≤2ns	V_{CC}/2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	V_{CC}/2	50pF	500Ω



PROPAGATION DELAY TIMES



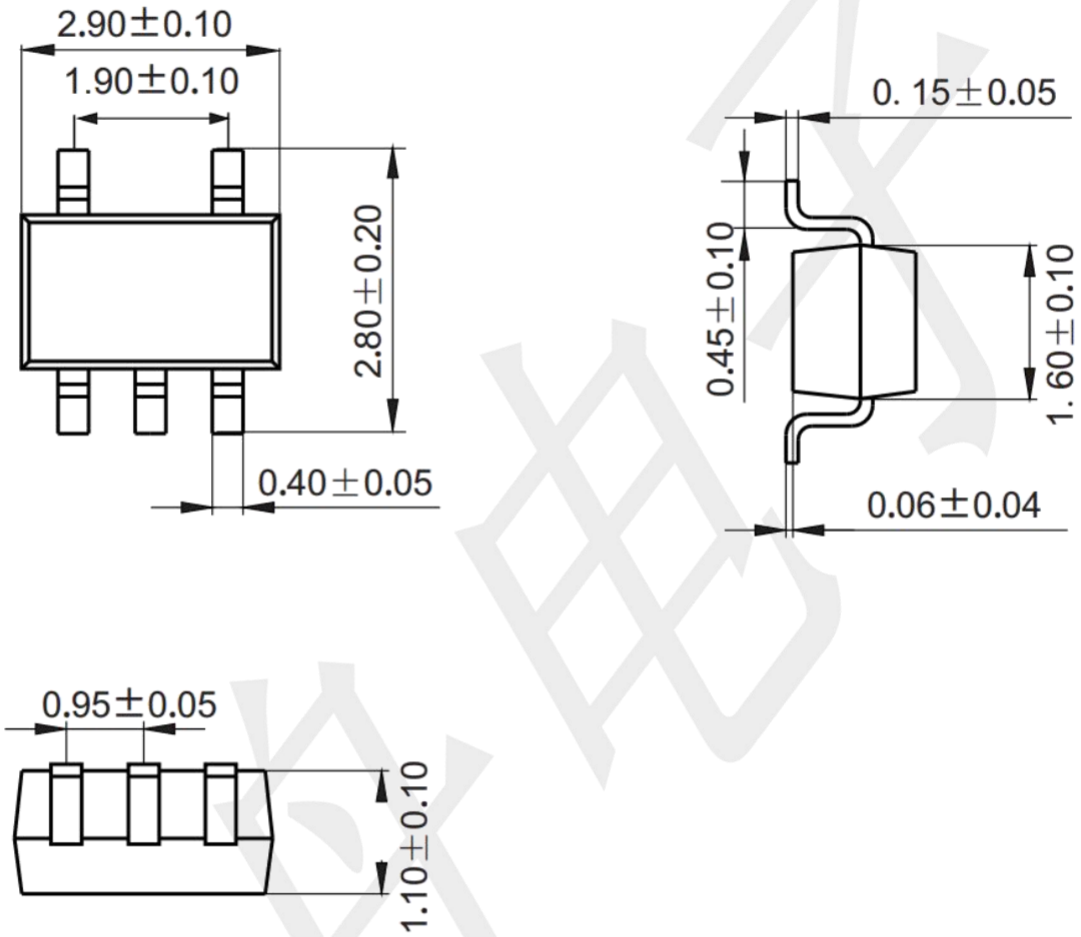
PROPAGATION DELAY TIMES

Note: CL includes probe and jig capacitance.

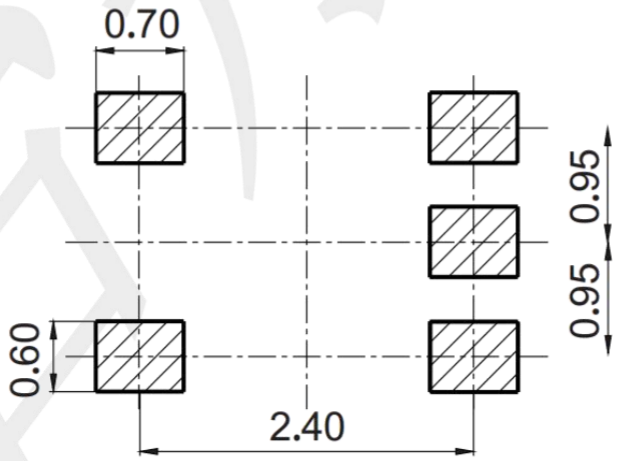
All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, ZO = 50Ω.

Package informantion

SOT23-5 (Unit: mm)

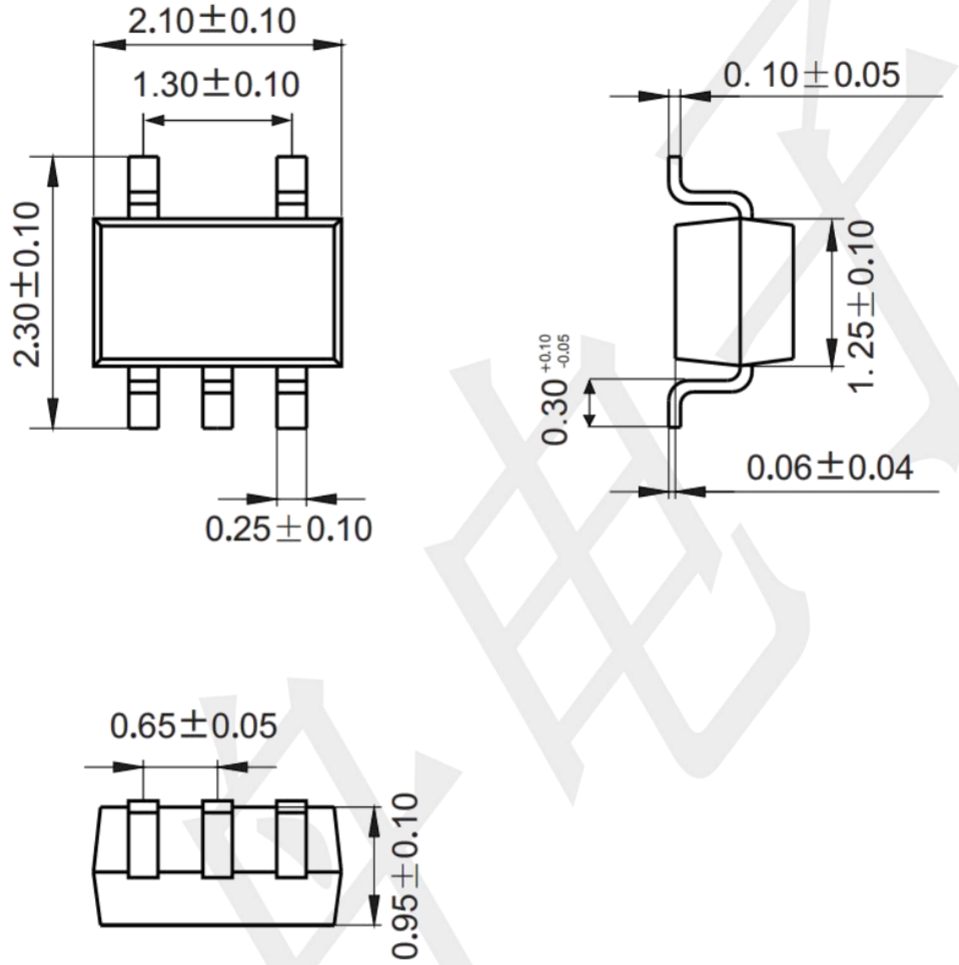


Mounting Pad Layout (unit: mm)

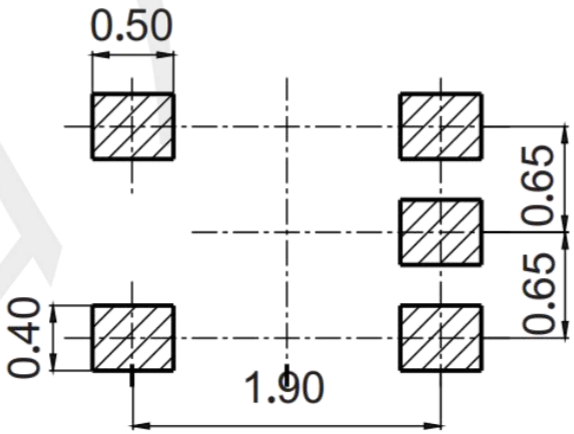


Package informantion

SOT353 (Unit: mm)

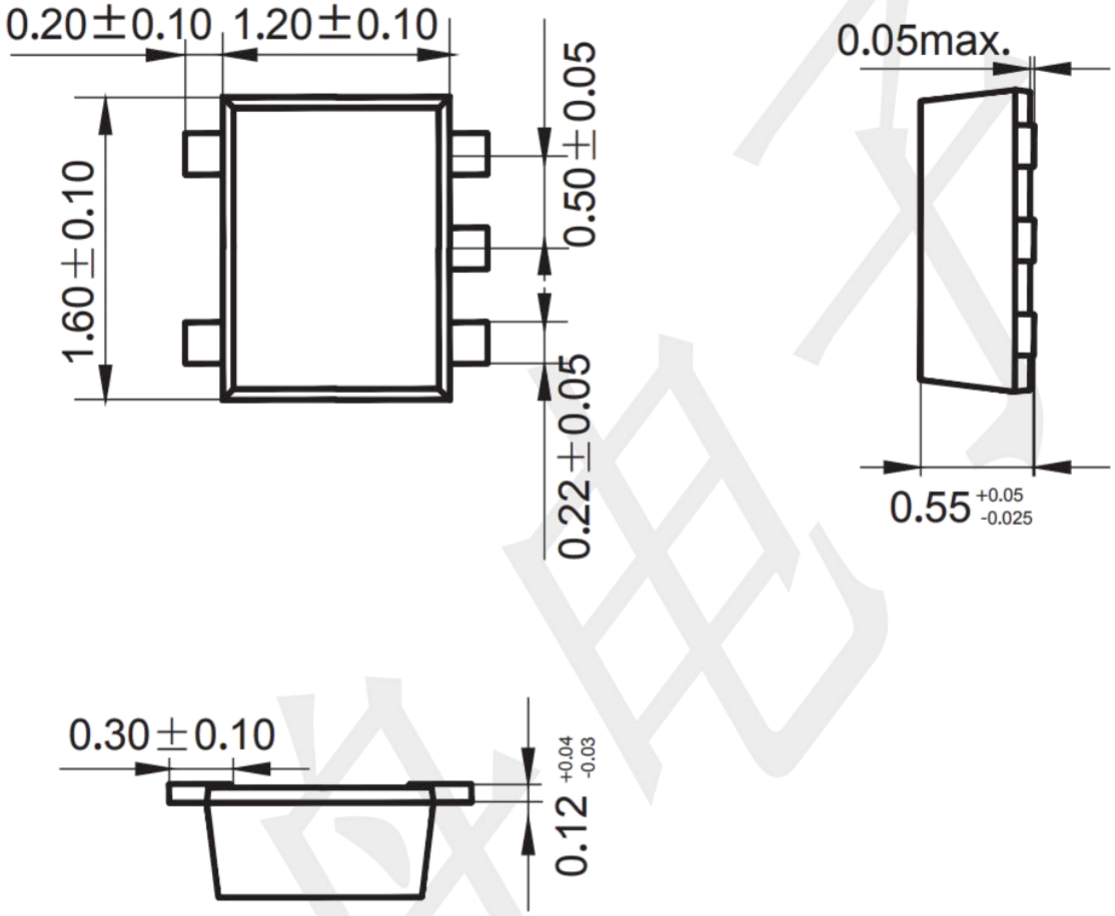


Mounting Pad Layout (unit: mm)

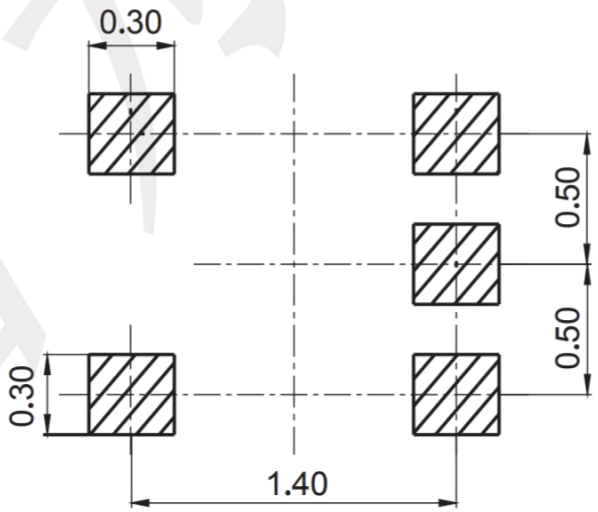


Package informantion

SOT553 (unit: mm)

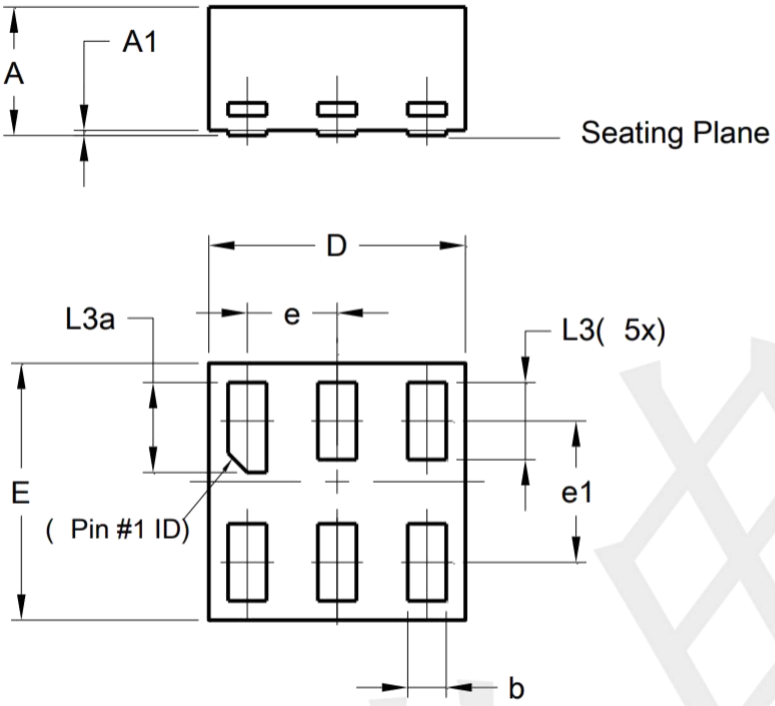


Mounting Pad Layout (unit: mm)



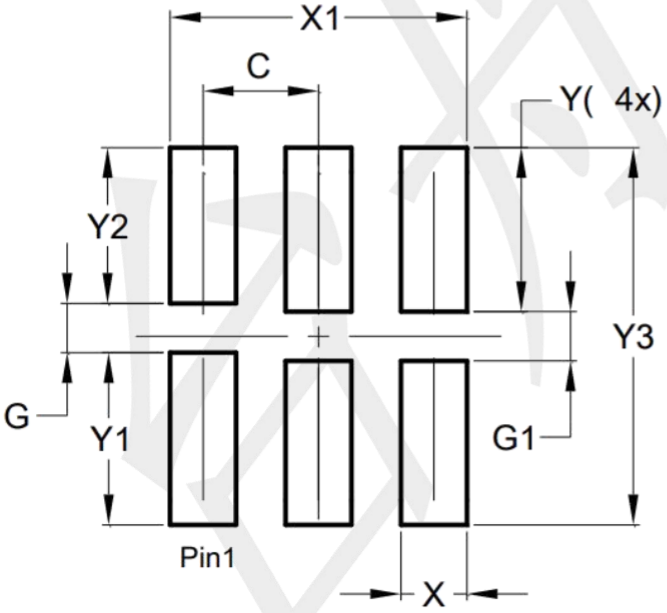
Package informantion

DFN1X1-6 (unit: mm)



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			

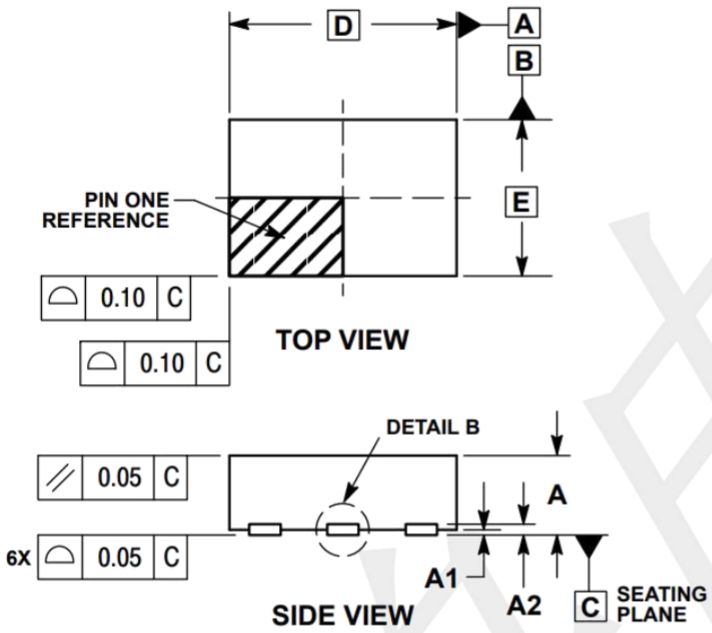
Mounting Pad Layout (unit: mm)



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

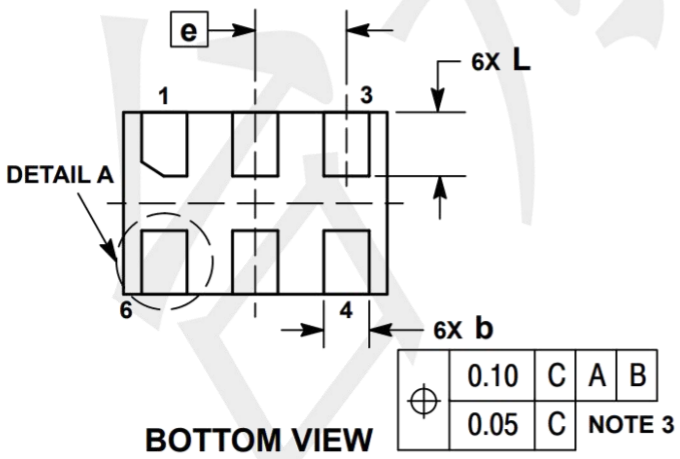
Package informantion

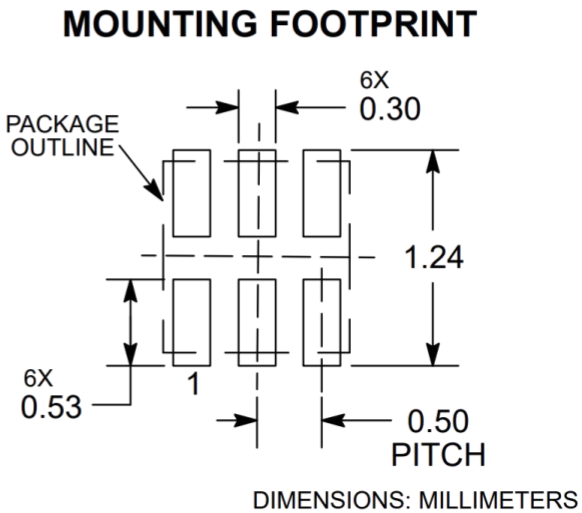
DFN1510-6 (unit: mm)



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

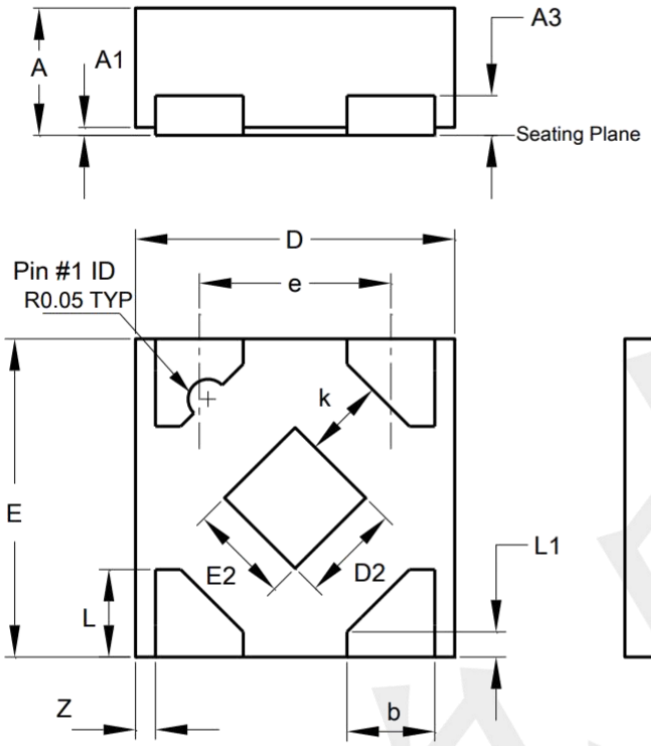
Mounting Pad Layout (unit: mm)





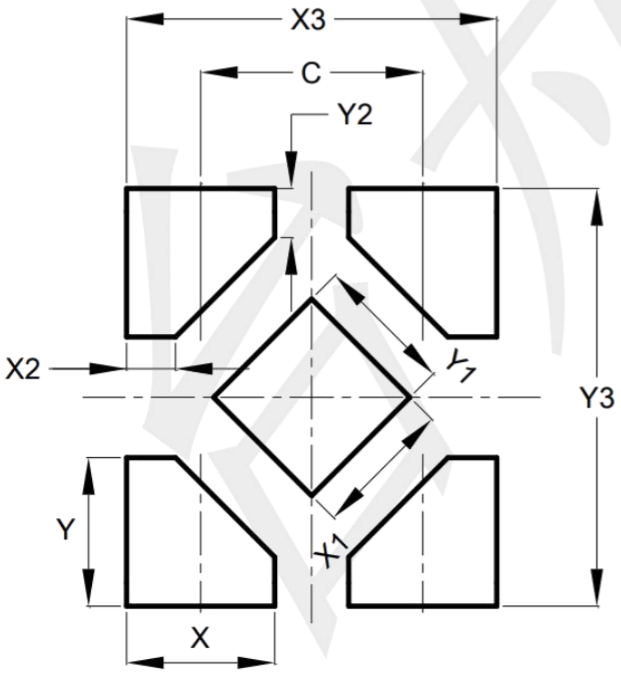
Package information

DFN0808-4 (unit: mm)



DFN0808-4			
Dim	Min	Max	Typ
A	0.25	0.35	0.30
A1	0	0.04	0.02
A3	-	-	0.13
b	0.17	0.27	0.22
D	0.75	0.85	0.80
D2	0.15	0.35	0.25
E	0.75	0.85	0.80
E2	0.15	0.35	0.25
e	-	-	0.48
k	0.20	-	-
L	0.17	0.27	0.22
L1	0.02	0.12	0.07
z	-	-	0.05
All Dimensions in mm			

Mounting Pad Layout (unit: mm)



Dimensions	Value
C	0.480
X	0.320
X1	0.300
X2	0.106
X3	0.800
Y	0.320
Y1	0.300
Y2	0.106
Y3	0.900