

Features

- Operate from 1.65V to 5.5V
- $\pm 24\text{mA}$ Output Drive ($V_{CC}=3.0\text{V}$)
- High Noise Immunity
- Power Down Protection
- 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 TP74LVC1G02 is a 2-input NOR gate Device which provides the Function $Y = \overline{A+B}$ in positive logic.

This device has power-down protective circuit preventing device from destruction when it is powered down.

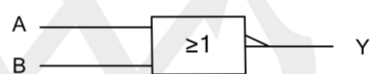
Applications

- 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



Logic Symbol

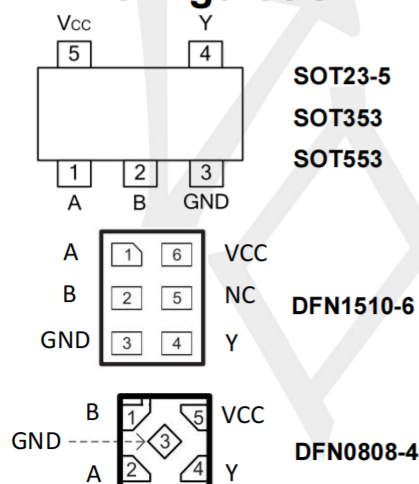


IEC Logic Symbol

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	Marking
TP74LVC1G02S5	SOT23-5	Tape and Reel, 3000	S102
TP74LVC1G02C5	SOT353	Tape and Reel, 3000	C102
TP74LVC1G02X5	SOT553	Tape and Reel, 4000	CB7
TP74LVC1G02N6	DFN1510-6	Tape and Reel, 5000	CB
TP74LVC1G02P6	DFN0808-4	Tape and Reel, 3000	J4

Pin Configuration



Function Table

INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	L
L	H	L
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
V _{CC} 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	°C
Junction to Ambient	θ_{JA}	SOT-23-5	230	°C/W
		SOT353	280	°C/W
		SOT553	250	°C/W
		DFN1510-6	440	°C/W
		DFN0808-4	340	°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	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	--	V _{CC}	V
Input Transition Rise or Fall rate	$\Delta t/\Delta v$	V _{CC} =1.8V±0.15V, 2.5V±0.2V	--	--	20	ns/V
		V _{CC} =3.3V±0.3V	--	--	10	ns/V
		V _{CC} =5V±0.5V	--	--	5	ns/V
Operating Temperature	T _A		-40	--	125	°C

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

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V _{IH}	V _{CC} =1.65V ~ 1.95V	0.65×V _{CC}	--	--	V
		V _{CC} =2.3V ~ 2.7V	1.7	--	--	V
		V _{CC} =3V ~ 3.6V	2	--	--	V
		V _{CC} =4.5V ~ 5.5V	0.7×V _{CC}	--	--	V
Low-Level Input Voltage	V _{IL}	V _{CC} =1.65V ~ 1.95V	--	--	0.35×V _{CC}	V
		V _{CC} =2.3V ~ 2.7V	--	--	0.7	V
		V _{CC} =3V ~ 3.6V	--	--	0.8	V
		V _{CC} =4.5V ~ 5.5V	--	--	0.35×V _{CC}	V
High-Level Output Voltage	V _{OH}	V _{CC} =1.65 ~ 5.5V, I _{OH} =-100μA	V _{CC} -0.1	--	--	V
		V _{CC} =1.65V, I _{OH} =-4mA	1.2	--	--	V
		V _{CC} =2.3V, I _{OH} =-8mA	1.9	--	--	V
		V _{CC} =3.0V, I _{OH} =-16mA	2.4	--	--	V
		V _{CC} =3.0V, I _{OH} =-24mA	2.3	--	--	V
		V _{CC} =4.5V, I _{OH} =-32mA	3.8	--	--	V
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65 ~ 5.5V, I _{OL} =100μA	--	--	0.1	V
		V _{CC} =1.65V, I _{OL} =4mA	--	--	0.45	V
		V _{CC} =2.3V, I _{OL} =8mA	--	--	0.3	V
		V _{CC} =3.0V, I _{OL} =16mA	--	--	0.4	V
		V _{CC} =3.0V, I _{OL} =24mA	--	--	0.55	V
		V _{CC} =4.5V, I _{OL} =32mA	--	--	0.55	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0 ~ 5.5V, V _{IN} =5.5V or GND	--	--	±5	uA
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{OUT} =5.5V	--	--	±10	uA
Quiescent Supply Current	I _Q	V _{CC} =1.65 ~ 5.5V, V _{IN} =V _{CC} or GND, I _{OUT} =0A	--	--	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	uA
Input Capacitance	C _I	V _{CC} =3.3V, V _{IN} =V _{CC} or GND	--	4	--	pF

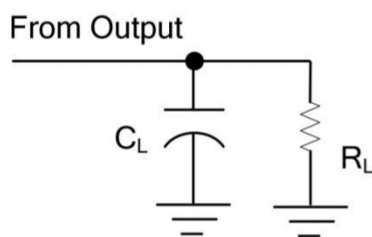
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =1.8V	--	23	--	pF
		V _{CC} =2.5V	--	23	--	pF
		V _{CC} =3.3V	--	23	--	pF
		V _{CC} =5.0V	--	25	--	pF

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

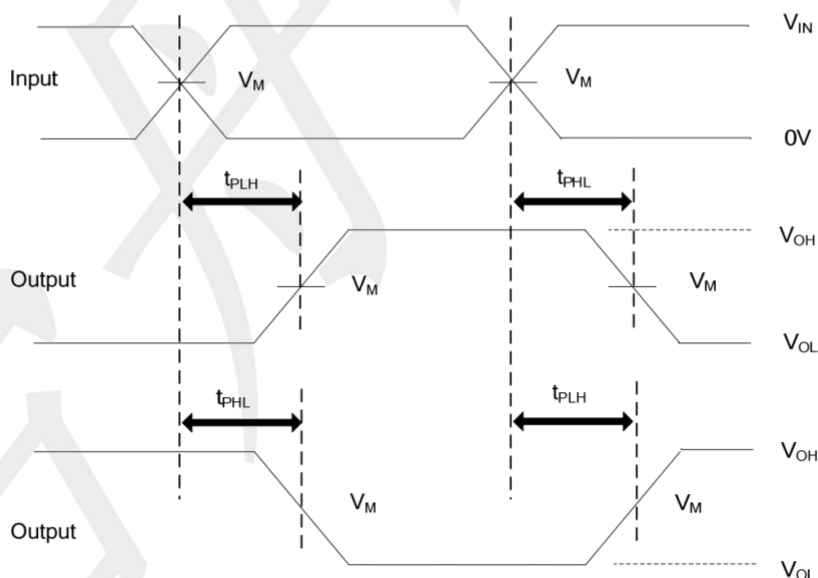
PARAMETER	SYMBOL	TEST Conditions		MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t _{PLH} / t _{PHL}	CL=15pF RL=1MΩ	V _{CC} =1.8±0.15V	1.9	--	7.2	nS
			V _{CC} =2.5±0.2V	0.8	--	4.4	nS
			V _{CC} =3.3±0.3V	0.8	--	3.6	nS
			V _{CC} =5±0.5V	0.8	--	3.4	nS
	t _{PLH} / t _{PHL}	CL=30pF	V _{CC} =1.8±0.15V, RL=1KΩ	2.8	--	8	nS
			V _{CC} =2.5±0.2V, RL=500Ω	1.2	--	5.5	nS
		CL=50pF RL=500Ω	V _{CC} =3.3±0.3V	1	--	4.5	nS
			V _{CC} =5±0.5V	1	--	4	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
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



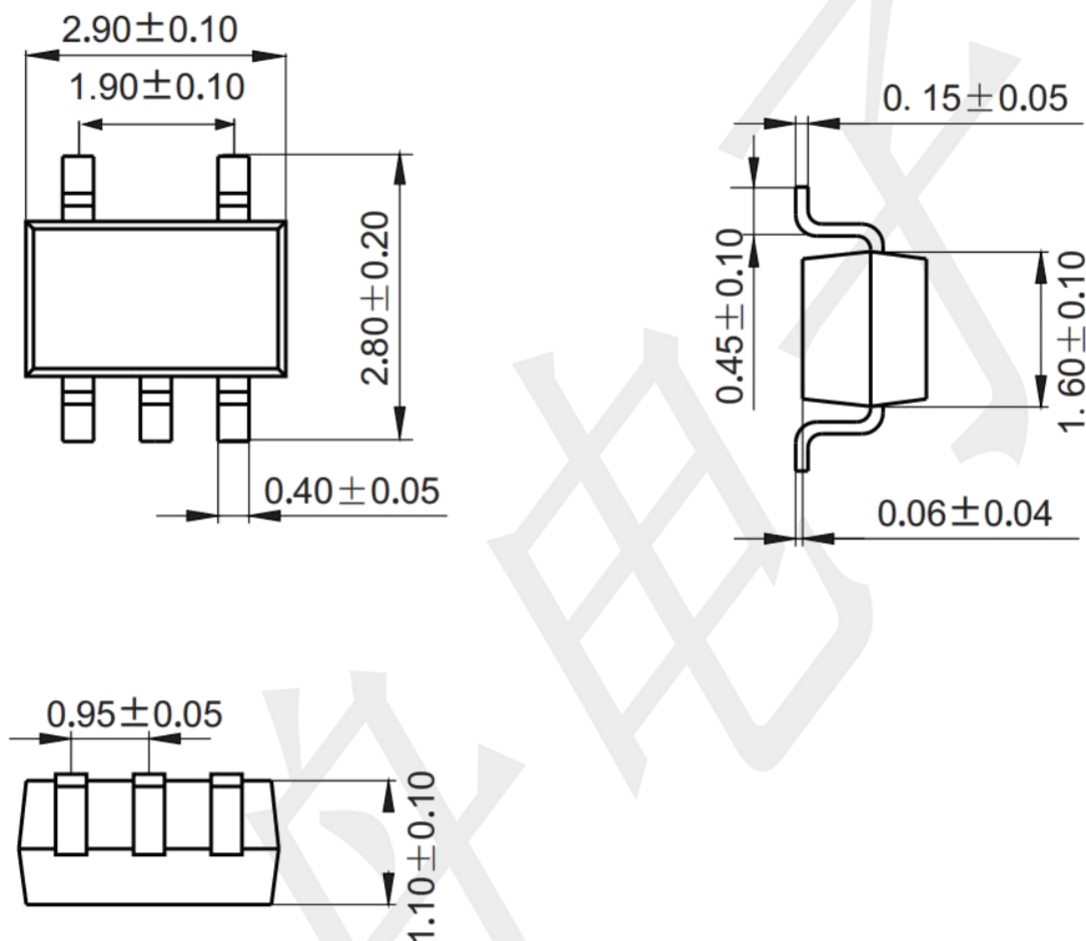
PROPAGATION DELAY TIMES

Note: CL includes probe and jig capacitance.

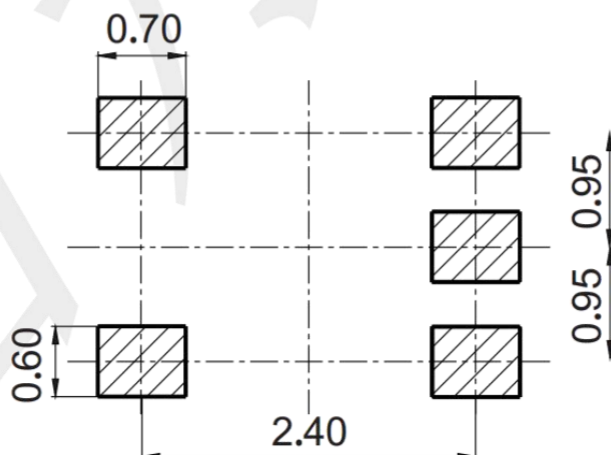
All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, ZO = 50Ω.

Package informantion

SOT23-5 (Unit: mm)

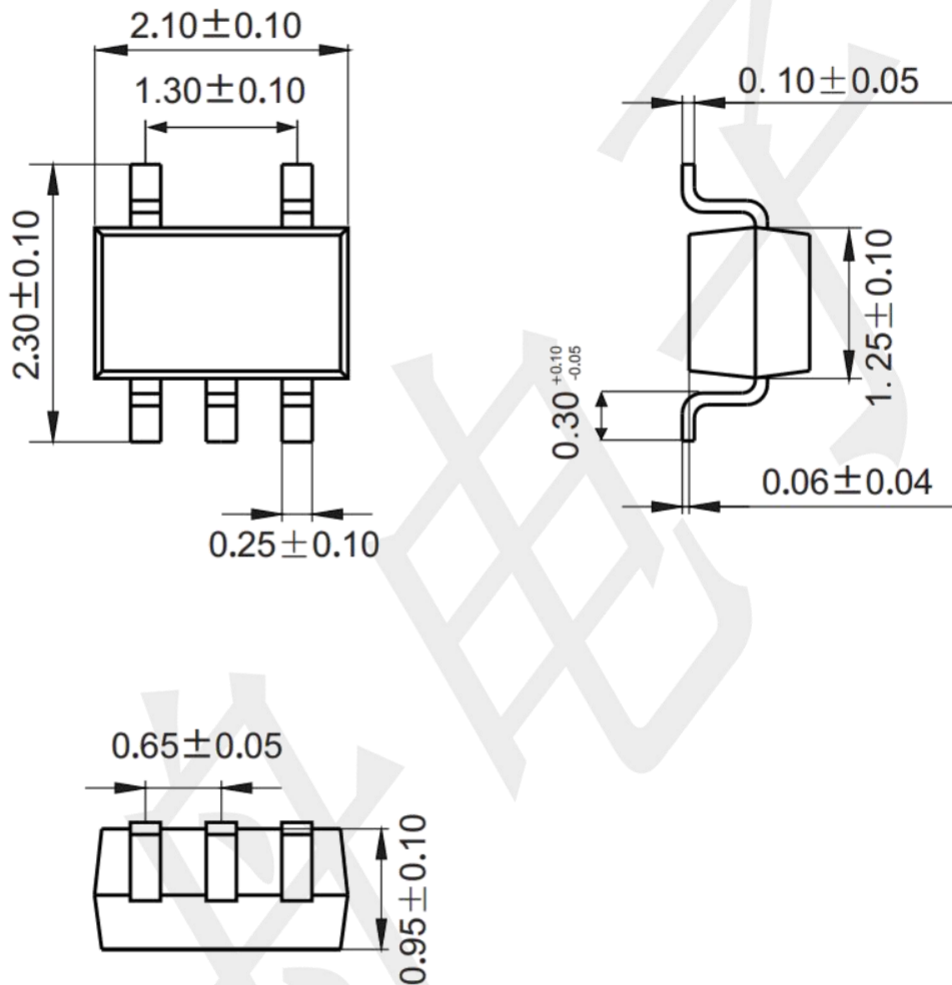


Mounting Pad Layout (Unit: mm)

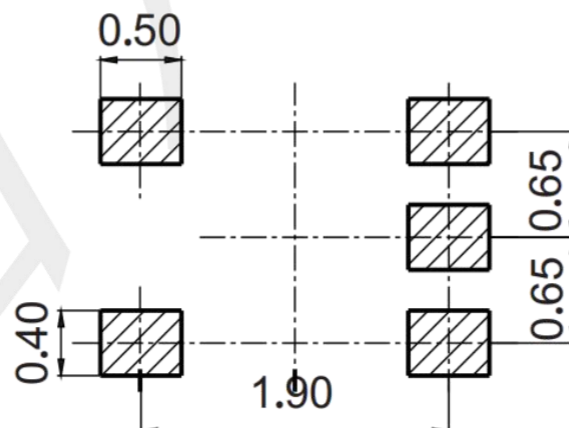


Package information

SOT353 (Unit: mm)

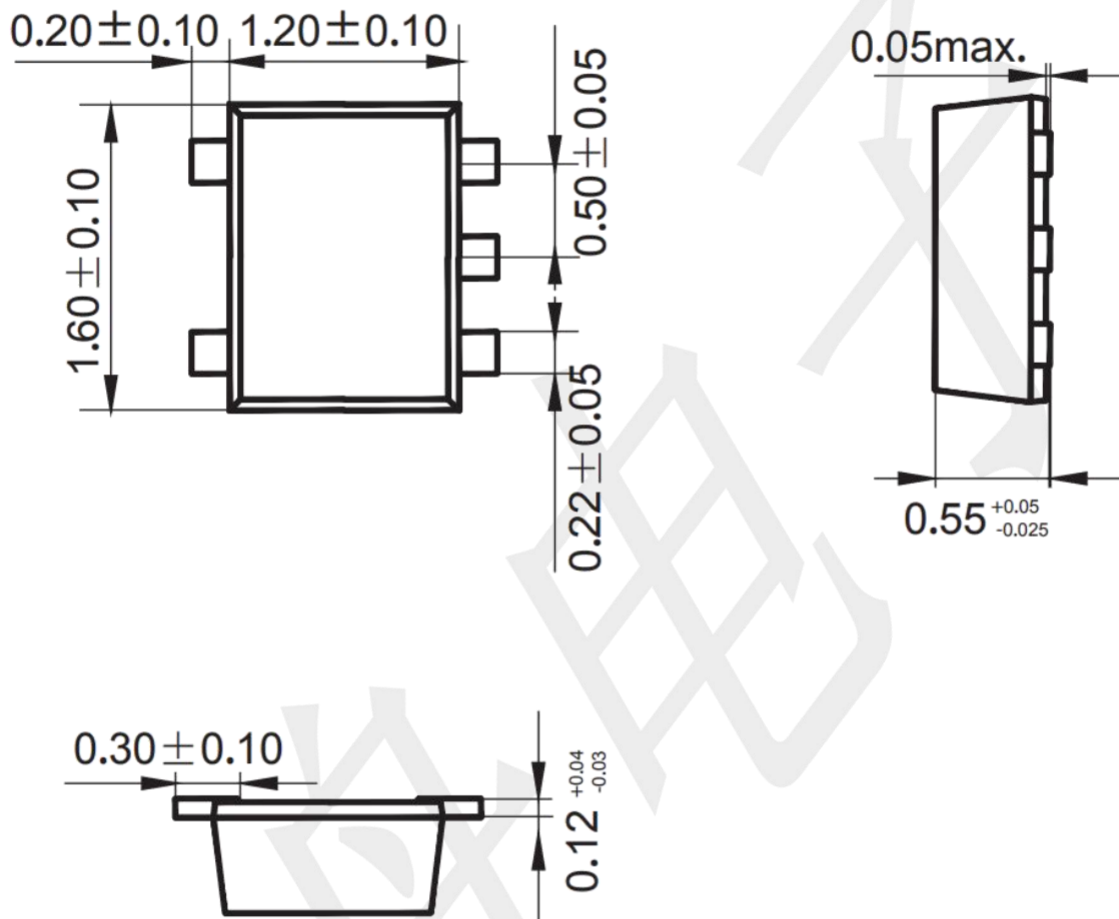


Mounting Pad Layout (Unit: mm)

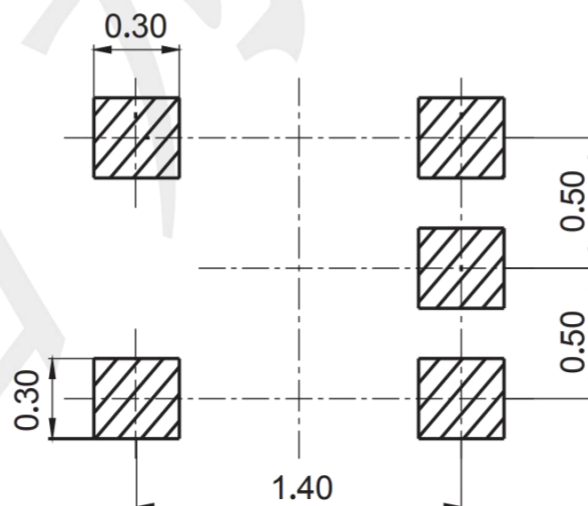


Package information

SOT553 (Unit: mm)

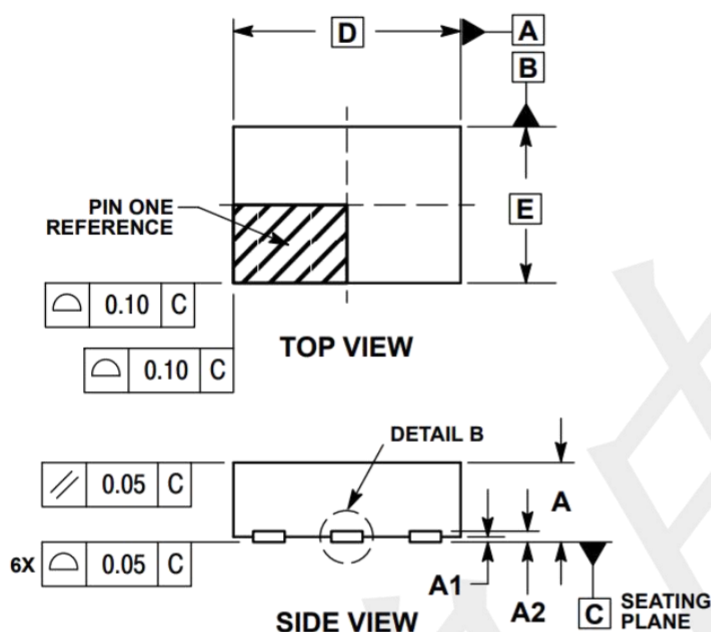


Mounting Pad Layout (Unit: mm)



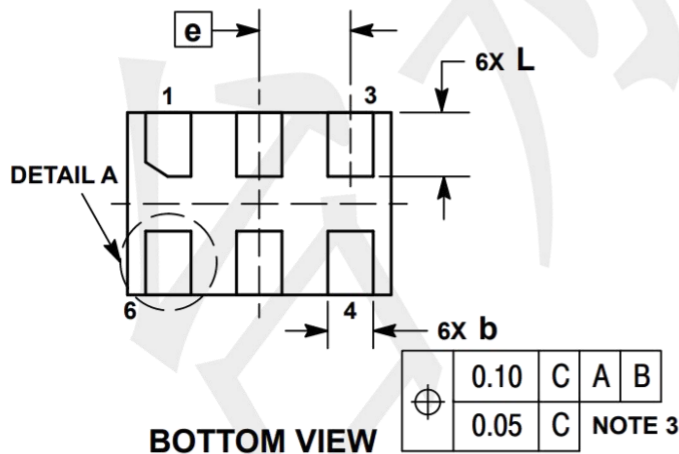
Package information

DFN1510-6 (Unit: mm)

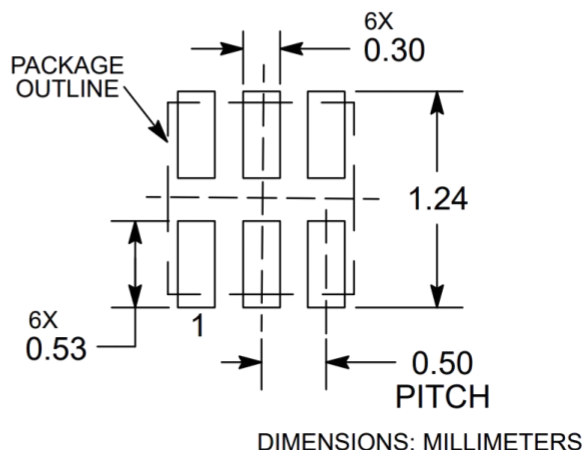


DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A2	0.07 REF	
b	0.20	0.30
D	1.45 BSC	
E	1.00 BSC	
e	0.50 BSC	
L	0.30	0.40
L1	---	0.15

Mounting Pad Layout (unit: mm)

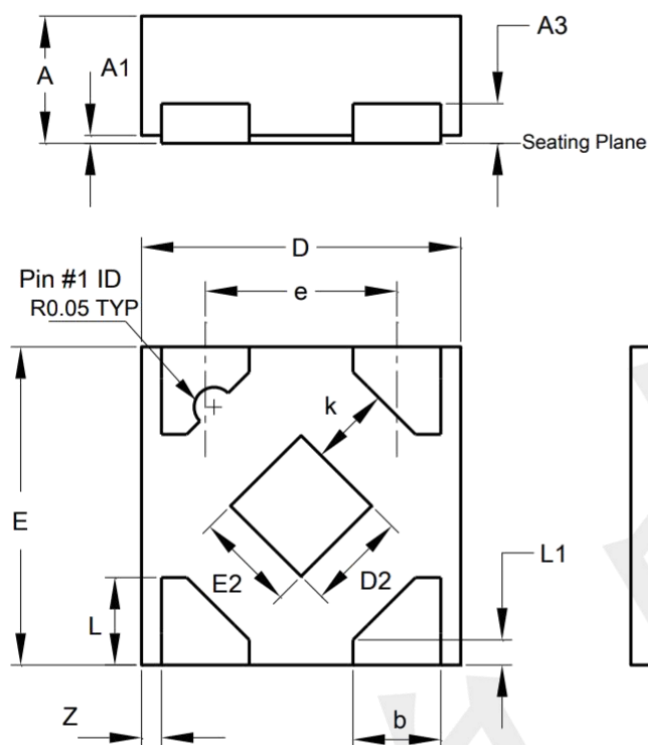


MOUNTING FOOTPRINT



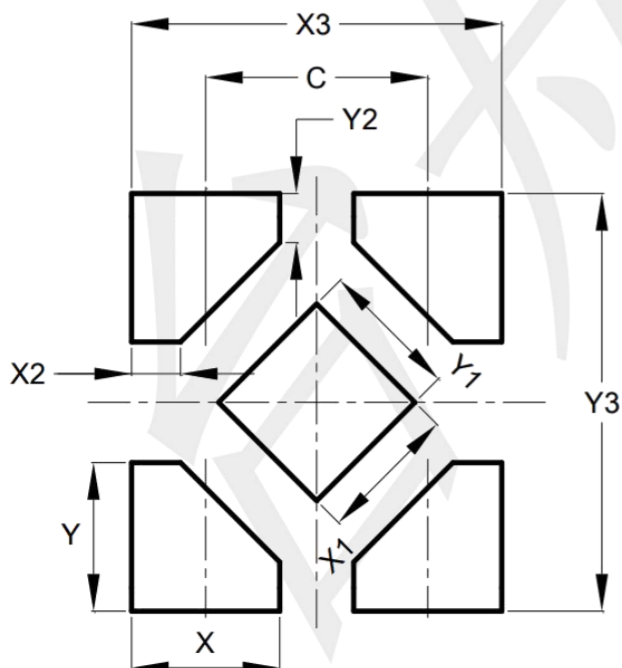
Package information

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