SINGLE INVERTER GATE

Features

- Operation voltage range: 1.65~5.5V
- Inputs Accept Voltages up to 5.5 V Allowing Down Translation to VCC
- ±24mA output drive (VCC=3.3V)
- Low Power Consumption, 10-μA Max ICC
- 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

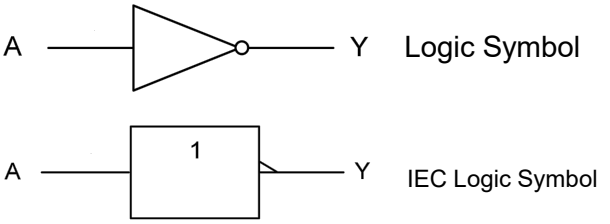
he FC74LVC1G04 is a single inverter gate, it provides the function $Y = \overline{A}$.

This device has power-down protective circuit, preventing device 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

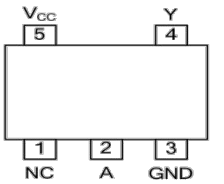
Logic Diagram



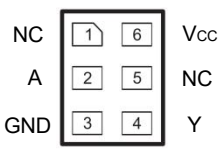
Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	Marking
FC74LVC1G04S5	SOT23-5	Tape and Reel,3000	S104
FC74LVC1G04C5	SOT353	Tape and Reel,3000	C104
FC74LVC1G04X5	SOT553	Tape and Reel,4000	CC7
FC74LVC1G04D6	DFN1X1-6	Tape and Reel,5000	CC
FC74LVC1G04N6	DFN1510-6	Tape and Reel,5000	CC
FC74LVC1G04P6	DFN0808-4	Tape and Reel,3000	K4

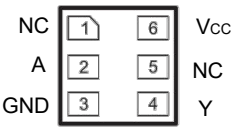
Pin Configuratio



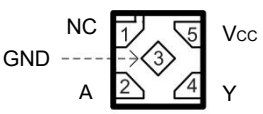
SOT23-5
SOT353
SOT553



DFN1510-6



DFN1X1-6



DFN0808-4

Function Table

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

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

SINGLE INVERTER GATE

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	Δt/Δv	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	℃

SINGLE INVERTER GATE

Electrical Characteristics (unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	TA =25°C			TA =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	VCC=1.65V ~ 1.95V	0.65×Vcc	--	--	0.65×Vcc	--	--	V
		VCC=2.3V ~ 2.7V	1.7	--	--	1.7	--	--	V
		VCC=3V ~ 3.6V	2	--	--	2	--	--	V
		VCC=4.5V ~ 5.5V	0.7×Vcc	--	--	0.7×Vcc	--	--	V
Low-Level Input Voltage	V_{IL}	Vcc=1.65V ~ 1.95V	--	--	0.35×Vcc	--	--	0.35×Vcc	V
		Vcc=2.3V ~ 2.7V	--	--	0.7	--	--	0.7	V
		Vcc=2.7V ~ 3.6V	--	--	0.8	--	--	0.8	V
		Vcc=4.5V ~ 5.5V	--	--	0.35×Vcc	--	--	0.35×Vcc	V
High-Level Output Voltage	V_{OH}	Vcc=1.65 ~ 5.5V, I_{OH}=-100μA	Vcc-0.1	--	--	Vcc-0.1	--	--	V
		Vcc=1.65V, I_{OH}=-4mA	1.2	--	--	0.95	--	--	V
		Vcc=2.3V, I_{OH}=-8mA	1.9	--	--	1.7	--	--	V
		Vcc=3.0V,I_{OH}=-16mA	2.2	--	--	1.9	--	--	V
		Vcc=3.0V,I_{OH}=-24mA	2.3	--	--	2.0	--	--	V
		Vcc=4.5V, I_{OH}=-32mA	3.8	--	--	3.4	--	--	V
Low-Level Output Voltage	V_{OL}	Vcc=1.65 ~ 5.5V, I_{OL}=100μA	--	--	0.1	--	--	0.1	V
		Vcc=1.65V, I_{OL}=4mA	--	--	0.45	--	--	0.7	V
		Vcc=2.3V, I_{OL}=8mA	--	--	0.3	--	--	0.45	V
		Vcc=3.0V,I_{OH}=16mA	--	--	0.4	--	--	0.6	V
		Vcc=3.0V,I_{OH}=24mA	--	--	0.55	--	--	0.8	V
		Vcc=4.5V, I_{OH}=32mA	--	--	0.55	--	--	0.8	V
Input Leakage Current	$I_{I(LEAK)}$	Vcc=0 ~ 5.5V, V_{IN}=5.5V or GND	--	±0.1	±5	--	--	±5	uA
Power OFF Leakage Current	I_{OFF}	Vcc=0V, V_{IN} or V_{OUT}=5.5V	--	±0.1	±10	--	--	±10	uA
Quiescent Supply Current	I_Q	VCC=1.65 ~ 5.5V, VIN=VCC or GND, IOUT=0A	--	0.1	10	--	--	10	uA
Additional Quiescent Supply ent Per Input Pin	ΔI_Q	Vcc=3 ~ 5.5V, One input at Vcc-0.6V, Other inputs at Vcc or GND	--	5	500	--	--	500	uA

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

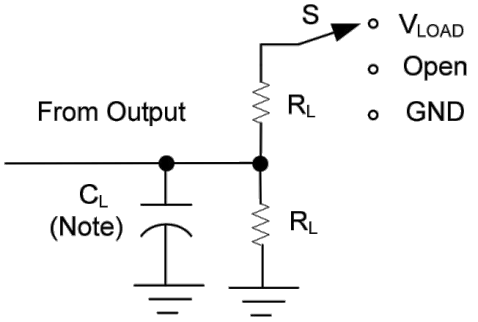
PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Input Capacitance	C_I	Vcc=3.3V, V_{IN}=Vcc or GND	--	3.5	--	pF
Power Dissipation Capacitance	C_{PD}	Vcc=1.8V	--	16	--	pF
		Vcc=2.5V	--	18	--	pF
		Vcc=3.3V	--	18	--	pF
		Vcc=5.0V	--	20	--	pF

SINGLE INVERTER GATE

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

PARAMETER	SYMBOL	TEST Conditions		TA =25°C			TA =-40°C~+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,C_L=15 pF	1.0	--	11	--	--	14	nS
			V_{CC}=2.5±0.2V,C_L=15 pF	0.5	--	8	--	--	10.5	nS
			V_{CC}=3.3±0.3V,C_L=15 pF	0.5	--	6	--	--	8	nS
			V_{CC}=5±0.5V,C_L=15 pF	0.5	--	5	--	--	6	nS
	t_{PLH} / t_{PHL}	C_L=30pF	V_{CC}=1.8±0.15V, C_L=30 pF	1.0	--	12	--	--	15	nS
			V_{CC}=2.5±0.2V, C_L=30 pF	0.5	--	9	--	--	11.5	nS
			V_{CC}=3.3±0.3V,C_L=50 pF	0.5	--	7	--	--	9	nS
			V_{CC}=5±0.5V ,C_L=50 pF	0.5	--	6	--	--	7	nS

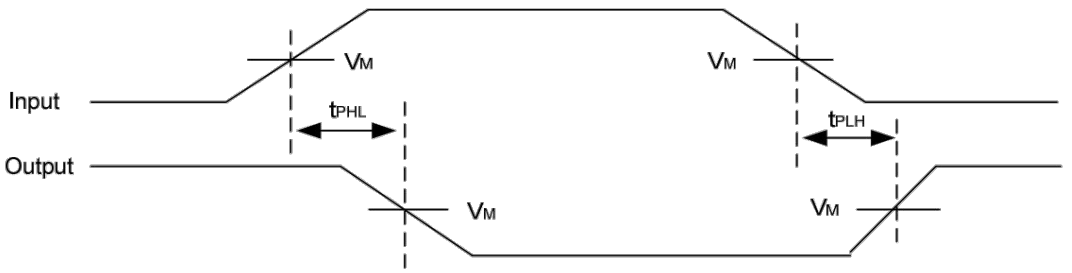
TEST CIRCUIT AND WAVEFORMS



TEST	S
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

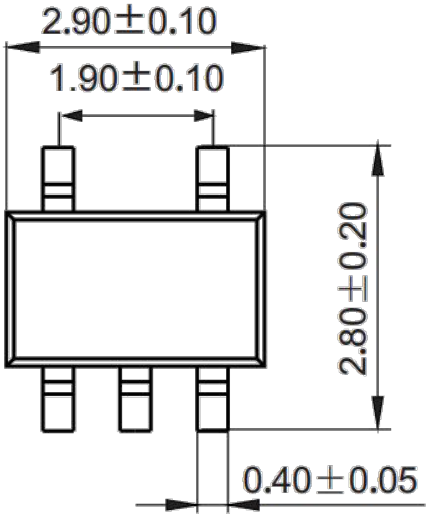
V_{CC}	V_{IN}	t_R, t_F	V_M	V_{LOAD}	C_L	R_L	V_Δ
1.8V±0.15V	V_{CC}	≤2ns	V_{CC}/2	2×V_{CC}	15pF	1MΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	V_{CC}/2	2×V_{CC}	15pF	1MΩ	0.15V
3.3V±0.3V	3 V	≤2.5ns	1.5V	6V	15pF	1MΩ	0.3V
5V±0.5V	V_{CC}	≤2.5ns	V_{CC}/2	2×V_{CC}	15pF	1MΩ	0.3V
1.8V±0.15V	V_{CC}	≤2ns	V_{CC}/2	2×V_{CC}	30pF	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	V_{CC}/2	2×V_{CC}	30pF	500Ω	0.15V
3.3V±0.3V	3 V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	V_{CC}/2	2×V_{CC}	50pF	500Ω	0.3V

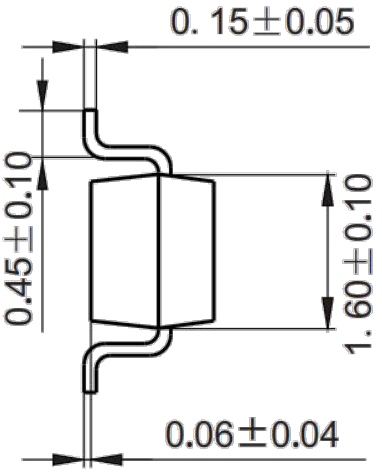


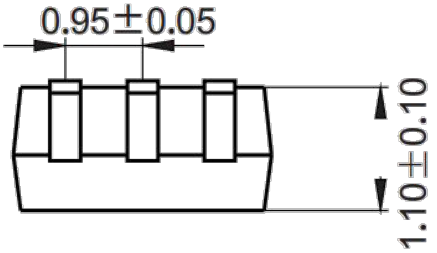
SINGLE INVERTER GATE

Package informantion

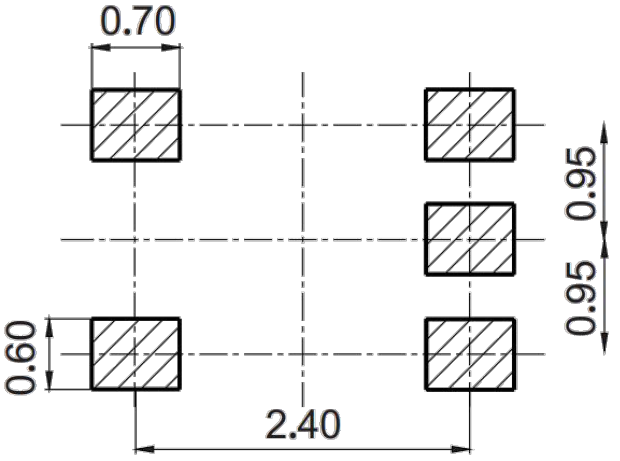
SOT23-5 (Unit: mm)







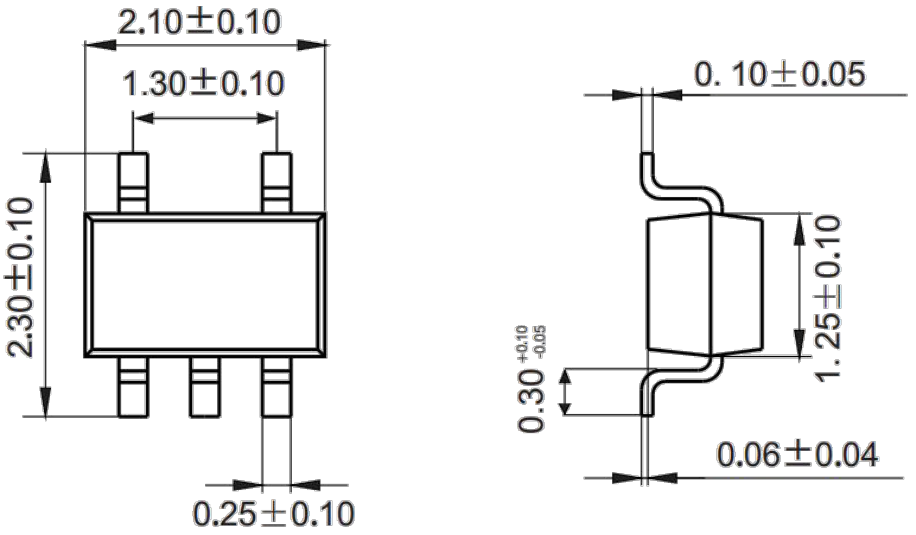
Mounting Pad Layout (unit: mm)

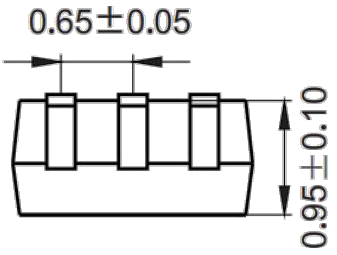


SINGLE INVERTER GATE

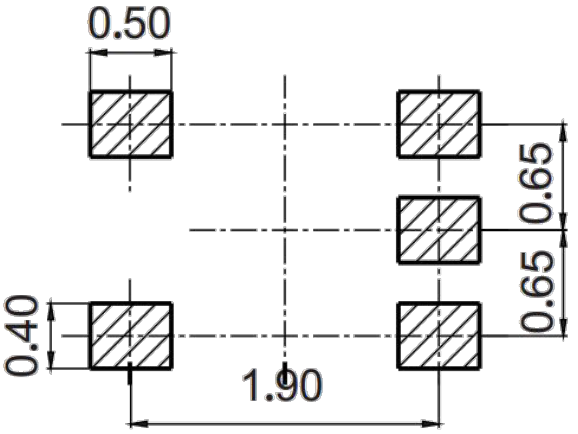
Package information

SOT353 (Unit: mm)





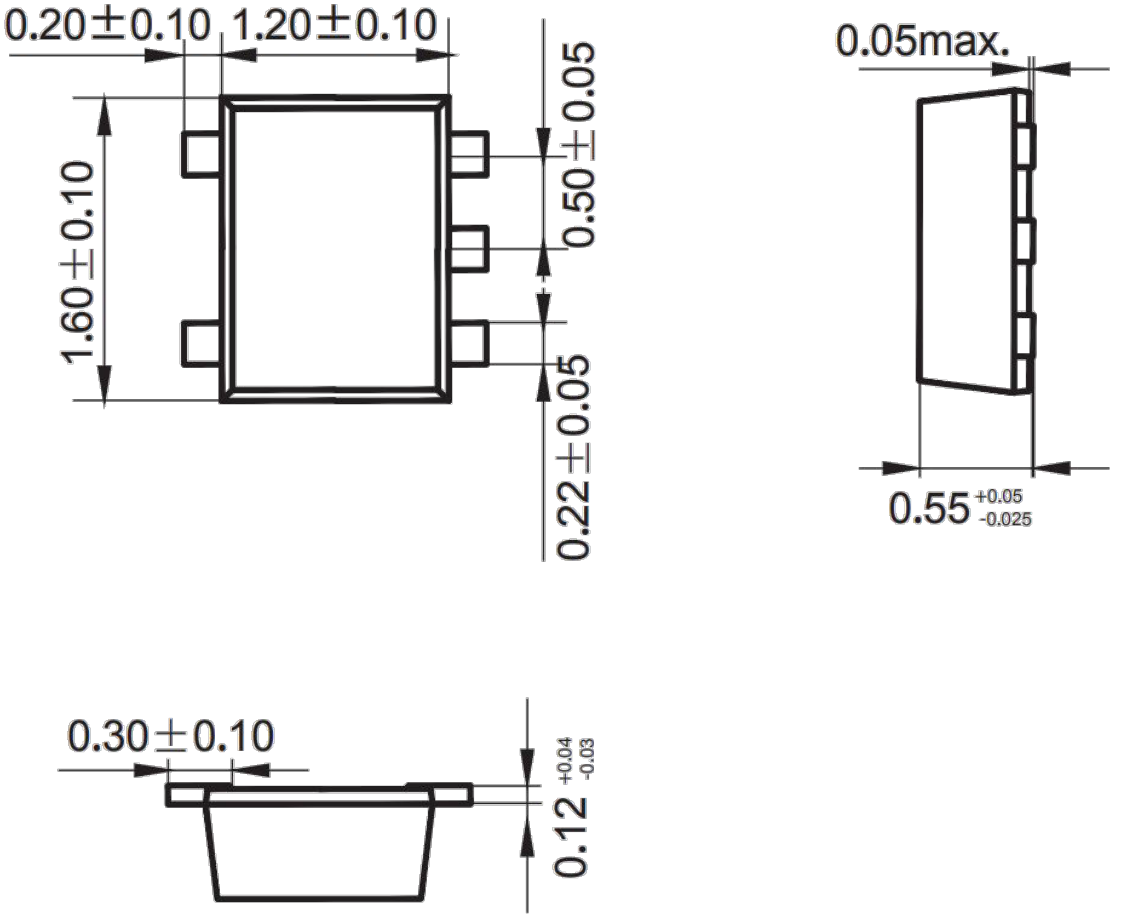
Mounting Pad Layout (unit: mm)



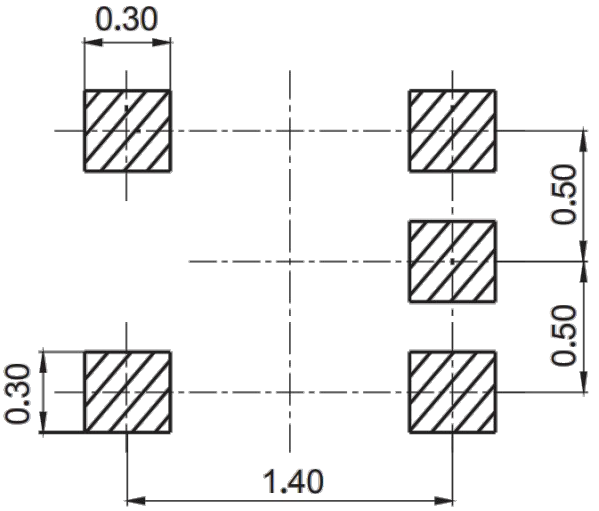
SINGLE INVERTER GATE

Package information

SOT553 (unit: mm)



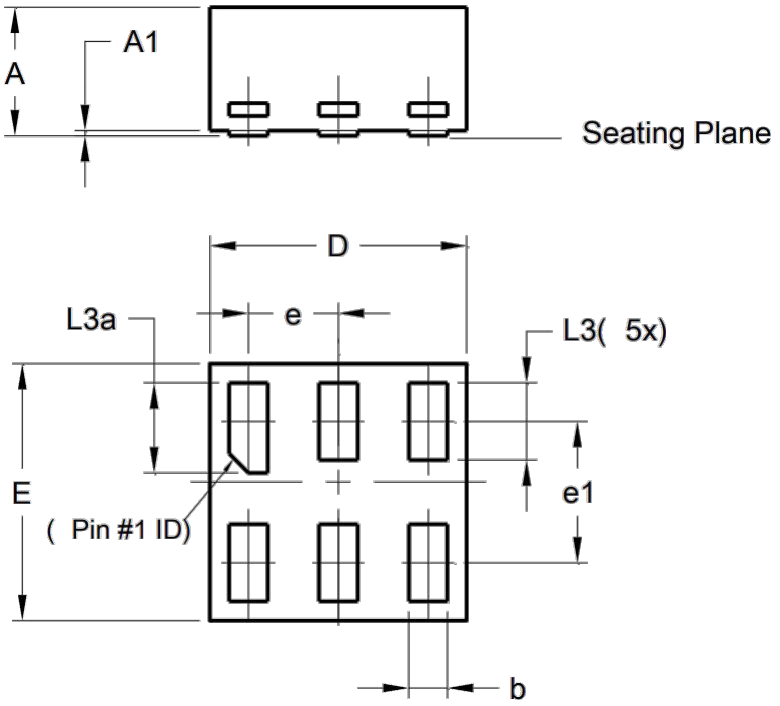
Mounting Pad Layout (unit: mm)



SINGLE INVERTER GATE

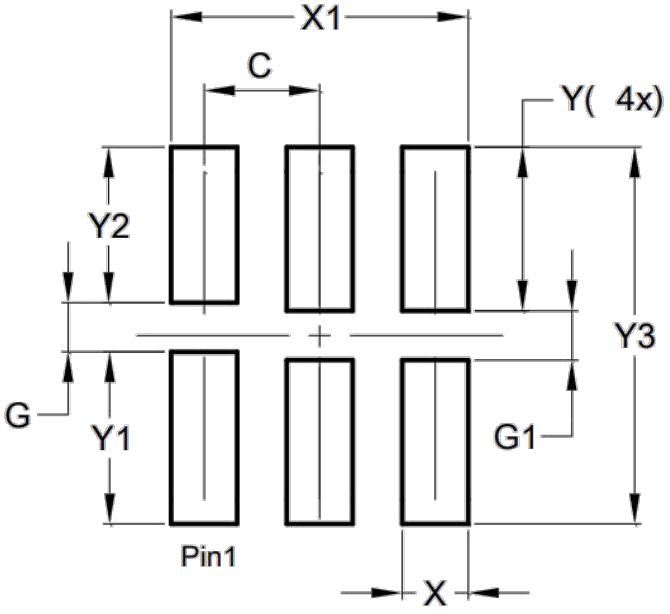
Package information

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)

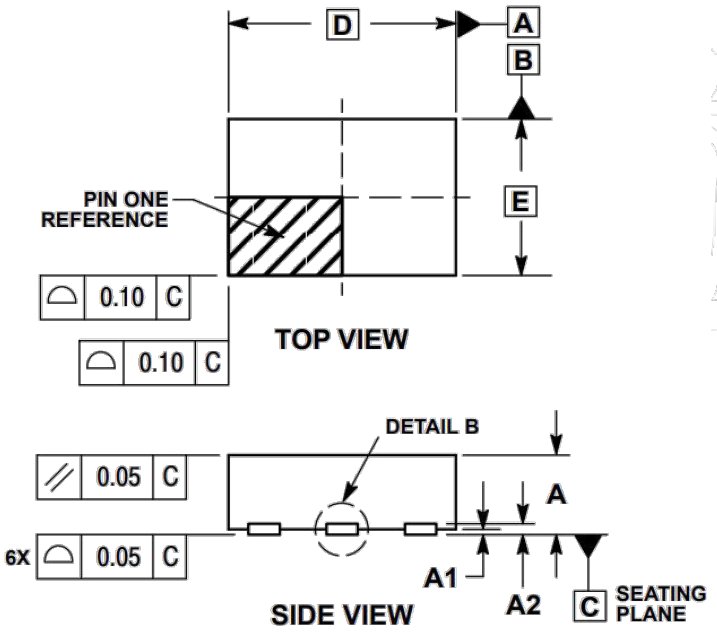


Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

SINGLE INVERTER GATE

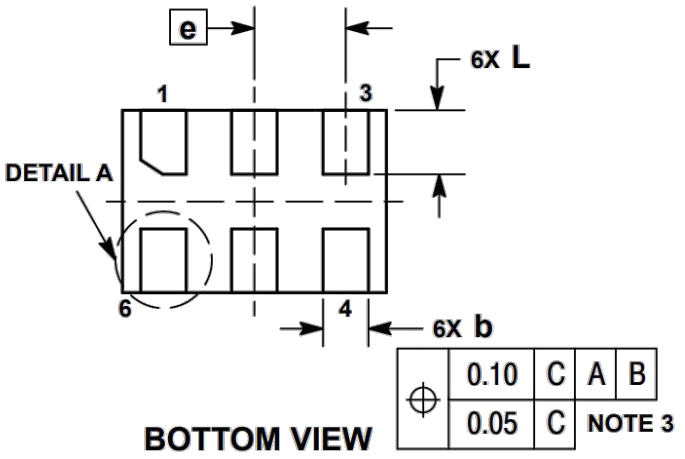
Package information

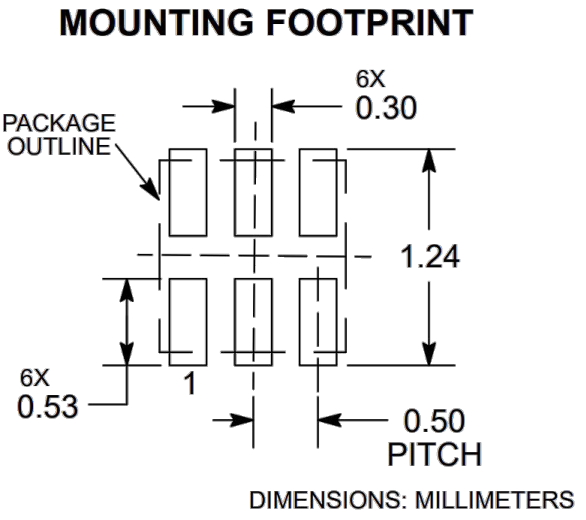
DFN1510-6 (unit: mm)



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)

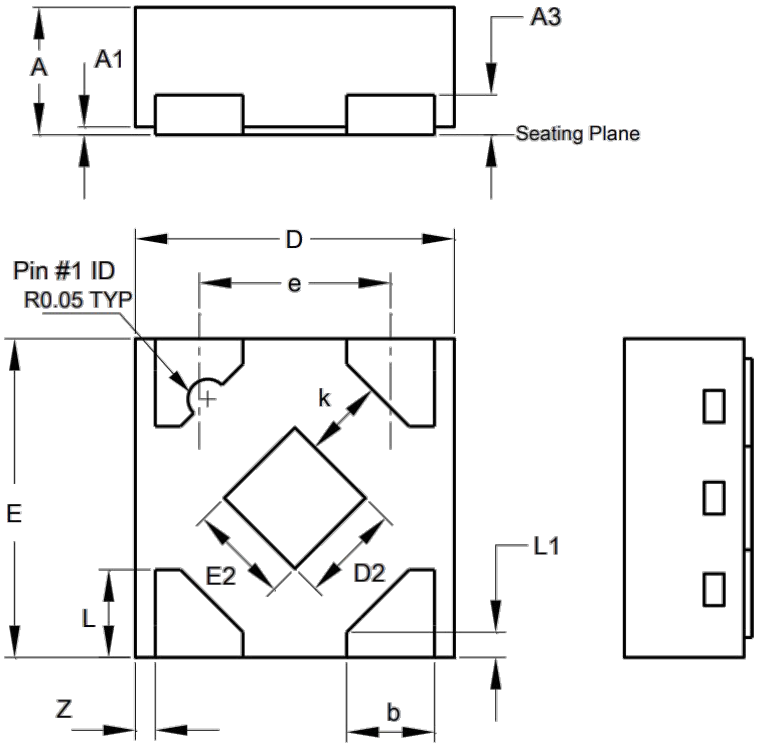




SINGLE INVERTER GATE

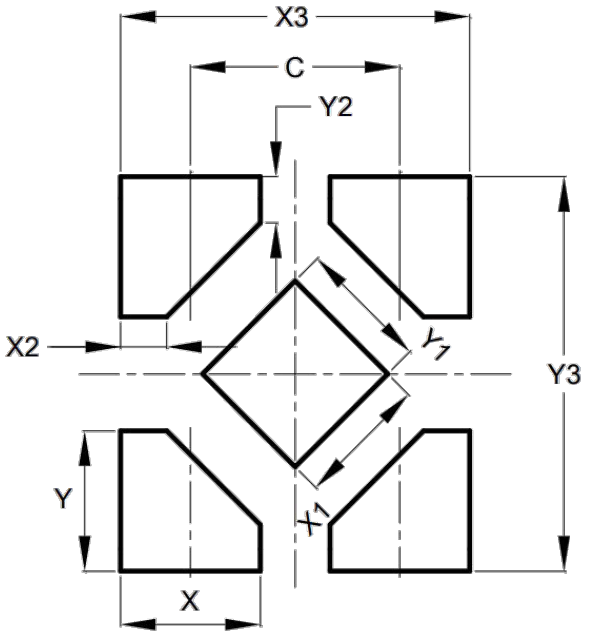
Package information

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