74LVC1G09 Single 2-Input Positive-AND Gate With Open-Drain Output

1. General Description

1.1 Description

The 74LVC1G09 is designed for 1.65-V to 5.5-V VCC operation.

is a single 2-input AND gate with open-drain output . It performs the Boolean function Y=A • B or $Y = \overline{\overline{A} + \overline{B}}$ in positive logic . For digital operation this device must have an external pull-up resistor to establish a logic HIGH-level.

1.2 Features

- Supports 5-V VCC Operation
- Inputs and Open-Drain Output accept voltages to 5.5V
- Low Power Consumption, 10-μA Max ICC
- ±24mA output drive(VCC=3.3V)
- Ioff supports partial-power-down mode

1.3 Device Information

PART NUMBER	PACKAGE
74LVC1G09	SOT23
	SC70
	SOT5X3
	DFN
	DSBGA

2. Connection Diagrams and Pin Description

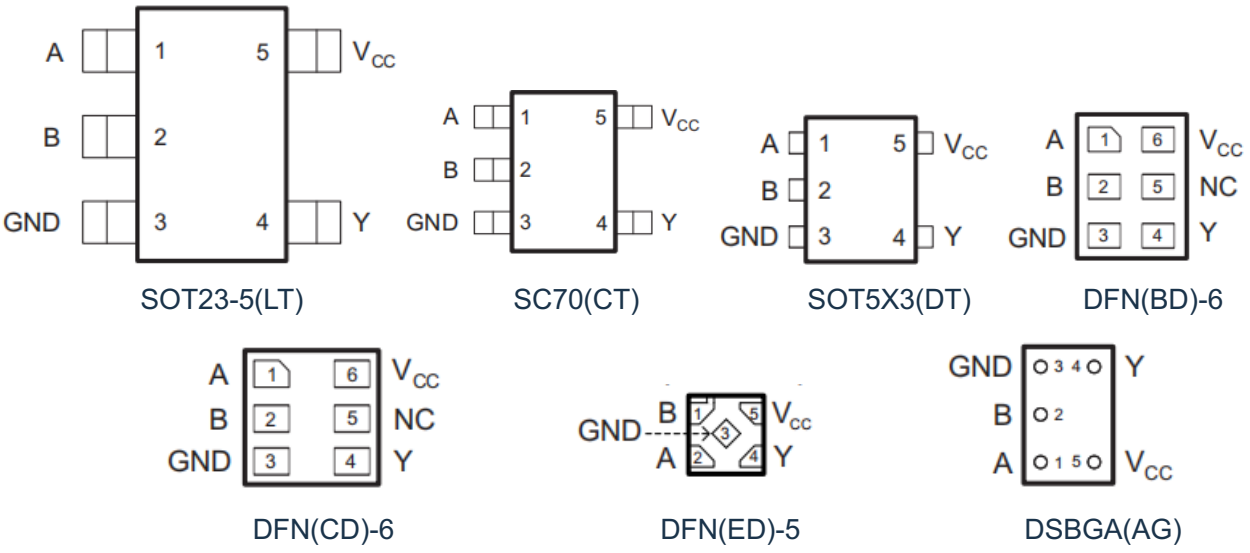


Figure 2.1 Top View

PIN No.				NAME	I/O	FUNCTION
LT/CT/DT	BD/CD	ED	AG			
1	1	2	1	A	I	Input
2	2	1	2	B	I	Input
3	3	3	3	GND		Ground
4	4	4	4	Y	O	Output
5	6	5	5	VCC		Supply Voltage
--	5	--	--	NC		No Connected

3. System Diagram

3.1 Logic Diagram

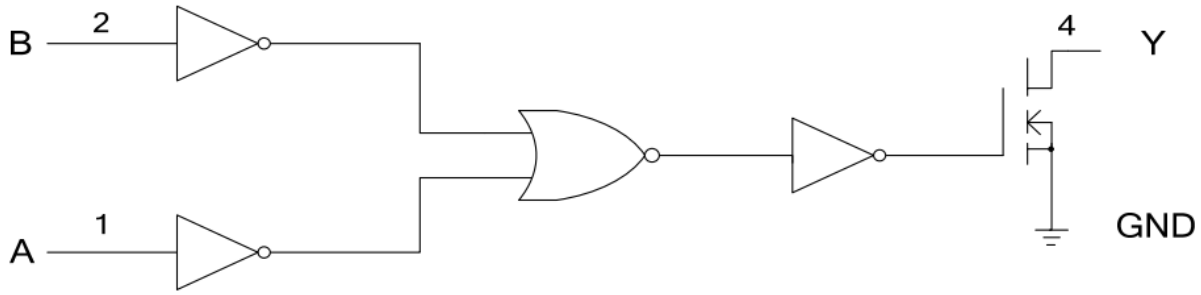


Figure 3.1：74LVC1G09 Logic Diagram

3.2 Function Table

Input		Output
A	B	Y
0	1	0
0	0	0
1	0	0
1	1	1

X = don’t care, 1≡High State, 0≡Low State,Z=High Impedance

4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V_{CC}	Supply Voltage	-0.5	6.5	V
V_I	Input Voltage Range	-0.5	6.5	V
V_O	Voltage Range(applied to any output in the high-impedance or power-off state)(1)	-0.5	6.5	V
	Voltage Range(applied to any output in the high or low state)	-0.5	VCC + 0.5	V
I_O	Continuous Output Current		±50	mA
T_J	Junction Temperature		125	℃
T_{OP}	Operating Temperature	0	70	℃

Absolute maximum ratings are those values beyond which the device could be permanently damaged,These are stress ratings only,which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.

(1) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

4.2 Electrical Characteristics

4.2.1 DC Specifications

(T_a=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_{IH}	High Level Input Voltage	V_{CC}=1.65V to 1.95V	0.65V_{CC}	--	--	V
		V_{CC}=2.3V to 2.7V	1.7	--	--	V
		V_{CC}=3V to 5.5V	0.7V_{CC}	--	--	V
V_{IL}	Low Level Input Voltage	V_{CC}=1.65V to 1.95V	--	--	0.35V_{CC}	V
		V_{CC}=2.3V to 2.7V	--	--	0.7	V
		V_{CC}=3V to 3.6V	--	--	0.8	V
		V_{CC}=4.5V to 5.5V	--	--	0.3V_{CC}	V
I_{OL}	Low Level Output Current	V_{CC}=1.65V	--	--	4	mA
		V_{CC}=2.3V	--	--	8	mA
		V_{CC}=3V	--	--	16	mA
			--	--	24	mA
		V_{CC}=4.5V	--	--	32	mA

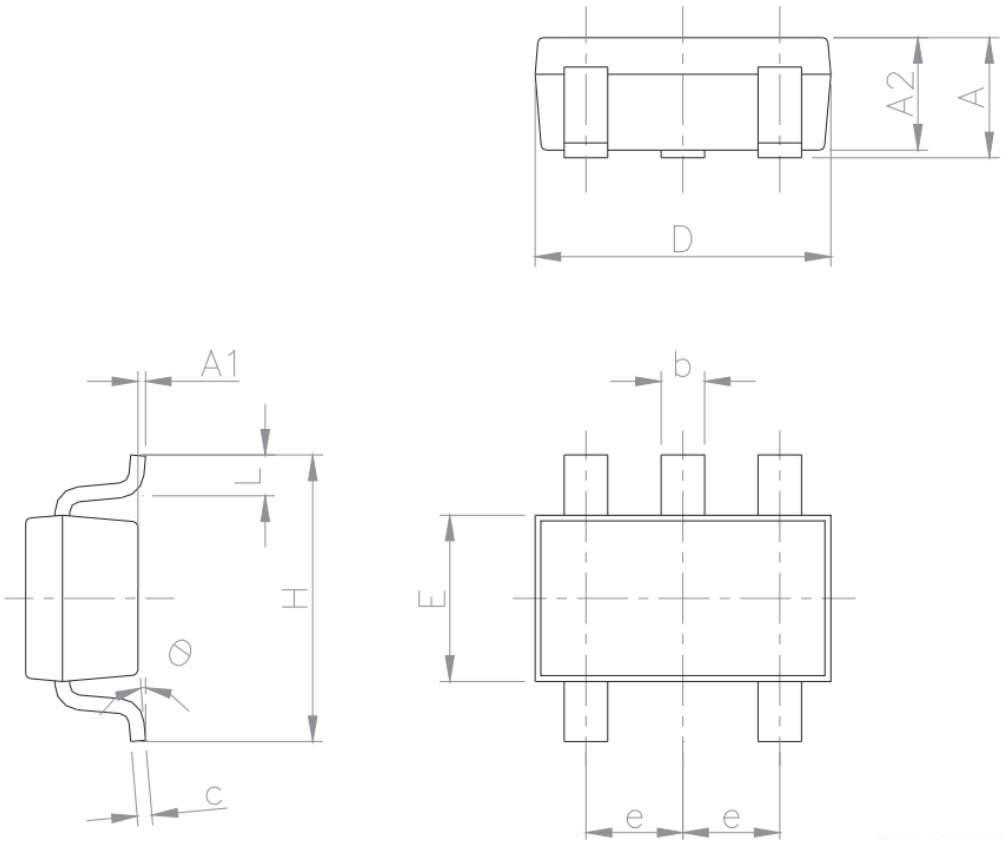
Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_{OL}	Low Level Output Voltage	V_{CC}=1.65V to 5.5V,I_{OH}=100uA	--	--	0.1	V
		V_{CC}=1.65V,I_O=4mA	--	0.09	--	V
		V_{CC}=2.3V,I_O=8mA	--	0.10	--	V
		V_{CC}=3V,I_O=16mA	--	0.15	--	V
		V_{CC}=3V,I_O=24mA	--	0.25	--	V
		V_{CC}=4.5V,I_O=32mA	--	0.25	--	V
I_I	A or B Inputs Leakage Current	V_{CC}=0 to 5.5V,V_I=V_{CC} or GND	--	0	±1	uA
I_{off}	Power Off Leakage Current	V_{CC}=0V,V_I or V_O=5.5V	--	0	±10	uA
I_{OZ}	3-State Output OFF-State Current	V_{CC}=3.6V, V_O = 0 to 5.5V	--	0	10	uA
I_{CC}	Quiescent Supply Current	V_{CC}=1.65V to 5.5V,V_I=V_{CC} or GND,I_O=0	--	0	10	uA
ΔI_{CC}	Additional Quiescent Supply Current Per Input Pin	V_{CC}=3V to 5.5V,one input at V_{CC} -0.6V,Other inputs at V_{CC} or GND	--	--	500	uA

5. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
74LVC1G09LT05ARCQ	SOT23	5	Tape & Reel	3000
74LVC1G09CT05ARCQ	SC70	5	Tape & Reel	3000
74LVC1G09DT05ARDQ	SOT5x3	5	Tape & Reel	4000
74LVC1G09BD06AREQ	DFN(BD)	6	Tape & Reel	5000
74LVC1G09CD06AREQ	DFN(CD)	6	Tape & Reel	5000
74LVC1G09ED05ARCQ	DFN	5	Tape & Reel	3000
74LVC1G09AG05ARCQ	DSBGA	5	Tape & Reel	3000

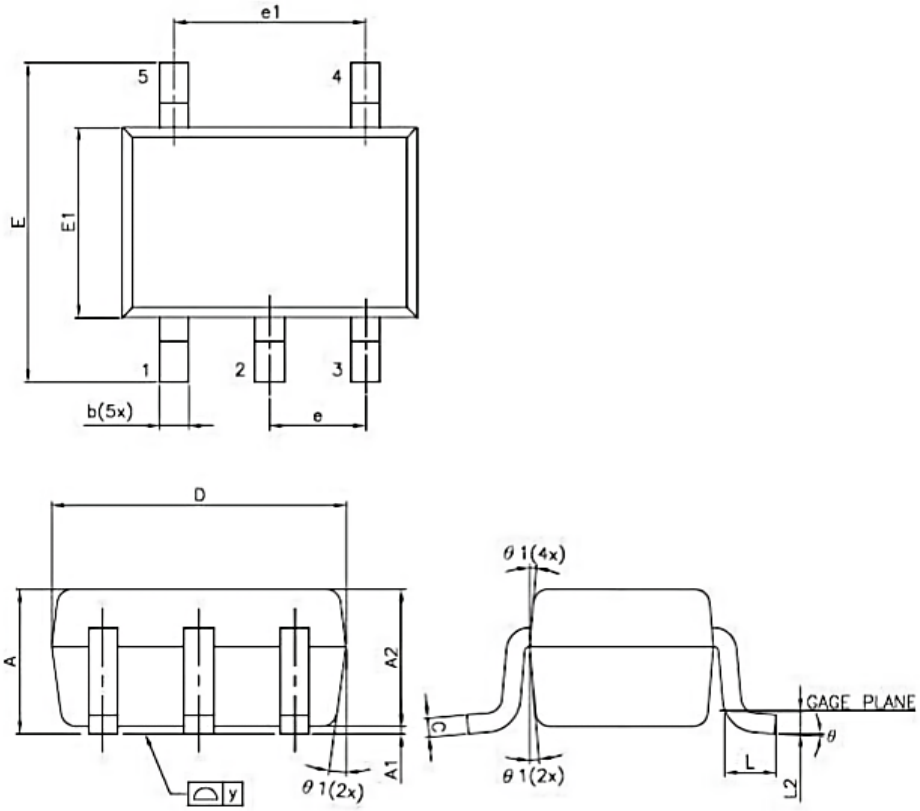
6. Package Information

6.1 SOT23-5



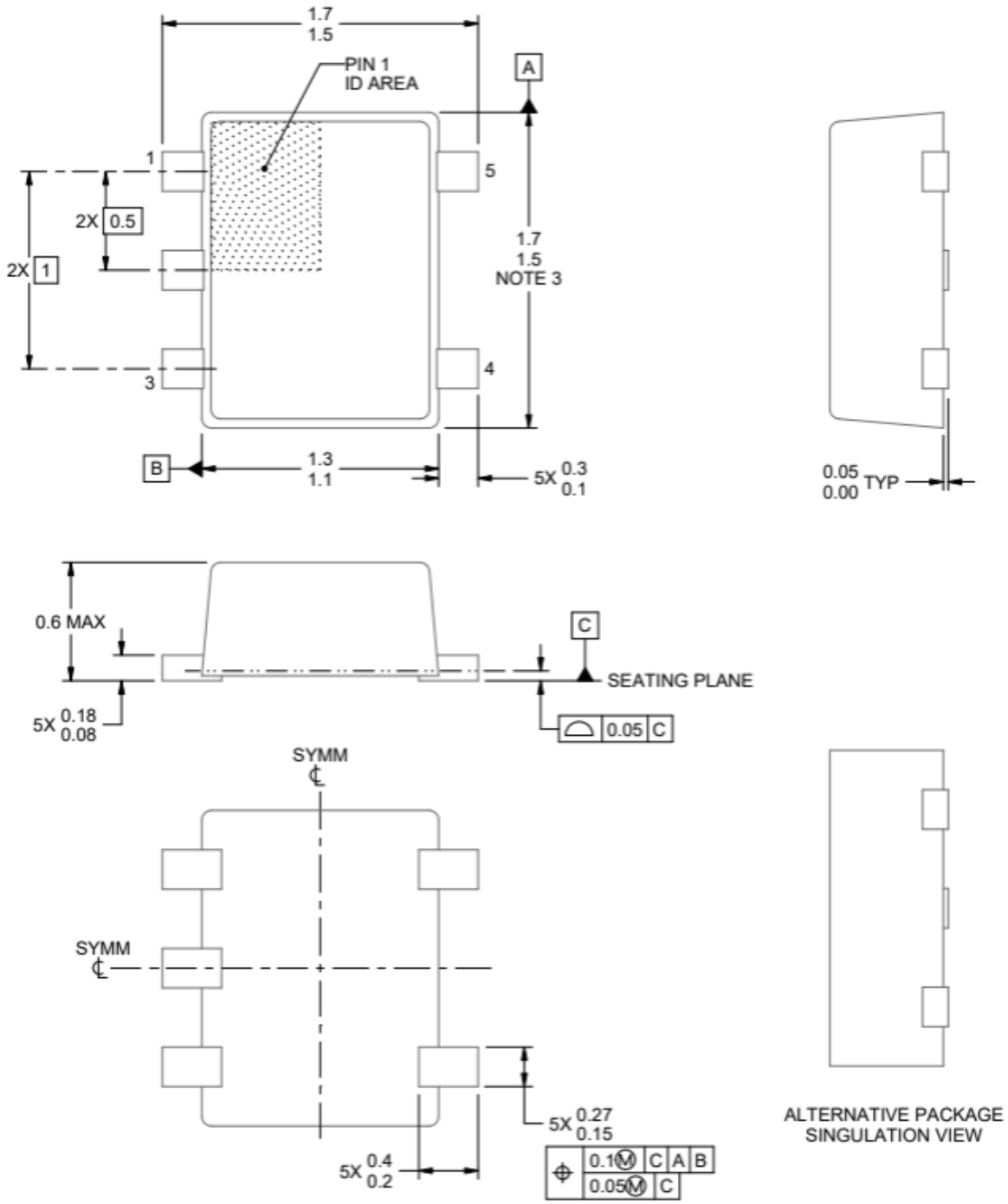
Symbol	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	-	1.45	0.035	-	0.057
A1	-	-	0.15	-	-	0.006
A2	0.90	-	1.30	0.035	-	0.051
b	0.35	-	0.50	0.014	-	0.020
c	0.09	-	0.20	0.004	-	0.008
D	2.80	-	3.05	0.110	-	0.120
E	1.50	-	1.75	0.059	-	0.069
e	-	0.95	-	-	0.037	-
H	2.60	-	3.00	0.102	-	0.118
L	0.10	-	0.60	0.004	-	0.024
θ	0 degrees	-	10 degrees	-	-	-

6.2 SC70

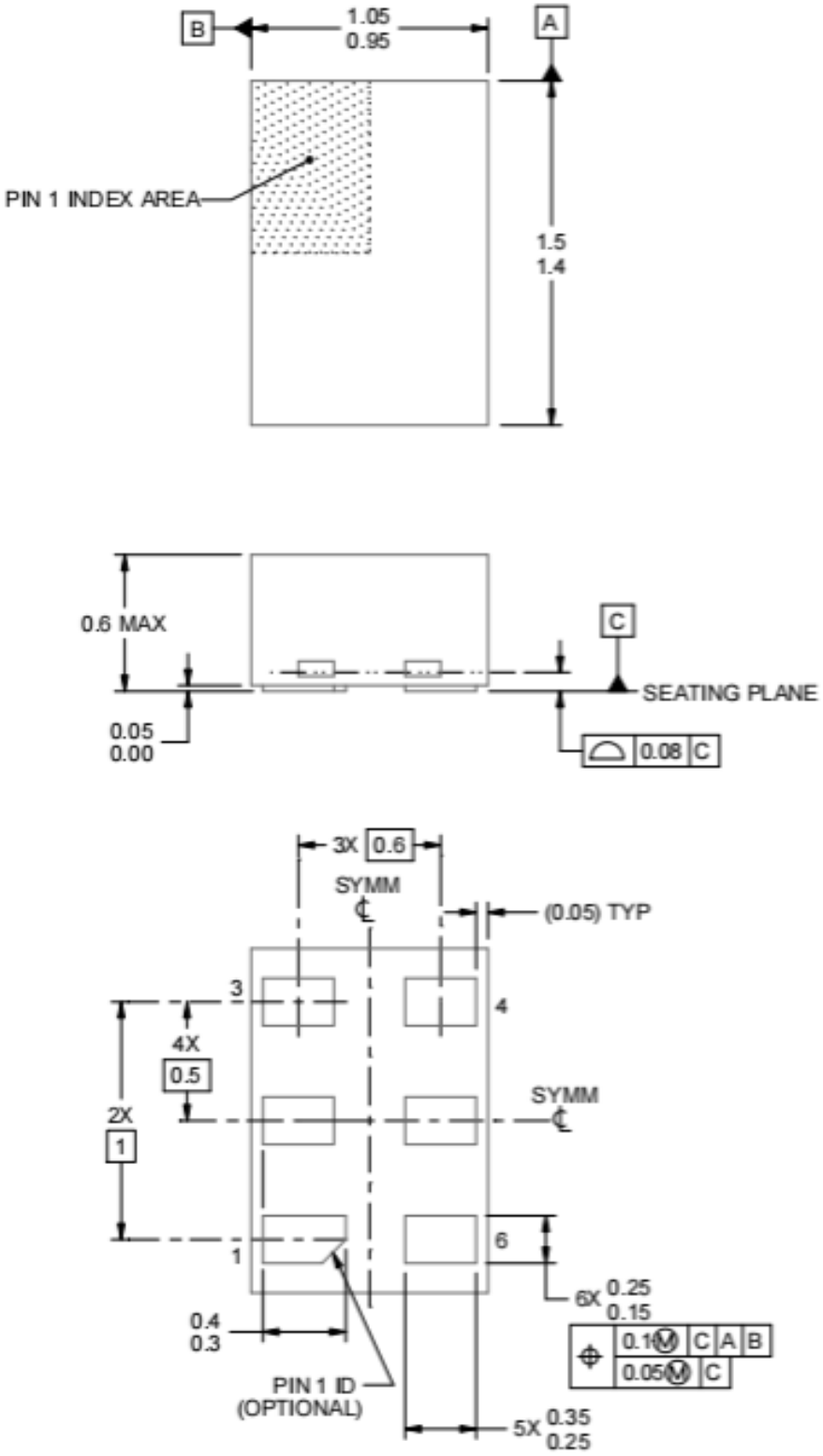


Symbol	Dim in mm		
	MIN	TYP	MAX
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.15	0.25	0.35
C	0.10	0.12	0.15
D	1.80	2.00	2.20
E	2.15	2.25	2.35
E1	1.15	1.25	1.35
e	0.650TYP.		
el	1.20	1.30	1.40
L	0.25	0.30	0.40
L2	0.15TYP.		
Y	0.00	0.05	0.10
θ	4°	8°	12°

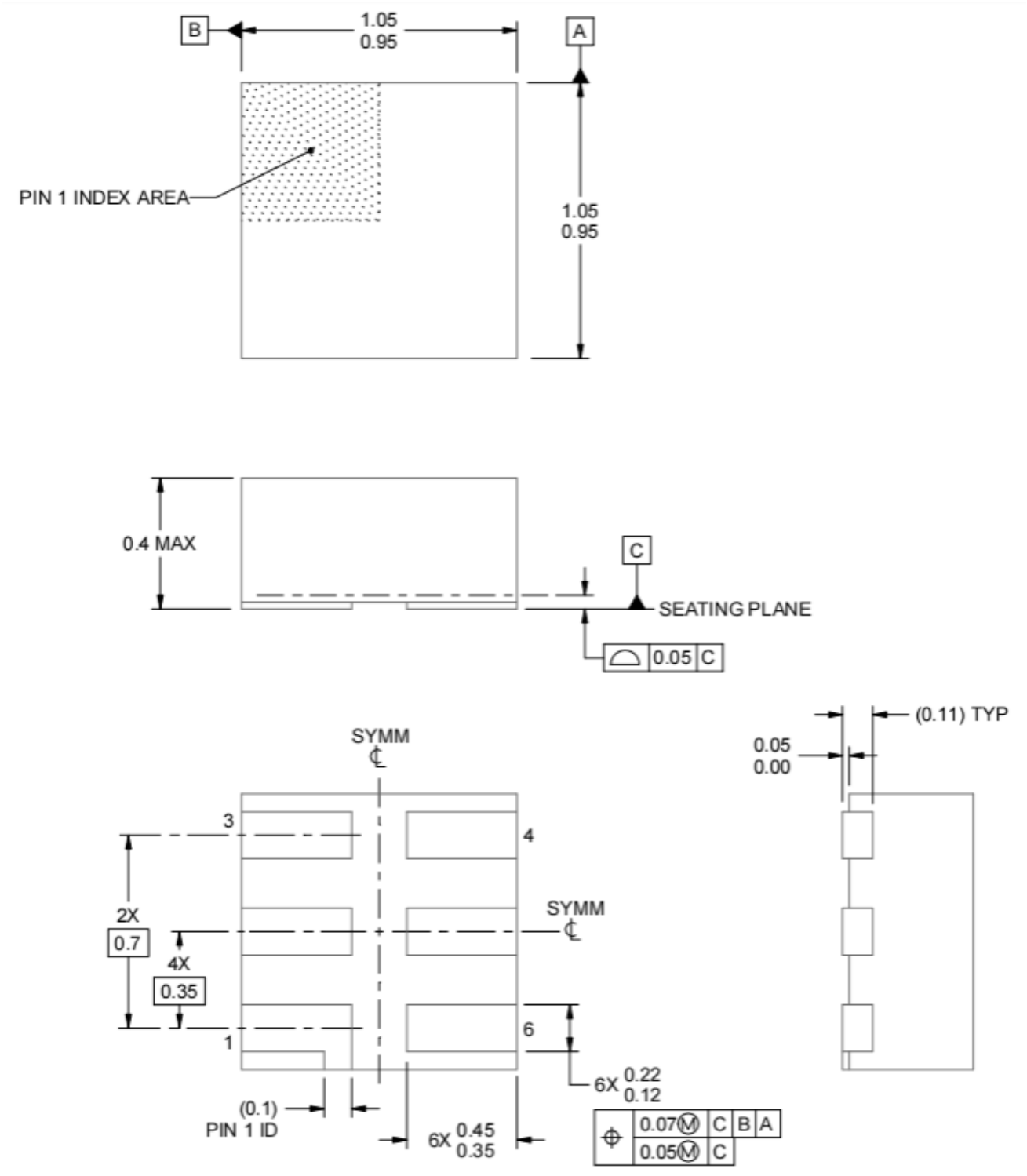
6.3 SOT5X3


1.7
1.5
PIN 1
ID AREA
A
1
5
2X 0.5
2X 1
1.7
1.5
NOTE 3
3
4
B
1.3
1.1
5X 0.3
0.1
0.05
0.00 TYP
0.6 MAX
C
SEATING PLANE
5X 0.18
0.08
0.05 C
SYMM
SYMM
5X 0.27
0.15
5X 0.4
0.2
0.1 M C A B
0.05 M C
ALTERNATIVE PACKAGE
SINGULATION VIEW

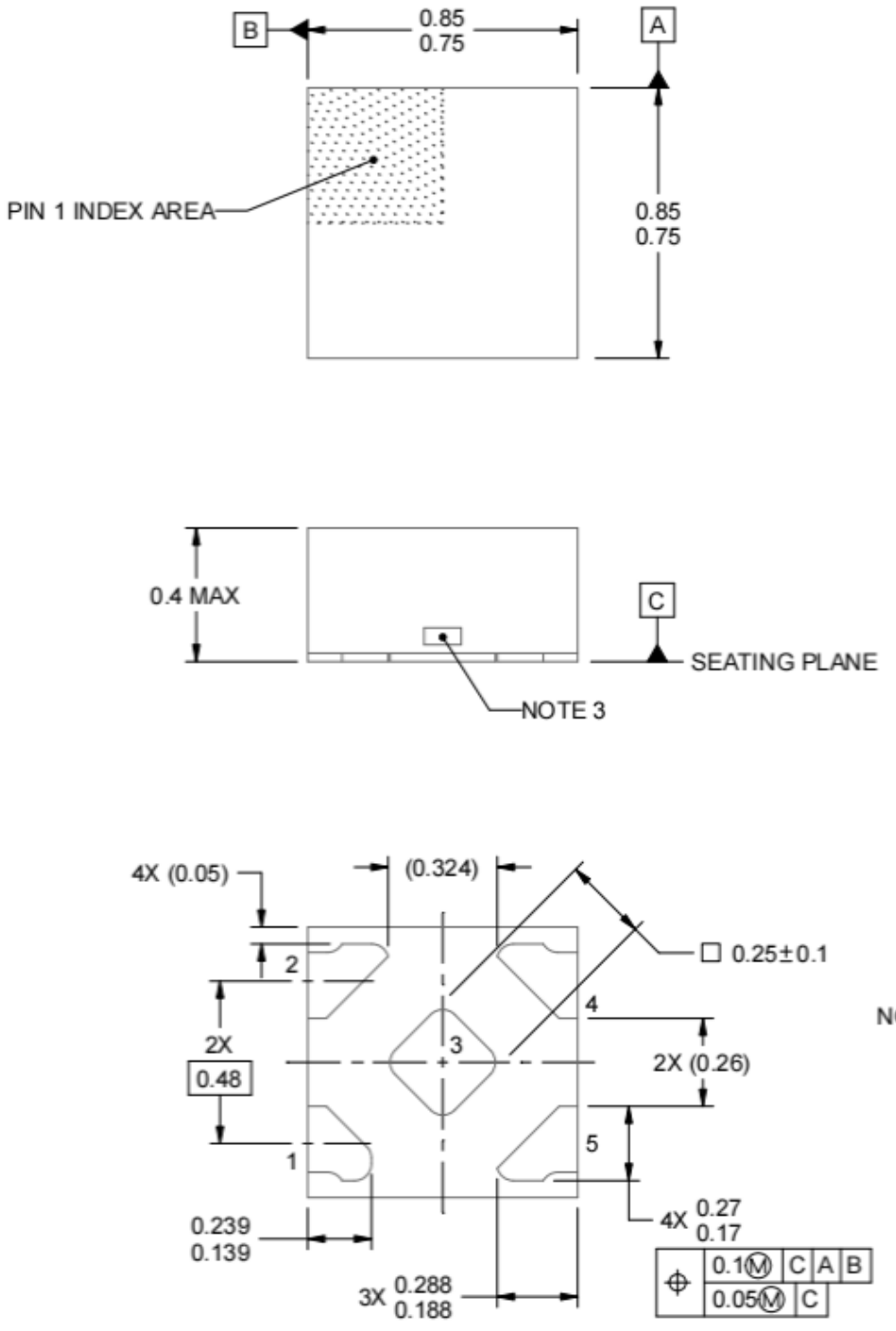
6.4 DFN(BD)-6


B
1.05
0.95
A
PIN 1 INDEX AREA
1.5
1.4
0.6 MAX
C
SEATING PLANE
0.05
0.00
0.08 C
3X 0.6
SYMM
(0.05) TYP
3
4
4X
0.5
SYMM
2X
1
1
6
6X 0.25
0.15
0.4
0.3
0.1 M C A B
0.05 M C
PIN 1 ID
(OPTIONAL)
5X 0.35
0.25
(0.127) TYP

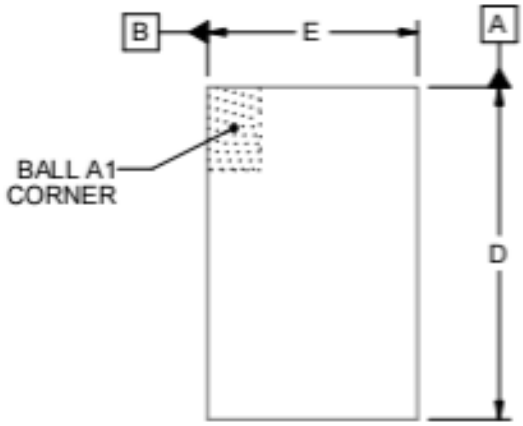
6.5 DFN(CD)-6

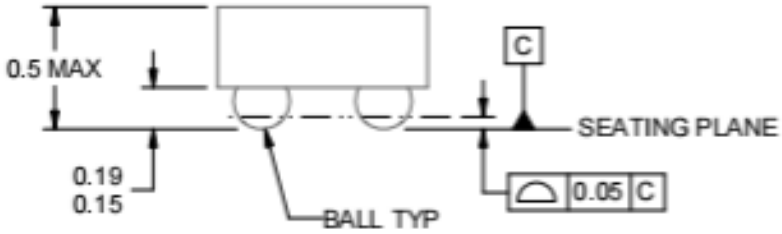

B
1.05
0.95
A
PIN 1 INDEX AREA
1.05
0.95
0.4 MAX
C
SEATING PLANE
0.05 C
SYMM
3
4
2X
0.7
4X
0.35
SYMM
1
6
6X 0.22
0.12
(0.1)
PIN 1 ID
6X 0.45
0.35
0.07 M C B A
0.05 M C
(0.11) TYP
0.05
0.00

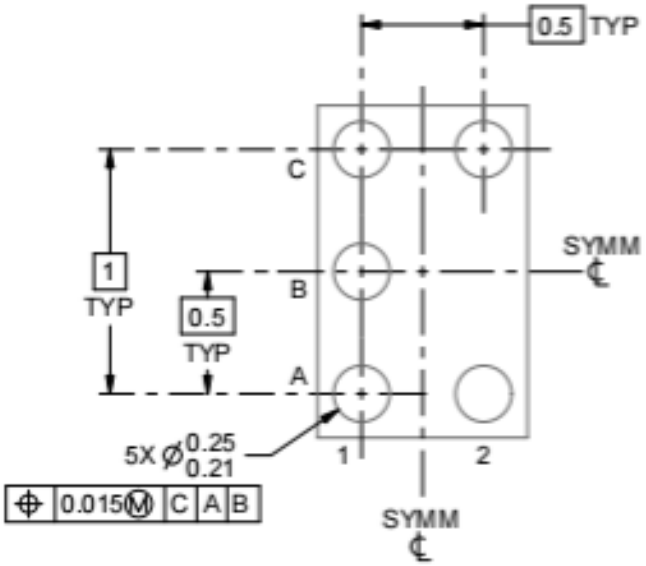
6.6 DFN5


B
0.85
0.75
A
PIN 1 INDEX AREA
0.85
0.75
0.4 MAX
C
SEATING PLANE
NOTE 3
4X (0.05)
(0.324)
0.25±0.1
2
2X
0.48
1
3
4
2X (0.26)
5
0.239
0.139
3X 0.288
0.188
4X 0.27
0.17
0.1 M C A B
0.05 M C
(0.1)
0.05
0.00
NOTE 3

6.7 DSBGA







D: Max = 1.418 mm, Min =1.358 mm

E: Max = 0.918 mm, Min =0.858 mm