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Understanding Embedded - CPLDs (Complex Programmable Logic Devices)

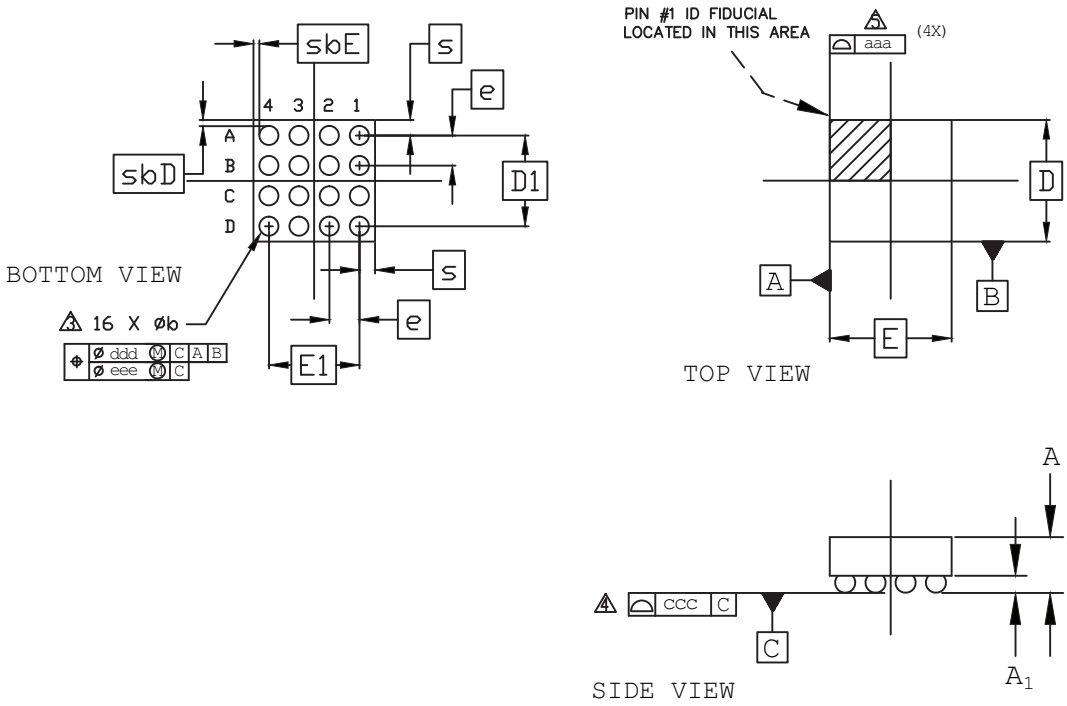
Embedded - CPLDs, or Complex Programmable Logic Devices, are highly versatile digital logic devices used in electronic systems. These programmable components are designed to perform complex logical operations and can be customized for specific applications. Unlike fixed-function ICs, CPLDs offer the flexibility to reprogram their configuration, making them an ideal choice for various embedded systems. They consist of a set of logic gates and programmable interconnects, allowing designers to implement complex logic circuits without needing custom hardware.

Applications of Embedded - CPLDs

Details	
Product Status	Obsolete
Programmable Type	In System Programmable
Delay Time tpd(1) Max	10 ns
Voltage Supply - Internal	3V ~ 3.6V
Number of Logic Elements/Blocks	8
Number of Macrocells	256
Number of Gates	12000
Number of I/O	144
Operating Temperature	0°C ~ 70°C (TA)
Mounting Type	Surface Mount
Package / Case	208-BFQFP
Supplier Device Package	208-PQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/isplsi-5256va-100lq208

16-Ball WLCS Package Option 2: iCE40 UltraLite™

Dimensions in Millimeters



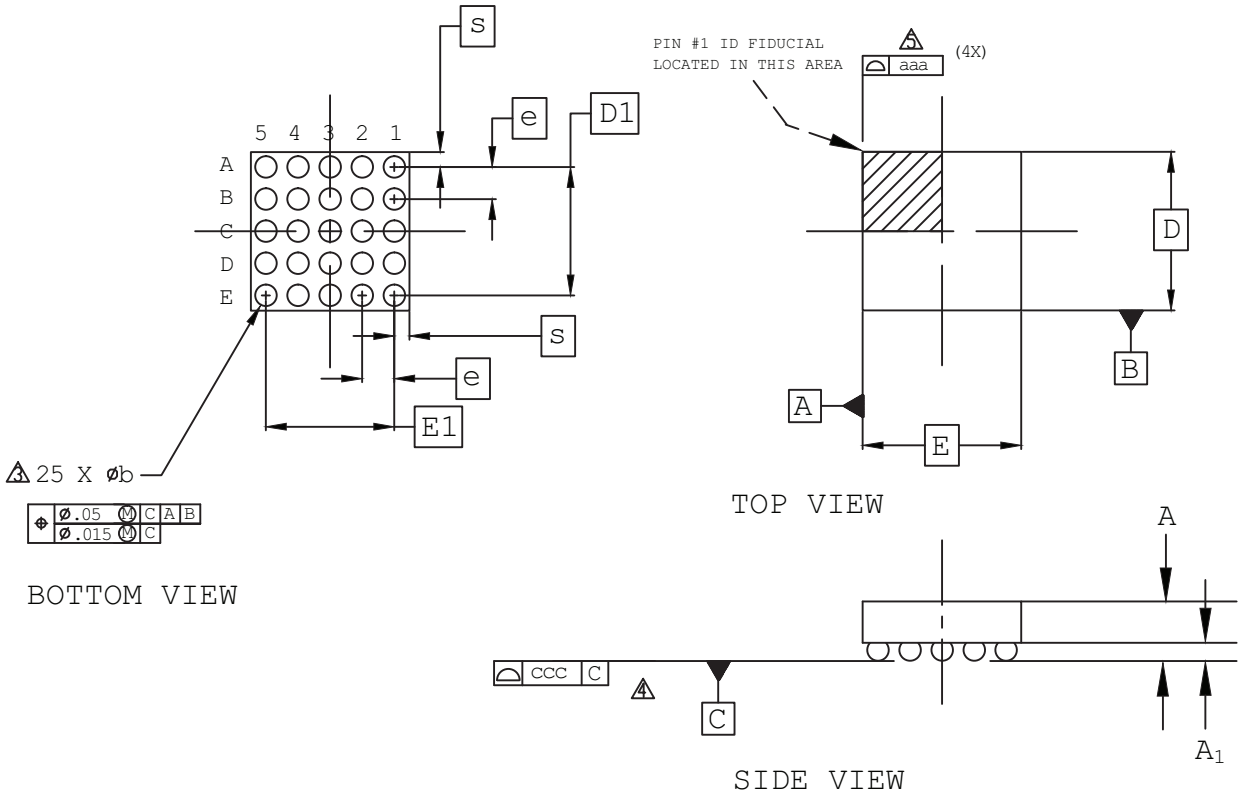
NOTES:

1. ALL DIMENSIONS AND TOLERANCE PER ASME Y 14.5M - 1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION "b" IS MEASURES AT THE MAXIMUM BUMP DIAMETER PARALLEL TO PRIMARY DATUM C.
4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BUMPS.
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

REF.	Min.	Nom.	Max.
A	0.413	0.452	0.491
A1	0.122	0.152	0.182
b	0.188	0.218	0.248
D	1.409 BSC		
E	1.409 BSC		
D1	1.05 BSC		
E1	1.05 BSC		
e	0.35 BSC		
s	-	0.180	-
sbD	0.067	0.071	0.072
sbE	0.067	0.071	0.072
aaa	0.03		
ccc	0.03		
ddd	0.050		
eee	0.015		

25-Ball WLCS Package (0.35 mm Pitch)

Dimensions in Millimeters



Notes:

1 ALL DIMENSIONS AND TOLERANCE PER ASME Y 14.5M - 1994.

2 ALL DIMENSIONS ARE IN MILLIMETERS.

3 DIMENSION "b" IS MEASURED AT THE MAXIMUM BUMP DIAMETER PARALLEL TO PRIMARY DATUM C.

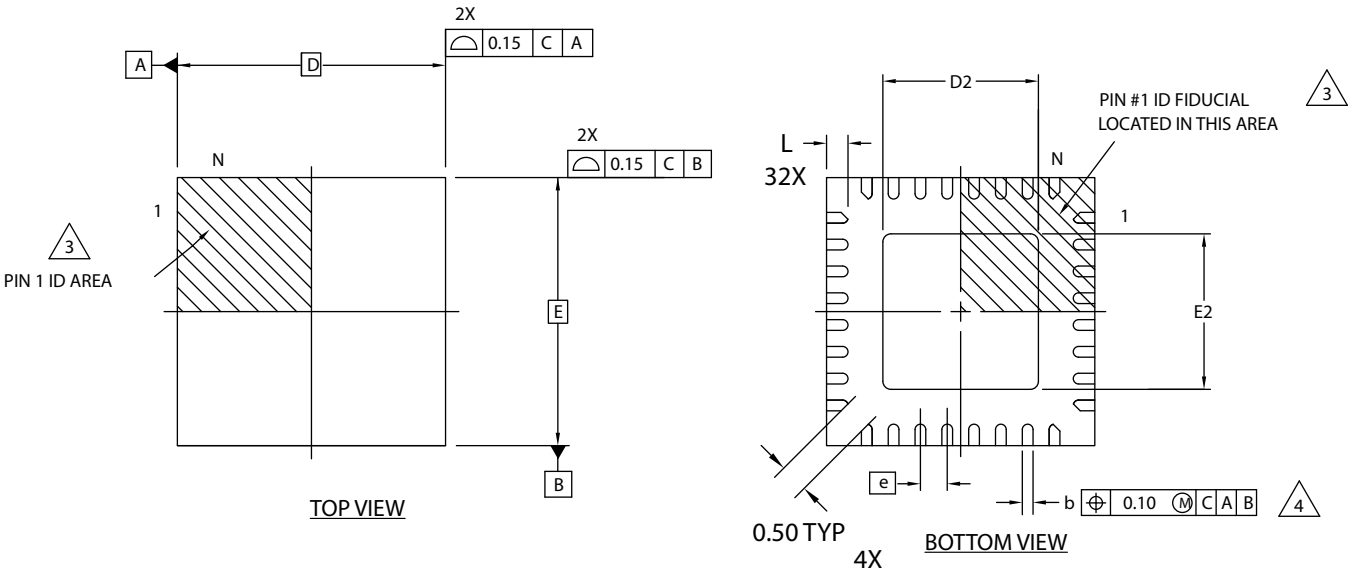
4 PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BUMPS.

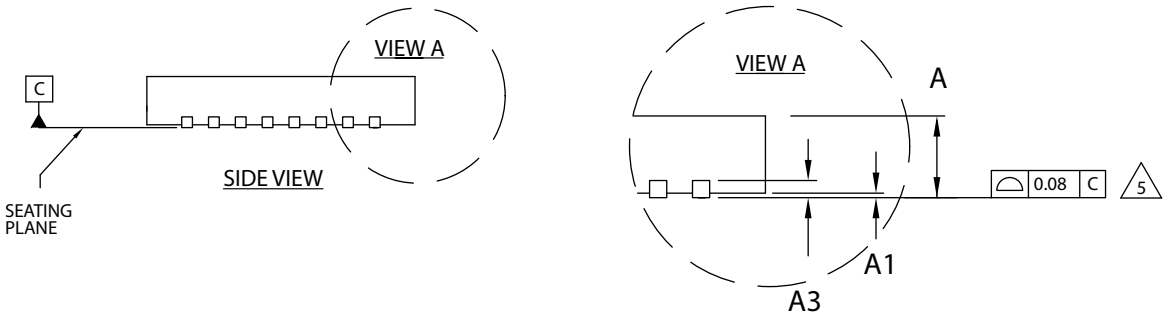
5 BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

REF.	Min.	Nom.	Max.
A	0.413	0.452	0.491
A1	0.122	0.152	0.182
b	0.188	0.218	0.248
D		1.71 BSC	
E		1.71 BSC	
D1		1.40 BSC	
E1		1.40 BSC	
e		0.35 BSC	
aaa		0.03	
ccc		0.03	
s	–	0.015	–

32-Pin QFN Package Option 1: Power Manager II, iCE40™

Dimensions in Millimeters





NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3 EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

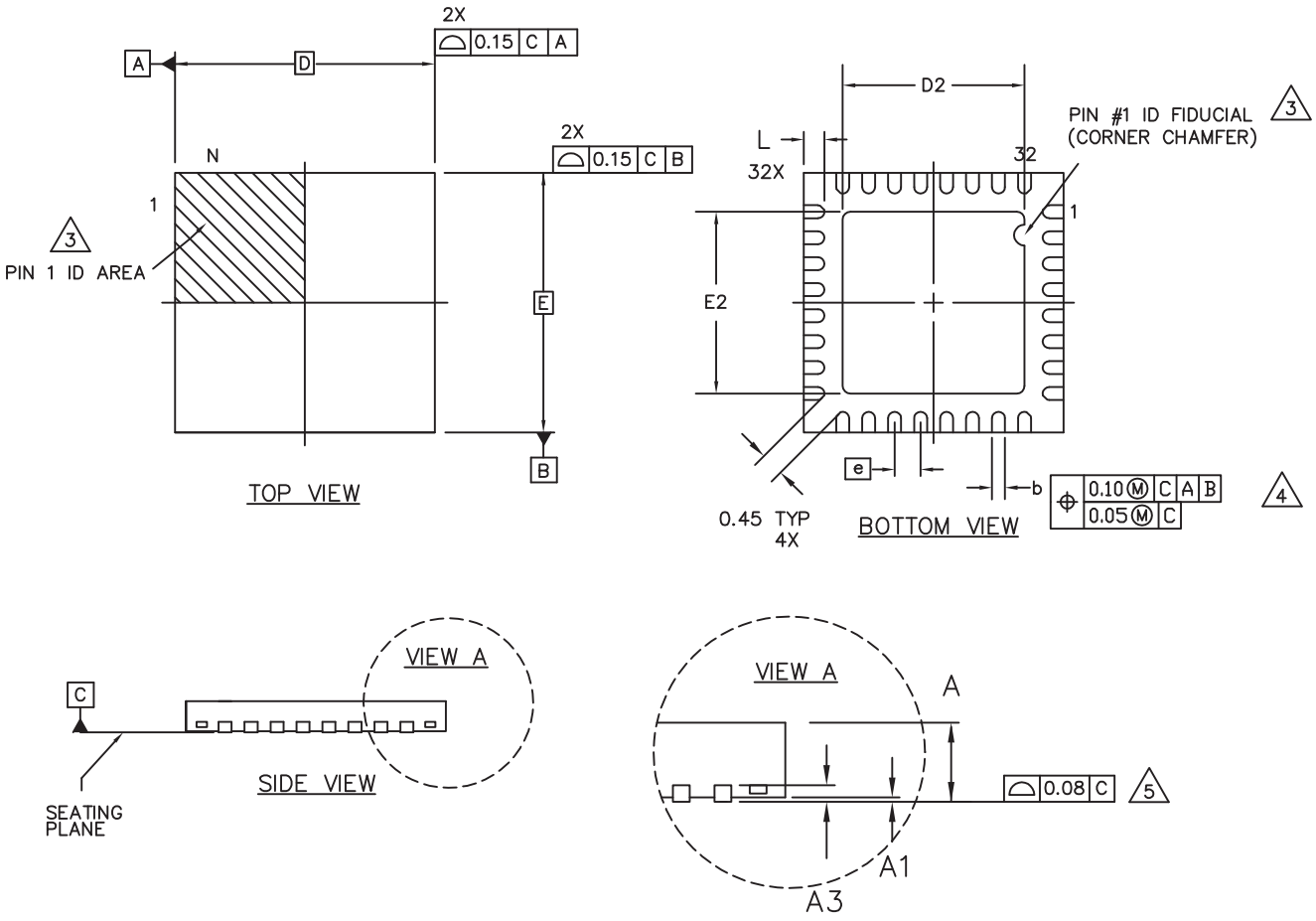
4 DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.

5 APPLIES TO EXPOSED PORTION OF TERMINALS.

SYMBOL	MIN.	NOM.	MAX.
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A3		0.2 REF	
D		5.0 BSC	
D2	1.25	2.70	3.75
E		5.0 BSC	
E2	1.25	2.70	3.75
b	0.18	0.24	0.30
e		0.50 BSC	
L	0.30	0.40	0.50

32-Pin QFN Package Option 3: MachXO2 SG32C

Dimensions in Millimeters



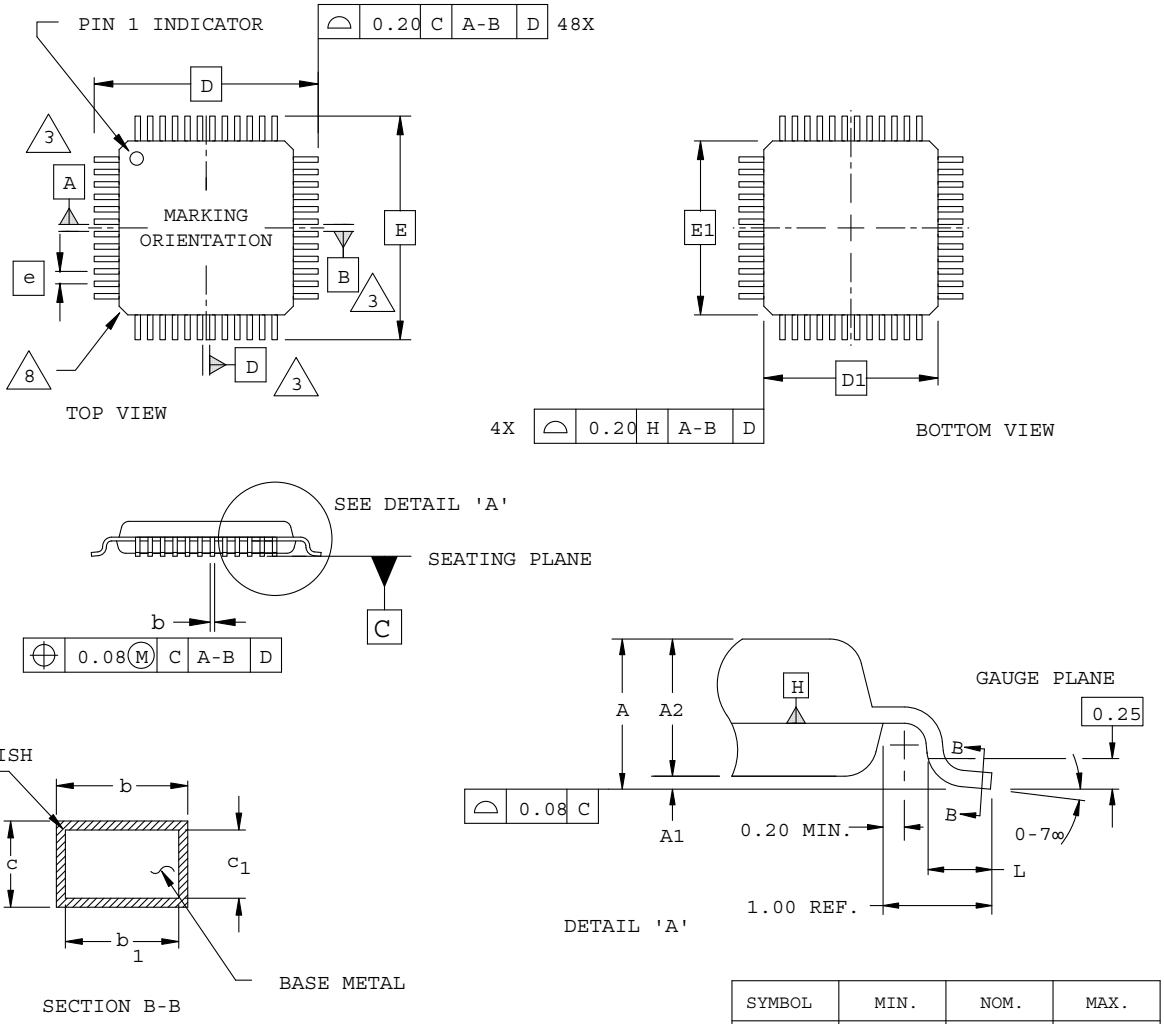
NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.
4. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.
5. APPLIES TO EXPOSED PORTION OF TERMINALS.
6. JEDEC REFERENCE MO-248 AND DR-4.2

SYMBOL	MIN.	NOM.	MAX.
A	0.50	0.55	0.65
A1	0.00	0.02	0.05
A3		0.2 REF	
D		5.0 BSC	
D2	3.40	3.50	3.60
E		5.0 BSC	
E2	3.40	3.50	3.60
b	0.18	0.25	0.30
e		0.50 BSC	
L	0.35	0.40	0.45

48-Pin TQFP Package (1.0 mm thick)

Dimensions in Millimeters



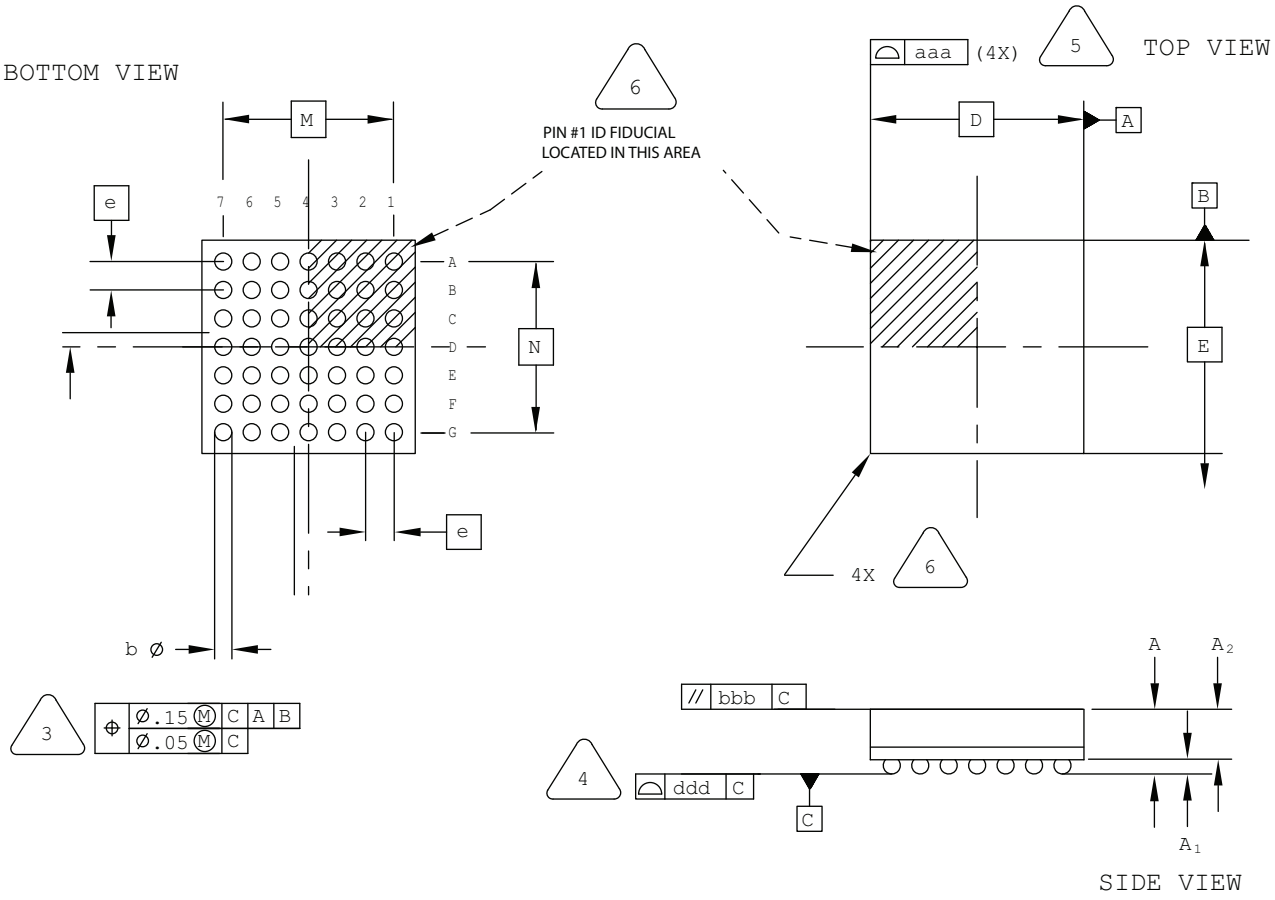
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1982.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
5. THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.
6. SECTION B-B:
   THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.
7. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
8. EXACT SHAPE OF EACH CORNER IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.20
A1	0.05	-	0.15
A2	.95	1.00	1.05
D		9.00 BSC	
D1		7.00 BSC	
E		9.00 BSC	
E1		7.00 BSC	
L	0.45	0.60	0.75
N		48	
e		0.50 BSC	
b	0.17	0.22	0.27
b1	0.17	0.20	0.23
c	0.09	0.15	0.20
c1	0.09	0.13	0.16

49-Ball ucBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

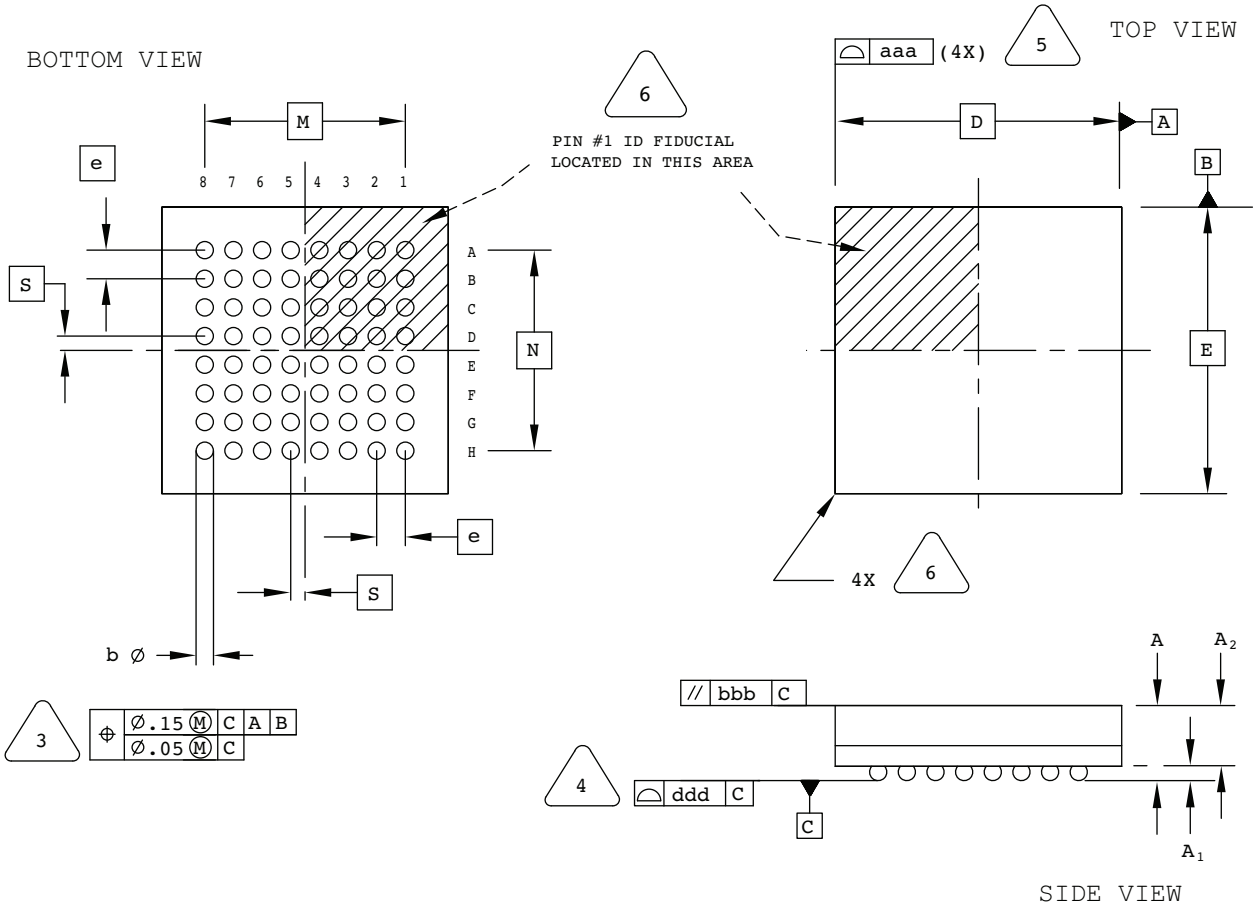
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.00
A1	0.10	-	-
A2	-	-	0.90
D/E	3.00 BSC		
M/N	2.40 BSC		
b	0.20	0.25	0.30
e	0.40 BSC		
aaa	-	-	0.10
bbb	-	-	0.10
ddd	-	-	0.10

64-Ball csBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

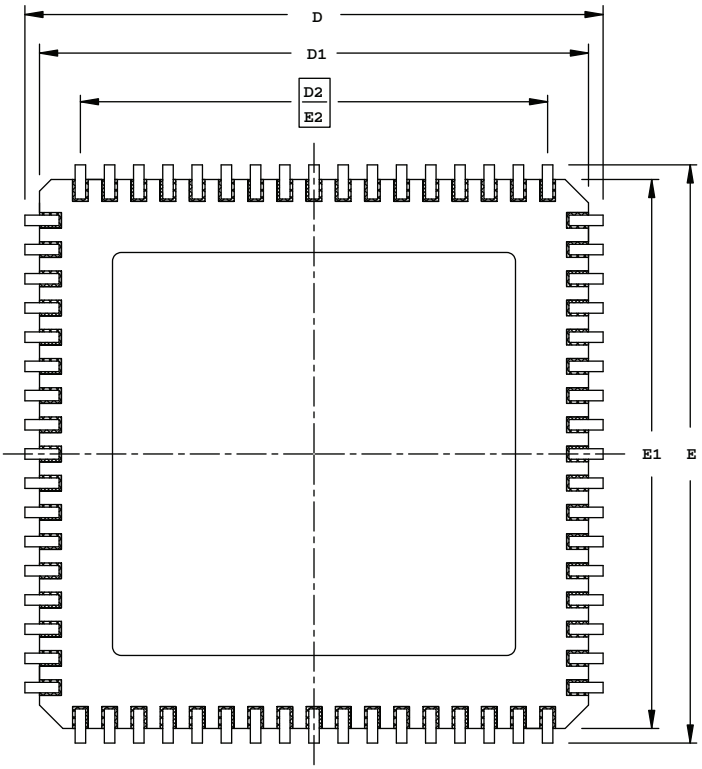
6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

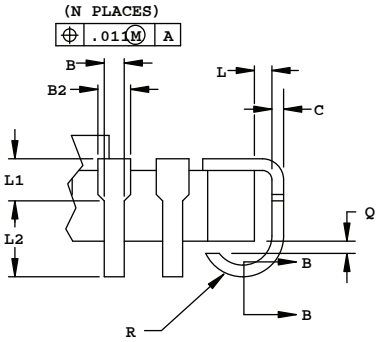
SYMBOL	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.15	–	–
A2	–	–	0.85
D/E	5.00 BSC		
M/N	3.50 BSC		
S	0.25 BSC		
b	0.25	0.30	0.35
e	0.50 BSC		
aaa	–	–	0.10
bbb	–	–	0.10
ddd	–	–	0.08

68-Pin JLCC Package

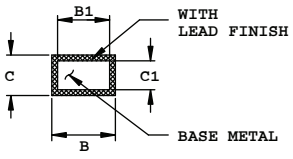
Dimensions in Inches

BOTTOM VIEW

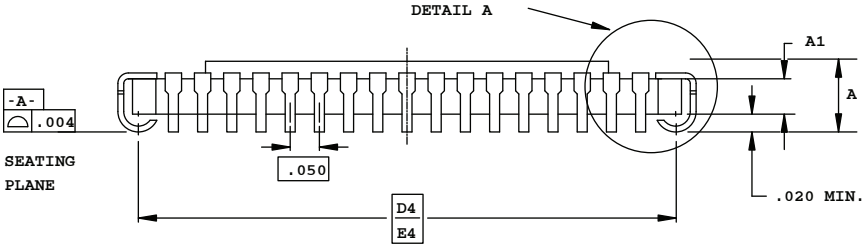




DETAIL A



SECTION B-B



SIDE VIEW

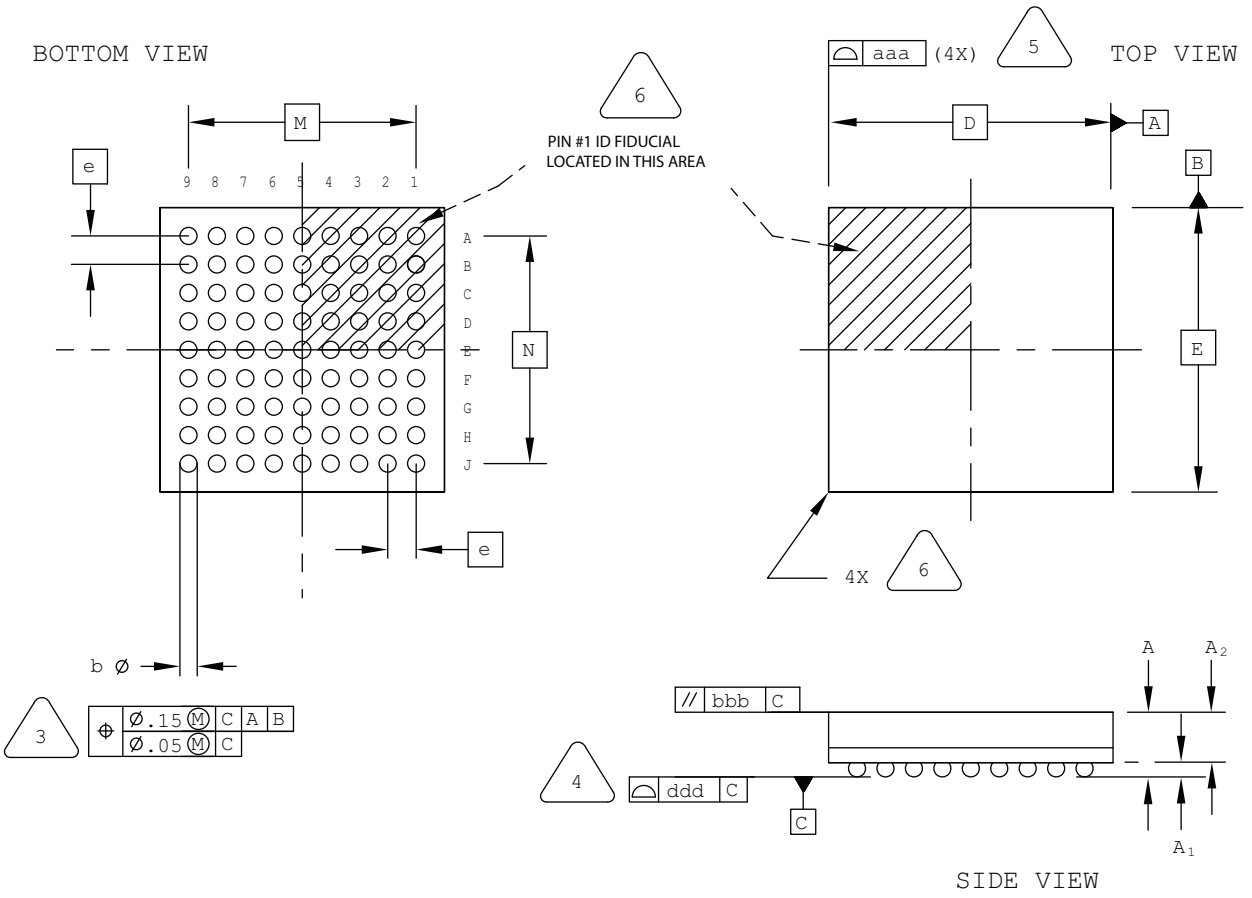
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M.
2. ALL DIMENSIONS ARE IN INCHES.
3. CORNER CHAMFERS AND/OR NOTCHES ARE OPTIONAL.

SYMBOL	INCHES		
	MIN.		MAX.
A	.115	-	.190
A1	.080 REF		
B	.013	-	.023
B1	.013	-	.020
B2	.022	-	.035
C	.007	-	.013
C1	.007	-	.010
D/E	.975	.990	1.000
D1/E1	.920	-	.960
D2/E2	.800 BSC		
D4/E4	.930 BSC		
L	.005	-	-
L1	.020	-	-
L2	.025	-	-
Q	.003	-	-
R	.020	-	.040
N	68		

81-Ball ucBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

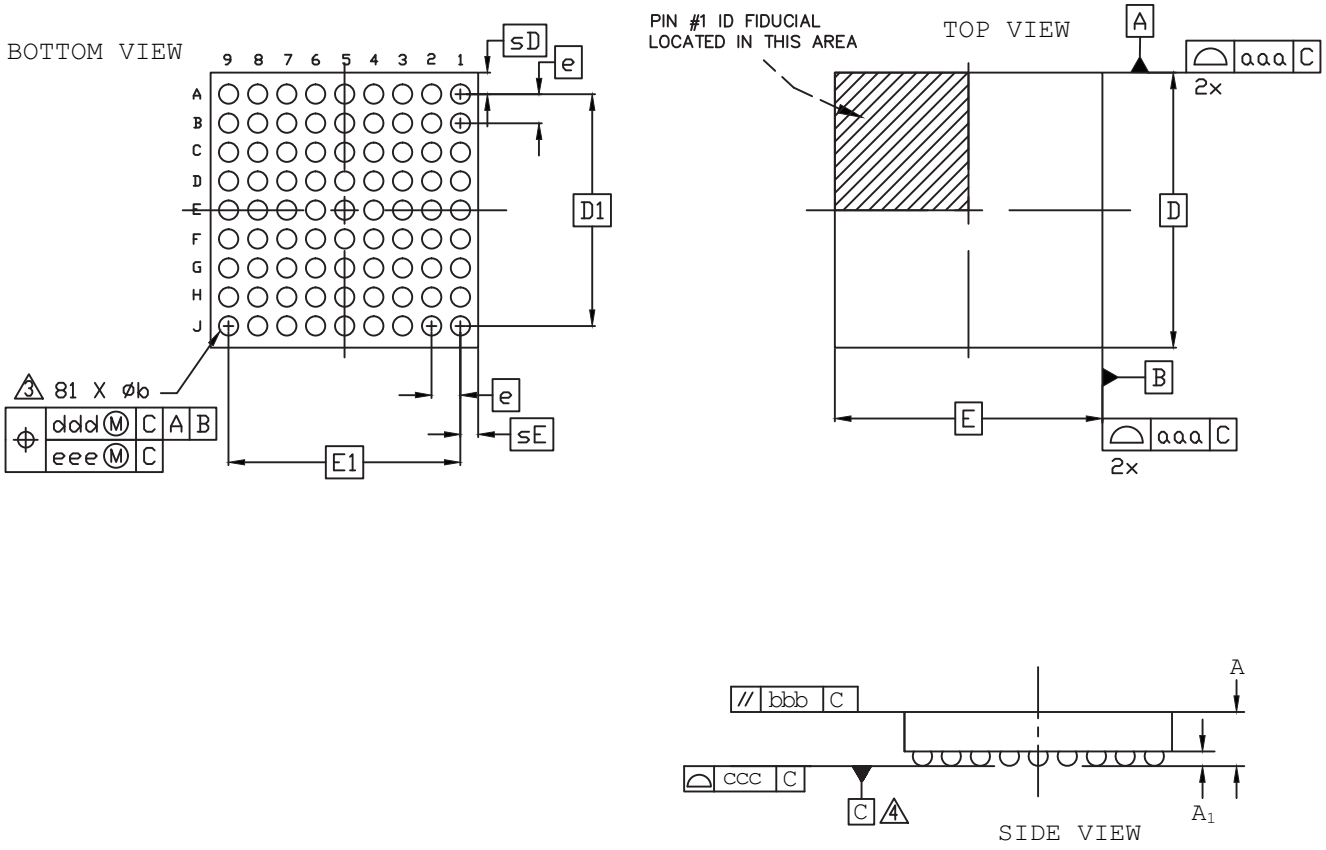
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.00
A1	0.10	-	-
A2	-	-	0.90
D/E	4.00 BSC		
M/N	3.20 BSC		
b	0.20	0.25	0.30
e	0.40 BSC		
aaa	-	-	0.10
bbb	-	-	0.10
ddd	-	-	0.10

81-Ball WLCS Package

Dimensions in Millimeters



Notes:

1 ALL DIMENSIONS AND TOLERANCE PER ASME Y 14.5M - 1994.

2 ALL DIMENSIONS ARE IN MILLIMETERS.

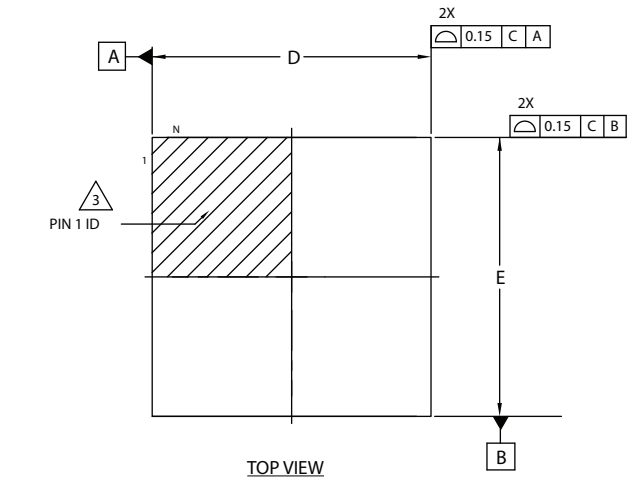
3 DIMENSION "b" IS MEASURED AT THE MAXIMUM BUMP DIAMETER PARALLEL TO PRIMARY DATUM C.

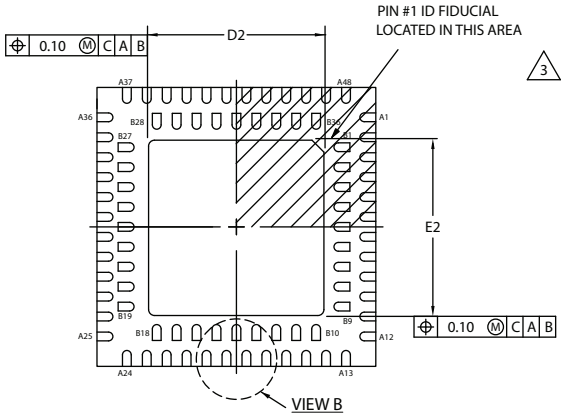
4 PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BUMPS.

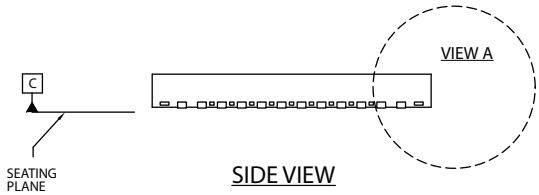
REF.	Min.	Nom.	Max.
A	0.510	0.543	0.567
A1	0.167	0.196	0.225
b	0.239	0.266	0.319
D		3.797 BSC	
E		3.693 BSC	
D1		3.20 BSC	
E1		3.20 BSC	
e		0.40 BSC	
sD	-	0.299	-
sE	-	0.247	-
aaa		0.025	
bbb		0.060	
ccc		0.030	
ddd		0.015	
eee		0.050	

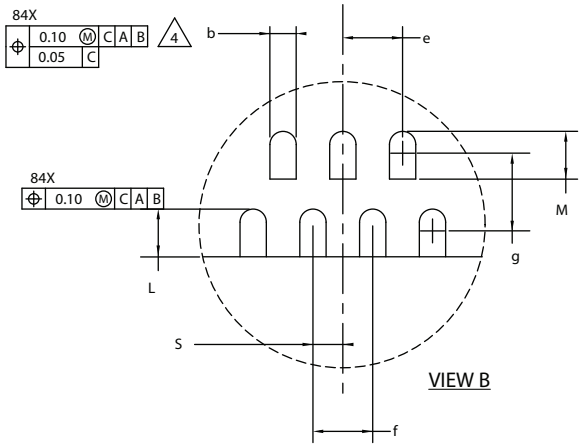
84-Pin QFN Package

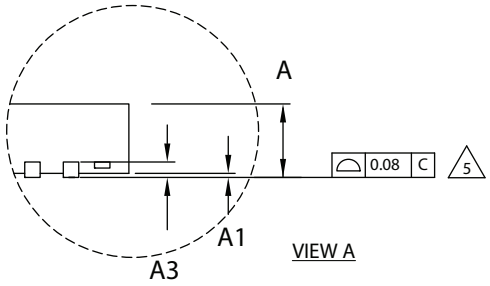
Dimensions in Millimeters











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3 EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

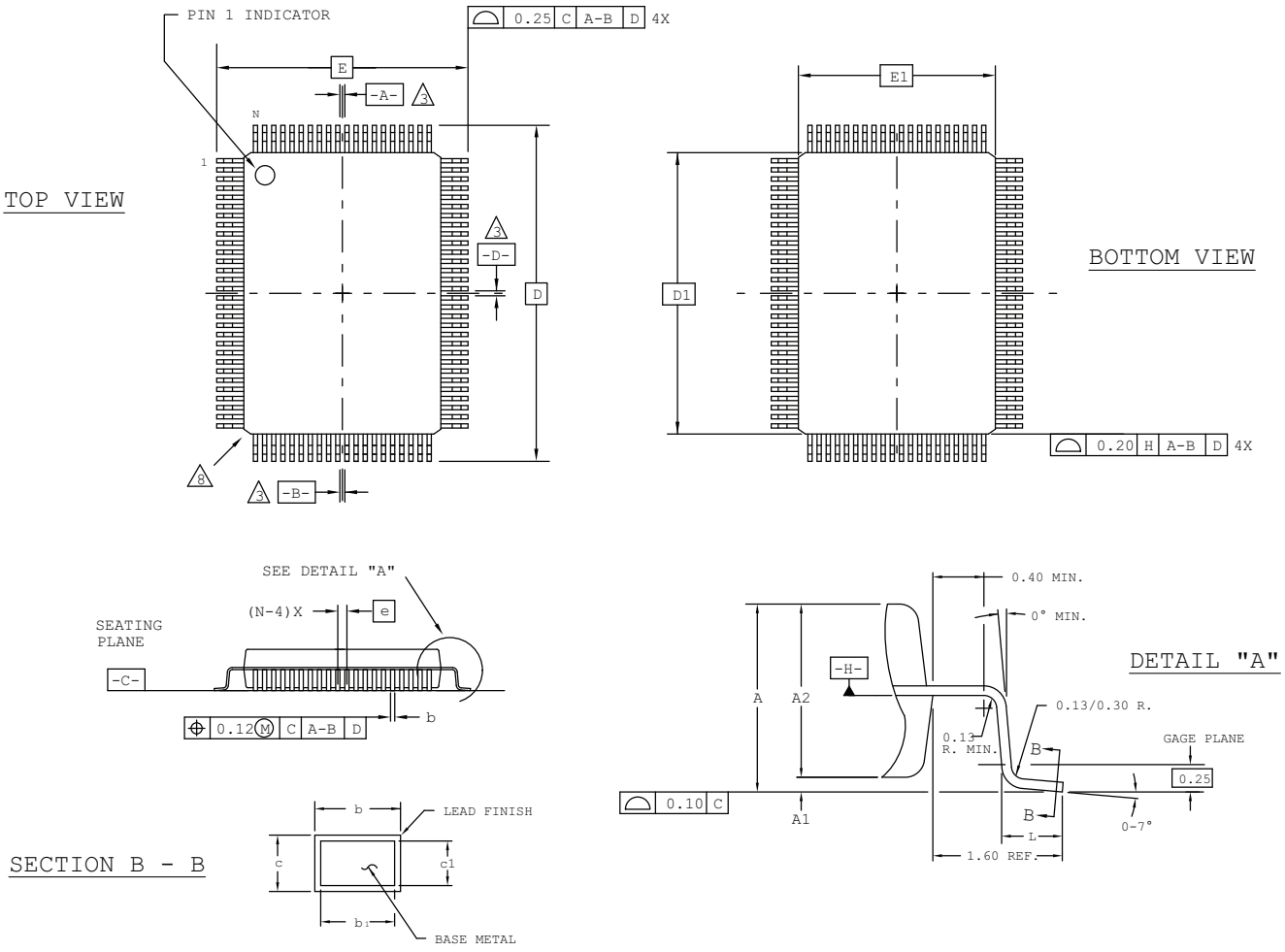
4 DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.

5 APPLIES TO EXPOSED PORTION OF TERMINALS.

SYMBOL	MIN.	NOM.	MAX.
A	0.75	0.85	0.95
A1	0.00	0.02	0.05
A3	0.15 REF		
D	7.0 BSC		
D2	4.30	-	4.50
E	7.0 BSC		
E2	4.30	-	4.50
b	0.17	0.22	0.27
e	0.50 BSC		
f	0.50 BSC		
g	0.65 BSC		
S	0.25 BSC		
L	0.30	0.40	0.50
M	0.30	0.40	0.50

100-Pin PQFP Package

Dimensions in Millimeters



NOTES:

1.0 DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1982.

2.0 ALL DIMENSIONS ARE IN MILLIMETERS.

3 DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.

4.0 DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.

5.0 THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.

6.0 SECTION B-B:
THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

7.0 A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

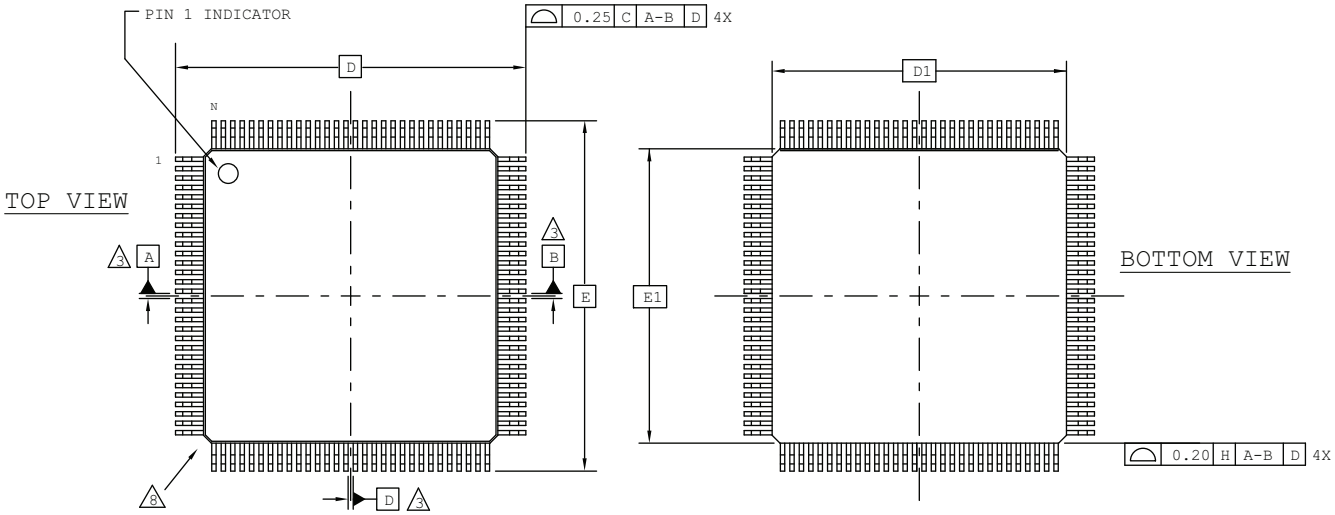
8 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

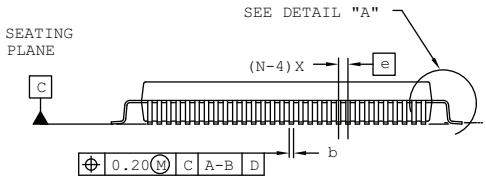
9 EXACT SHAPE OF EXPOSED HEATSINK IS OPTIONAL.

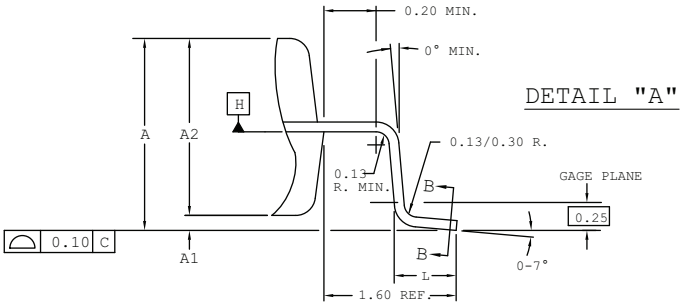
SYMBOL	MIN.	NOM.	MAX.
A	-	-	3.40
A1	0.25	-	0.50
A2	2.50	2.70	2.90
D		23.20 BSC	
D1		20.00 BSC	
E		17.20 BSC	
E1		14.00 BSC	
L	0.73	0.88	1.03
N		100	
e		0.65 BSC	
b	0.22	-	0.40
b1	0.22	0.30	0.36
c	0.11	-	0.23
c1	0.11	0.15	0.19

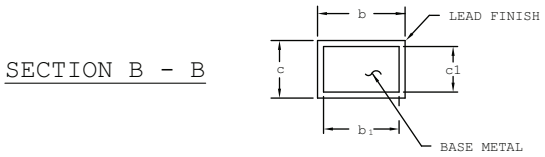
120-Pin PQFP Package

Dimensions in Millimeters









NOTES:

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2.0 ALL DIMENSIONS ARE IN MILLIMETERS.

3 DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.

4.0 DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.

5.0 THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.

6.0 SECTION B-B:
THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

7.0 A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

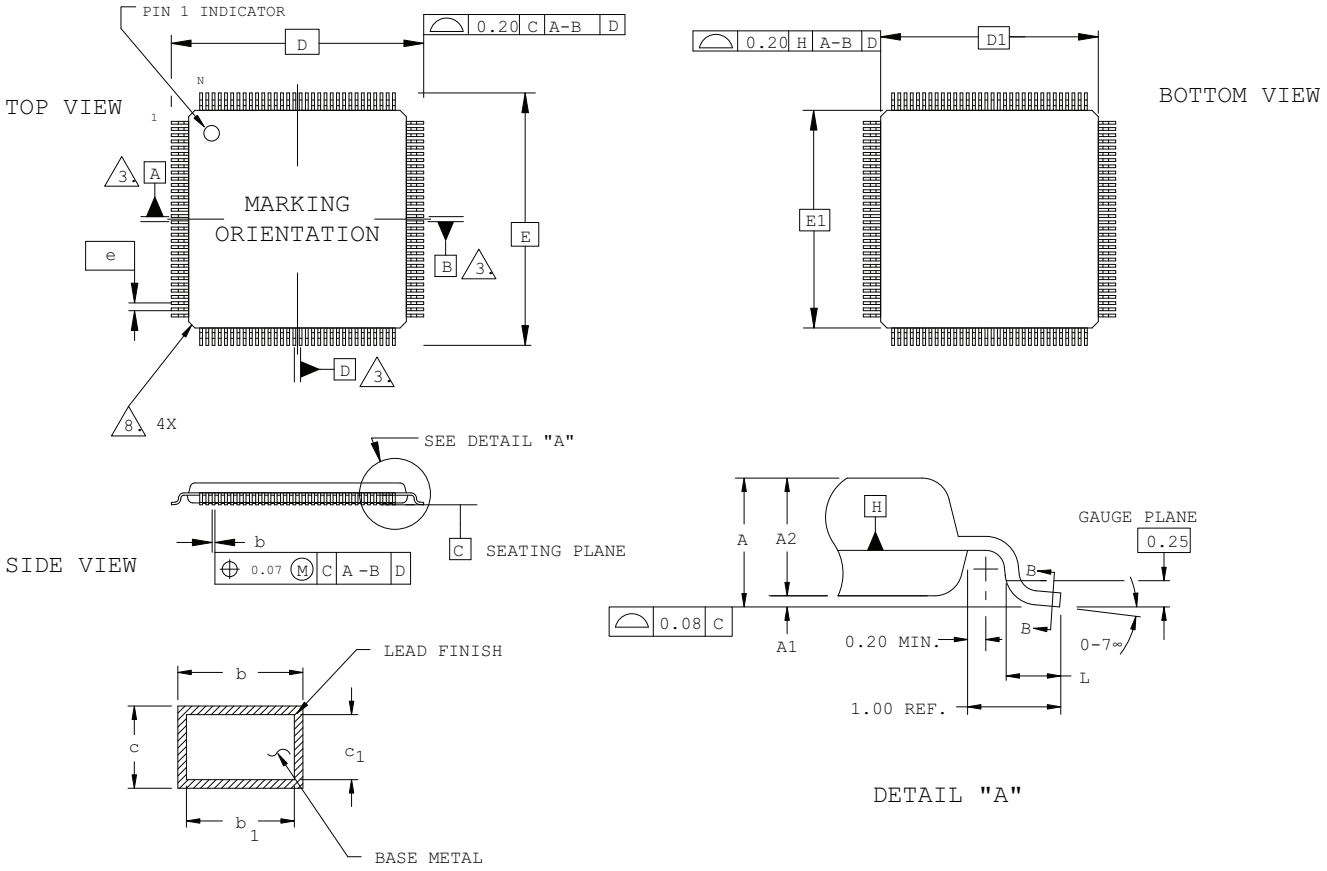
8 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

9 EXACT SHAPE OF EXPOSED HEATSINK IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	4.10
A1	0.25	-	0.50
A2	3.20	3.40	3.60
D	31.20 BSC		
D1	28.00 BSC		
E	31.20 BSC		
E1	28.00 BSC		
L	0.73	0.88	1.03
N	120		
e	0.80 BSC		
b	0.29	-	0.45
b1	0.29	0.35	0.41
c	0.11	-	0.23
c1	0.11	0.15	0.19

128-Pin TQFP Package

Dimensions in Millimeters



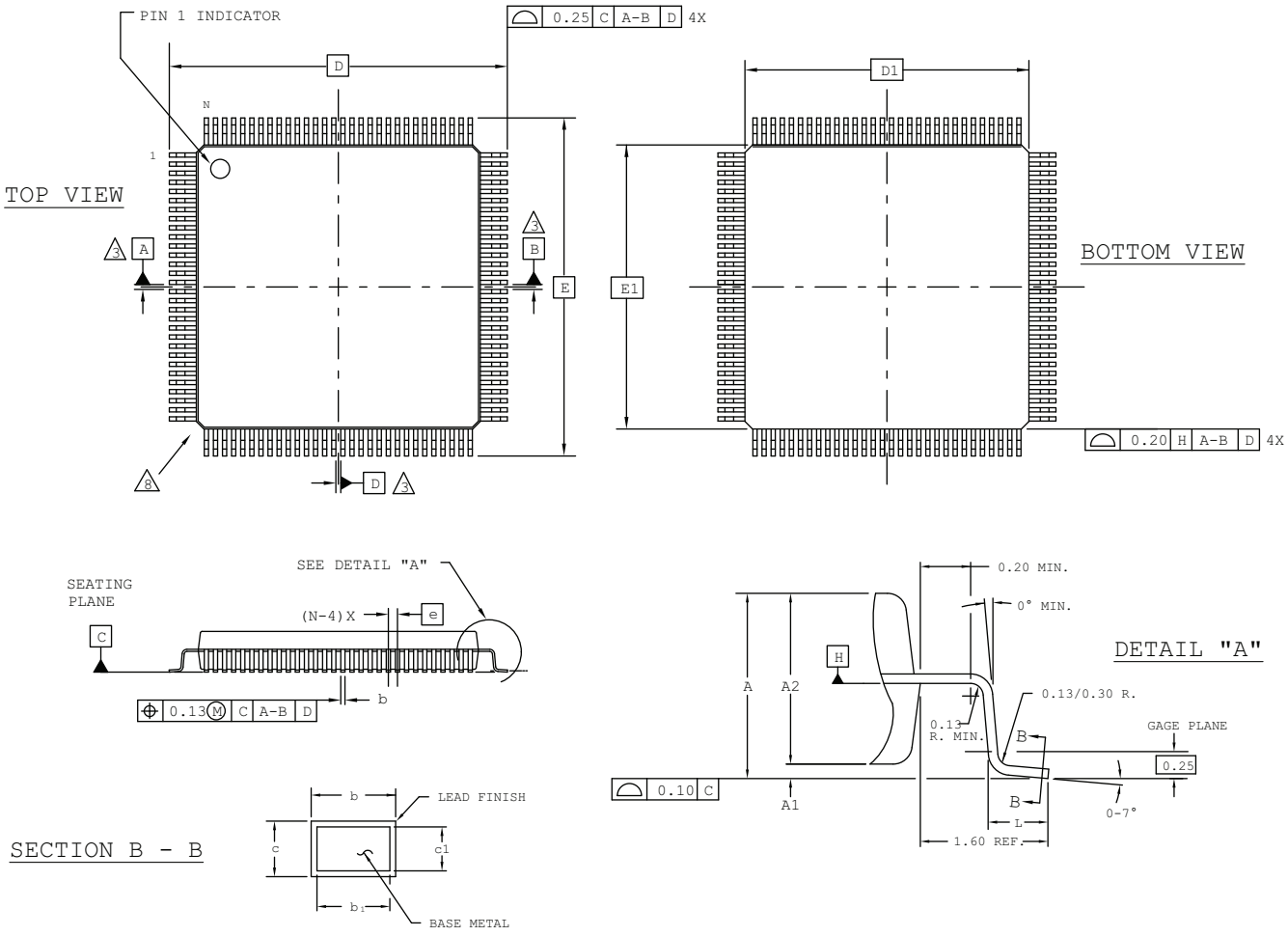
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1982.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
5. THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.
6. SECTION B-B:
   THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.
7. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
8. EXACT SHAPE OF EACH CORNER IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.60
A1	0.05	-	0.15
A2	1.35	1.40	1.45
D		16.00 BSC	
D1		14.00 BSC	
E		16.00 BSC	
E1		14.00 BSC	
L	0.45	0.60	0.75
N		128	
e		0.40 BSC	
b	0.13	0.18	0.23
b1	0.13	0.16	0.19
c	0.09	0.15	0.20
c1	0.09	0.13	0.16

160-Pin PQFP Package

Dimensions in Millimeters



NOTES:

1.0 DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1982.

2.0 ALL DIMENSIONS ARE IN MILLIMETERS.

3 DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.

4.0 DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.

5.0 THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.

6.0 SECTION B-B:
THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

7.0 A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

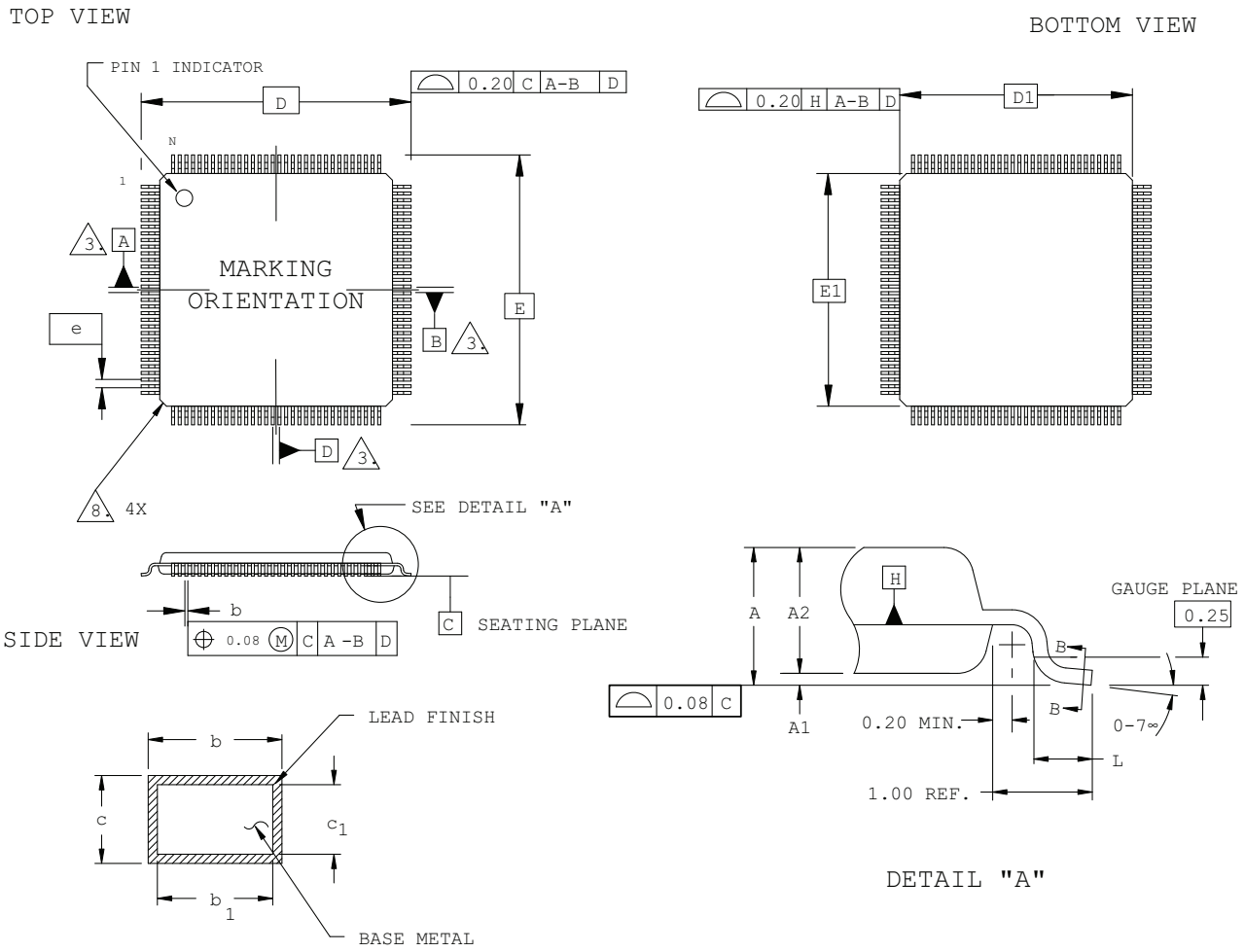
8 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

9 EXACT SHAPE OF EXPOSED HEATSINK IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	4.10
A1	0.25	-	0.50
A2	3.20	3.40	3.60
D		31.20 BSC	
D1		28.00 BSC	
E		31.20 BSC	
E1		28.00 BSC	
L	0.73	0.88	1.03
N		160	
e		0.65 BSC	
b	0.22	-	0.40
b1	0.22	0.30	0.36
c	0.11	-	0.23
c1	0.11	0.15	0.19

176-Pin TQFP Package

Dimensions in Millimeters



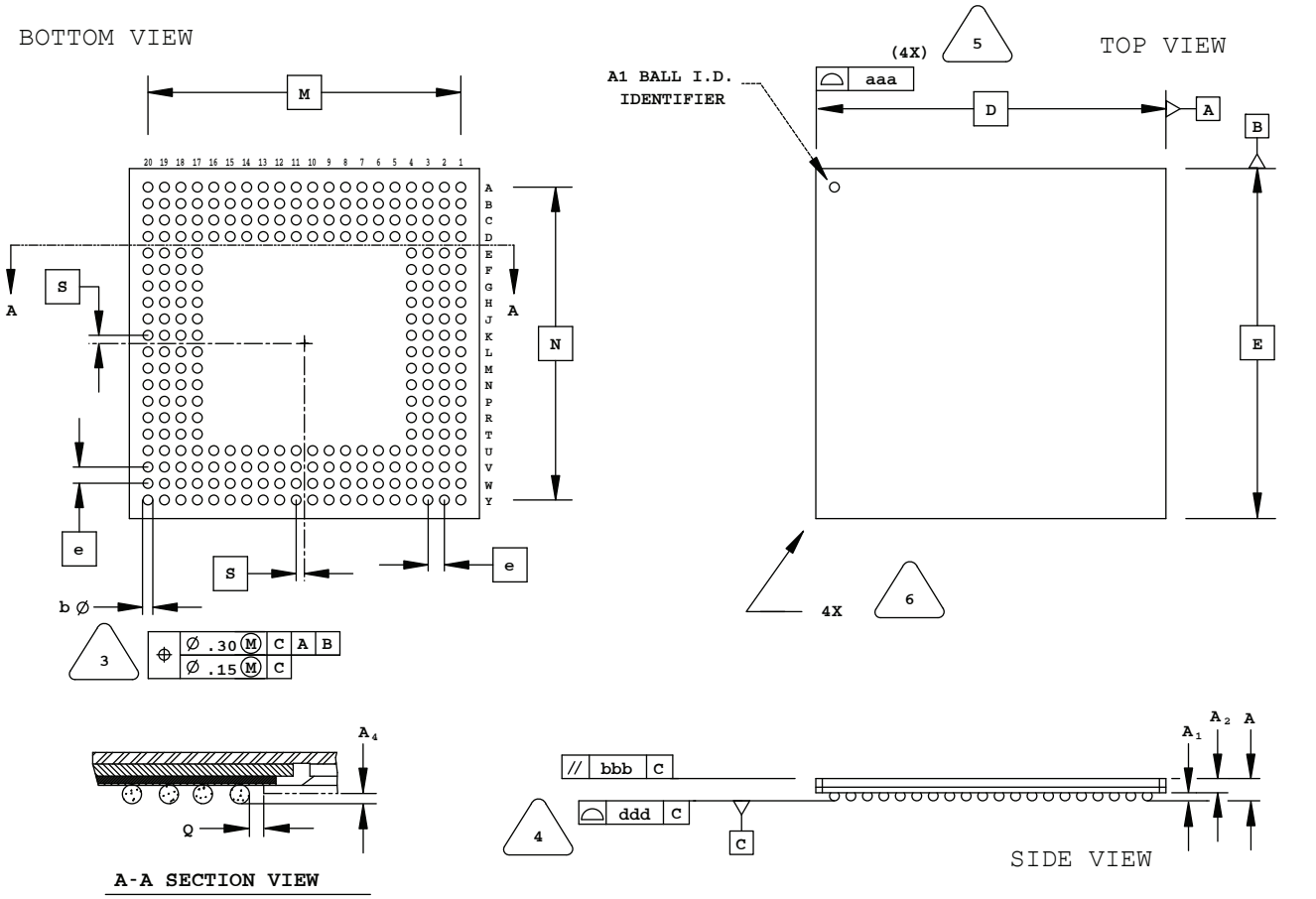
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1982.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
5. THE TOP OF PACKAGE MAY BE SMALLER THAN THE BOTTOM OF THE PACKAGE BY 0.15 MM.
6. SECTION B-B:
   THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.
7. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
8. EXACT SHAPE OF EACH CORNER IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.60
A1	0.05	-	0.15
A2	1.35	1.40	1.45
D		26.00 BSC	
D1		24.00 BSC	
E		26.00 BSC	
E1		24.00 BSC	
L	0.45	0.60	0.75
N		176	
e		0.50 BSC	
b	0.17	0.22	0.27
b1	0.17	0.20	0.23
c	0.09	0.15	0.20
c1	0.09	0.13	0.16

256-Ball SBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

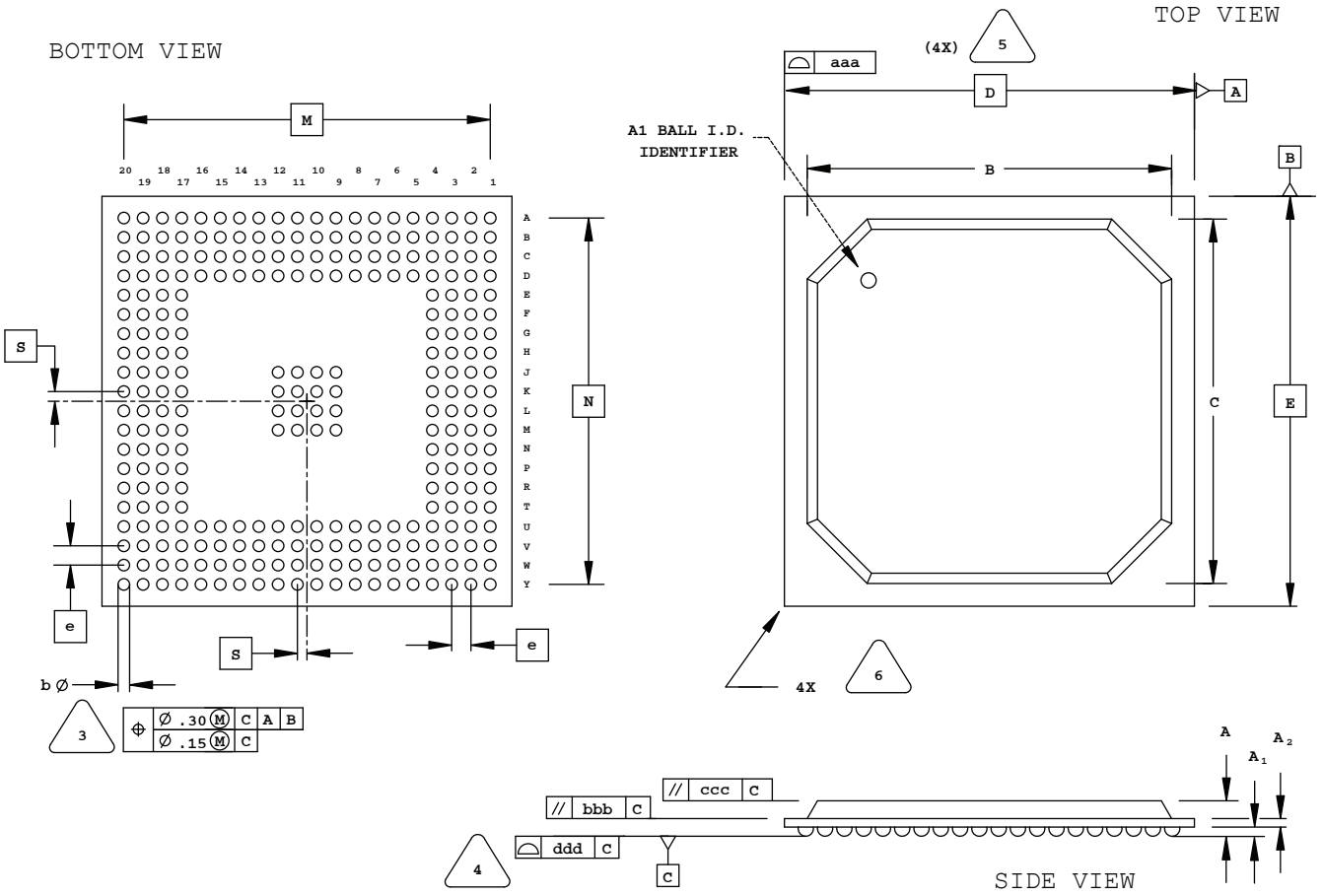
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	-	-	1.70
A1	0.50	0.65	0.80
A2	0.80	0.90	1.00
D/E	27.00 BSC		
M/N	24.13 BSC		
S	0.635 BSC		
b	0.60	0.75	0.90
e	1.27 BSC		
Q	0.25	-	-
A4	0.10	-	-
aaa	-	-	0.20
bbb	-	-	0.25
ddd	-	-	0.20

272-Ball BGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

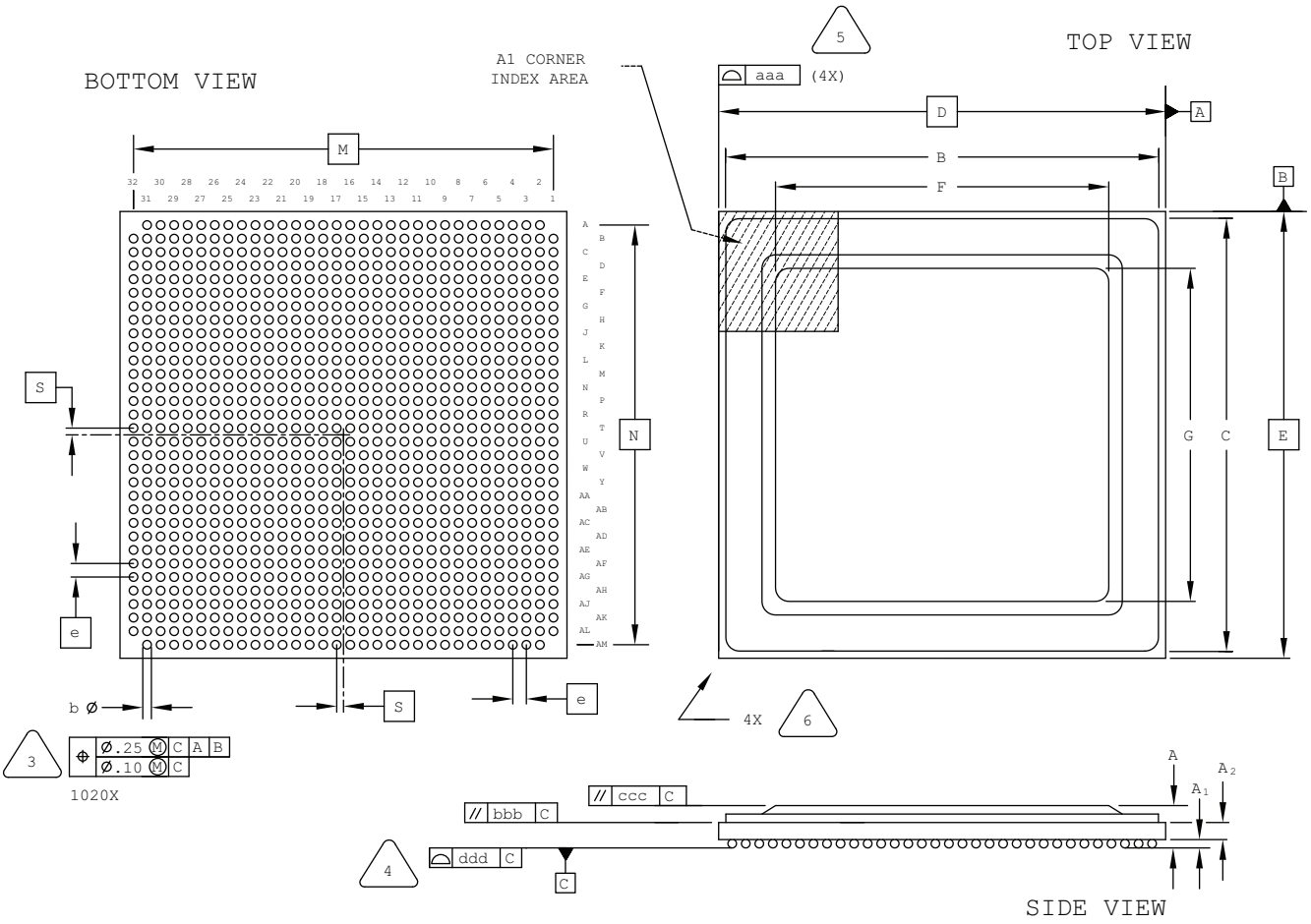
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	1.90	2.25	2.80
A1	0.50	0.65	0.80
A2	0.28	0.54	0.80
B/C	23.80	24.30	24.80
D/E	27.00 BSC		
M/N	24.13 BSC		
S	0.635 BSC		
b	0.60	0.75	0.90
e	1.27 BSC		
aaa	-	-	0.20
bbb	-	-	0.25
ccc	-	-	0.35
ddd	-	-	0.20

1020-Ball Organic fcBGA Package Rev. 2

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

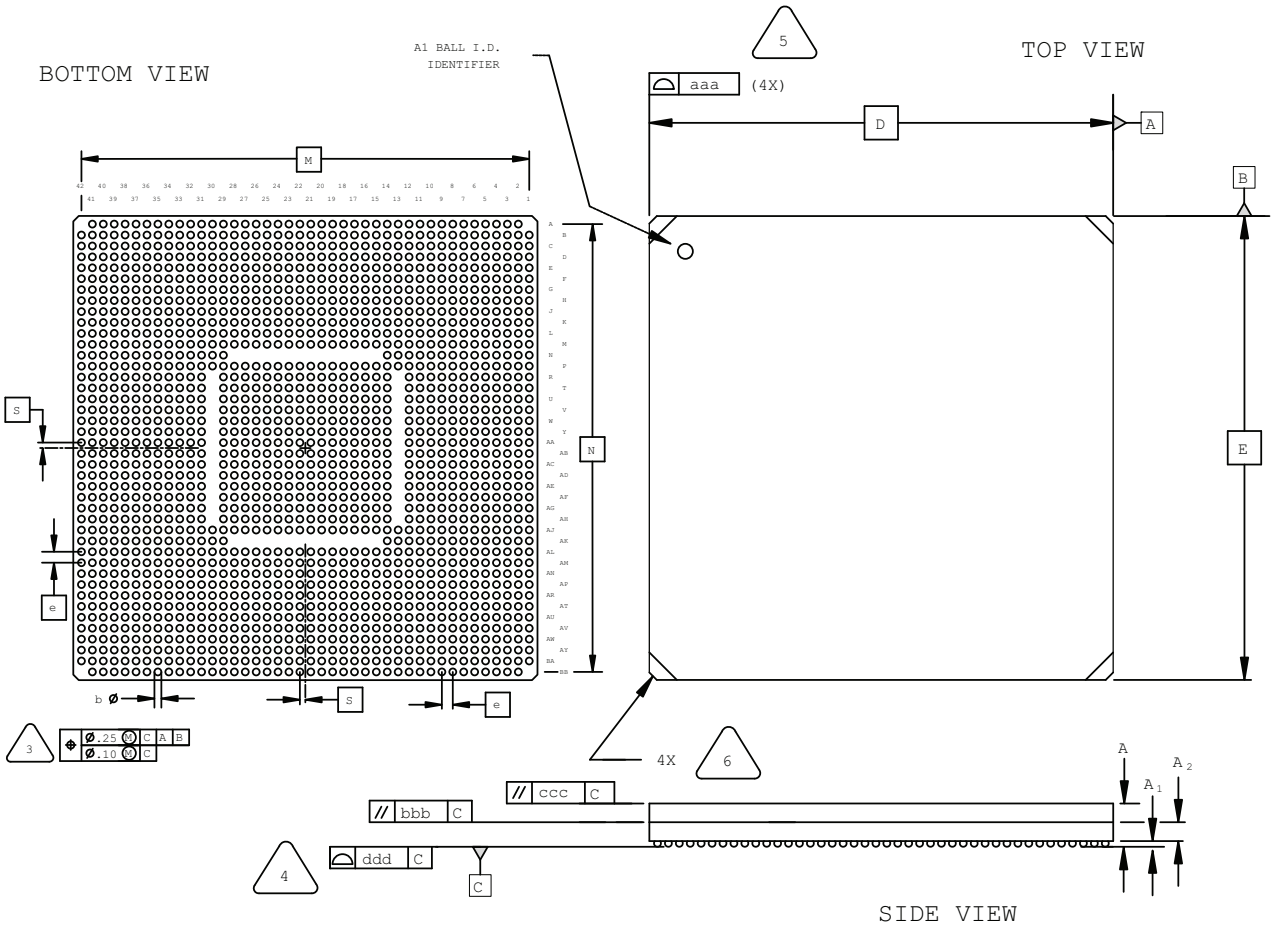
5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	2.55	2.90	3.25
A1	0.40	0.50	0.60
A2		1.20 REF	
B/C	32.40	32.60	32.80
D/E		33.00 BSC	
F/G	24.50	24.60	24.70
M/N		31.00 BSC	
S		0.50 BSC	
b	0.50	0.60	0.70
e		1.00 BSC	
aaa	-	-	0.20
bbb	-	-	0.25
ccc	-	-	0.35
ddd	-	-	0.20

1704-Ball Ceramic fcBGA Package

Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

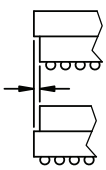
2. ALL DIMENSIONS ARE IN MILLIMETERS.

3. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C

4. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.

5. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY. PACKAGE BODY INCLUDES SUBSTRATE AND LID.

MAXIMUM OFFSET: 0.20 mm



6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	4.30	4.80	5.30
A1	0.30	0.50	0.70
A2	1.30	1.60	1.90
D/E		42.50 BSC	
M/N		41.00 BSC	
S		0.50 BSC	
b	0.50	0.60	0.70
e		1.00 BSC	
aaa	-	-	0.20
bbb	-	-	0.25
ccc	-	-	0.35
ddd	-	-	0.20