

### **Lattice Semiconductor Corporation - LFEC3E-3T100C Datasheet**





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# Understanding <u>Embedded - FPGAs (Field Programmable Gate Array)</u>

Embedded - FPGAs, or Field Programmable Gate Arrays, are advanced integrated circuits that offer unparalleled flexibility and performance for digital systems. Unlike traditional fixed-function logic devices, FPGAs can be programmed and reprogrammed to execute a wide array of logical operations, enabling customized functionality tailored to specific applications. This reprogrammability allows developers to iterate designs quickly and implement complex functions without the need for custom hardware.

#### **Applications of Embedded - FPGAs**

The versatility of Embedded - FPGAs makes them indispensable in numerous fields. In telecommunications.

| Details                        |  |
|--------------------------------|--|
| Product Status                 | Obsolete   |
| Number of LABs/CLBs            | -  |
| Number of Logic Elements/Cells | 3100   |
| Total RAM Bits                 | 56320  |
| Number of I/O                  | 67   |
| Number of Gates                | -  |
| Voltage - Supply               | 1.14V ~ 1.26V  |
| Mounting Type                  | Surface Mount  |
| Operating Temperature          | 0°C ~ 85°C (TJ)  |
| Package / Case                 | 100-LQFP   |
| Supplier Device Package        | 100-TQFP (14x14)   |
| Purchase URL                   | https://www.e-xfl.com/product-detail/lattice-semiconductor/lfec3e-3t100c |

Email: info@E-XFL.COM

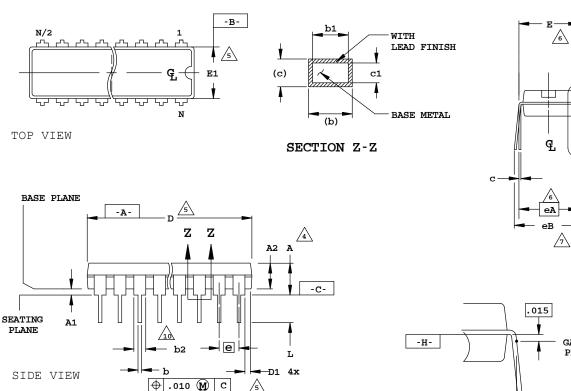
Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong

SEE DETAIL



## 20-Pin Plastic DIP Package

#### Dimensions in Inches



#### NOTES:

- 1. CONTROLLING DIMENSION: INCH.
- 2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M
- 3. DISTANCE BETWEEN LEADS INCLUDING DAMBAR
- PROTRUSIONS TO BE .005 MINIMUM. DIMENSIONS A, A1 & L ARE MEASURED WITH THE PACKAGE SEATED IN JEDEC SEATING
- PLANE GAUGE GS-3.
- PLANE GAGE GS-3.

  DIMENSIONS D, D1 AND E1
  DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

  MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010

  6 E AND eA MEASURED WITH THE LEADS CONSTRAINED

  TO BE PERPENDICULAR TO DATUM C-
- 70 BE PERPENDICULAR TO DATOM.

  eB AND eC ARE MEASURED AT THE LEAD TIPS

  MITH THE LEADS UNCONSTRAINED. 8 N IS THE MAXIMUM NUMBER OF LEAD
- POSITIONS.

  9. POINTED OR ROUNDED LEAD TIPS ARE PREFERRED TO EASE INSERTION
- 10 b2 MAXIMUM DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSIONS. DAMBAR PROTRUSIONS SHALL NOT EXCEED .010
- 11 DATUM PLANE -H- COINCIDENT WITH THE BOTTOM OF LEAD , WHERE LEAD EXITS BODY

| -Н- | GAGE   |
|-----|--------|
|     | → ← eC |

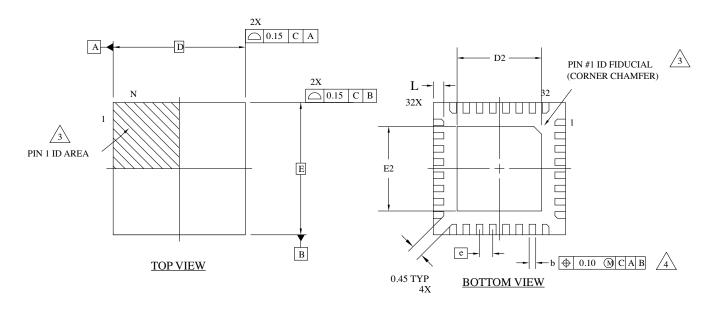
DETAIL A

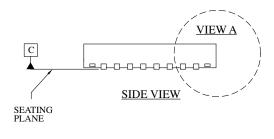
|                  | N = 20   |       |       |       |
|------------------|----------|-------|-------|-------|
| s<br>Y<br>M<br>B | I        | NCHES |       | N O T |
| o<br>L           | MIN.     | NOM.  | MAX.  | TE    |
| Α                | -        | ı     | .210  | 4     |
| A 1              | .015     | -     | -     | 4     |
| A 2              | .115     | .130  | .195  |       |
| b                | .014     | .018  | .022  |       |
| b1               | .014     | .018  | .020  |       |
| b2               | .045     | .060  | .070  | 10    |
| С                | .008     | .010  | .014  |       |
| C1               | .008     | .010  | .011  |       |
| D                | .980     | 1.030 | 1.060 | 5     |
| D1               | .005     | 1     | -     | 5     |
| E                | .300     | .310  | . 325 | 6     |
| E1               | .240     | .250  | .280  | 5     |
| е                | .100 BSC |       |       |       |
| еA               | .300 BSC |       |       | 6     |
| eВ               | 430      |       | .430  | 7     |
| еC               | .000     | -     | .060  | 7     |
| L                | .115     | .130  | .150  | 4     |

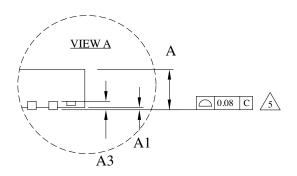


# 32-Pin QFN Package Option 2: MachXO2™

#### **Dimensions in Millimeters**







#### NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.

EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

DIMENSION 6 APPLIES TO PLATED
TERMINAL AND IS MEASURED BETWEEN
0.15 AND 0.30 mm FROM TERMINAL TIP.

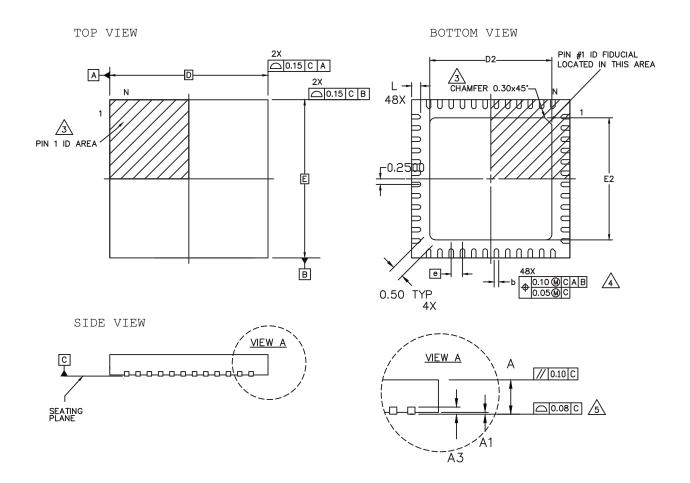
APPLIES TO EXPOSED PORTION OF TERMINALS.

| SYMBOL         MIN.         NOM.         MAX.           A         0.50         0.55         0.60           A1         0.00         0.02         0.05           A3         0.2 REF           D         5.0 BSC           D2         3.10         3.20         3.30           E         5.0 BSC           E2         3.10         3.20         3.30           b         0.20         0.25         0.30           e         0.50 BSC           L         0.35         0.40         0.45 |        |          |         |      |  |
|--|--------|----------|---------|------|--|
| A1 0.00 0.02 0.05  A3 0.2 REF  D 5.0 BSC  D2 3.10 3.20 3.30  E 5.0 BSC  E2 3.10 3.20 3.30  b 0.20 0.25 0.30  e 0.50 BSC  | SYMBOL | MIN.     | NOM.    | MAX. |  |
| A3 0.2 REF  D 5.0 BSC  D2 3.10 3.20 3.30  E 5.0 BSC  E2 3.10 3.20 3.30  b 0.20 0.25 0.30  e 0.50 BSC   | A      | 0.50     | 0.55    | 0.60 |  |
| D 5.0 BSC  D2 3.10 3.20 3.30  E 5.0 BSC  E2 3.10 3.20 3.30  b 0.20 0.25 0.30  e 0.50 BSC   | A1     | 0.00     | 0.02    | 0.05 |  |
| D2 3.10 3.20 3.30  E 5.0 BSC  E2 3.10 3.20 3.30  b 0.20 0.25 0.30  e 0.50 BSC  | A3     |          | 0.2 REF |      |  |
| E 5.0 BSC  E2 3.10 3.20 3.30  b 0.20 0.25 0.30  e 0.50 BSC   | D      |          | 5.0 BSC |      |  |
| E2 3.10 3.20 3.30<br>b 0.20 0.25 0.30<br>e 0.50 BSC  | D2     | 3.10     | 3.20    | 3.30 |  |
| b 0.20 0.25 0.30<br>e 0.50 BSC   | Е      | 5.0 BSC  |         |      |  |
| e 0.50 BSC   | E2     | 3.10     | 3.20    | 3.30 |  |
|  | b      | 0.20     | 0.25    | 0.30 |  |
| L 0.35 0.40 0.45   | e      | 0.50 BSC |         |      |  |
|  | L      | 0.35     | 0.40    | 0.45 |  |



## 48-Pin QFN Package Option 2: L-ASC10, iCE40 Ultra, iCE40 UltraPlus, MachXO2

**Dimensions in Millimeters** 



NOTES: UNLESS OTHERWISE SPECIFIED

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

2. ALL DIMENSIONS ARE IN MILLIMETERS.

<u>3</u>

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\

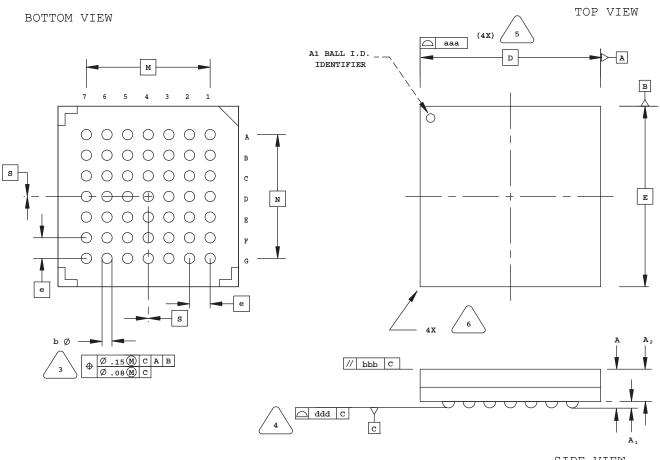
APPLIES TO EXPOSED PORTION OF TERMINALS.

| SYMBOL | MIN.     | NOM.    | MAX. |
|--------|----------|---------|------|
| А      | 0.80     | 0.90    | 1.00 |
| A1     | 0.00     | 0.02    | 0.05 |
| A3     |          | 0.2 REF |      |
| D      | 7.0 BSC  |         |      |
| D2     | 5.30     | 5.40    | 5.50 |
| E      | 7.0 BSC  |         |      |
| E2     | 5.30     | 5.40    | 5.50 |
| b      | 0.15     | 0.20    | 0.25 |
| е      | 0.50 BSC |         |      |
| L      | 0.35     | 0.40    | 0.45 |



## 49-Ball caBGA Package

#### **Dimensions in Millimeters**



SIDE VIEW

NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES 1. PER ANSI Y14.5M.
- ALL DIMENSIONS ARE IN MILLIMETERS. 2.



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



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



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

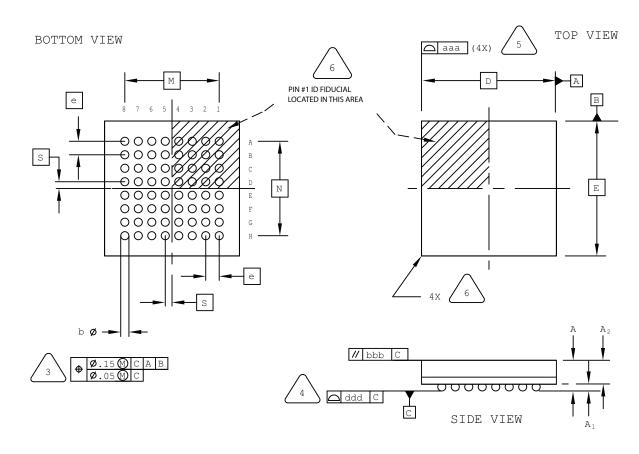


| SYMBOL | MIN. | NOM.     | MAX. |
|--------|------|----------|------|
| A      | 1.30 | 1.40     | 1.50 |
| A1     | 0.31 | 0.36     | 0.41 |
| A2     | 0.99 | 1.04     | 1.09 |
| D/E    | 7    | .00 BSC  |      |
| M/N    | 4    | 4.80 BSC |      |
| s      |      | 0 BSC    |      |
| b      | 0.40 | 0.46     | 0.52 |
| е      | 0    | .80 BSC  |      |
| aaa    | -    | -        | 0.10 |
| bbb    | -    | -        | 0.10 |
| ddd    | -    | -        | 0.12 |



## 64-Ball ucBGA Package

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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



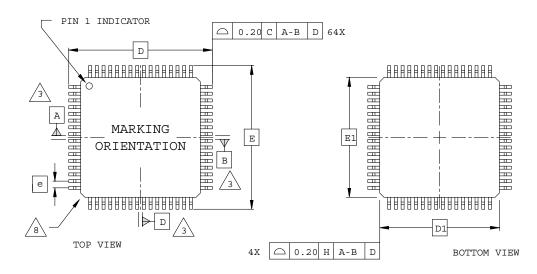
| SYMBOL | MIN.     | NOM.     | MAX. |  |
|--------|----------|----------|------|--|
| А      | ı        | -        | 1.00 |  |
| A1     | 0.10     | _        | -    |  |
| A2     | -        | -        | 0.90 |  |
| D/E    | 4        | 4.00 BSC |      |  |
| M/N    | 2.80 BSC |          |      |  |
| S      | 0        | .20 BSC  |      |  |
| b      | 0.20     | 0.25     | 0.30 |  |
| е      | 0        | .40 BSC  |      |  |
| aaa    | _        | _        | 0.10 |  |
| bbb    | _        | -        | 0.10 |  |
| ddd    | -        | _        | 0.08 |  |
| bbb    | -        | -        | 0.10 |  |

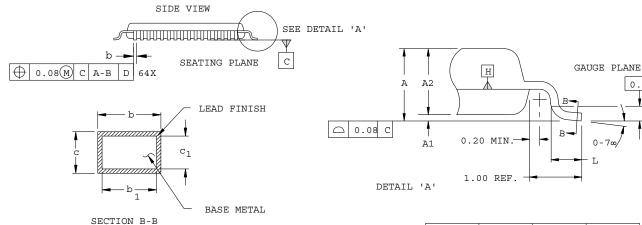
0.25



# 64-Pin TQFP Package

#### **Dimensions in Millimeters**





#### NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 1982.
- ALL DIMENSIONS ARE IN MILLIMETERS.

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.

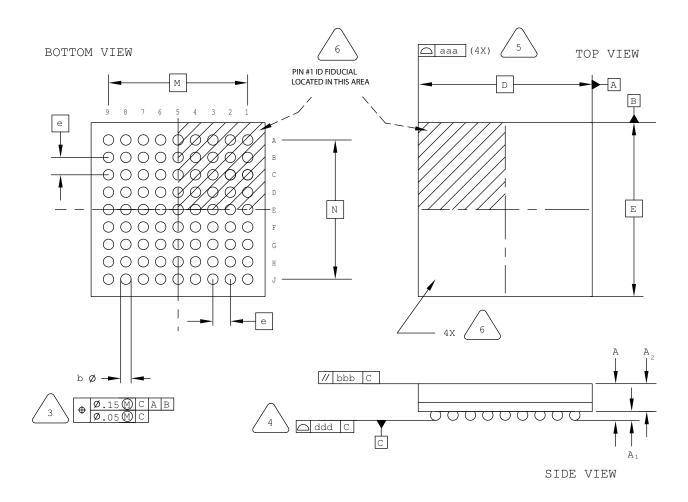
/8\ EXACT SHAPE OF EACH CORNER IS OPTIONAL.

| SYMBOL | MIN.      | NOM.      | MAX. |
|--------|-----------|-----------|------|
| A      | -         | -         | 1.60 |
| A1     | 0.05      | -         | 0.15 |
| A2     | 1.35      | 1.40      | 1.45 |
| D      |           | 12.00 BSC |      |
| D1     |           | 10.00 BSC |      |
| E      |           | 12.00 BSC |      |
| E1     | 10.00 BSC |           |      |
| L      | 0.45      | 0.60      | 0.75 |
| N      | 64        |           |      |
| е      | 0.50 BSC  |           |      |
| b      | 0.17      | 0.22      | 0.27 |
| b1     | 0.17      | 0.20      | 0.23 |
| С      | 0.09      | -         | 0.20 |
| c1     | 0.09      | -         | 0.16 |



## 81-Ball csBGA Package

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



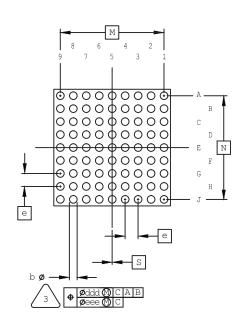
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.

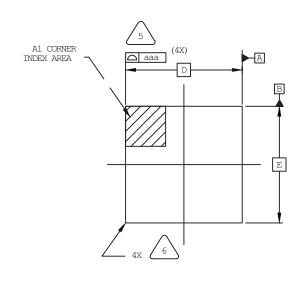


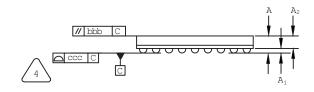
| SYMBOL | MIN.     | NOM.    | MAX. |
|--------|----------|---------|------|
| А      | -        | ı       | 1.00 |
| A1     | 0.10     | -       | -    |
| A2     | -        | -       | 0.90 |
| D/E    | 5        | .00 BSC |      |
| M/N    | 4.00 BSC |         |      |
| b      | 0.20     | 0.25    | 0.30 |
| е      | 0.50 BSC |         |      |
| aaa    | -        | _       | 0.10 |
| bbb    | -        | _       | 0.10 |
| ddd    | _        | _       | 0.10 |



#### **Dimensions in Millimeters**







NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



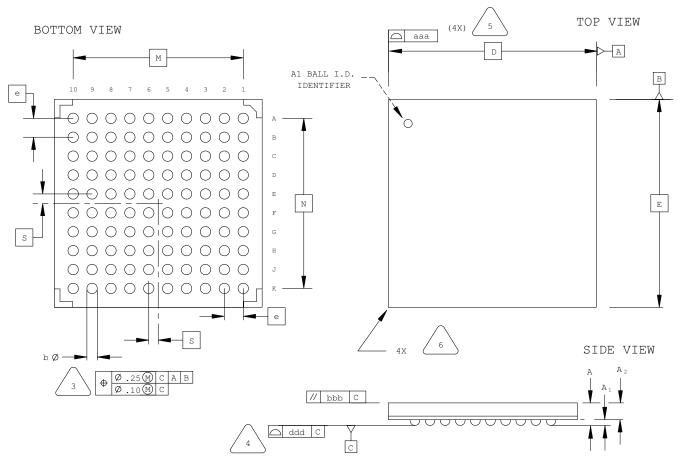
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



| SYMBOL | MIN.     | NOM.     | MAX. |
|--------|----------|----------|------|
| А      | -        | -        | 1.00 |
| A1     | 0.11     | -        | ı    |
| A2     | 0.64     | -        | ı    |
| D/E    |          | 4.50 BSC |      |
| M/N    |          | 4.00 BSC |      |
| S      | 0.00 BSC |          |      |
| b      | 0.20     | 0.25     | 0.30 |
| е      | 0.50 BSC |          |      |
| aaa    | 0.10     |          |      |
| bbb    | 0.10     |          |      |
| ccc    | 0.08     |          |      |
| ddd    | 0.15     |          |      |
| eee    |          | 0.08     |      |



#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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

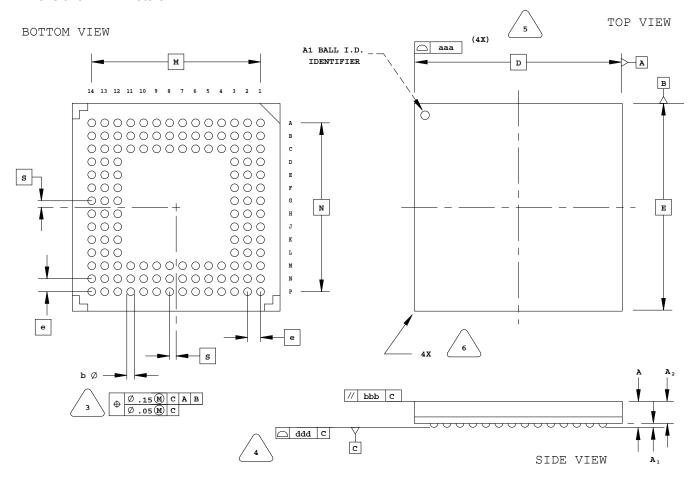


| SYMBOL | MIN.     | NOM.     | MAX. |
|--------|----------|----------|------|
| А      | 1.30     | 1.50     | 1.70 |
| A1     | 0.30     | 0.50     | 0.70 |
| A2     | 1.       | .10 REF  |      |
| D/E    | 11       | 1.00 BSC |      |
| M/N    | 9.00 BSC |          |      |
| S      | 0.50 BSC |          |      |
| b      | 0.40     | 0.55     | 0.70 |
| е      | 1.00 BSC |          |      |
| aaa    | -        | -        | 0.20 |
| bbb    | _        | _        | 0.25 |
| ddd    | _        | _        | 0.20 |



# 132-Ball csBGA Package Option 1: MachXO2, MachXO, LatticeXP2™

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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

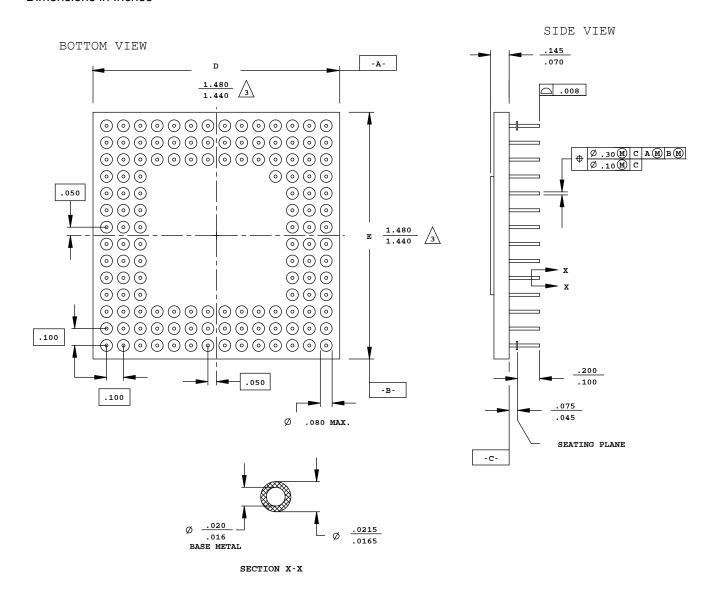


|        | Г        |         |      |
|--------|----------|---------|------|
| SYMBOL | MIN.     | NOM.    | MAX. |
| A      | 0.90     | 1.23    | 1.35 |
| A1     | 0.15     | -       | -    |
| A2     | -        | -       | 1.10 |
| D/E    | 8        | .00 BSC |      |
| M/N    | 6.50 BSC |         |      |
| s      | 0.25 BSC |         |      |
| b      | 0.25     | 0.30    | 0.35 |
| е      | 0        | .50 BSC |      |
| aaa    | -        | -       | 0.10 |
| bbb    | -        | -       | 0.10 |
| ddd    | -        | -       | 0.08 |



### 133-Pin CPGA Package

#### Dimensions in Inches



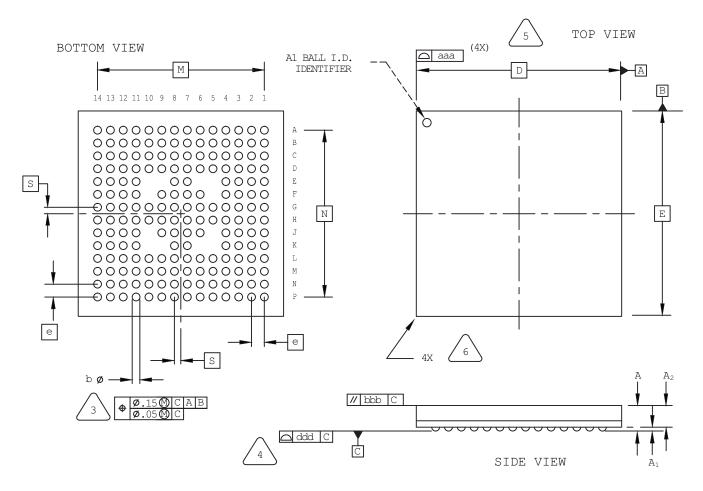
#### NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN INCHES.
- DIMENSIONS D AND E MAY HAVE MATERIAL PROTRUSION OF
  .006 INCHES MAXIMUM ABOVE THE DIMENSION SHOWN
  NOT TO EXCEED .003 INCHES MAXIMUM PER SIDE.



### 184-Ball csBGA Package

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



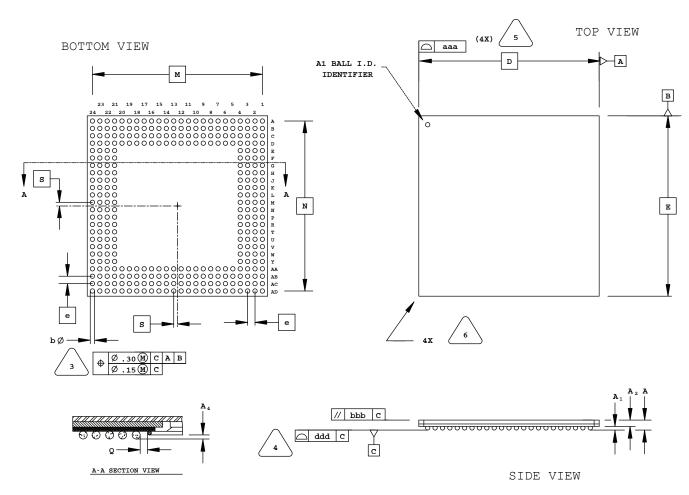
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



| SYMBOL | MIN.     | NOM. | MAX. |
|--------|----------|------|------|
| А      | 1.20     | 1.35 | 1.50 |
| A1     | 0.16     | -    | -    |
| A2     | _        | _    | 1.34 |
| D/E    | 8.00 BSC |      |      |
| M/N    | 6.50 BSC |      |      |
| S      | 0.25 BSC |      |      |
| b      | 0.25     | 0.30 | 0.35 |
| е      | 0.50 BSC |      |      |
| aaa    | _        | _    | 0.10 |
| bbb    | _        | _    | 0.10 |
| ddd    | _        | _    | 0.08 |



#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES
  PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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

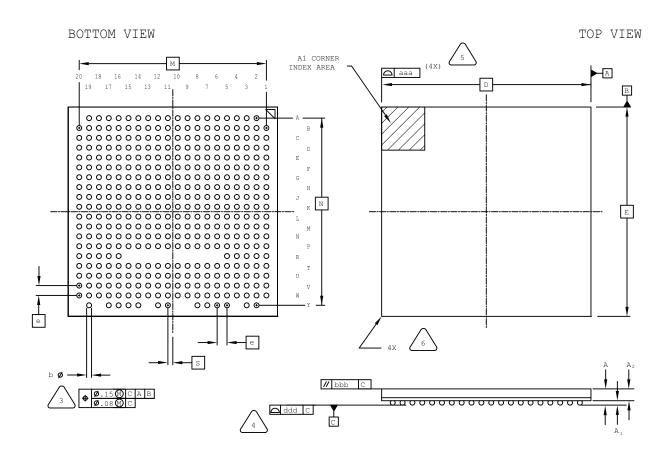


| SYMBOL | MIN.      | NOM.     | MAX. |
|--------|-----------|----------|------|
| A      | -         | -        | 1.70 |
| A1     | 0.50      | 0.65     | 0.80 |
| A2     | 0.80      | 0.90     | 1.00 |
| D/E    | 3:        | 1.00 BSC |      |
| M/N    | 29.21 BSC |          |      |
| s      | 0.635 BSC |          |      |
| b      | 0.60      | 0.75     | 0.90 |
| е      | 1         | .27 BSC  |      |
| Q      | 0.25      | -        | -    |
| A4     | 0.10      | -        | -    |
| aaa    | -         | -        | 0.20 |
| bbb    | -         | -        | 0.25 |
| ddd    | -         | -        | 0.20 |



### 381-Ball caBGA Package

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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

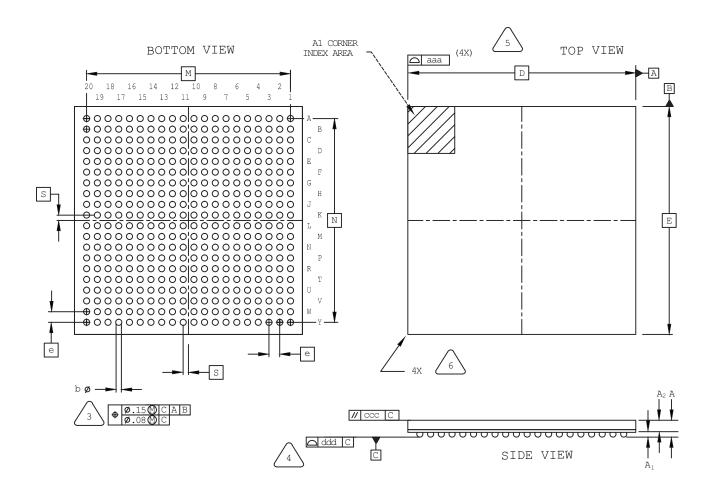


| SYMBOL | MIN.      | NOM. | MAX. |
|--------|-----------|------|------|
| А      | ı         | -    | 1.76 |
| A1     | 0.25      | 0.30 | 0.35 |
| A2     | 0.80      | -    | ı    |
| D/E    | 17.00 BSC |      |      |
| M/N    | 15.20 BSC |      |      |
| S      | 0.40 BSC  |      |      |
| b      | 0.35      | 0.40 | 0.45 |
| е      | 0.80 BSC  |      |      |
| aaa    | _         | -    | 0.15 |
| bbb    | -         | -    | 0.20 |
| ddd    | -         | _    | 0.12 |



### 400-Ball caBGA Package

#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM  $\boxed{\mathbb{C}}$ 



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



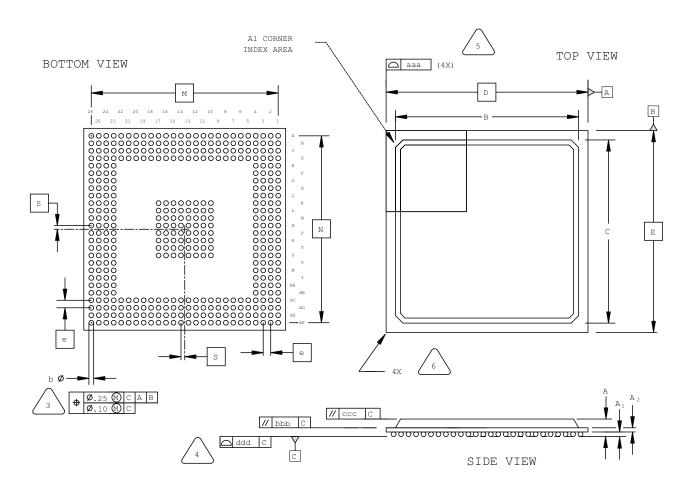
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



| SYMBOL | MIN.     | NOM. | MAX. |
|--------|----------|------|------|
| А      | ı        | -    | 1.70 |
| A1     | 0.25     | 0.35 | -    |
| A2     | 0.80     | 1.00 | _    |
| D/E    | 17.0 BSC |      |      |
| M/N    | 15.2 BSC |      |      |
| S      | 0.40 BSC |      |      |
| b      | 0.40     | 0.45 | 0.50 |
| е      | 0.80 BSC |      |      |
| aaa    | _        | _    | 0.15 |
| ccc    | _        | _    | 0.20 |
| ddd    | _        | _    | 0.20 |



#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



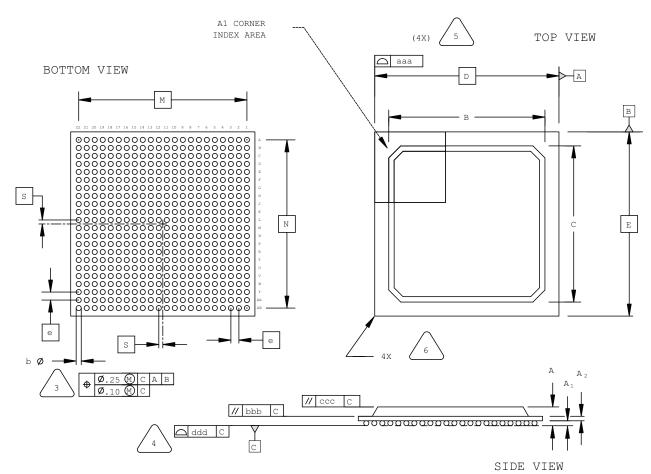
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



| SYMBOL | MIN.      | NOM.  | MAX.  |
|--------|-----------|-------|-------|
| А      | 1.70      | 2.15  | 2.60  |
| A1     | 0.30      | 0.50  | 0.70  |
| A2     | 0.30      | 0.50  | 0.70  |
| B/C    | 23.80     | 24.80 | 25.80 |
| D/E    | 27.00 BSC |       |       |
| M/N    | 25.00 BSC |       |       |
| S      | 0.50 BSC  |       |       |
| b      | 0.50      | 0.60  | 0.70  |
| е      | 1.00 BSC  |       |       |
| aaa    | -         | -     | 0.20  |
| bbb    | -         | _     | 0.25  |
| ccc    | -         | _     | 0.35  |
| ddd    | _         | _     | 0.20  |



#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM  $\fbox{\colored{C}}$ 



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



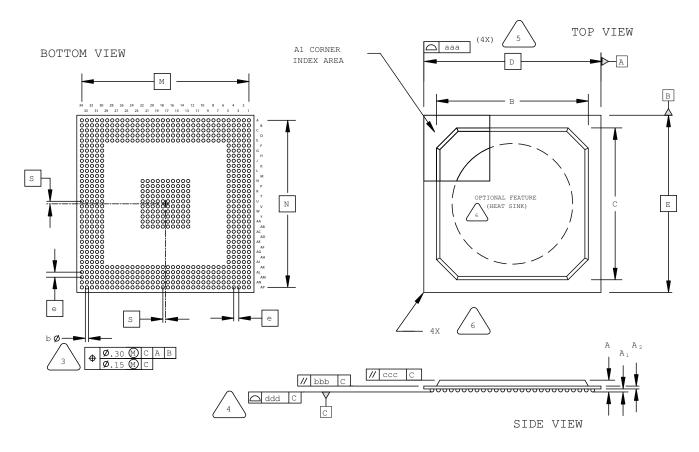
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



| SYMBOL | MIN.      | NOM.  | MAX.  |
|--------|-----------|-------|-------|
| A      | 1.70      | 2.15  | 2.60  |
| A1     | 0.30      | 0.50  | 0.70  |
| A2     | 0.30      | 0.50  | 0.70  |
| B/C    | 19.30     | 19.80 | 20.30 |
| D/E    | 23.00 BSC |       |       |
| M/N    | 21.00 BSC |       |       |
| S      | 0.50 BSC  |       |       |
| b      | 0.50      | 0.60  | 0.70  |
| е      | 1.00 BSC  |       |       |
| aaa    | _         | _     | 0.20  |
| bbb    | _         | _     | 0.25  |
| ccc    | _         | _     | 0.35  |
| ddd    | _         | _     | 0.20  |



(with or without Internal Heat Spreader)
Dimensions in Millimeters



NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.



DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM  $\fbox{$\mathbb{C}$}$ 



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



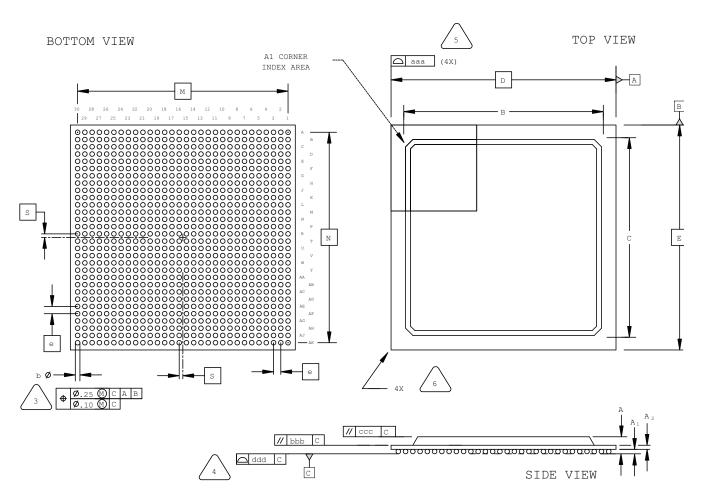
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



|        | T         | Γ     | ī     |
|--------|-----------|-------|-------|
| SYMBOL | MIN.      | NOM.  | MAX.  |
| A      | 1.90      | 2.25  | 2.60  |
| A1     | 0.30      | 0.50  | 0.70  |
| A2     | 0.40      | 0.60  | 0.80  |
| B/C    | 29.80     | 30.30 | 30.80 |
| D/E    | 35.00 BSC |       |       |
| M/N    | 33.00 BSC |       |       |
| S      | 0.50 BSC  |       |       |
| b      | 0.50      | 0.60  | 0.70  |
| е      | 1.00 BSC  |       |       |
| aaa    | -         | -     | 0.20  |
| bbb    | -         | -     | 0.25  |
| ccc    | -         | -     | 0.35  |
| ddd    | -         | -     | 0.20  |



#### **Dimensions in Millimeters**



NOTES: UNLESS OTHERWISE SPECIFIED

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

2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



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



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



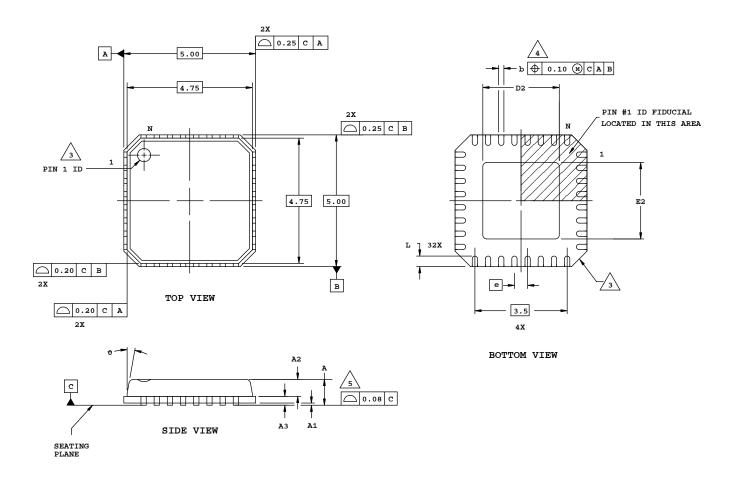
| SYMBOL | MIN.      | NOM.  | MAX.  |
|--------|-----------|-------|-------|
| А      | 1.70      | 2.15  | 2.60  |
| A1     | 0.30      | 0.50  | 0.70  |
| A2     | 0.30      | 0.50  | 0.70  |
| B/C    | 25.80     | 27.55 | 29.30 |
| D/E    | 31.00 BSC |       |       |
| M/N    | 29.00 BSC |       |       |
| S      | 0.50 BSC  |       |       |
| b      | 0.50      | 0.60  | 0.70  |
| е      | 1.00 BSC  |       |       |
| aaa    | _         | -     | 0.20  |
| bbb    | -         | _     | 0.25  |
| ccc    | -         |       | 0.35  |
| ddd    | _         | _     | 0.20  |



## Appendix A. Package Archive

### 32-Pin QFN (Punch Singulated) Package

**Dimensions in Millimeters** 



NOTES: UNLESS OTHERWISE SPECIFIED

- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- 2. ALL DIMENSIONS ARE IN MILLIMETERS.

<u>3</u> I

EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.



DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM TERMINAL TIP.



APPLIES TO EXPOSED PORTION OF TERMINALS.

| SYMBOL     | MIN.     | NOM. | MAX. |
|------------|----------|------|------|
| A          | -        | 0.85 | 1.00 |
| A1         | 0.00     | 0.01 | 0.05 |
| A2         | 0.00     | 0.65 | 1.00 |
| <b>A</b> 3 | 0.20 REF |      |      |
| D2         | 1.25     | 2.70 | 3.25 |
| E2         | 1.25     | 2.70 | 3.25 |
| е          | 0.50 BSC |      |      |
| b          | 0.18     | 0.24 | 0.30 |
| L          | 0.30     | 0.40 | 0.50 |
| Ð          | -        | -    | 12   |