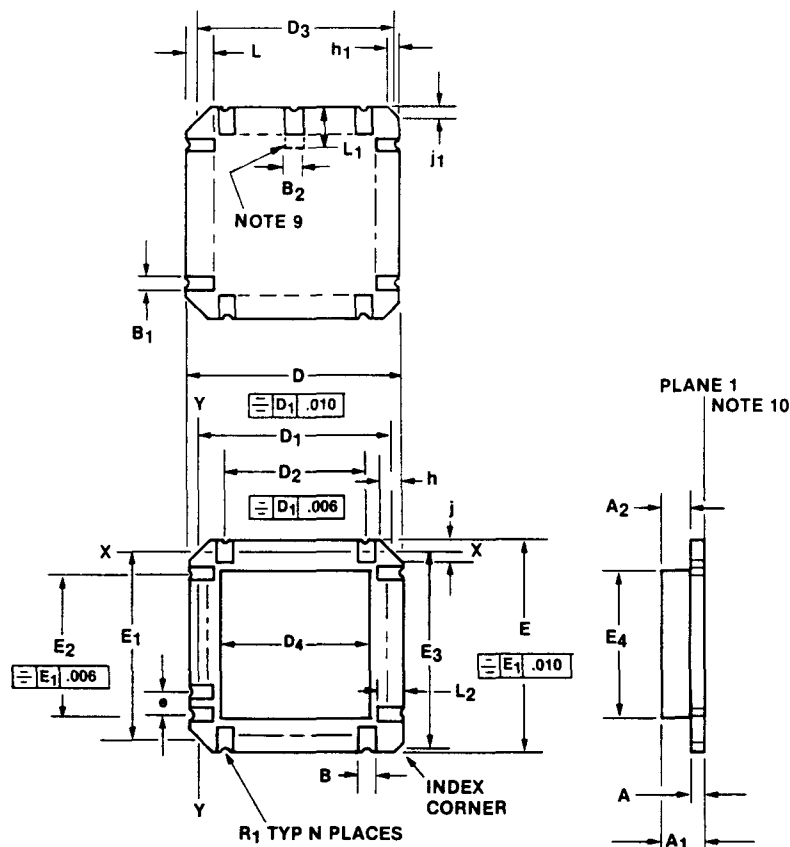


**MS004**

.050" CENTER, LEADLESS TYPE C



# NOTES:

- REFER TO APPLICABLE SYMBOL LIST.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5 1973.
- METALIZED CASTELLATIONS CONNECTED TO PLANE 1 TERMINALS.
- RELIEF ON CORNER TERMINAL MAXIMUM DIMENSION PERMISSIBLE.
- N IS THE MAXIMUM QUANTITY OF TERMINAL POSITIONS. REFER TO NUMBERING CONVENTION.
- X AND Y ARE REFERENCE DATUMS.
- ELECTRICAL CONNECTION IS REQUIRED ON PLANE 1. METALIZATION IS OPTIONAL ON PLANE 2. HOWEVER, IF PLANE 2 IS METALIZED IT MUST BE ELECTRICALLY CONNECTED.
- DIMENSIONS VARY IN DIRECT PROPORTION TO FEATURE SIZE OF  $D_1$  AND  $E_1$ .
- FEATURES FOR ELECTRICAL/OPTIONAL ORIENTATION OR HANDLING PURPOSES MUST BE WITHIN THE AREA SHOWN.
- PLANE 1 IS A HEAT RADIATING SURFACE. METALIZATION IS OPTIONAL. HOWEVER, IF PRESENT, A CLEARANCE OF 0.020" (0.51mm) MUST BE MAINTAINED FROM ALL FEATURES.
- DIMENSION  $A_1$  CONTROLS THE OVERALL PACKAGE THICKNESS. APPLYING SOLDER TO THE TERMINALS AND/OR PADS WILL INCREASE DIMENSION  $A_1$ . THE MAXIMUM INCREASE ALLOWED FOR THIS SOLDER THICKNESS IS 0.006" (0.15mm). THIS ADDITIONAL SOLDER THICKNESS MAY PUT THE PACKAGE THICKNESS OUTSIDE OF THE DIMENSION RANGE SPECIFIED IN THE VARIATIONS TABLES. THE PACKAGE MUST ONLY MEET DIMENSION  $A_1$  WITHOUT SOLDER.
- CONTROLLING DIMENSION: INCH.
- MULTILAYER IMPLEMENTATIONS OF THIS TYPE MAY HAVE AN OVERALL MATERIAL PROTRUSION OF 0.010" (0.26mm) MAXIMUM ABOVE THE MAXIMUM DIMENSION SHOWN, NOT TO EXCEED 0.005" (0.013mm) MAXIMUM PER SIDE.
- A FLATNESS TOLERANCE OF 0.004" PER INCH (0.004mm PER mm), BUT NOT LESS THAN 0.002" PER INCH (0.002mm PER mm), APPLIES TO PLANE 1. APPLYING SOLDER TO THE TERMINALS AND/OR PADS WILL INCREASE THE RESULTANT FLATNESS TOLERANCE RANGE BY AN ADDITIONAL 0.004" (0.10mm), REGARDLESS OF THE PACKAGE SIZE.

|  |  |  |            |              |
|--|--|--|------------|--------------|
| NOTE                                     |  |  |            |              |
| REF.                                     |  |  |            |              |
| ISSUE                                    |  |  |            |              |
| JEDEC<br>SOLID STATE PRODUCT<br>OUTLINES |  | TITLE<br>.050" CENTER<br>LEADLESS TYPE C | ISSUE<br>B | DATE<br>5/90 |
| MS004                                    |  |  |            |              |

ALL DIMENSIONS SHOWN IN INCHES

| SYMBOL         | VARIATIONS |      |      |          |      |      |          |      |      |          |      |      |
|----------------|------------|------|------|----------|------|------|----------|------|------|----------|------|------|
|                | CA         |      | NOTE | CB       |      | NOTE | CC       |      | NOTE | CD       |      | NOTE |
|                | MIN.       | MAX. |      | MIN.     | MAX. |      | MIN.     | MAX. |      | MIN.     | MAX. |      |
| A              | .017       | .088 |      | .017     | .088 |      | .017     | .088 |      | .037     | .088 |      |
| A <sub>1</sub> | .064       | .100 | 11   | .064     | .100 | 11   | .064     | .100 | 11   | .069     | .120 | 11   |
| A <sub>2</sub> | .007       | .075 |      | .007     | .075 |      | .007     | .075 |      | .007     | .080 |      |
| B              | —          | —    |      | —        | —    |      | —        | —    |      | .033     | .039 |      |
| B <sub>1</sub> | .022       | .028 | 7    | .022     | .028 | 7    | .022     | .028 | 7    | .022     | .028 | 7    |
| B <sub>2</sub> | .022       | .041 |      | .022     | .041 |      | .022     | .041 |      | .022     | .041 |      |
| D              | .292       | .308 |      | .342     | .358 |      | .442     | .458 |      | .640     | .660 |      |
| D <sub>1</sub> | .255       | .265 |      | .305     | .315 |      | .404     | .415 |      | .600     | .620 |      |
| D <sub>2</sub> | .150       |      | 8    | .200     |      | 8    | .300     |      | 8    | .500     |      | 8    |
| D <sub>3</sub> | .270 REF   |      |      | .315 REF |      |      | .420 REF |      |      | .620 REF |      |      |
| D <sub>4</sub> | .257       | .308 |      | .307     | .358 |      | .406     | .458 |      | .495     | .560 |      |
| E              | .292       | .308 |      | .342     | .358 |      | .442     | .458 |      | .640     | .660 |      |
| E <sub>1</sub> | .255       | .265 |      | .305     | .315 |      | .404     | .415 |      | .600     | .620 |      |
| E <sub>2</sub> | .150       |      | 8    | .200     |      | 8    | .300     |      | 8    | .500     |      | 8    |
| E <sub>3</sub> | .270 REF   |      |      | .315 REF |      |      | .420 REF |      |      | .620 REF |      |      |
| E <sub>4</sub> | .257       | .308 |      | .307     | .358 |      | .406     | .458 |      | .495     | .560 |      |
| e              | .050 BSC   |      |      | .050 BSC |      |      | .050 BSC |      |      | .050 BSC |      |      |
| h              | .040 BSC   |      |      | .040 BSC |      |      | .040 BSC |      |      | .040 BSC |      |      |
| h <sub>1</sub> | .010       | .020 |      | .010     | .020 |      | .010     | .020 |      | .010     | .020 |      |
| j              | .040 BSC   |      |      | .040 BSC |      |      | .040 BSC |      |      | .040 BSC |      |      |
| j <sub>1</sub> | .010       | .020 |      | .010     | .020 |      | .010     | .020 |      | .010     | .020 |      |
| L              | .045       | .055 | 4    | .045     | .055 | 4    | .045     | .055 | 4    | .045     | .055 | 4    |
| L <sub>1</sub> | .077       | .093 | 9    | .077     | .093 | 9    | .077     | .093 | 9    | .077     | .093 | 9    |
| L <sub>2</sub> | —          | —    |      | —        | —    |      | —        | —    |      | .045     | .055 |      |
| N              | —          | 16   | 5    | —        | 20   | 5    | —        | 28   | 5    | 44       |      | 5    |
| R <sub>1</sub> | .007       | .011 | 3    | .007     | .011 | 3    | .007     | .011 | 3    | .007     | .011 | 3    |

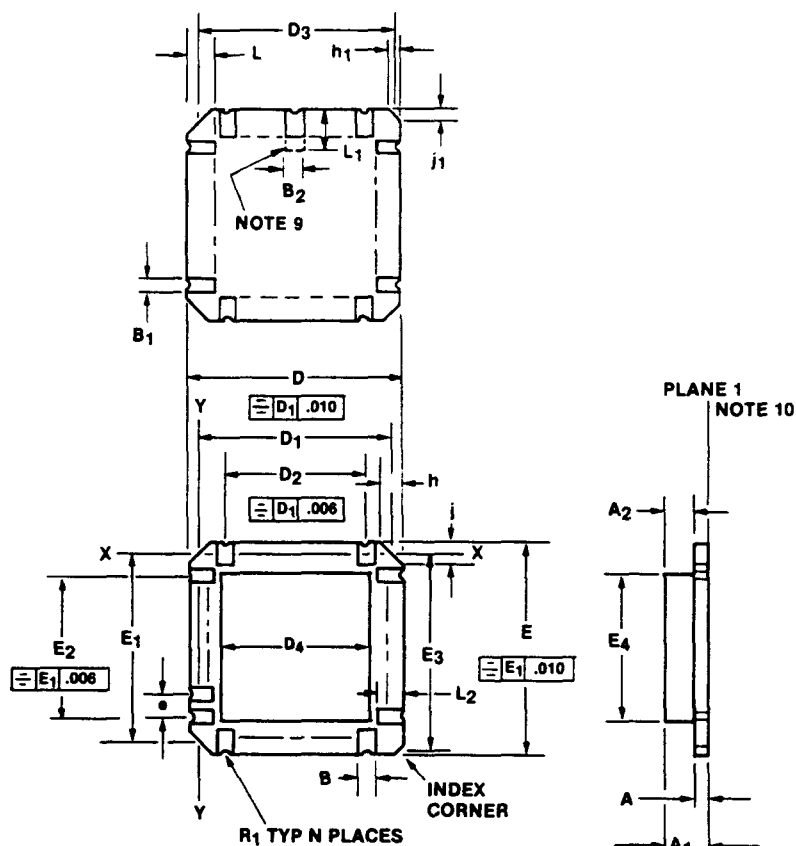
STANDARD

ALL DIMENSIONS SHOWN IN MILLIMETERS

| SYMBOL         | VARIATIONS          |      |      |                     |      |      |                     |       |      |                     |       |      |
|----------------|---------------------|------|------|---------------------|------|------|---------------------|-------|------|---------------------|-------|------|
|                | CA                  |      | NOTE | CB                  |      | NOTE | CC                  |       | NOTE | CD                  |       | NOTE |
|                | MIN.                | MAX. |      | MIN.                | MAX. |      | MIN.                | MAX.  |      | MIN.                | MAX.  |      |
| A              | .44                 | 2.23 |      | .44                 | 2.23 |      | .44                 | 2.23  |      | .94                 | 2.23  |      |
| A <sub>1</sub> | 1.63                | 2.54 | 11   | 1.63                | 2.54 | 11   | 1.63                | 2.54  | 11   | 1.76                | 3.04  | 11   |
| A <sub>2</sub> | .18                 | 1.90 |      | .18                 | 1.90 |      | .18                 | 1.90  |      | .18                 | 2.03  |      |
| B              | —                   | —    |      | —                   | —    |      | —                   | —     |      | .839                | .990  |      |
| B <sub>1</sub> | .559                | .711 | 7    | .559                | .711 | 7    | .559                | .711  | 7    | .559                | .711  | 7    |
| B <sub>2</sub> | .56                 | 1.04 |      | .56                 | 1.04 |      | .56                 | 1.04  |      | .56                 | 1.04  |      |
| D              | 7.42                | 7.82 |      | 8.69                | 9.09 |      | 11.23               | 11.63 |      | 16.26               | 16.76 |      |
| D <sub>1</sub> | 6.48                | 6.73 |      | 7.75                | 8.00 |      | 10.27               | 10.54 |      | 15.24               | 15.74 |      |
| D <sub>2</sub> | 3.81                |      | 8    | 5.08                |      | 8    | 7.62                |       | 8    | 12.70               |       | 8    |
| D <sub>3</sub> | 6.86 REF            |      |      | 8.00 REF            |      |      | 10.67 REF           |       |      | 15.75 REF           |       |      |
| D <sub>4</sub> | 6.53                | 7.82 |      | 7.80                | 9.09 |      | 10.32               | 11.63 |      | 12.58               | 14.22 |      |
| E              | 7.42                | 7.82 |      | 8.69                | 9.09 |      | 11.23               | 11.63 |      | 16.26               | 16.76 |      |
| E <sub>1</sub> | 6.48                | 6.73 |      | 7.75                | 8.00 |      | 10.27               | 10.54 |      | 15.24               | 15.74 |      |
| E <sub>2</sub> | 3.81                |      | 8    | 5.08                |      | 8    | 7.62                |       | 8    | 12.70               |       | 8    |
| E <sub>3</sub> | 6.86 REF            |      |      | 8.00 REF            |      |      | 10.67 REF           |       |      | 15.75 REF           |       |      |
| E <sub>4</sub> | 6.53                | 7.82 |      | 7.80                | 9.09 |      | 10.32               | 11.63 |      | 12.58               | 14.22 |      |
| e              | 1.27 BSC            |      |      | 1.27 BSC            |      |      | 1.27 BSC            |       |      | 1.27 BSC            |       |      |
| h              | 1.02 BSC            |      |      | 1.02 BSC            |      |      | 1.02 BSC            |       |      | 1.02 BSC            |       |      |
| h <sub>1</sub> | .26                 | .50  |      | .26                 | .50  |      | .26                 | .50   |      | .26                 | .50   |      |
| j              | 1.02 BSC            |      |      | 1.02 BSC            |      |      | 1.02 BSC            |       |      | 1.02 BSC            |       |      |
| j <sub>1</sub> | .26                 | .50  |      | .26                 | .50  |      | .26                 | .50   |      | .26                 | .50   |      |
| L              | 1.15                | 1.39 | 4    | 1.15                | 1.39 | 4    | 1.15                | 1.39  | 4    | 1.15                | 1.39  | 4    |
| L <sub>1</sub> | 1.96                | 2.36 | 9    | 1.96                | 2.36 | 9    | 1.96                | 2.36  | 9    | 1.96                | 2.36  | 9    |
| L <sub>2</sub> | —                   | —    |      | —                   | —    |      | —                   | —     |      | 1.15                | 1.39  |      |
| N              | —                   | 16   | 5    | —                   | 20   | 5    | —                   | 28    | 5    | 44                  |       | 5    |
| R <sub>1</sub> | .178                | .279 | 3    | .178                | .279 | 3    | .178                | .279  | 3    | .178                | .279  | 3    |
| NOTE           | 1, 2, 6, 10, 12, 13 |      |      | 1, 2, 6, 10, 12, 13 |      |      | 1, 2, 6, 10, 12, 13 |       |      | 1, 2, 6, 10, 12, 13 |       |      |
| F.             |                     |      |      |                     |      |      |                     |       |      |                     |       |      |
| ISSUE          |                     |      |      |                     |      |      |                     |       |      |                     |       |      |

JEDEC  
SOLID STATE PRODUCT  
OUTLINESTITLE  
.050 CENTER  
LEADLESS TYPE CISSUE  
B  
DATE  
5/90

MS004



## NOTES:

1. REFER TO APPLICABLE SYMBOL LIST.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5 1973.
3. METALIZED CASTELLATIONS CONNECTED TO PLANE 1 TERMINALS.
4. RELIEF ON CORNER TERMINAL MAXIMUM DIMENSION PERMISSIBLE.
5. N IS THE MAXIMUM QUANTITY OF TERMINAL POSITIONS. REFER TO NUMBERING CONVENTION.
6. X AND Y ARE REFERENCE DATUMS.
7. ELECTRICAL CONNECTION IS REQUIRED ON PLANE 1. METALIZATION IS OPTIONAL ON PLANE 2. HOWEVER, IF PLANE 2 IS METALIZED IT MUST BE ELECTRICALLY CONNECTED.
8. DIMENSIONS VARY IN DIRECT PROPORTION TO FEATURE SIZE OF  $D_1$  AND  $E_1$ .
9. FEATURES FOR ELECTRICAL/OPTIONAL ORIENTATION OR HANDLING PURPOSES MUST BE WITHIN THE AREA SHOWN.
10. PLANE 1 IS A HEAT RADIATING SURFACE. METALIZATION IS OPTIONAL. HOWEVER, IF PRESENT, A CLEARANCE OF 0.020" (0.51mm) MUST BE MAINTAINED FROM ALL FEATURES.
11. DIMENSION  $A_1$  CONTROLS THE OVERALL PACKAGE THICKNESS. APPLYING SOLDER TO THE TERMINALS AND/OR PADS WILL INCREASE DIMENSION  $A_1$ . THE MAXIMUM INCREASE ALLOWED FOR THIS SOLDER THICKNESS IS 0.006" (0.15mm). THIS ADDITIONAL SOLDER THICKNESS MAY PUT THE PACKAGE THICKNESS OUTSIDE OF THE DIMENSION RANGE SPECIFIED IN THE VARIATIONS TABLES. THE PACKAGE MUST ONLY MEET DIMENSION  $A_1$  WITHOUT SOLDER.
12. CONTROLLING DIMENSION: INCH.
13. MULTILAYER IMPLEMENTATIONS OF THIS TYPE MAY HAVE AN OVERALL MATERIAL PROTRUSION OF 0.010" (0.26mm) MAXIMUM ABOVE THE MAXIMUM DIMENSION SHOWN, NOT TO EXCEED 0.005" (0.013mm) MAXIMUM PER SIDE.
14. A FLATNESS TOLERANCE OF 0.004" PER INCH (0.004mm PER mm), BUT NOT LESS THAN 0.002" PER INCH (0.002mm PER mm), APPLIES TO PLANE 1. APPLYING SOLDER TO THE TERMINALS AND/OR PADS WILL INCREASE THE RESULTANT FLATNESS TOLERANCE RANGE BY AN ADDITIONAL 0.004" (0.10mm), REGARDLESS OF THE PACKAGE SIZE.

|  |  |  |            |              |
|--|--|--|------------|--------------|
| NOTE                                     |  |  |            |              |
| REF.                                     |  |  |            |              |
| ISSUE                                    |  |  |            |              |
| JEDEC<br>SOLID STATE PRODUCT<br>OUTLINES |  | TITLE<br>.050" CENTER<br>LEADLESS TYPE C | ISSUE<br>B | DATE<br>5/90 |
|  |  | MS004                                    |            |              |

| SYMBOL         | VARIATIONS |      |      |          |      |      |           |       |      |          |      |      |
|----------------|------------|------|------|----------|------|------|-----------|-------|------|----------|------|------|
|                | CE         |      | NOTE | CF       |      | NOTE | CG        |       | NOTE | CH       |      | NOTE |
|                | MIN.       | MAX. |      | MIN.     | MAX. |      | MIN.      | MAX.  |      | MIN.     | MAX. |      |
| A              | .037       | .088 | 11   | .037     | .088 | 11   | .037      | .088  | 11   | .017     | .088 | 11   |
| A <sub>1</sub> | .082       | .120 |      | .082     | .120 |      | .082      | .120  |      | .064     | .100 |      |
| A <sub>2</sub> | .007       | .080 |      | .007     | .080 |      | .007      | .080  |      | .007     | .075 |      |
| B              | .033       | .039 | 7    | .033     | .039 | 7    | .033      | .039  | 7    | —        | —    | 7    |
| B <sub>1</sub> | .022       | .028 |      | .022     | .028 |      | .022      | .028  |      | .022     | .028 |      |
| B <sub>2</sub> | .022       | .041 |      | .022     | .041 |      | .022      | .041  |      | .022     | .041 |      |
| D              | .739       | .761 | 8    | .938     | .962 | 8    | 1.135     | 1.165 | 8    | .395     | .410 | 8    |
| D <sub>1</sub> | .699       | .721 |      | .898     | .922 |      | 1.095     | 1.125 |      | .358     | .367 |      |
| D <sub>2</sub> |            |      |      |          |      |      |           |       |      |          |      |      |
| D <sub>3</sub> | .600       |      | 8    | .800     |      | 8    | 1.000     |       | 8    | .250     |      | 8    |
| D <sub>4</sub> | .720 REF   |      |      | .920 REF |      |      | 1.120 REF |       |      | .370 REF |      |      |
| E              | .495       | .560 |      | .495     | .862 |      | .495      | 1.065 |      | .352     | .408 |      |
| E <sub>1</sub> | .739       | .761 | 8    | .938     | .962 | 8    | 1.135     | 1.165 | 8    | .395     | .410 | 8    |
| E <sub>2</sub> | .699       | .721 |      | .898     | .922 |      | 1.095     | 1.125 |      | .358     | .367 |      |
| E <sub>3</sub> |            |      |      |          |      |      |           |       |      |          |      |      |
| E <sub>4</sub> | .600       |      | 8    | .800     |      | 8    | 1.000     |       | 8    | .250     |      | 8    |
| e              | .720 REF   |      |      | .920 REF |      |      | 1.120 REF |       |      | .370 REF |      |      |
| h              | .495       | .560 |      | .495     | .862 |      | .495      | 1.065 |      | .352     | .408 |      |
| h <sub>1</sub> | .050 BSC   |      | 4    | .050 BSC |      | 4    | .050 BSC  |       | 4    | .050 BSC |      | 4    |
| h <sub>2</sub> | .040 BSC   |      |      | .040 BSC |      |      | .040 BSC  |       |      | .040 BSC |      |      |
| i              | .010       | .020 |      | .010     | .020 |      | .010      | .020  |      | .010     | .020 |      |
| i <sub>1</sub> | .040 BSC   |      | 9    | .040 BSC |      | 9    | .040 BSC  |       | 9    | .040 BSC |      | 9    |
| i <sub>2</sub> |            |      |      |          |      |      |           |       |      |          |      |      |
| L              | .010       | .020 |      | .010     | .020 |      | .010      | .020  |      | .010     | .020 |      |
| L <sub>1</sub> | .045       | .055 | 5    | .045     | .055 | 5    | .045      | .055  | 5    | .045     | .055 | 5    |
| L <sub>2</sub> | .077       | .093 |      | .077     | .093 |      | .077      | .093  |      | .077     | .093 |      |
| N              | .045       | .055 |      | .045     | .055 |      | .045      | .055  |      | —        | —    |      |
| R <sub>1</sub> | 52         |      | 3    | 68       |      | 3    | 84        |       | 3    | 24       |      | 3    |
| R <sub>2</sub> | .007       | .011 |      | .007     | .011 |      | .007      | .011  |      | .007     | .011 |      |

STANDARD

| SYMBOL         | VARIATIONS |       |      |           |       |      |           |       |      |          |       |      |
|----------------|------------|-------|------|-----------|-------|------|-----------|-------|------|----------|-------|------|
|                | CE         |       | NOTE | CF        |       | NOTE | CG        |       | NOTE | CH       |       | NOTE |
|                | MIN.       | MAX.  |      | MIN.      | MAX.  |      | MIN.      | MAX.  |      | MIN.     | MAX.  |      |
| A              | 94         | 2.23  | 11   | .94       | 2.23  | 11   | 94        | 2.23  | 11   | .44      | 2.23  | 11   |
| A <sub>1</sub> | 2.09       | 3.04  |      | 2.09      | 3.04  |      | 2.09      | 3.04  |      | 1.63     | 2.54  |      |
| A <sub>2</sub> | .18        | 2.03  |      | .18       | 2.03  |      | .18       | 2.03  |      | .18      | 1.90  |      |
| B              | .839       | .990  | 7    | .839      | .990  | 7    | .839      | .990  | 7    | —        | —     | 7    |
| B <sub>1</sub> | .559       | .711  |      | .559      | .711  |      | .559      | .711  |      | .559     | .711  |      |
| B <sub>2</sub> | .56        | 1.04  |      | .56       | 1.04  |      | .56       | 1.04  |      | .56      | 1.04  |      |
| D              | 18.78      | 19.32 | 8    | 23.83     | 24.43 | 8    | 28.83     | 29.59 | 8    | 10.04    | 10.41 | 8    |
| D <sub>1</sub> | 17.76      | 18.31 |      | 22.81     | 23.41 |      | 27.82     | 28.57 |      | 9.094    | 9.321 |      |
| D <sub>2</sub> |            |       |      |           |       |      |           |       |      |          |       |      |
| D <sub>3</sub> | 15.24      |       | 8    | 20.32     |       | 8    | 25.40     |       | 8    | 6.35     |       | 8    |
| D <sub>4</sub> | 18.29 REF  |       |      | 23.37 REF |       |      | 28.45 REF |       |      | 9.40 REF |       |      |
| E              | 12.58      | 14.22 |      | 12.6      | 21.8  |      | 12.6      | 27.0  |      | 8.95     | 10.36 |      |
| E <sub>1</sub> | 18.78      | 19.32 | 8    | 23.83     | 24.43 | 8    | 28.83     | 29.59 | 8    | 10.04    | 10.41 | 8    |
| E <sub>2</sub> | 17.76      | 18.31 |      | 22.81     | 23.41 |      | 27.82     | 28.57 |      | 9.094    | 9.321 |      |
| E <sub>3</sub> |            |       |      |           |       |      |           |       |      |          |       |      |
| E <sub>4</sub> | 15.24      |       | 8    | 20.32     |       | 8    | 25.40     |       | 8    | 6.35     |       | 8    |
| e              | 18.29 REF  |       |      | 23.37 REF |       |      | 28.45 REF |       |      | 9.40 REF |       |      |
| h              | 12.58      | 14.22 |      | 12.6      | 21.8  |      | 12.6      | 27.0  |      | 8.95     | 10.36 |      |
| h <sub>1</sub> | 1.27 BSC   |       | 4    | 1.27 BSC  |       | 4    | 1.27 BSC  |       | 4    | 1.27 BSC |       | 4    |
| h <sub>2</sub> | 1.02 BSC   |       |      | 1.02 BSC  |       |      | 1.02 BSC  |       |      | 1.02 BSC |       |      |
| i              | .26        | .50   |      | .26       | .50   |      | .26       | .50   |      | .26      | .50   |      |
| i <sub>1</sub> | 1.02 BSC   |       | 9    | 1.02 BSC  |       | 9    | 1.02 BSC  |       | 9    | 1.02 BSC |       | 9    |
| i <sub>2</sub> |            |       |      |           |       |      |           |       |      |          |       |      |
| L              | .26        | .50   |      | .26       | .50   |      | .26       | .50   |      | .26      | .50   |      |
| L <sub>1</sub> | 1.15       | 1.39  | 5    | 1.15      | 1.39  | 5    | 1.15      | 1.39  | 5    | 1.15     | 1.39  | 5    |
| L <sub>2</sub> | 1.96       | 2.36  |      | 1.96      | 2.36  |      | 1.96      | 2.36  |      | 1.96     | 2.36  |      |
| N              | 1.15       | 1.39  |      | 1.15      | 1.39  |      | 1.15      | 1.39  |      | —        | —     |      |
| R <sub>1</sub> | 52         |       | 3    | 68        |       | 3    | 84        |       | 3    | 24       |       | 3    |
| R <sub>2</sub> | .178       | .279  |      | .178      | .279  |      | .178      | .279  |      | .178     | .279  |      |

|  |  |            |              |       |
|--|--|------------|--------------|-------|
| JEDEC<br>SOLID STATE PRODUCT<br>OUTLINES | TITLE<br>.050" CENTER<br>LEADLESS TYPE C | ISSUE<br>B | DATE<br>5/90 | MS004 |
|--|--|------------|--------------|-------|