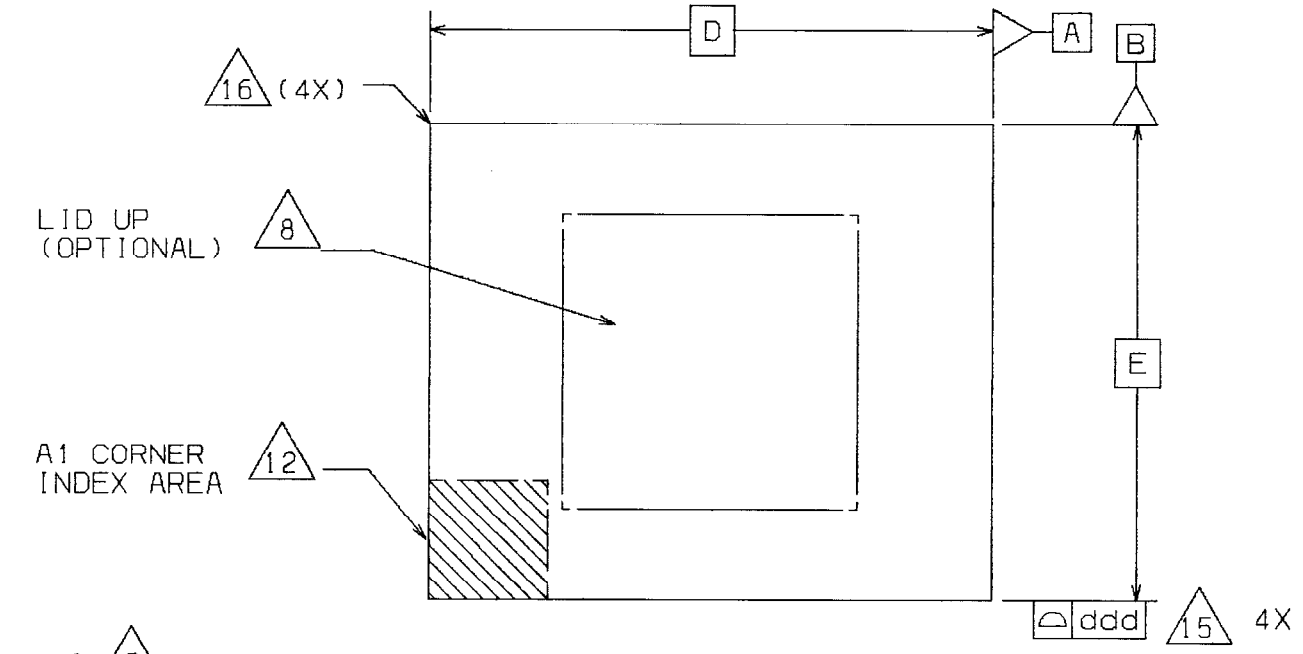
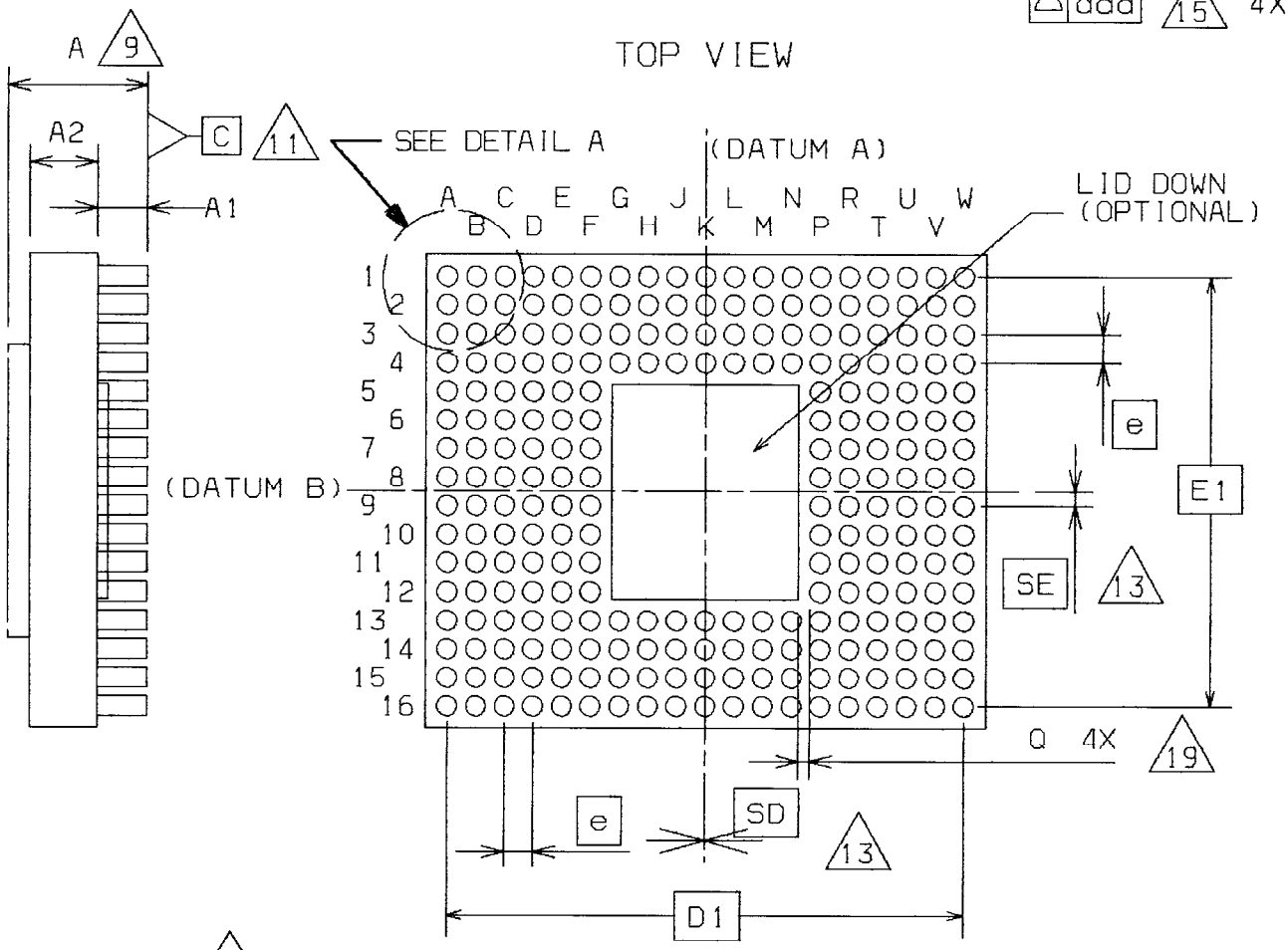


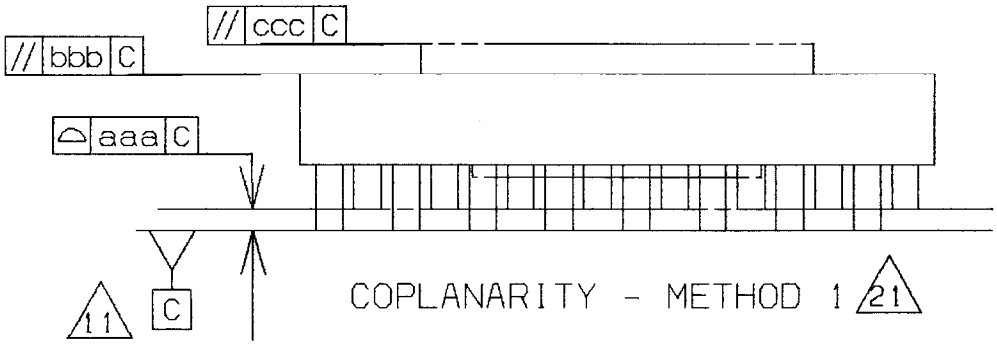
TOP VIEW



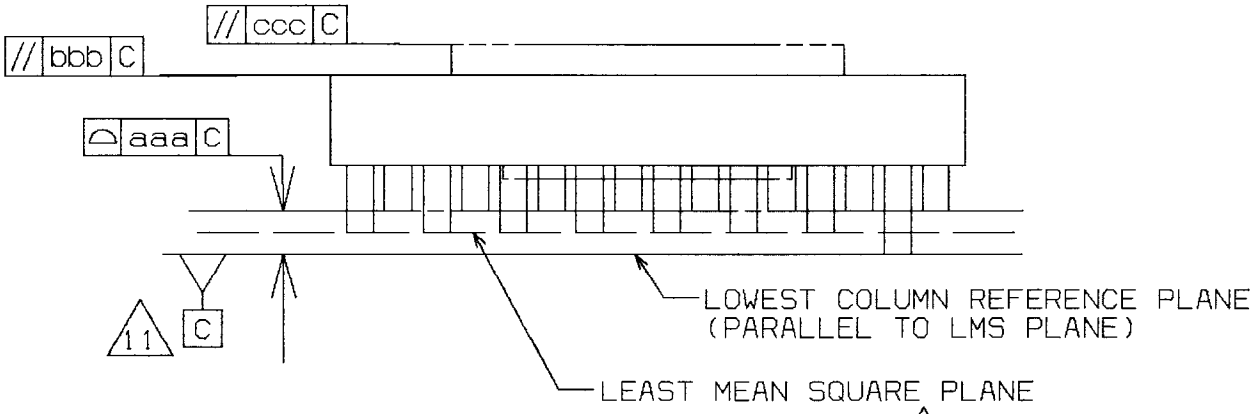
PATENT CLAIM 17

BOTTOM VIEW

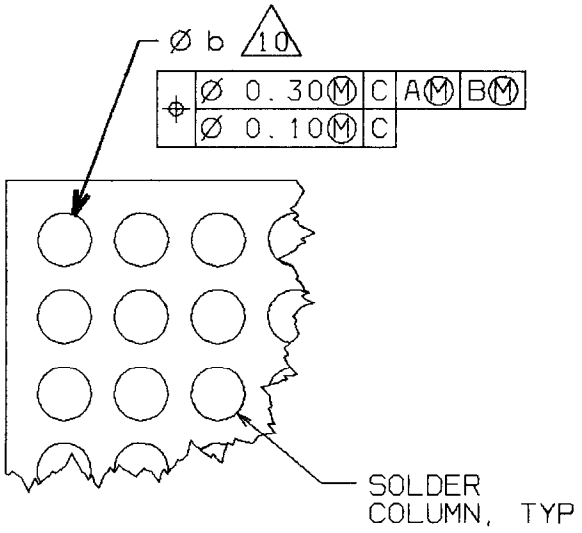
JEDEC SOLID STATE PRODUCT OUTLINE	THIS *REGISTERED OUTLINE* HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.					
TITLE CERAMIC COLUMN GRID ARRAY FAMILY – RECTANGULAR	R-CBGA-X/CCGA	ISSUE B	DATE 6/99	MO-159		



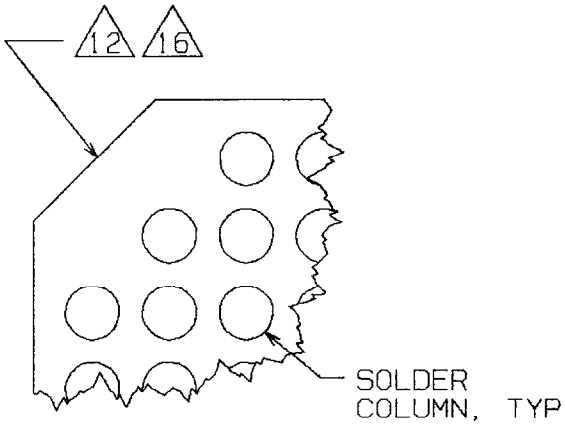
COPLANARITY - METHOD 1 21



COPLANARITY - METHOD 2 21



DETAIL A



DETAIL A
CORNER A1
OPTIONAL CONFIGURATION

JEDEC SOLID STATE PRODUCT OUTLINES	TITLE R-CBGA-X/CCGA CERAMIC COLUMN GRID ARRAY FAMILY - RECTANGULAR	ISSUE B	DATE 6/99	MO-159	2 OF 6

COMMON DIMENSION TABLE										
SYMBOL	e = 1.50			e = 1.27			e = 1.00			NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	
A	2.30	--	7.40	2.30	--	7.40	2.30	--	7.40	9
A1	2.00	2.20	2.40	2.00	2.20	2.40	2.00	2.20	2.40	
A2	0.30	--	5.00	0.30	--	5.00	0.30	--	5.00	
b	0.45	0.55	0.65	0.45	0.55	0.65	0.41	0.51	0.61	10
Q	0.50	--	--	0.50	--	--	0.50	--	--	19
REF.	10-371			10-371			10-371			
ISSUE	B			B			B			

TOLERANCES OF FORM AND POSITION				
SYMBOL	e = 1.50	e = 1.27	e = 1.00	NOTES
aaa	0.15	0.15	0.15	21
bbb	0.25	0.25	0.25	
ccc	0.35	0.35	0.35	
ddd	0.20	0.20	0.20	15
REF.	10-337	10-337	10-337	
ISSUE	A	A	A	

VARIATION TABLES

D	E	e	M	N	D1	SD	E1	SE	VAR.
32.50	25.00	1.50	21x16	336	30.00	0.00	22.50	0.75	AA-1
42.50	32.50	1.50	28x21	588	40.50	0.75	30.00	0.00	AB-1
32.50	25.00	1.27	25x19	475	30.48	0.00	22.86	0.00	BA-1
42.50	32.50	1.27	33x25	825	40.64	0.00	30.48	0.00	BB-1
32.50	25.00	1.00	31x24	744	30.00	0.00	23.00	0.50	CA-1
42.50	32.50	1.00	42x31	1302	41.00	0.50	30.00	0.00	CB-1
NOTE			5	6		13		13	
REF.	10-337								
ISSUE	A								

D	E	e	M-1	N	D1	SD	E1	SE	VAR.
32.50	25.00	1.50	20x15	300	28.50	0.75	21.00	0.00	AA-2
42.50	32.50	1.50	27x20	540	39.00	0.00	28.50	0.75	AB-2
32.50	25.00	1.27	24x18	432	29.21	0.635	21.59	0.635	BA-2
42.50	32.50	1.27	32x24	768	39.37	0.635	29.21	0.635	BB-2
32.50	25.00	1.00	30x23	690	29.00	0.50	22.00	0.00	CA-2
42.50	32.50	1.00	41x30	1230	40.00	0.00	29.00	0.50	CB-2
NOTE				6		13		13	
REF.	10-371								
ISSUE	B								

NOTES

1 ALL DIMENSIONING AND TOLERANCING CONFORMS TO ASME Y14.5-1994.

2 ALL DIMENSIONS ARE IN MILLIMETERS.

3 SOLDER COLUMN POSITION DESIGNATION PER JEDEC PUBLICATION 95-1 STANDARD PROCEDURES AND PRACTICES SPP-010.

4 "e" REPRESENTS THE BASIC SOLDER COLUMN GRID PITCH.

5 "M" REPRESENTS THE MAXIMUM SOLDER COLUMN MATRIX SIZE.

6 "N" REPRESENTS THE MAXIMUM ALLOWABLE NUMBER OF SOLDER COLUMNS.

7 21 X 16 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.

8 LID MAY EXTEND TO PERIPHERY OF PACKAGE AND MAY CONSIST OF CERAMIC, METAL, OR OTHER MATERIAL. LID MAY EXTEND ABOVE/BELOW PACKAGE BODY SURFACE.

9 THIS DIMENSION INCLUDES STANDOFF HEIGHT "A1", PACKAGE BODY THICKNESS AND LID HEIGHT, BUT DOES NOT INCLUDE ATTACHED FEATURES, e.g., EXTERNAL HEAT SINK OR CHIP CAPACITORS. AN INTEGRAL HEAT SLUG IS NOT CONSIDERED AN ATTACHED FEATURE.

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

11 PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE ENDS OF THE SOLDER COLUMNS.

12 THE A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY, LID, OR INTEGRAL HEAT SLUG. IF THE OPTIONAL CHAMFERED CORNER IS USED, THE MAXIMUM NUMBER OF SOLDER COLUMNS N MAY BE REDUCED.

13 [SD/SE] IS MEASURED WITH RESPECT TO DATUM A AND B AND DEFINES THE POSITION OF THE CENTER SOLDER COLUMN IN THE OUTER ROW. WHEN THERE IS AN ODD NUMBER OF SOLDER COLUMNS IN THE OUTER ROW, [SD/SE] = 0.00 MM; WHEN THERE IS AN EVEN NUMBER OF SOLDER COLUMNS IN THE OUTER ROW, [SD/SE] = [e/2].

14 SOLDER COLUMN ARRAY MAY BE DEPOPULATED BY ANY METHOD, PROVIDED THERE IS NO PATTERN SHIFTING. DEPOPULATION IS THE OMISSION OF SOLDER COLUMNS FROM A FULL MATRIX.

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

16 EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

17 INTERNATIONAL BUSINESS MACHINES CORPORATION HAS STATED THAT U.S. PATENT #4,914,814 MAY RELATE TO CERTAIN FEATURES OF THIS PACKAGE OUTLINE. LICENSING OF THIS TECHNOLOGY IS AVAILABLE IN COMPLIANCE WITH PARAGRAPH 3.4(2) OF EIA ENGINEERING PUBLICATION EP-7A.

18 THERE SHALL BE A MINIMUM CLEARANCE OF 0.25mm BETWEEN THE EDGE OF THE SOLDER COLUMN AND THE BODY EDGE. FOR SOME VARIATIONS WITH MAXIMIZED SOLDER COLUMN COUNTS, IT MAY BE NECESSARY TO TIGHTEN THE ALLOWED BODY TOLERANCE, SOLDER COLUMN SIZE TOLERANCE, OR SOLDER COLUMN POSITIONAL TOLERANCE TO MEET THE 0.25mm MINIMUM OVERHANG REQUIREMENT.

19 Q IS THE MINIMUM CLEARANCE BETWEEN THE LID EDGE AND THE INNER ROW OF SOLDER COLUMNS ON CAVITY DOWN CONFIGURATIONS.

APPLICATION NOTES:

20 THE COMPONENT MANUFACTURER SHOULD INSURE SOLDER COLUMN GEOMETRIES AND METALURGY ARE COORDINATED FOR PROPER INTERCONNECT COMPLIANCY.

21 COPLANARITY METHOD 1 IS THE PREFERRED METHODOLOGY. METHOD 2 IS AN ACCEPTABLE ALTERNATIVE PROVIDED THE RESULTS OBTAINED CORRELATE TO METHOD 1.