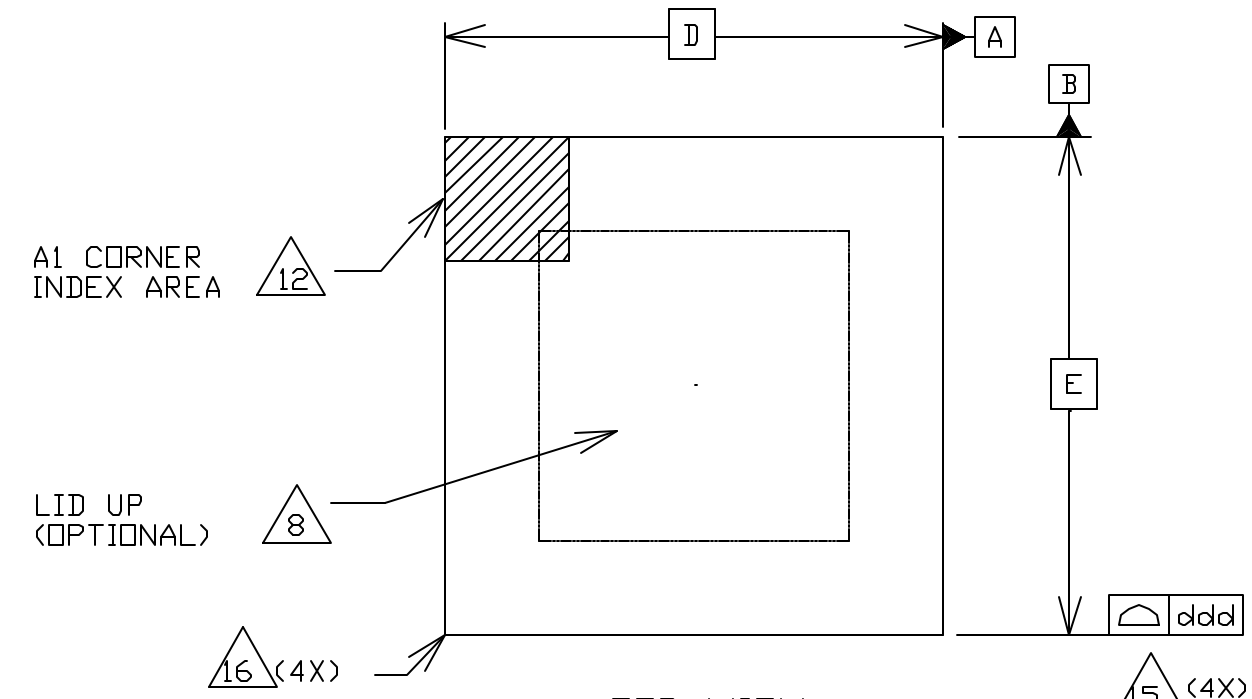
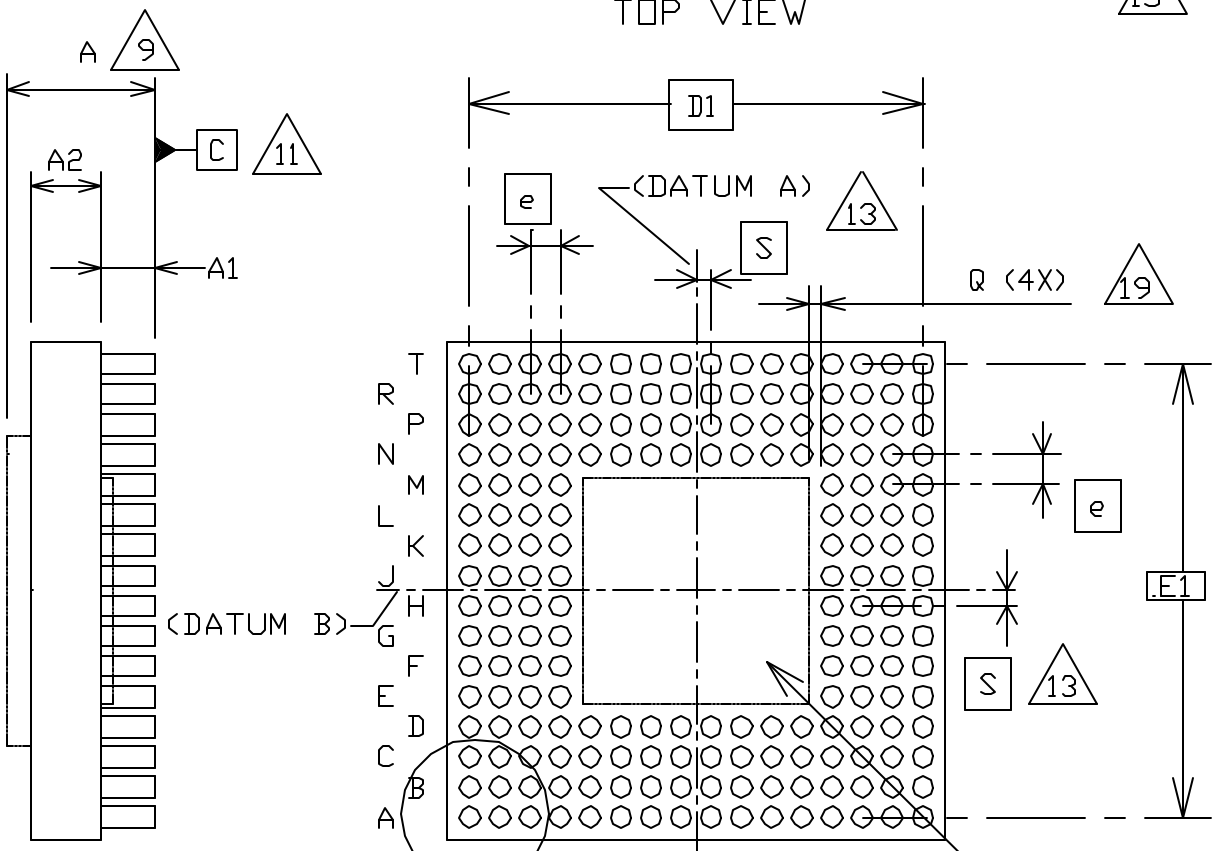


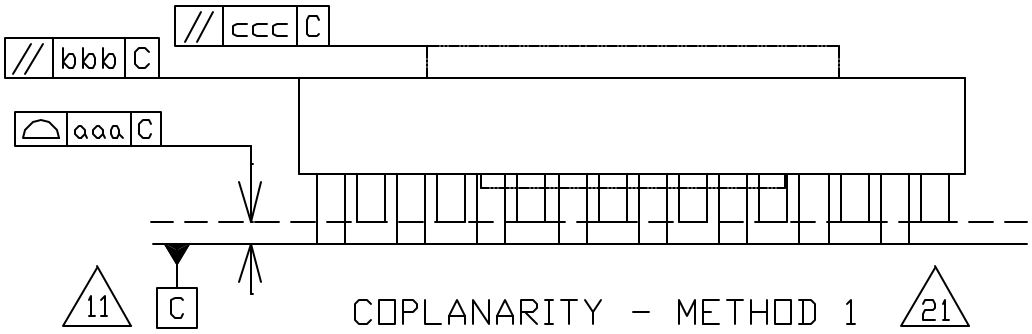
TOP VIEW



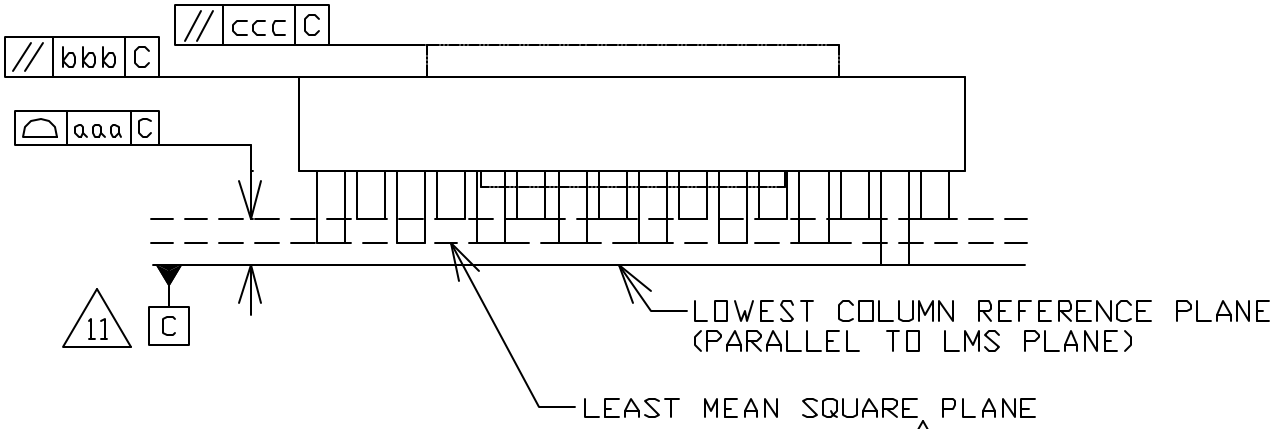
BOTTOM VIEW

PATENT CLAIM 17

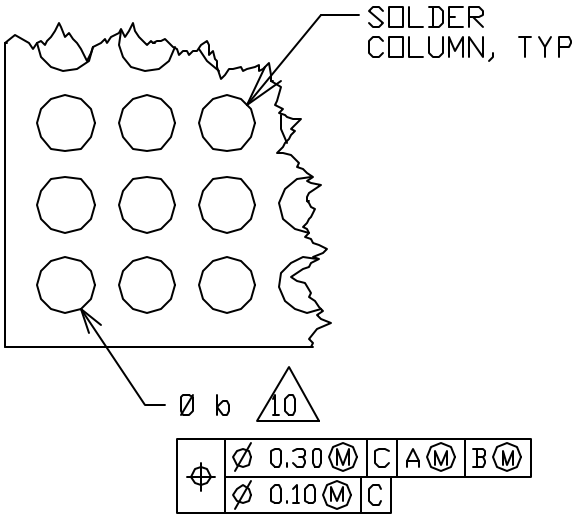
JEDEC SOLID STATE PRODUCT OUTLINE	THIS *REGISTERED OUTLINE* HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.					
TITLE CERAMIC COLUMN GRID ARRAY FAMILY - SQUARE	JESD-30 DESIGNATOR CBGA-X/CCGA	ISSUE D	DATE April 2002	MO-158		



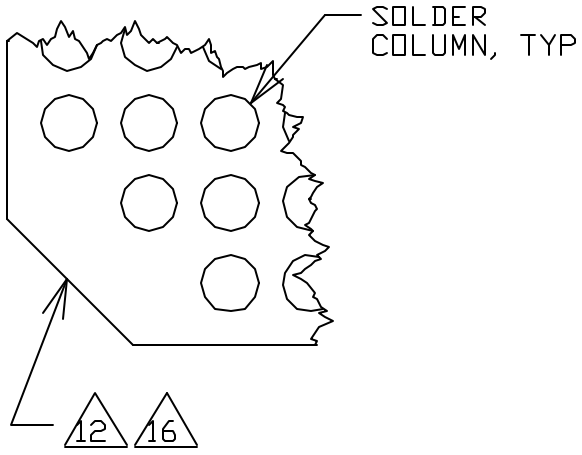
COPLANARITY - METHOD 1



COPLANARITY - METHOD 2 21



DETAIL A



DETAIL A
CORNER A1
OPTIONAL CONFIGURATION

JEDEC SOLID STATE PRODUCT OUTLINES	TITLE CBGA-X/CCGA CERAMIC COLUMN GRID ARRAY FAMILY - SQUARE	ISSUE D	DATE April 2002	MO-158	2 OF 8

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.	10-372			10-372			10-372			
ISSUE	C			C			C			

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.	10-338	10-338	10-338	
ISSUE	A	A	A	

VARIATIONS TABLE

D / E	e = 1.50									
	M	N	D1/E1	S	VAR.	M-1	N	D1/E1	S	VAR.
25.0	16	256	22.50	0.75	AA-1	15	225	21.00	0.00	AA-2
27.0	18	324	25.50	0.75	AB-1	17	289	24.00	0.00	AB-2
29.0	19	361	27.00	0.00	AC-1	18	324	25.50	0.75	AC-2
31.0	20	400	28.50	0.75	AD-1	19	361	27.00	0.00	AD-2
32.5	21	441	30.00	0.00	AE-1	20	400	28.50	0.75	AE-2
33.0	22	484	31.50	0.75	AF-1	21	441	30.00	0.00	AF-2
35.0	23	529	33.00	0.00	AG-1	22	484	31.50	0.75	AG-2
37.5	25	625	36.00	0.00	AH-1	24	576	34.50	0.75	AH-2
40.0	26	676	37.50	0.75	AJ-1	25	625	36.00	0.00	AJ-2
42.5	28	784	40.50	0.75	AK-1	27	729	39.00	0.00	AK-2
45.0	30	900	43.50	0.75	AL-1	29	841	42.00	0.00	AL-2
NOTE	5	6		13			6		13	
REF.	10-338					10-372				
ISSUE	A					C				

VARIATIONS TABLE

D / E	e = 1.27									
	M	N	D1/E1	S	VAR.	M-1	N	D1/E1	S	VAR.
25.0	19	361	22.86	0.000	BA-1	18	324	21.59	0.635	BA-2
27.0	21	441	25.40	0.000	BB-1	20	400	24.13	0.635	BB-2
29.0	22	484	26.67	0.635	BC-1	21	441	25.40	0.000	BC-2
31.0	24	576	29.21	0.635	BD-1	23	529	27.94	0.000	BD-2
32.5	25	625	30.48	0.000	BE-1	24	576	29.21	0.635	BE-2
33.0	25	625	30.48	0.000	BF-1	24	576	29.21	0.635	BF-2
35.0	27	729	33.02	0.000	BG-1	26	676	31.75	0.635	BG-2
37.5	29	841	35.56	0.000	BH-1	28	784	34.29	0.635	BH-2
40.0	31	961	38.10	0.000	BJ-1	30	900	36.83	0.635	BJ-2
42.5	33	1089	40.64	0.000	BK-1	32	1024	39.37	0.635	BK-2
43.5	34	1156	41.91	0.635	BM-1	33	1089	40.64	0.000	BM-2
45.0	35	1225	43.18	0.000	BL-1	34	1156	41.91	0.635	BL-2
47.5	37	1369	45.72	0.000	BN-1	36	1296	44.45	0.635	BN-2
50.0	39	1521	48.26	0.000	BP-1	38	1444	46.99	0.635	BP-2
52.5	41	1681	50.80	0.000	BR-1	40	1600	49.53	0.635	BR-2
55.0	43	1849	53.34	0.000	BT-1	42	1764	52.07	0.635	BT-2
NOTE	5	6		13			6		13	
REF.	11.10-415					11.10-415				
ISSUE	D					D				

VARIATIONS TABLE

D / E	e = 1.00									
	M	N	D1/E1	S	VAR.	M-1	N	D1/E1	S	VAR.
25.0	24	576	23.00	0.50	CA-1	23	529	22.00	0.00	CA-2
27.0	26	676	25.00	0.50	CB-1	25	625	24.00	0.00	CB-2
29.0	28	784	27.00	0.50	CC-1	27	729	26.00	0.00	CC-2
31.0	30	900	29.00	0.50	CD-1	29	841	28.00	0.00	CD-2
32.5	31	961	30.00	0.00	CE-1	30	900	29.00	0.50	CE-2
33.0	32	1024	31.00	0.50	CF-1	31	961	30.00	0.00	CF-2
35.0	34	1156	33.00	0.50	CG-1	33	1089	32.00	0.00	CG-2
37.5	37	1369	36.00	0.00	CH-1	36	1296	35.00	0.50	CH-2
40.0	39	1521	38.00	0.00	CJ-1	38	1444	37.00	0.50	CJ-2
42.5	42	1764	41.00	0.50	CK-1	41	1681	40.00	0.00	CK-2
45.0	44	1936	43.00	0.50	CL-1	43	1849	42.00	0.00	CL-2
47.5	47	2209	46.00	0.00	CM-1	46	2116	45.00	0.50	CM-2
50.0	49	2401	48.00	0.00	CN-1	48	2304	47.00	0.50	CN-2
52.5	52	2704	51.00	0.50	CP-1	51	2601	50.00	0.00	CP-2
55.0	54	2916	53.00	0.00	CR-1	53	2809	52.00	0.50	CR-2
NOTE	5	6		13			6		13	
REF.	11.10-415					11.10-415				
ISSUE	D					D				

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 16 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 [S] 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, [S] = 0.00 MM; WHEN THERE IS AN EVEN NUMBER OF SOLDER COLUMNS IN THE OUTER ROW, [S] = [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 SOLD ER 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.