



**JEDEC Matrix Trays
X, Y and Step Dimensions
See Drawing Last Page**

Updated
Jan 2013

Dimensions are metric (mm)

TopLine does not guarantee the accuracy of this list.

BGA

Type	JEDEC Standard	Var	BGA Body Size	Columns N1	Rows N2	Cells N3	Up Left Corner (+X) M	Up Left Corner (-Y) M1	-Y step M2	+X Step M3
BGA	CO-029	AAA	5mm x 5mm	16	36	576	8.70	8.75	8.50	7.90
BGA	CO-029	AA	7mm x 7mm	13	32	416	11.55	11.80	9.40	9.40
BGA	CO-029	AAB	8mm x 8mm	12	29	348	10.75	11.90	10.40	10.40
BGA	CO-029	AB	9mm x 9mm	10	26	260	16.65	15.00	11.40	11.40
BGA	CO-029	AY	10mm x 10mm	10	24	240	9.00	9.15	12.90	13.10
BGA	CO-029	AC	11mm x 11mm	8	22	176	17.20	16.80	13.40	14.50
BGA	CO-029	AZ	12mm x 12mm	9	21	189	9.55	10.00	14.75	14.60
BGA	CO-029	AD	13mm x 13mm	8	20	160	15.45	15.00	15.00	15.00
BGA	CO-029	AE	15mm x 15mm	7	18	126	16.35	11.30	17.20	17.20
BGA	CO-029	AF	17mm x 17mm	6	15	90	19.20	21.00	19.50	19.50
BGA	CO-029	AG	19mm x 19mm	6	14	84	14.60	18.79	21.34	21.34
BGA	CO-029	AH	21mm x 21mm	5	12	60	20.15	26.05	23.90	23.90
BGA	CO-029	AJ	23mm x 23mm	5	12	60	16.95	17.25	25.50	25.50
BGA	CO-029	AK	25mm x 25mm	4	11	44	26.70	20.00	27.50	27.50
BGA	CO-029	AL	27mm x 27mm	4	10	40	24.15	26.10	29.20	29.20
BGA	CO-029	AM	29mm x 29mm	4	9	36	20.85	31.10	31.60	31.40
BGA	CO-029	AN	31mm x 31mm	3	9	27	25.05	21.90	33.60	42.90
BGA	CO-029	AP	33mm x 33mm	3	8	24	32.45	33.25	35.50	35.50
BGA	CO-029	AR	35mm x 25mm	3	8	24	29.95	24.50	38.00	38.00
BGA	CO-029	AX	37.5mm x 37.5mm	3	7	21	27.95	37.50	40.00	40.00
BGA	CO-029	AT	40mm x 40mm	3	7	21	25.65	30.60	42.30	42.30
BGA	CO-029	AU	42.5mm x 42.5mm	2	6	12	26.70	43.75	45.50	82.50
BGA	CO-029	AV	45mm x 45mm	2	6	12	30.00	30.00	51.00	75.90
BGA	CO-029	AW	47.5mm x 47.5mm	2	6	12	30.00	31.25	50.50	75.90
BGA	CO-029	AX	50mm x 50mm	2	5	12	41.45	51.50	53.00	53.00
RECTANGULAR PACKAGE										
BGA	CO-029	BF	16mm x 8mm	9	20	180	8.20	12.60	20.70	11.95
BGA	CO-029	BG	13mm x 11mm	11	15	165	9.55	10.25	15.50	14.60
BGA	CO-029	BE	22mm x 14mm	8	12	96	11.60	24.95	24.10	16.10
BGA	CO-029	BA	22mm x 14mm	7	12	84	12.75	23.30	24.40	18.40
BGA	CO-029	BB	21mm x 18.5mm	6	13	78	14.60	16.50	23.50	21.34
BGA	CO-029	BC	25mm x 21mm	5	11	55	20.95	20.00	27.50	23.50
BGA	CO-029	BD	32.5mm x 25mm	4	8	32	26.70	33.25	35.50	27.50



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Dimensions in mm

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QFP, TQFP, LQFP

Metric Type	JEDEC Standard	Var	QFP Body Size	columns N1	Rows N2	Cells N3	From Corner (+X) M	From Corner (-Y) M1	-Y step M2	+X Step M3
TQFP	CS-007	AA	5mm Square	12	30	360	10.20	11.05	10.10	10.50
TQFP	CS-007	AB	7mm Square	10	25	250	11.25	11.10	12.20	12.60
QFP	CS-004	AA	10mm Square	6	16	96	18.30	17.25	18.70	19.86
TQFP	CS-007	AC	10mm Square	8	20	160	13.00	13.10	15.20	15.70
TQFP	CS-007	AJ	12mm Square	7	17	119	13.95	14.30	17.90	18.00
QFP	CS-004	AB	14mm Square	6	14	84	15.45	17.75	21.50	21.00
TQFP	CS-007	AE	14mm Square	6	15	90	15.45	15.40	20.30	21.00
TQFP	CS-007	AG	20mm Square	5	12	60	17.55	17.80	25.40	25.20
TQFP	CS-007	AH	24mm Square	4	10	40	20.70	20.70	30.40	31.50
QFP	CS-004	AD	28mm Square	3	8	24	30.93	27.93	37.02	37.02
TQFP	CS-007	AJ	28mm Square	4	9	36	19.65	28.70	32.20	32.20
QFP	CS-004	AE	32mm Square	3	8	24	26.57	25.13	37.82	41.38
QFP	CS-004	AF	40mm Square	2	6	12	29.22	31.10	50.56	77.46
QFP	CS-004	AC	14mm x 20mm	6	11	66	15.45	22.50	27.00	21.00
TQFP	CS-007	AF	14mm x 20mm	6	12	72	15.45	17.80	25.40	21.00

BQFP

Bumpered Type	JEDEC Standard	Var	Size Lead Count	columns N1	Rows N2	Cells N3	From Corner (+X) M	From Corner (-Y) M1	-Y step M2	+X Step M3
			BQFP - PQFP							
BQFP	CS-002	AC	100 PIN	5	11	55	17.81	19.05	27.69	25.07
BQFP	CS-002	AD	132 PIN	4	9	36	20.94	23.98	33.38	31.34

QFN

Bumpered Type	JEDEC Standard	Var	Size Lead Count	columns N1	Rows N2	Cells N3	From Corner (+X) M	From Corner (-Y) M1	-Y step M2	+X Step M3
			BQFP - PQFP							
QFN	CO-034	AA	3x3mm ~ 6x6mm	14	35	490	8.15	7.90	8.80	9.20
QFN	CO-034	AB	7x7mm ~ 9x9mm	10	26	260	10.35	10.00	11.80	12.80
QFN	CO-034	AC	10x10mm ~ 12x12mm	8	21	168	11.95	11.00	14.65	16.00
BGA	CO-029	AZ	12mm x 12mm	9	21	189	9.55	10.00	14.75	14.60



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Dimensions in mm

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TSOP (T1)

Type 1	JEDEC Standard	Var	Body Size	Columns N1	Rows N2	Cells N3	Corner (+X) M	Corner (-Y) M1	-Y step M2	+X Step M3
TSOP (I)	CS-008	AA	6 X14mm (24L)	16	15	256	8.70	15.00	19.00	7.90
TSOP (I)	CS-008	AB	6 x16mm (24L)	16	15	240	8.70	14.00	20.50	7.90
TSOP (I)	CS-008	AC	6 x 18mm (24L)	16	13	208	8.70	16.50	23.50	7.90
TSOP (I)	CS-008	AD	6 x 20mm (24L)	16	12	192	8.70	17.25	25.50	7.90
TSOP (I)	CS-008	BA	8 x 14mm (32L)	13	16	208	8.85	15.00	19.00	9.85
TSOP (I)	CS-008	BB	8 x 16mm (32L)	13	15	195	8.85	14.00	20.50	9.85
TSOP (I)	CS-008	BC	8 x 18mm (32L)	13	13	169	8.85	16.50	23.50	9.85
TSOP (I)	CS-008	BD	8 x 20mm (32L)	13	12	156	8.85	14.50	26.00	9.85
TSOP (I)	CS-008	CA	10 x 14mm (40L)	10	16	160	14.40	15.00	19.00	11.90
TSOP (I)	CS-008	CB	10 x 16mm (40L)	10	15	150	14.40	14.00	20.50	11.90
TSOP (I)	CS-008	CC	10 x 18mm (40L)	10	13	130	14.40	16.50	23.50	11.90
TSOP (I)	CS-008	CD	10 x 20mm (40L)	10	12	120	14.40	17.25	25.50	11.90
TSOP (I)	CS-008	DA	12 x 14mm (48L)	8	16	128	15.80	15.00	19.00	14.90
TSOP (I)	CS-008	DB	12 x 16mm (48L)	8	15	120	15.80	14.00	20.50	14.90
TSOP (I)	CS-008	DC	12 x 18mm (48L)	8	13	104	15.80	16.50	23.50	14.90
TSOP (I)	CS-008	DD	12 x 20mm (48L)	8	12	96	15.80	17.25	25.50	14.90
TSOP (I)	CS-008	EA	14 x 16mm (56L)	7	16	112	18.15	15.75	18.90	16.60
TSOP (I)	CS-008	EB	14 x 18mm (56L)	7	14	98	18.15	21.65	20.90	16.60
TSOP (I)	CS-008	EC	14 x 20mm (56L)	7	13	91	18.15	20.10	22.90	16.60

TSOP (T2)

Type 2	JEDEC Standard	Var	Lead Count and Body Size	Columns N1	Rows N2	Cells N3	Up Left Corner (+X) M	Up Left Corner (-Y) M1	-Y step M2	+X Step M3
TSOP(II)	CS-005	AA	7.62 x 17.14mm	11	16	176	12.30	13.95	19.14	11.13
TSOP(II)	CS-005	AB	10.16 x 18.41mm	9	15	135	13.27	14.56	20.42	13.67
TSOP(II)	CS-005	AC	10.16 x 20.95mm	9	13	117	13.27	19.74	22.96	13.67
TSOP(II)	CS-005	AE	7.62 x 18.41mm	11	15	165	12.30	14.56	20.42	11.13
TSOP(II)	CS-005	AF	10.16 x 22.22 (23.5)mm	9	12	108	13.27	15.60	25.80	13.67
TSOP(II)	CS-005	AG	10.16 x 26.03mm	9	11	99	13.27	16.50	28.20	13.67



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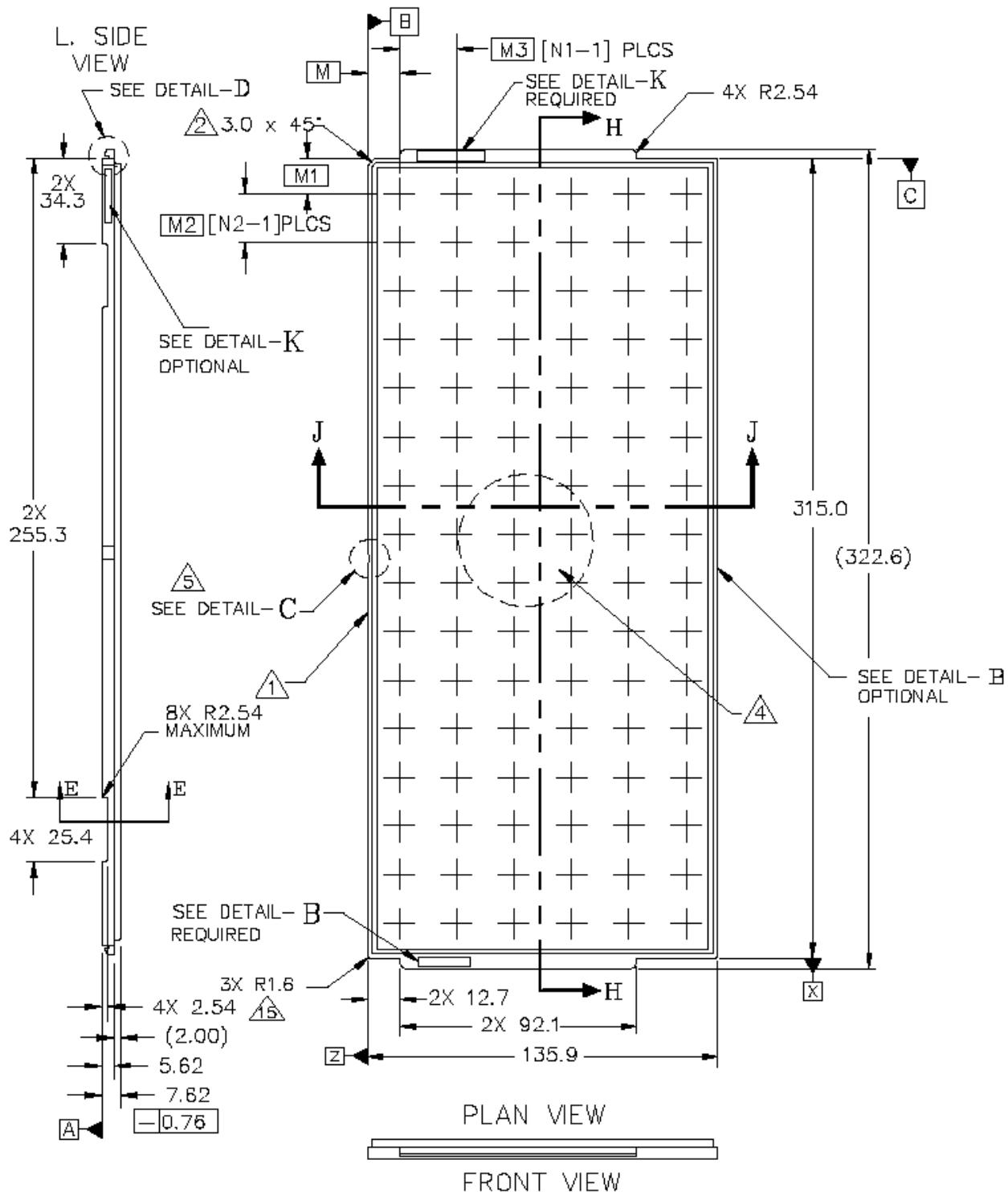
Dimensions in mm (Inch)

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PLCC

Type	JEDEC Standard	Var	PLCC Pin Count	columns N1	Rows N2	Cells N3	Up Left Corner (+X) M	Up Left Corner (-Y) M1	-Y step M2	+X Step M3
PLCC	CO-016	AG	44 Square	4	10	40	0.899"	1.180"	1.180"	1.184"
PLCC	CS-003	AG	44 Square	4	10	40	16.5mm	23.73mm	20.58mm	20.58mm
PLCC	CO-016	AH	52 Square	4	9	36	0.869"	1.307"	1.307"	1.204"
PLCC	CS-003	AH	52 Square	4	9	36	21.71mm	18.78mm	23.12mm	23.12mm
PLCC	CO-016	AI	68 Square	3	7	21	1.079"	1.679"	1.679"	1.596"
PLCC	CS-003	AJ	68 Square	3	7	21	25.65mm	30.6mm	28.2mm	28.2mm
PLCC	CO-016	AJ	84 Square	3	7	21	1.070"	1.148"	1.684"	1.605"
PLCC	CS-003	AK	84 Square	3	7	21	34.67mm	24.38mm	33.28mm	33.28mm

Typical JEDEC Outline



XXXX (N4)



XXX°C MAX.

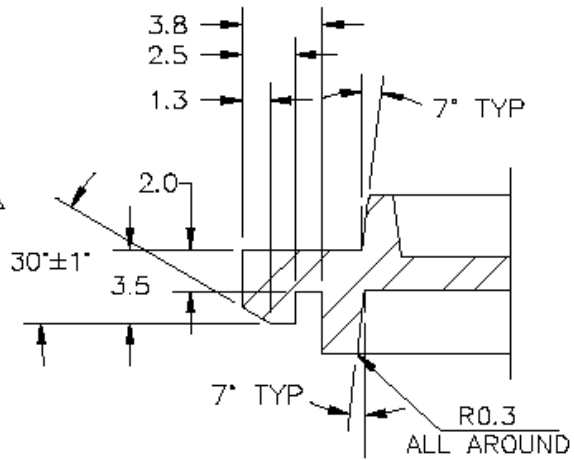


TRAY DESIGNATOR

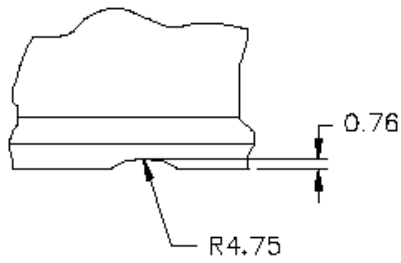
TEMP. RATING

DETAIL~ K

DETAIL~ B

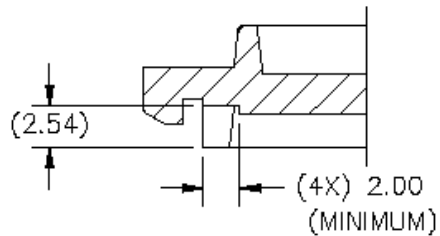


DETAIL~ D



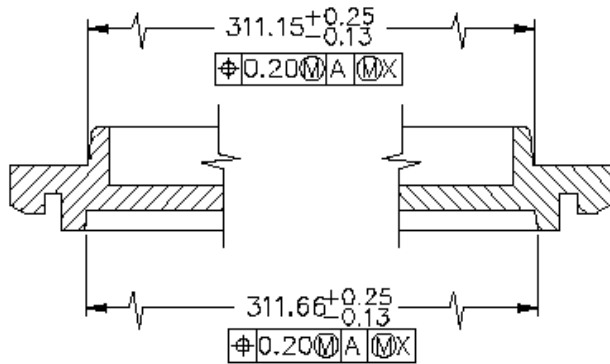
DETAIL~ C

NOTE: SCALLOP IS CENTERED ON SIDE OF TRAY.



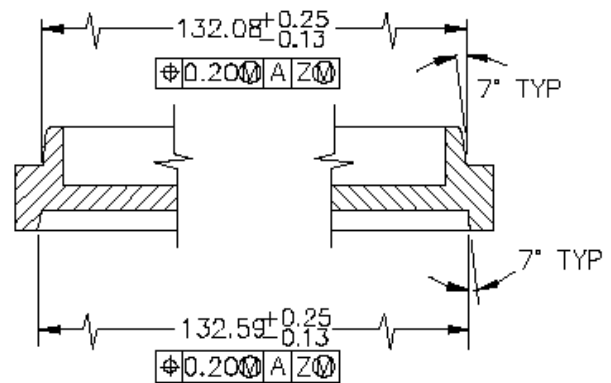
SECTION~ E-E

ROTATED 90° CCW



SECTION~ H-H

ROTATED 90° CCW



SECTION~ J-J

TRAY STACKING DETAIL

NOTES:

- ① THESE SURFACES TO BE FREE OF SEAMS.
- ② CHAMFER DENOTES PACKAGE PIN 1 ORIENTATION.
- 3 TRAY VACUUM PICKUP METHOD ALLOWS TWO SEPARATE PICKUP AREAS, RESULTING IN TWO CLOSED CELLS PER TRAY. OPTIONAL VACUUM PICKUP CELL LOCATIONS ARE N5.
- ④ TRAY VACUUM PICKUP METHOD REQUIRES A 28mm SQUARE (MINIMUM) WALLED PICKUP AREA, LOCATED AS CLOSE TO THE CENTER OF THE TRAY AS IS PRACTICAL. CENTER VACUUM PICKUP CELL LOCATIONS ARE N6.
- ⑤ THE SCALLOP ALLOWS THE USE OF A PIN TO MECHANICALLY BIAS THE TRAY ORIENTATION.
- 6 ALL TRAY MEASUREMENTS ARE TO BE MADE WITH THE TRAY UN-RESTRICTED.
- 7 TOTAL USABLE CELLS N3 = N1 x N2
- 8 PACKAGE INTERFACE CONTROLLED BY PACKAGE DESIGN AND LEAD FORM.
- 9 NON-TABULATED DIMENSIONS HAVE A TOLERANCE OF .X=±0.25 .XX=±0.13, ANGLES ±0.5°
- 10 ALL DIMENSIONS ARE IN MILLIMETERS.
- 11 INTERPRET DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.
- ⑫ XXX IS THE MAXIMUM OPERATING TEMPERATURE THE EMPTY TRAY CAN BE SUBJECTED TO FOR 48 CONTINUOUS HOURS WITHOUT VIOLATING THE DIMENSIONAL TOLERANCE OF THE TRAY.
- ⑬ N4 INDICATES PACKAGE TYPE ACCOMMODATED.
- 14 DIMENSIONS M, M1, M2, AND M3 DEFINE THE CENTER LINES FOR THE CELL SITES.
- ⑮ BOTTOM SIDEWALL NOTCHES REQUIRE A 2.00mm (MINIMUM) DEPTH TO FACILITATE AUTO HANDLING EQUIPMENT.
- 16 ALL EXTERNAL TRAY SURFACES WHICH MAY COME IN CONTACT WITH THE DRY PACK BAGS SHALL BE FREE OF SHARP EDGES.
- *17 RECOMMENDED FOR PACKAGES WITH OVERALL THICKNESS OF 1.20mm OR LESS. MAY ACCOMMODATE UP TO A MAXIMUM THICKNESS OF 4.02mm.
- 18 ALL VARIATIONS COMPLY WITH DESIGN GUIDE, PUB 95, SECTION 4.9, REVISION A.