

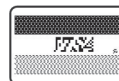


2008 BGA Catalog

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SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
---	General Kit Information			65-66
953	BGA Visual Placement	BALL & BUMP KITS	XK1	67-69
901~909	Flip Chip Kit			70-71
921	BGA46 0.75mm pitch			72-73
963	Universal CSP 0.5/0.75/0.8mm			74-75
981	Universal BGA 0.8/1.0mm pitch			76-77
9981	BGA 1.0mm & 0.8mm pitch			78-79
976	BGA256 1.0mm/SBGA560 1.27mm pitch			80-81
974	LBGA1600/1936 Very Large 1.0mm			82-83
947	Universal BGA Daisy Chain			84-85
937	BGA 256/272 1.27mm pitch			86-87
967	BGA169/225			88-89
946	Universal BGA 1.27/1.5mm pitch			90-91
958	LBGA1225 Very Large 1.27mm			92-93
951	Ceramic CBGA			94-95
986	Lead Free Multicomponents			96-97
919	Large Machine Run	FINE PITCH KITS	XK1	98-99
928	Challenger 2			100-101
950	SMTA SABER Array			102-103
935/936	Stencil Evaluation			104-105
914	Mixed Technology 2	MIXED TECHNOLOGY KITS		118-119 142-143



DUMMY COMPONENT ORDERING INFORMATION

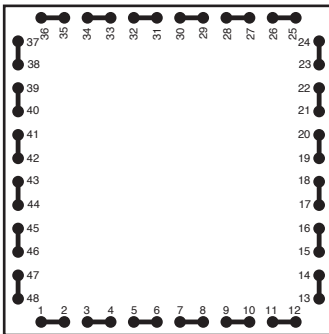
NBR BUMPS	PITCH	BUMP INFORMATION			DIE SIZE METRIC	NOTES	DIE PER BUMPED 5" WAFER QTY	 WAFFLE 2" SQ Tray Part Number	QTY
		HIGH	Ø DIA	MATERIAL					
48	457µm	140	178µm	Eutectic	6.3mm SQ	PB18	236	FC48D6.3E457	25
88	204µm	107	102µm	Eutectic	5.08mm SQ	PB08	340	FC88G5.08E204	36
96	457µm	140	178µm	Eutectic	12.7mm SQ	PB18	46	FC96D12.7E457	9
112	152µm	85	88µm	Eutectic	5.08mm SQ	PB06	340	FC112K5.08E152	36
176	204µm	107	102µm	Eutectic	10.2mm SQ	PB08	81-85	FC176G10E204	9
220	204µm	125	102µm	Eutectic	10.2 x 15.25mm	PB08	45-48	FC220G10x15E204	6
317	254µm	119	102µm	Eutectic	5.08mm SQ	FA10	340	FC317G5.08E254	36
1268	254µm	119	102µm	Eutectic	10.2mm SQ	FA10	81-85	FC1268G10E254	9
2853	254µm	119	102µm	Eutectic	15.0mm SQ	FA10	28	FC2853G15E254	4
5072	254µm	119	102µm	Eutectic	20.0mm SQ	FA10	18	FC5072G20E254	4

PART NUMBERING SYSTEM

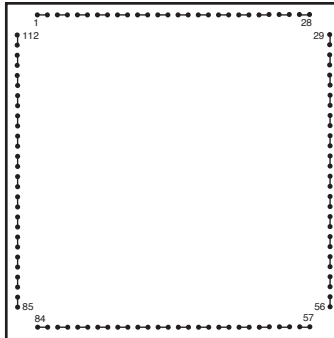
FC 48 D 6.3 E 457 - DC	
Flip Chip FC = Standard Flip Chip FCW = Bumped Wafer FCQ = Quartz Flip Chip FCWQ = Quartz Wafer FCN = Bumpless Chip FCWN = Bumpless Wafer	Die Size In millimeter 6.3 = 6.3mm SQ 10 x 15 = 10mm x 15mm
Number Bumps Actual Count	Bump Pitch in µm (1000m = 1.0µm)
Bump Diameter A = 100 x 127µm B = 115µm SQ C = 160µm D = 190µm E = 56µm SQ	Bump Material E = Eutectic Sn63 G = Gold over Nickel C = Lead Free Sn/Ag/Cu A = Aluminum (Bumpless)
H = 105µm SQ K = 88µm G = 100-135µm R = 100µm SQ T = 50µm SQ	Daisy Chain

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O** Eutectic 63/37 SnPb allows repeatable bump collapse of 25-40µm for a typical 125µm tall bump. Flip Chips are available with daisy chain (-DC). For bumped wafers, change prefix of part number to FCW. For bumpless flip chip for wire bonding, change suffix to FCN.

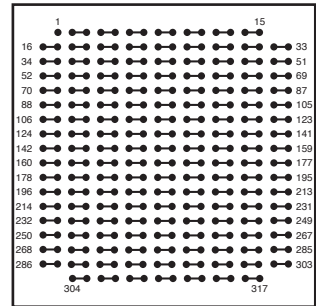
Ⓛ Lead Free available, change "E" to "C" in part number for Sn96.8/Ag2.6/Cu0.6 -SAC266 - Lead Free Eutectic Bumps.



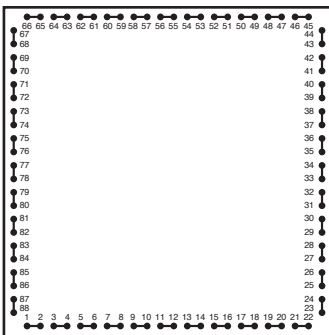
FC48 (PB18 - 250x250)



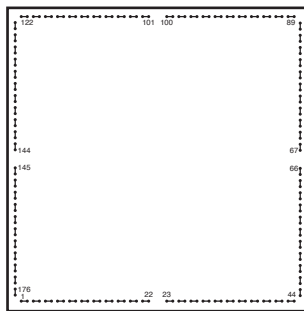
FC112 (PB06 -200x200)



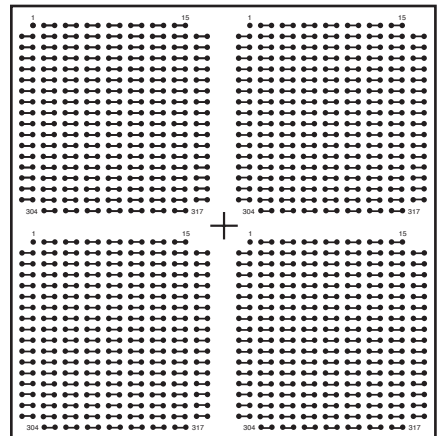
FC317 (FA10-200x200)



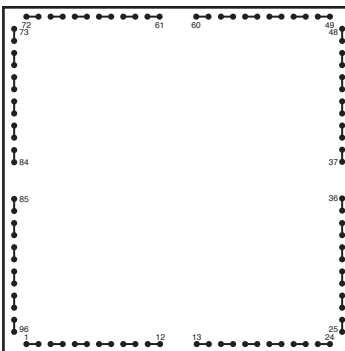
FC88 (PB08 - 200x200)



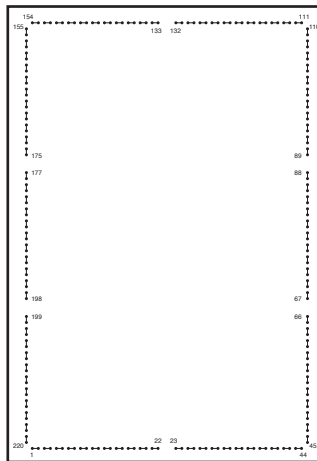
FC176 (PB08 - 400x400)



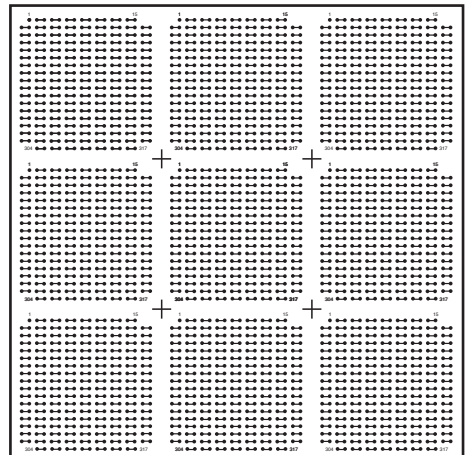
FC1268 (FA10 - 400x400)



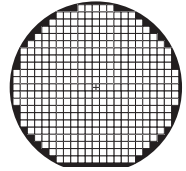
FC96 (PB18 - 500x500)



FC220 (PB08 - 400x600)



FC2853 (FA10 - 600x600)



DUMMY WAFER ORDERING INFORMATION

WAFER DIAMETER	WAFER TYPE	 WAFER IN JAR PART NUMBER	 WAFER IN CASSETTE PART NUMBER	 DIE NITTO TAPE & RING PART NUMBER
4-inch (100mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM4-J WE4- mm x mm - J - -	WM4-C WE4- mm x mm -C - -	- - WMD4- mm x mm -NTR WED4- mm x mm -NTR
5-inch (125mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM5-J WE5- mm x mm - J - -	WM5-C WE5- mm x mm -C - -	- - WMD5- mm x mm -NTR WED5- mm x mm -NTR
6-inch (150mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM6-J WE6- mm x mm - J - -	WM6-C WE6- mm x mm -C - -	- - WMD6- mm x mm -NTR WED6- mm x mm -NTR
8-inch (200mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM8-J WE8- mm x mm - J - -	WM8-C WE8- mm x mm -C - -	- - WMD8- mm x mm -NTR WED8- mm x mm -NTR
12-inch (300mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM12-J - - -	WM12-C WE12-mm x mm-C - -	- - WMD12- mm x mm -NTR WED12-mm x mm -NTR

TYPICAL WAFER THICKNESS BEFORE BACK GRINDING

4" wafer = 525 μ m (20 mils)
 5" wafer = 625 μ m (24 mils)
 6" wafer = 680 μ m (27 mils)
 8" wafer = 725 μ m (29 mils)
 12" wafer = 825 μ m (32 - 33mils)

OPTIONS

Back Grinding: Add suffix -BG after wafer size
in part number
 Blue Nitto Tape = NT suffix
 Blue Nitto Tape & Ring = NTR suffix
 Ultra Violet Tape & Ring = UVR suffix
 Die in 2" Waffle Pack: Add -WP2 to part number
 Etch Die: ED (sawn)
 Mirror Die = MD (sawn)



BGA MAXIMUM BALL COUNT

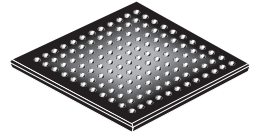
Rows Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
6x6	20	32	36																				
7x7	24	40	49																				
8x8	28	48	60	64																			
9x9	32	56	72	80	81																		
10x10	36	64	84	96	100																		
11x11	40	72	96	112	120	121																	
12x12	44	80	108	128	140	144																	
13x13	48	88	120	144	160	168	169																
14x14	52	96	132	160	180	192	196																
15x15	56	104	144	176	200	216	224	225															
16x16	60	112	156	192	220	240	252	256															
17x17	64	120	168	208	240	264	280	288	289														
18x18	68	128	180	224	260	288	308	320	324														
19x19	72	136	192	240	280	312	336	352	360	361													
20x20	76	144	204	256	300	336	364	384	396	400													
21x21	80	152	216	272	320	373	392	416	432	440	441												
22x22	84	160	228	288	340	384	420	448	468	480	484												
23x23	88	168	240	304	360	408	448	480	504	520	528	529											
24x24	92	176	252	320	380	432	476	512	540	560	572	576											
25x25	96	184	264	336	400	456	504	544	576	600	616	624	625										
26x26	100	192	276	352	420	480	532	576	612	640	660	672	676										
27x27	104	200	288	368	440	504	560	608	648	680	704	720	728	729									
28x28	108	208	300	384	460	528	588	640	684	720	748	768	780	784									
29x29	112	216	312	400	480	552	616	672	720	760	792	816	832	840	841								
30x30	116	224	324	416	500	576	644	704	756	800	836	864	884	896	900								
31x31	120	232	336	432	520	600	672	736	792	840	880	912	936	952	960	961							
32x32	124	240	348	448	540	624	700	768	828	880	924	960	988	1008	1020	1024							
33x33	128	248	360	464	560	648	728	800	864	920	968	1008	1040	1064	1080	1088	1089						
34x34	132	256	372	480	580	672	756	832	900	960	1012	1056	1092	1120	1140	1152	1156						
35x35	136	264	384	496	600	696	784	864	936	1000	1056	1104	1144	1176	1200	1216	1224	1225					
36x36	140	272	396	512	620	720	812	896	972	1040	1100	1152	1196	1232	1260	1280	1292	1296					
37x37	144	280	408	528	640	744	840	928	1008	1080	1144	1200	1248	1288	1320	1344	1360	1368	1369				
38x38	148	288	420	544	660	768	868	960	1044	1120	1188	1248	1300	1344	1380	1408	1428	1440	1444				
39x39	152	296	432	560	680	792	896	992	1080	1160	1232	1296	1352	1400	1440	1472	1496	1512	1520	1521			
40x40	156	304	444	576	700	816	924	1024	1116	1200	1276	1344	1404	1456	1500	1536	1564	1584	1596	1600			
41x41	160	312	456	592	720	840	952	1056	1152	1240	1320	1392	1456	1512	1560	1600	1632	1656	1672	1680	1681		
42x42	164	320	468	608	740	864	980	1088	1188	1280	1364	1440	1508	1568	1620	1664	1700	1728	1748	1760	1764		
43x43	168	328	480	624	760	888	1008	1120	1224	1320	1408	1488	1560	1624	1680	1728	1768	1800	1824	1840	1848	1849	
44x44	172	336	492	640	780	912	1036	1152	1260	1360	1452	1536	1612	1680	1740	1792	1836	1872	1900	1920	1932	1936	
45x45	176	344	504	656	800	936	1064	1184	1296	1400	1496	1584	1664	1736	1800	1856	1904	1944	1976	2000	2016	2024	2025



CSP

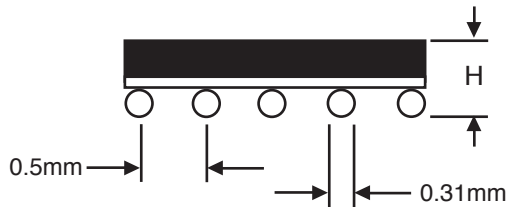
BALL GRID ARRAY

0.5MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	HEIGHT	BALL MATRIX	SUBSTRATE	Tray Part Number XJ1	QTY
1	6	1.5 x 1.0mm	Full	0.65mm	3 x 2	Si	CSP6E7A.5-DC023	Reel
2	40	5mm	2-Row	1.24mm	8 x 8	BT	CSP40T.5-DC082	624
3	56	6mm	2-Row	1.24mm	10 x 10	BT	CSP56T.5-DC102	608
4	84	6mm	3-Row	1.1mm	10 x 10	BT	CSP84T.5-DC104	608
5	84	7mm	3-Row	1.1mm	12 x 12	BT	CSP84T.5-DC123	478
6	96	8mm	2-Row	1.24mm	14 x 14	Pi	fBGA96T.5-DC144	360
7	132	8mm	3-Row	1.1mm	14 x 14	BT	CSP132T.5-DC145	360
8	228	12mm	3-Row	1.1mm	22 x 22	BT	LBGA228T.5-DC222	189
9	288	12mm	4-Row	1.1mm	22 x 22	BT	LBGA288T.5-DC221	189
10	484	12mm	Full	1.1mm	22 x 22	BT	LBGA484T.5-DC229	189
11	2025	25mm	Full	1.1mm	45 x 45	BT	LBGA2025T.5-DC459	44
12	2025	21mm	0.4mm Pitch	1.1mm	45 x 45	BT	LBGA2025T.4-DC459	60



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fBGA - Flex Polyimide substrate. Total package height 1.02mm. Ball diameter is 0.3mm.

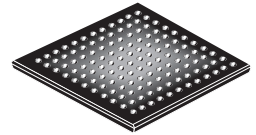
For Interior Die, add suffix -D to end of part number

CSP - BT substrate. Total package height 1.24mm. Ball diameter is 0.3mm.

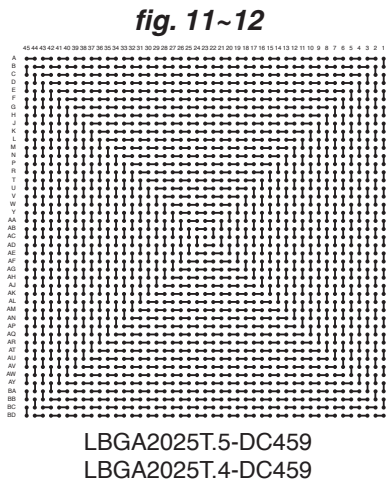
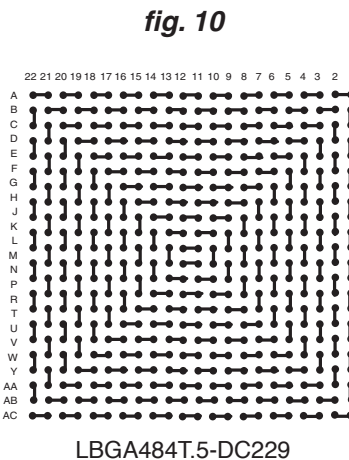
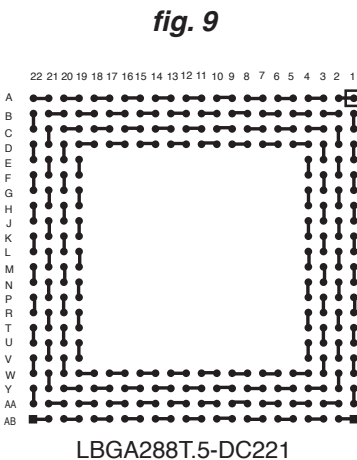
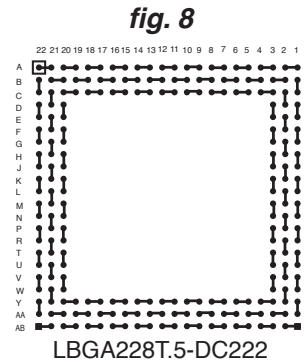
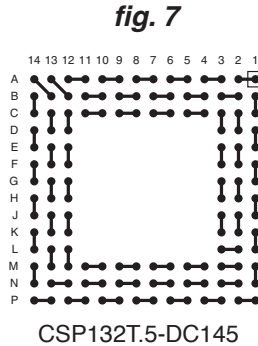
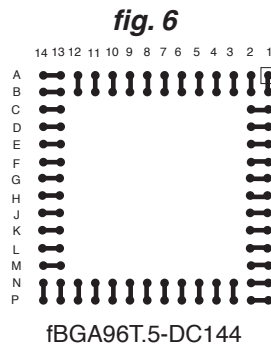
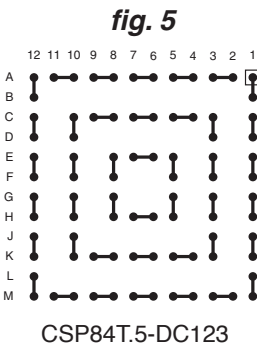
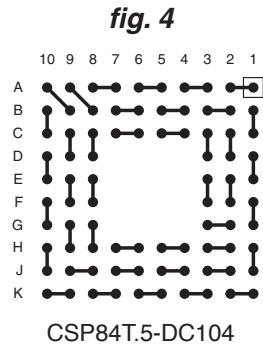
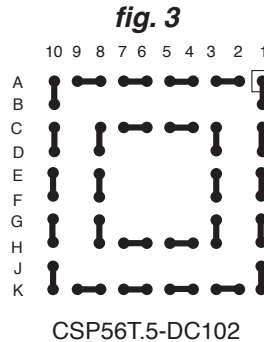
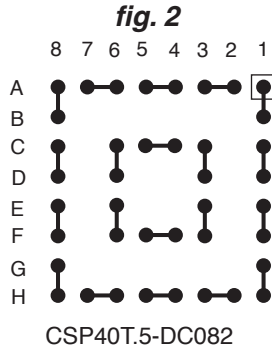
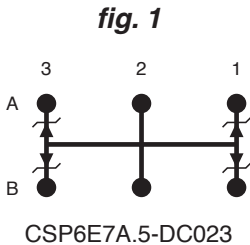
For Internal Die, add suffix -D to end of part number

- Lead free option: Add "C" after pitch in part number for SnAgCu balls.

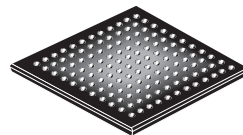
CSP BALL GRID ARRAY 0.5MM PITCH



BALL VIEW



BGA & CSP BALL GRID ARRAY 0.75~0.8MM PITCH

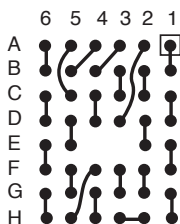


DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	PITCH	BALL MATRIX	SUBSTRATE	 Tray Part Number	QTY
1A	46	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA46T.75-DC24	160
1C	48	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA48T.75-ISO-6x8	160
2	36	6mm	Full	0.8mm	6 x 6	BT	BGA36T.8-DC069	608
1B	48	8 x 9mm	Full		6 x 8	FR4	LBGA48T.8-DC689	297
3	49	7mm	Full		7 x 7	BT	BGA49T.8-DC077	476
4	64	8mm	Full		8 x 8	BT	BGA64T.8-DC089	360
5	81	8mm	Full		9 x 9	BT	BGA81T.8-DC099	360
6	100	10mm	Full		10 x 10	BT	BGA100T.8-DC109	250
7	112	10mm	4-Row		11 x 11	FR4	LBGA112T.8-DC114	184
8	144	12mm	Full		12 x 12	FR4	LBGA144T.8-DC128	189
9	144	13mm	4-Row		13 x 13	FR4	LBGA144T.8-DC134	168/198
10	175	13mm	4-Row		15 x 15	BT	BGA175T.8-DC153	160
11	208	15mm	4-Row		17 x 17	BT	BGA208T.8-DC170	126
12	280	17mm	5-Row		19 x 19	FR4	LBGA280T.8-DC195	90
13	532	23mm	7-Row		26 x 26	FR4	LBGA532T.8-DC266	60
14	2025	40mm	Full		45 x 45	BT	LBGA2025T.8-DC459D	21
15	2025	32.5mm	Full	0.65mm	45 x 45	BT	LBGA2025T.65DC459D	24

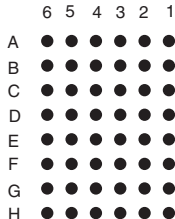
Ball View

fig. 1A



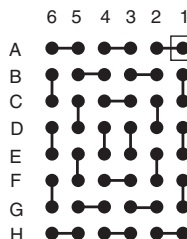
BGA46T.75-DC24

fig. 1C



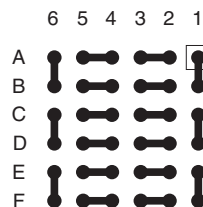
BGA48T.75-ISO-6x8

fig. 1B



LBGA48T.8-DC689

fig. 2



BGA36T.8-DC069

BGA - Near CSP dimensions on rigid BT substrate with molding compound.

Eutectic Sn63 solder balls 0.46mm diameter. (0.75mm Pitch is 0.3mm ball diameter)

LBGA - FR4 features near CSP dimensions with unencapsulated body.

Eutectic Sn63 solder balls 0.46mm diameter.

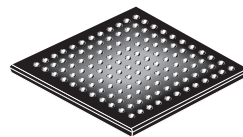
-Lead free option: Add "C" after pitch in part number for SnAgCu balls.



BGA & CSP

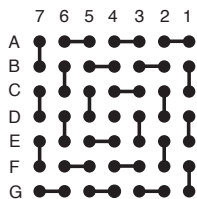
BALL GRID ARRAY

0.75~0.8MM PITCH



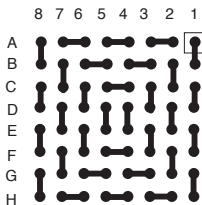
BALL VIEW

fig. 3



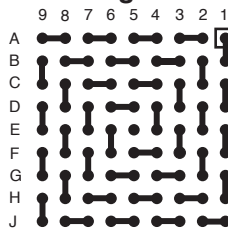
BGA49T.8-DC077

fig. 4



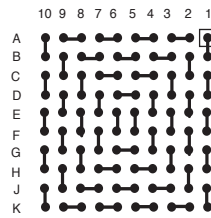
LBGA64T.8-DC089

fig. 5



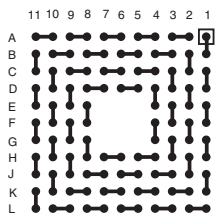
BGA81T.8-DC099

fig. 6



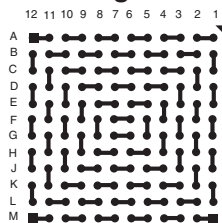
BGA100T.8-DC109

fig. 7



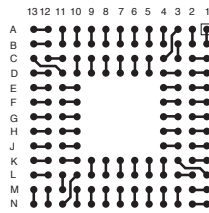
LBGA112T.8-DC114

fig. 8



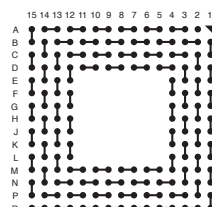
LBGA144T.8-DC128

fig. 9



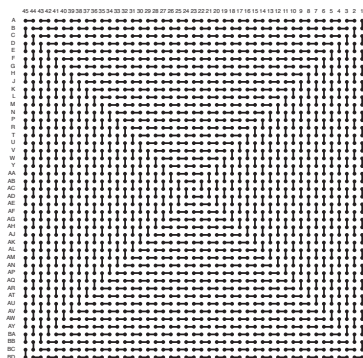
LBGA144T.8-DC134

fig. 10



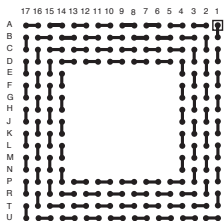
BGA175T.8-DC153

fig. 14~15



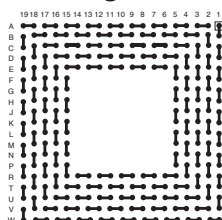
LBGA2025T.8-DC459
LBGA2025T.65-DC459

fig. 11



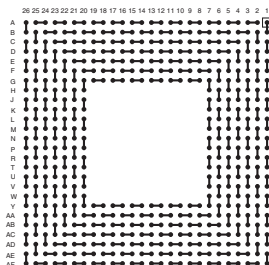
LBGA208T.8-DC170

fig. 12



LBGA280T.8-DC195

fig. 13

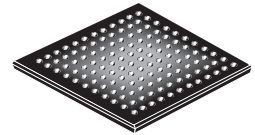


LBGA532T.8-DC266

BGA

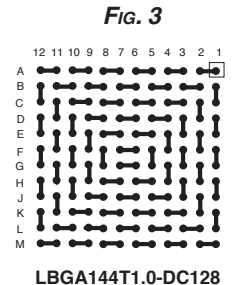
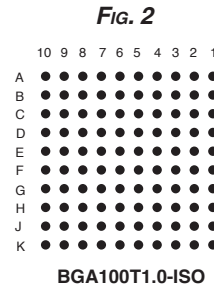
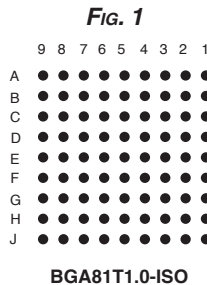
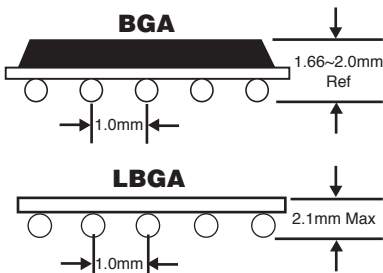
PLASTIC BALL GRID ARRAY

1.0MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	CENTER BALL	BALL MATRIX	 Tray Part Number STANDARD	 Tray Part Number UNENCAPSULATED	QTY
1	81	10mm	Full Array	NA	9 x 9	BGA81T1.0-ISO	-	250
2	100	11mm	Full Array	NA	10 x 10	BGA100T1.0-ISO	-	176
3	144	13mm	Full Array	NA	12 x 12	BGA144T1.0	LBGA144T1.0-DC128	160/168
4	160	15mm	4-Row	NA	14 x 14	BGA160T1.0-DC147A	-	126
5	192	17mm	4-Row	NA	16 x 16	BGA192T1.0-DC160A	-	90
6	196	15mm	Full Array	NA	14 x 14	BGA196T1.0-DC149A	-	126
7	208	17mm	4-Row	4 x 4	16 x 16	BGA208T1.0-DC164A	-	90
8	256	17mm	Full Array	NA	16 x 16	BGA256T1.0-DC169A	-	90
9	288	23mm	4-Row	NA	22 x 22	BGA288T1.0-DC221	-	60
10	324	23mm	4-Row	6 x 6	22 x 22	BGA324T1.0-DC224	-	60
11	388	27mm	4-Row	6 x 6	26 x 26	BGA388T1.0-DC264	-	40
12	400	21mm	Full Array	NA	20 x 20	-	LBGA400T1.0-DC209	60
13	484	23mm	Full Array	NA	22 x 22	-	LBGA484T1.0-DC229A	60
14	672	27mm	Full Array	NA	26 x 26	-	LBGA672T1.0-DC268	40
15	676	27mm	Full Array	NA	26 x 26	BGA676T1.0-DC269	-	40
16	900	31mm	Full Array	NA	30 x 30	-	LBGA900T1.0-DC309	27
17	1156	35mm	Full Array	NA	34 x 34	-	LBGA1156T1.0-DC349	24
18	1600	42.5mm	Full Array	NA	40 x 40	-	LBGA1600T1.0-DC409	12
19	1936	45mm	Full Array	NA	44 x 44	-	LBGA1936T1.0-DC449	12
-	10,000	115mm	Full Array	NA	100 x 100	-	LBGA10000T1.0-BUS	4



I N F O

BGA - Standard BGA plastic packages should be baked at 125°C for 24 hours prior to assembly to prevent delamination and the “popcorn” phenomena during the assembly process. Solder balls are eutectic Sn63 SnPb 25mil (0.63mm)

LBGA- Unencapsulated profile laminate Ball Grid Arrays offer the lowest cost when placement practice is the primary concern. Includes daisy chain laminate substrate with 25mil (0.63mm) Sn63.

☑ - Lead Free Option: Add “C” after pitch in part number for SnAgCu balls.

BGA

PLASTIC BALL GRID ARRAY

1.0MM PITCH BALL VIEW

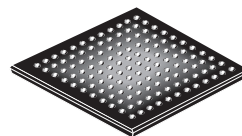
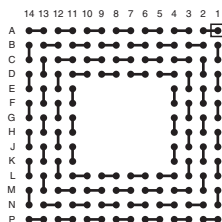
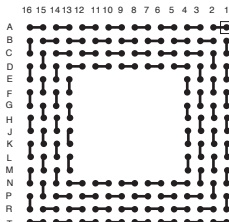


Fig. 4



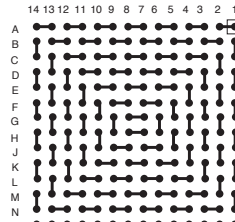
BGA160T1.0-DC147A

Fig. 5



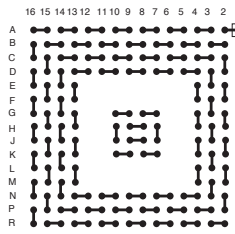
BGA192T1.0-DC160A

Fig. 6



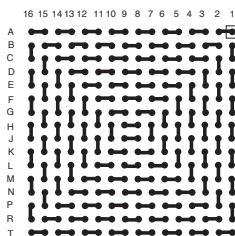
BGA196T1.0-DC149A

Fig. 7



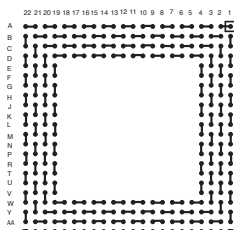
BGA208T1.0-DC164A

Fig. 8



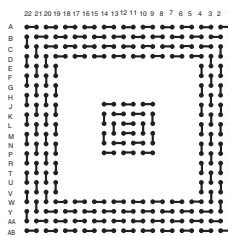
BGA256T1.0-DC169A

Fig. 9



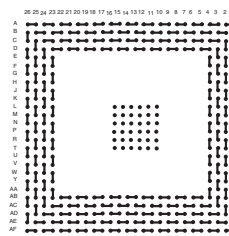
BGA288T1.0-DC221

Fig. 10



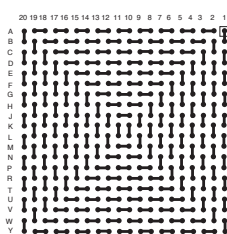
BGA324T1.0-DC224

Fig. 11



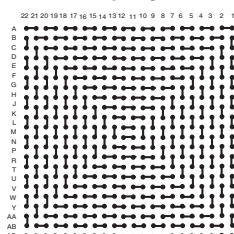
BGA388T1.0-DC264

Fig. 12



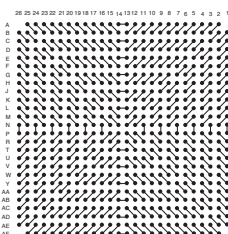
LBGA400T1.0-DC209

Fig. 13



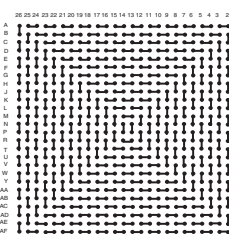
LBGA484T1.0-DC229A

Fig. 14



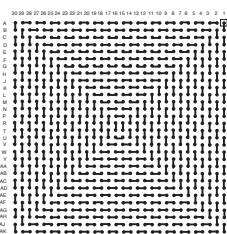
LBGA672T1.0-DC268

Fig. 15



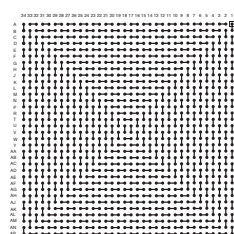
BGA676T1.0-DC269

Fig. 16



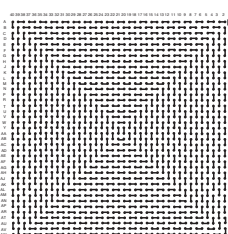
LBGA900T1.0-DC309

Fig. 17



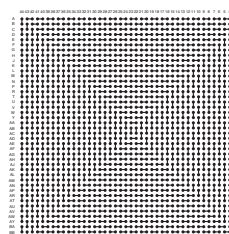
LBGA1156T1.0-DC349

Fig. 18



LBGA1600T1.0-DC409

Fig. 19

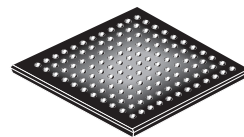


LBGA1936T1.0-DC449

BGA

PLASTIC BALL GRID ARRAY

1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	CENTER BALL	BALL MATRIX	 Tray Part Number XJ1 STANDARD	 Tray Part Number UNENCAPSULATED	QTY
1	208	23mm	4-Row	-0-	17 x 17	BGA208T1.27-DC170	-	60
2	208	23mm	4-Row	-0-	17 x 17	BGA208T1.27-DC171	-	60
3	217	23mm	4-Row	3 x 3	17 x 17	BGA217T1.27-DC172	-	60
4	217	23mm	4-Row	3 x 3	17 x 17	BGA217T1.27-DC174	-	60
5	256	27mm	4-Row	-0-	20 x 20	BGA256T1.27-DC200	-	40
6	272	27mm	4-Row	4 x 4	20 x 20	BGA272T1.27-DC202	-	40
7	352	35mm	4-Row	-0-	26 x 26	BGA352T1.27-DC70	-	24
8	357	25mm	Full	NA	19 x 19	-	LBGA357T1.27-DC73	24
9	388	35mm	4-Row	6 x 6	26 x 26	BGA388T1.27-DC72	-	24
10	1225	45mm	Full	-0-	35 x 35	-	LBGA1225T1.27-DC359	12

SIDE VIEW

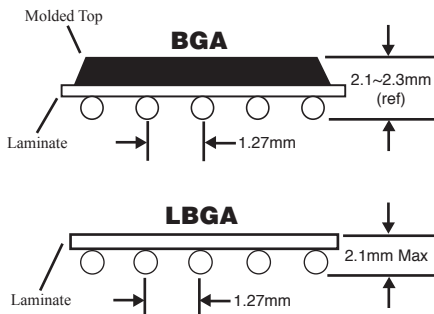
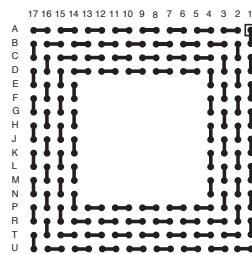
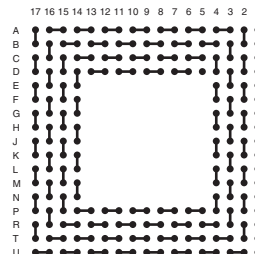


FIG. 1



BGA208T1.27-DC170

FIG. 2

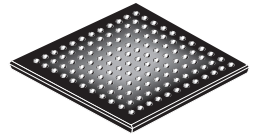


BGA208T1.27-DC171

- INFO**
- BGA - Standard BGA plastic packages should be baked at 125°C for 24 hours prior to assembly to prevent delamination and the "popcorn" phenomena during the assembly process. Solder balls are eutetic Sn63/Pb37 30mil (0.75mm)
 - LBGA - Laminate Ball Grid Arrays offer the lowest cost when placement practice is the primary concern. Includes daisy chain laminate with 30mil (0.75mm) Sn63/Pb37 balls for soldering at 210°C.
 - Lead Free available. SnAgCu = Add "C" after pitch in part number.

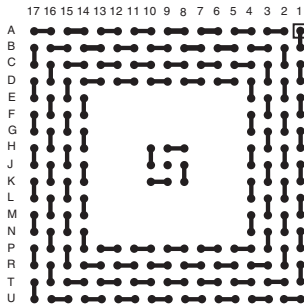


BGA PLASTIC BALL GRID ARRAY 1.27MM PITCH



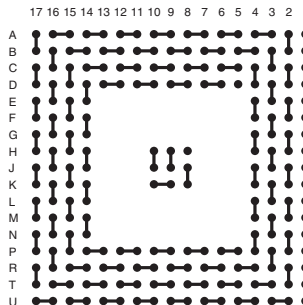
BALL VIEW

FIG. 3



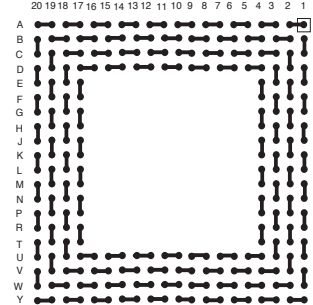
BGA217T1.27-DC172

FIG. 4



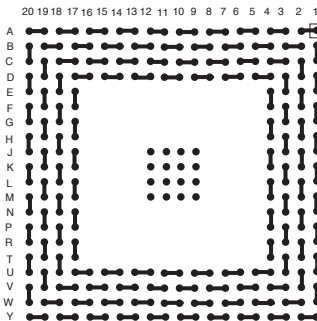
BGA217T1.27-DC174

FIG. 5



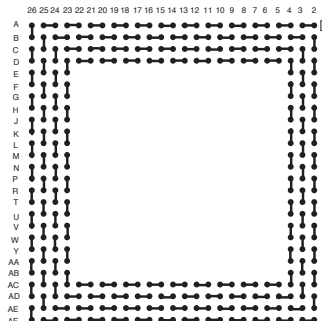
BGA256T1.27-DC200

FIG. 6



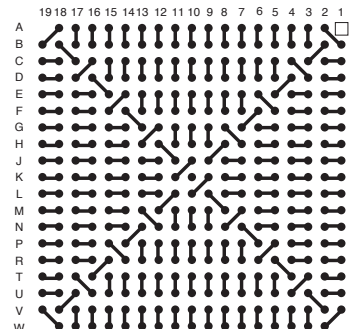
BGA272T1.27-DC202

FIG. 7



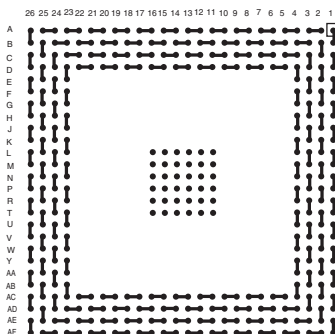
BGA352T1.27-DC70

FIG. 8



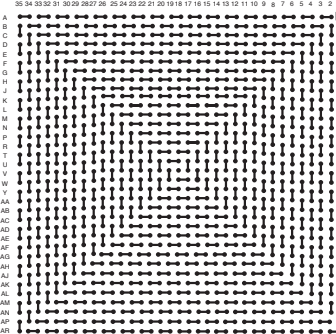
LBGA357T1.27-DC73

FIG. 9



BGA388T1.27-DC72

FIG. 10



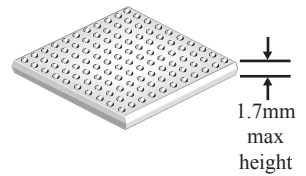
LBGA1225T1.27-DC359



CBGA

CERAMIC BALL GRID ARRAY

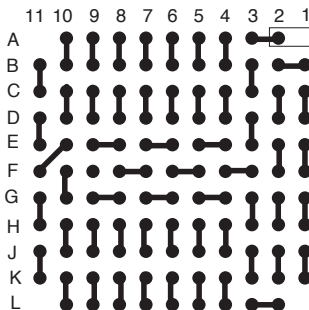
1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

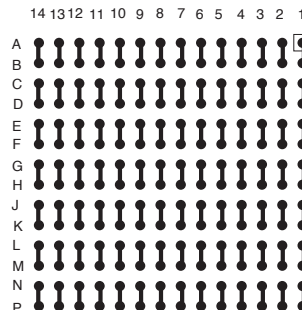
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	BALL MATRIX	Tray Part Number LOW TEMP 210°C XJ1 62/36/2 SnPbAg	Tray Part Number HIGH TEMP 320°C XJ1 10/90 SnPb	QTY
1	121	15mm	Full Grid	11 x 11	CBGA121T1.27L-DC5	CBGA121T1.27-DC5	126
2	196	18.5mm	Full Grid	14 x 14	CBGA196T1.27L-DC11	CBGA196T1.27-DC11	84
3	256	21mm	Full Grid	16 x 16	CBGA256T1.27L-DC61	CBGA256T1.27-DC61	60
4	304	21 x 25mm	Full Grid	16 x 19	CBGA304T1.27L-DC63	CBGA304T1.27-DC63	55
5	361	25mm	Full Grid	19 x 19	CBGA361T1.27L-DC71	CBGA361T1.27-DC71	44
6	400	27mm	Full Grid	20 x 20	CBGA400T1.27L-DC21	CBGA400T1.27-DC21	40
7	625	32.5mm	Full Grid	25 x 25	-	CBGA625T1.27-DC81	24
8	1089	42.5mm	Full Grid	33 x 33	-	CBGA1089T1.27-DC339	12

FIG. 1



CBGA121T1.27-DC5
(BALL VIEW)

FIG. 2



CBGA196T1.27-DC11
(BALL VIEW)

**I
N
F
O**

Ceramic Ball Grid Arrays are not sensitive to moisture and do not require baking prior to assembly. Ball diameter is 30 mils (0.75mm). Standard ball material is Sn10/Pb90 for high temperature soldering at 320°C to ceramic substrate. For low temperature soldering at 210°C to laminate substrate, specify Sn62/Pb36/Ag2 solder balls by adding -L to part number. Custom sizes and ball counts available.



Lead free available with SnAgCu balls. Add "C" after pitch in part number

CBGA - CERAMIC BALL GRID ARRAY - 1.27MM PITCH

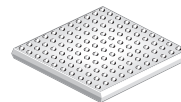
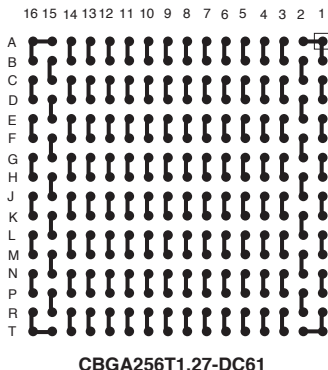
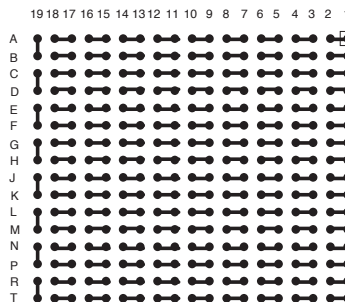


Fig. 3 (BALL VIEW)



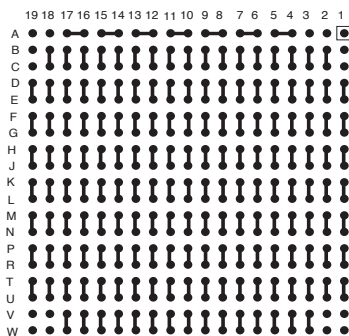
CBGA256T1.27-DC61

Fig. 4



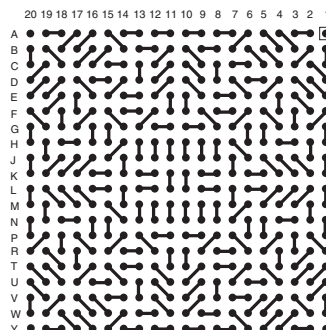
CBGA304T1.27-DC63

Fig. 5



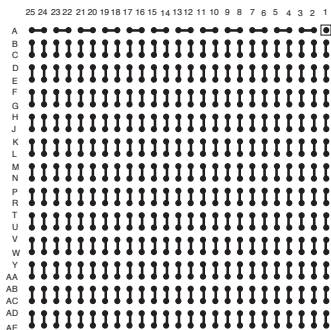
CBGA361T1.27-DC71

Fig. 6



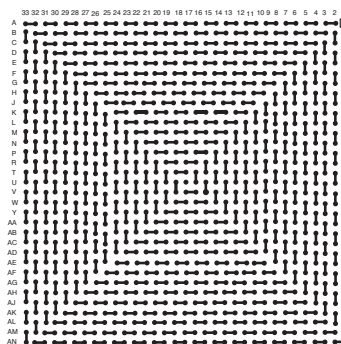
CBGA400T1.27-DC21

Fig. 7



CBGA625T1.27-DC81

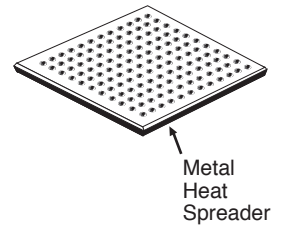
Fig. 8



CBGA1089T1.27-DC339



SBGA METAL BALL GRID ARRAY 1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	PITCH	BALL MATRIX	DIE SIZE MINI-MAX	JX1 Tray Part Number	QTY
1	256	27mm	4-Row	1.27mm	20 x 20	6.8 - 9.8mm	SBGA256T1.27-DC200	40
2	304	31mm	4-Row	1.27mm	23 x 23	8.0 - 11mm	SBGA304T1.27-DC230	27
3	352	35mm	4-Row	1.27mm	26 x 26	11.3 - 14.3mm	SBGA352T1.27-DC70	24
4	432	40mm	4-Row	1.27mm	31 x 31	9.7 - 12.7mm	SBGA432T1.27-DC314	21
5	480	37.5mm	5-Row	1.27mm	29 x 29	10 - 14mm	SBGA480T1.27-ISO	21
6	560	42.5mm	5-Row	1.27mm	33 x 33	14.3 - 17.3mm	SBGA560T1.27-DC87	12
7	600	45mm	5-Row	1.27mm	35 x 35	15 - 18mm	SBGA600T1.27-DC355	12

Fig. 1

Fig. 2

Fig. 3

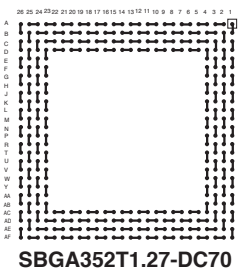
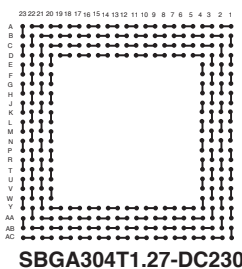
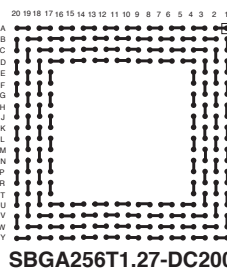
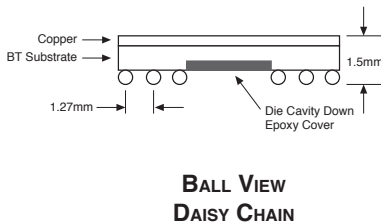
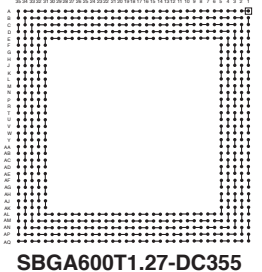
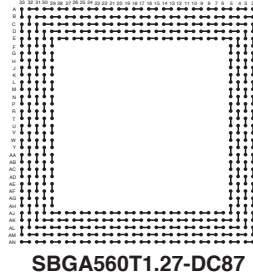
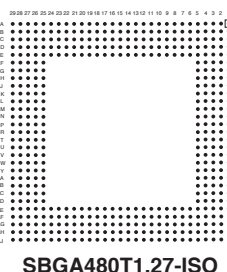
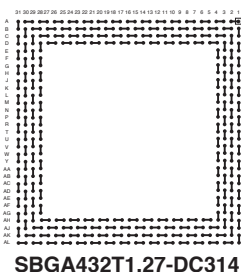


Fig. 4

Fig. 5

Fig. 6

Fig. 7

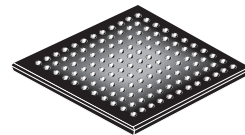


I N F O S-BGA - Copper Heat Spreader has superior thermal performance. Die is mounted cavity down. Substrate is BT. For Polyimide Tape dielectric, change part number to TBGA. Dummy units are supplied with internal die.
- Lead Free Available: Add "C" after pitch in part number for SnAgCu balls.

BGA

PLASTIC BALL GRID ARRAY

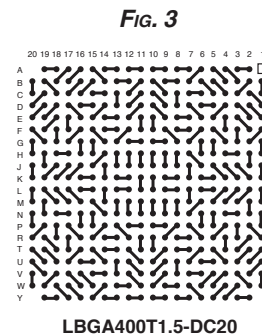
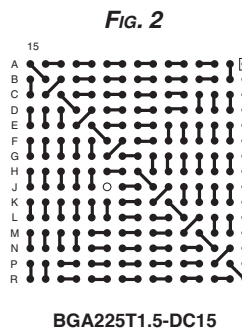
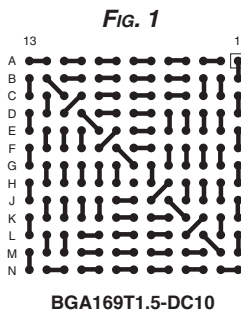
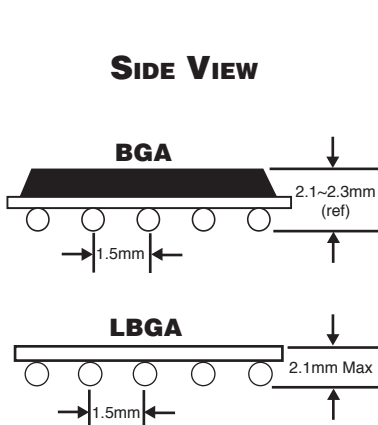
1.5MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

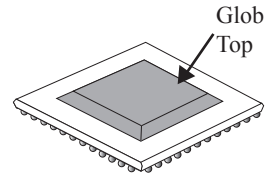
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	BALL MATRIX	Tray Part Number		QTY
					XJ1 STANDARD	XJ1 UNENCAPSULATED	
1	169	23mm	Full Array	13 x 13	BGA169T1.5-DC10	-	60
2	225	27mm	Full Array	15 x 15	BGA225T1.5-DC15	-	40
3	400	35mm	Full Array	20 x 20	-	LBGA400T1.5-DC20	24

BGA DAISY CHAIN PATTERNS (BALL VIEW) - ILLUSTRATIONS NOT TO SCALE

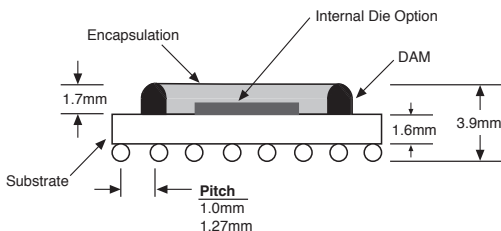


- BGA - Standard BGA plastic packages should be baked at 125°C for 24 hours prior to assembly to prevent delamination and the "popcorn" phenomena during the assembly process. Solder balls are eutectic 63/37 SnPb 30mil (0.75mm)
- LBGA - Unencapsulated laminate Ball Grid Arrays offer the lowest cost when placement practice is the primary concern. Includes daisy chain laminate substrate with 30mil (0.75mm) SnPb balls for soldering at 210°C. Since there is no molded or encapsulated top.
- Lead Free Available: Add "C" after pitch in part number for SnAgCu balls.

eBGA LIQUID ENCAPSULATED



NBR BALLS	BODY SIZE	BALL PATTERN	CENTER BALL	BALL MATRIX	XJ1 Tray Part Number	QTY
1.27MM PITCH						
357	25mm	Full	NA	19 x 19	eBGA357T1.27D73D	44
420	35mm	5-Row	NA	26 x 26	eBGA420T1.27D85D	24
480	35mm	6-Row	NA	26 x 26	eBGA480T1.27D90D	24
540	42.5mm	5-Row	NA	32 x 32	eBGA540T1.27D80D	12
560	42.5mm	5-Row	NA	33 x 33	eBGA560T1.27D87D	12
676	35mm	Full	NA	26 x 26	eBGA676T1.27D269D	24
1089	42.5mm	Full	NA	33 x 33	eBGA1089T1.27D339D	12
1225	45mm	Full	NA	35 x 35	eBGA1225T1.27D359D	12
1.0MM PITCH						
416	31mm	4-Row	NA	30 x 30	eBGA416T1.0D304D	27
480	35mm	4-Row	NA	34 x 34	eBGA480T1.0D344D	24
484	23mm	Full	NA	22 x 22	eBGA484T1.0D229AD	60
580	35mm	5-Row	NA	34 x 34	eBGA580T1.0D345D	24
592	42.5mm	4-Row	NA	41 x 41	eBGA592T1.0D414D	12
620	37.5mm	5-Row	NA	36 x 36	eBGA620T1.0D365D	21
640	45mm	4-Row	NA	44 x 44	eBGA640T1.0D444D	12
672	27mm	Full	NA	26 x 26	eBGA672T1.0D268D	40
720	42.5mm	5-Row	NA	41 x 41	eBGA720T1.0D415D	12
780	45mm	5-Row	NA	44 x 44	eBGA780T1.0D445D	12
900	31mm	Full	NA	30 x 30	eBGA900T1.0D309D	27
1156	35mm	Full	NA	34 x 34	eBGA1156T1.0D349D	24
1444	40mm	Full	NA	38 x 38	eBGA1444T1.0D389D	21
1600	42.5mm	Full	NA	40 x 40	eBGA1600T1.0D409D	12
1936	45mm	Full	NA	44 x 44	eBGA1936T1.0D449D	12



PART NUMBER CONFIGURATION

eBGA
Type
eBGA =
Liquid
Encapsulated

1225
Balls

T
Trays

1.27
Pitch
mm
Ball Matl
D = Sn62 Eutectic
F = Sn96 Lead Free
C = SnAgCu Lead Free

D 359
Circuit
Daisy Chain

D
Die
Blank = No Die
D = Internal Die



LGA

LAND GRID ARRAY

SPECIFICATION FORM



NAME _____

TITLE _____

COMPANY _____

PHONE _____

EMAIL _____

FAX _____

1. Quantity Required _____

8. Solder Mask Opening _____

2. Body Size _____ x _____ mm

9. Substrate Thickness

☐ 1.5mm ☐ 0.6mm

3. Number I/O Pads _____

☐ 0.8mm ☐ 0.4mm

4. Pitch ☐ 1.27mm ☐ 1.0mm ☐ 0.8mm ☐ 0.5mm

☐ other _____

5. Pad Material

☐ Sn63/Pb37

☐ Sn100 Tin

☐ Ni-Au (gold)

☐ Cu100 with OSP

10. Application

☐ Insertion into Socket

☐ Ball Attach by Customer

☐ Solder to mother board

6. Pad Diameter

☐ Standard

☐ other _____ mm

11. Circuit

☐ Daisy Chain

☐ All Pads Shorted

☐ All Pads Isolated

☐ Any Available

7. Solder Mask

☐ None ☐ Taiyo PSR4000 AUS5

12. Substrate Material

☐ FR4

☐ BT

☐ Ceramic

☐ Other _____

Part Number Configuration

LGA

625

T

1.27

- DC61

G

8

Substrate

I/O

Packaging

Pitch

Circuit

Pad Material

Substrate

Plastic

T = Trays

mm

DC = Daisy Chain Pads

BUS = All Pads Shorted

ISO = All Pads Isolated

Blank = Sn63/Pb37

T = Sn100 Tin

G = Ni-Au Gold

C = Cu100 OSP

15 = 1.5mm thick (Standard)

8 = 0.8mm thick

6 = 0.6mm thick

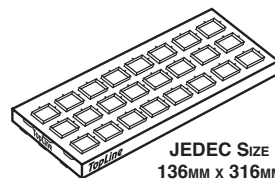
4 = 0.4mm thick

**I
N
F
O**

LGA - Land Grid Arrays for socket insertion, Ball Attach and soldering to mother board.

Available in a variety of configurations and pad heights. Contact TopLine for details.

MATRIX TRAYS FOR BGA BALL GRID ARRAY



TRAY ORDERING INFORMATION

COMPONENT SIZE PER TRAY	COMPONENTS ROW COLUMN	MATRIX XZ1	 Tray Part Number
5 x 5mm	576	16 x 36	BGATRAY5mm-16x36
5 x 5mm	624	16 x 39	BGATRAY5mm-16x39
5 x 5mm	640	16 x 40	BGATRAY5mm-16x40
6 x 6mm	360	12 x 30	BGATRAY6mm-12x30
6 x 6mm	608	16 x 38	BGATRAY6mm-16x38
7 x 7mm	416	13 x 32	BGATRAY7mm-13x32
7 x 7mm	476	14 x 34	BGATRAY7mm-14x34
8 x 8mm	348	12 x 29	BGATRAY8mm-12x29
8 x 8mm	360	12 x 30	BGATRAY8mm-12x30
9 x 9mm	250	10 x 25	BGATRAY9mm-10x25
10 x 10mm	184	8 x 23	BGATRAY10mm-8x23
10 x 10mm	240	10 x 24	BGATRAY10mm-10x24
10 x 10mm	250	10 x 25	BGATRAY10mm-10x25
11 x 11mm	176	8 x 22	BGATRAY11mm-8x22
12 x 12mm	189	9 x 21	BGATRAY12mm-9x21
12 x 12mm	198	9 x 22	BGATRAY12mm-9x22
13 x 13mm	160	8 x 20	BGATRAY13mm-8x20
14 x 14mm	152	8 x 19	BGATRAY14mm-8x19
14 x 14mm	119	7 x 17	BGATRAY14mm-7x17
15 x 15mm	126	7 x 18	BGATRAY15mm-7x18
16 x 16mm	119	7 x 17	BGATRAY16mm-7x17
17 x 17mm	90	6 x 15	BGATRAY17mm-6x15
19 x 19mm	84	6 x 14	BGATRAY19mm-6x14
21 x 21mm	60	5 x 12	BGATRAY21mm-5x12
23 x 23mm	60	5 x 12	BGATRAY23mm-5x12
25 x 25mm	44	4 x 11	BGATRAY25mm-4x11
27 x 27mm	40	4 x 10	BGATRAY27mm-4x10
31 x 31mm	27	3 x 9	BGATRAY31mm-3x9
35 x 35mm	24	3 x 8	BGATRAY35mm-3x8
37.5 x 37.5mm	21	3 x 7	BGATRAY37.5mm-3x7
40 x 40mm	21	3 x 7	BGATRAY40mm-3x7
42.5 x 42.5mm	12	2 x 6	BGATRAY42.5mm-2x6
45 x 45mm	12	2 x 6	BGATRAY45mm-2x6
47.5 x 47.5mm	12	2 x 6	BGATRAY47.5mm-2x6
6 x 7mm	160	10 x 16	BGATRAY6x7-10x26
6 x 8mm	260	10 x 26	BGATRAY6x8-10x26
7 x 9mm	325	13 x 25	BGATRAY7x9mm-13x25
14 x 22mm	84/96	7 x 12 6 x 14 8 x 12	BGATRAY14x22-6x14
21 x 25mm	55	5 x 11	BGATRAY21x25-5x11



Kit PART NUMBERING SYSTEM

WebCODE XK1



926

025

SERIES	
900 = QFP Lead Template *	945 = PCMCIA
901 = Multiple Flip Chip *	946 = Universal BGA 1.27/1.5mm
902 = FC88 Laminate	947 = BGA256/272/292/352/388
903 = FC317 Laminate	948 = Monster 2 *
904 = FC220 Laminate	949 = 0201/0402 Chip
905 = CBGA Ceramic Substrates	950 = SMTA Saber
906 = FC96 Ceramic	951 = CBGA
907 = FC96 Lamanate	952 = TBGA *
908 = FC48 Ceramic	953 = Visual BGA & Flip Chip
909 = FC48 Laminate	954 = Custom *
910 = Beginner Throughhole	955 = Custom *
911 = CCGA1089 Ceramic *	956 = Custom *
912 = Recertification Mix Tech	957 = CBGA196/625 *
913 = Multilayer Throughhole	958 = LBGA1089/1225
914 = Mixed Technology 2	959 = Custom *
915 = Multipurpose Throughhole	960 = Machine Diagnostic *
916 = Multipurpose Throughhole	961 = Fiducial Comparator
917 = BGA121, 352, 400 (obsolete)	962 = 28mm QFP Assortment
918 = Unassigned *	963 = Universal BGA .5~.8mm
919 = Phillips Machine	964 = 0402/0603 Chip
920 = Challenger 1 (see 928) *	965 = Rework 1 Practice
921 = μ BGA TV46	966 = BGA169/225 6L
922 = TV74 (obsolete)	967 = BGA169/225
923 = TV188 (obsolete) *	968 = 0805/1206 Chip
924 = Beginners SMD	969 = Mixed Technology 1
925 = SMD Introductory	970 = Display Boards
926 = Practical Mixed Technology	9705 = Universal Bread Board *
927 = Unassigned	971 = Label for 970 *
928 = Challenger 2	972 = Parts for Display
929 = Jumbo Chip Set *	973 = CCGA1089/CCGA1274*
930 = Advanced w/o QFP256	974 = eBGA1600/eBGA1936
931 = Advanced w/QFP256	976 = BGA256 1.0mm/SBGA560
932 = μ BGA TV62	977 = Metcal *
933 = Custom *	978 = Rework 3 Practice
934 = μ BGA TV208	979 = Unassigned *
935 = Stencil Eval. w/TQFP168	980 = PC Board Album *
936 = Stencil Evaluation	981 = Universal BGA 1.0/0.8mm
937 = Econo I - BGA	982 = QFP208 Lead Free
938 = Econo II - Mixed	983 = 0805/1206 Lead Free
939 = Econo III - Mixed	984 = 0402/0603 Lead Free
940 = Monster (see 948) *	985 = BGA Lead Free *
941 = Mydata *	986 = Lead Free Multicomponent
942 = Intertronic 2001	999 = Special/Custom *
943 = TQFP168 (obsolete)	9603 = TSOP32 *
944 = Rework 2 Practice	9613 = BQFP132 *

SPECIFICATIONS	
000 = Single Pack Kit (Hand Solder)	
001 = Standard PC Board	
002 = Lead Free Tin Plated Board	
003 = Populated PC Board	
004 = X, Y, Theta Parts Placement ASCII File	
005 = Gerber File For Solder Paste Stencil	
006 = Immersion Silver Board (Lead Free)	
007 = Polyimide Board	
008 = OSP Copper Board Entek (Lead Free)	
009 = Ni Au PC Board	
010 = Kit Of 10	
025 = Kit Of 25	
050 = Kit Of 50	
100 = Kit Of 100	
9616 = QFP160 *	
9618 = Rotational Test	
9621 = QFP208	
9625 = QFP256	

* = Not Shown in Catalog



GENERAL KIT INFORMATION



FR-4 (STANDARD)

Epoxy-glass FR-4 is standard for most kits. Most Boards are double sided. Tg = 140°C.

FR4 (HIGH TEMP)

High Temp (Tg = 170°C ~ 180°C) is used for Lead Free boards.

POLYIMIDE (OPTIONAL)

For high temperatures during assembly or burn-in. Polyimide Tg is 270°C.

BT (OPTIONAL)

Bismaleimide Triazine available special order.

COPPER THICKNESS

Usually 1.0 oz. of copper.

HOT AIR SOLDER LEVELING (Sn63)

Hot air solder leveling (HASL) during board fabrication gives boards a controlled plating flatness which assures coplanarity for fine pitch components.

LIQUID PHOTO IMAGEABLE SOLDER MASK

Liquid photoimageable (LPI) soldermask with Sanwa Chemical SPSR-950. Taiyo PSR4000 AUS5 is available special order.

X,Y THETA: (ACCESSORY)

Component placement data for pick and place machines. Free download.

GERBER DATA: (ACCESSORY)

For solder paste stencil. Free download.

LEAD-FREE (OPTIONAL)

Available in 4 finishes:

Sn100 - White Tin

AU (ENIG) Ni - Immersion Gold

Ag - Immersion Silver

OSP - ENTEK 106 Copper

GLOBAL FIDUCIALS

A minimum of two global fiducials are located diagonally opposed as far apart as possible.

LOCAL FIDUCIALS

Used to locate the position of an individual.

GENERAL

Kits are supplied with enough components for one side of the board only.

OSP (OPTIONAL)

Organic Solder Preservative over bare copper such as ENTEK106 is available special order.



RoHS Banned Substances

Substance	Maximum Limit (ppm)
Cadmium (Cd)	100
Lead (Pb)	1000
Mercury (Hg)	1000
Hexavalent Chromium (Cr 6+)	1000
Polybrominated Biphenyls (PBB)	1000
Polybrominated Diphenyl Ethers (PBDE)	1000

About RoHS:

The European Union has adopted Directive 2002/95/EC – the Restriction of Hazardous Substances (RoHS) in electrical and electronic equipment. This legislation bans the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in electrical and electronic devices after July 1, 2006 with certain exemptions.



LEAD FREE BOARDS RoHS COMPATIBLE



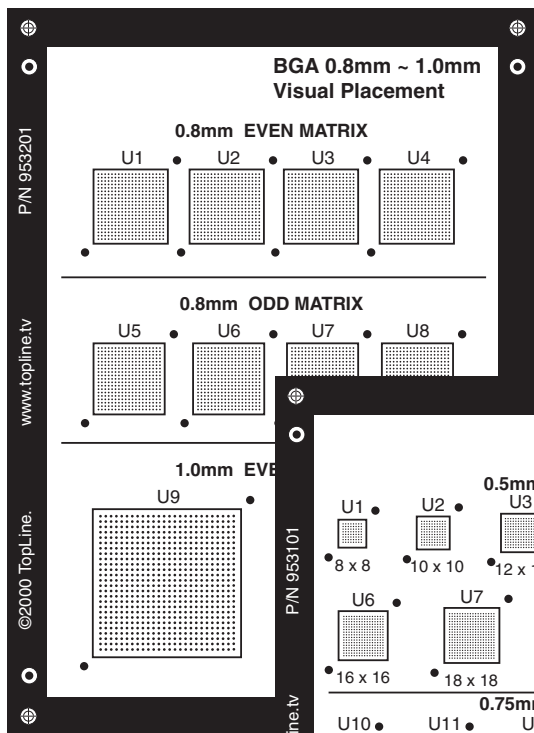
TopLine offers Lead Free boards with 4 popular finishes compatible with RoHS.

COMPARISON OF LEAD FREE FINISHES			
	Description	Advantages	Concerns
Sn	White Tin (also known as Immersion Tin)	• Low Cost • Widely Accepted • Re-workable • Good Flatness • Good Shelf Life	• Potential Whisker • Microscopic Voids
Ag	Immersion Silver	• Low Cost • Widely Accepted • Re-workable • Excellent Flatness • Excellent Wetting	• Shelf Life • Tarnishing
OSP Cu	Organic Solderability Preservative Entek 106	• Low Cost • Widely Accepted • Re-workable • Excellent Flatness	• Shelf Life • Degrades with Temperature • Handling Sensitivity • Flex Sensitive
Ni-Au	Electroless Nickel Immersion Gold (Also known as ENIG)	• Widely Accepted • Excellent Flatness • Very Long Shelf Life	• Added Cost • Difficulty with rework • More brittle solder joints

COMPARISON OF STANDARD FINISHES (WITH Pb)			
	Description	Advantages	Concerns
Sn/Pb	Hot Air Solder Level (also known as HASL)	• Low Cost • Widely Accepted • Re-workable • Good Shelf Life	• Flatness (Coplanarity) • Paste Misprints • Not RoHS Compatible



VISUAL PLACEMENT SEE THRU ACRYLIC BOARD



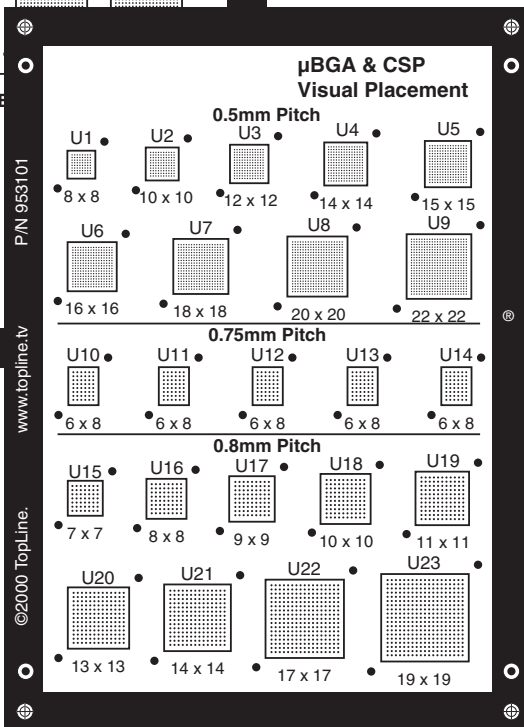
Order
953201

Visual Placement Inspection Boards allow you to actually see if all the balls are aligned on the pads.

HOW TO USE:

1. Peel off protective cover from sticky tape on acrylic board.
2. Place BGA or Flip Chip
3. Turn board over and visually inspect for placement accuracy.
4. Remove BGA and start again.

Order
953101



See Page 69
for Ordering
Information

BOARD TYPES

Choice of either sticky (preferred choice) or non-stick acrylic boards available.

Actual Size: 4" x 5.5" (100 x 140mm) .062" Thick

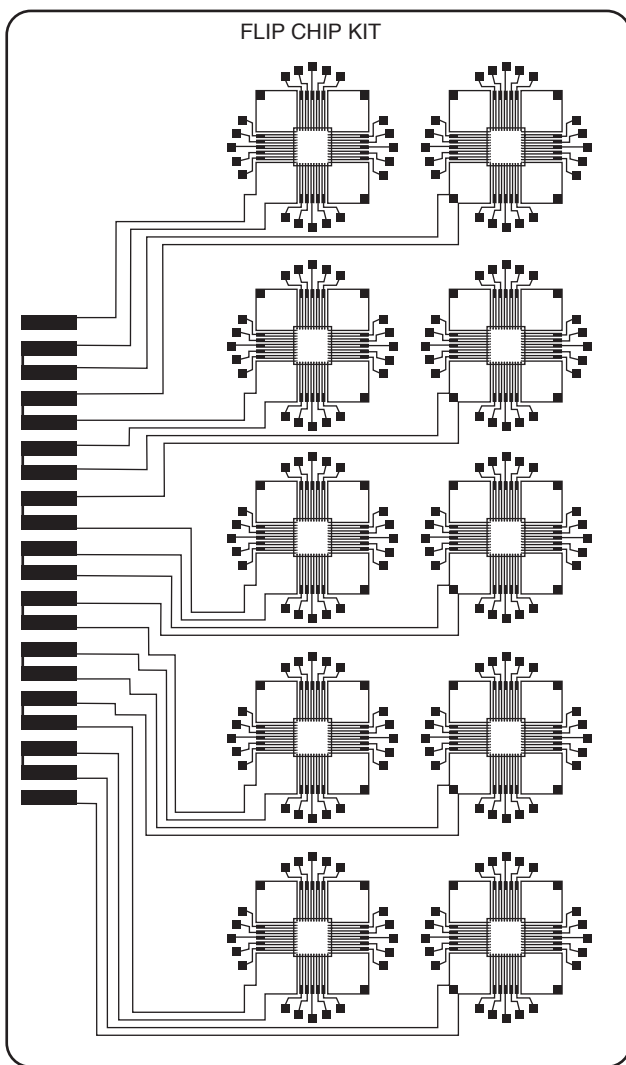


VISUAL PLACEMENT INSPECTION KIT **SEE THRU ACRYLIC BOARD**



KIT ORDERING INFORMATION

			 MANUAL ASSEMBLY OR  MACHINE RUN			
	MIL PITCH	MM PITCH	STICKY ACRYLIC BOARD	KITS WITH COMPONENTS	PARTS PLACEMENT DATA	GERBER DATA
μ BGA & CSP		0.5mm 0.75mm 0.8mm	953101	953100	953104	953105
BGA		0.8mm 1.0mm	953201	953200	953204	953205
BGA		1.27mm 1.5mm	953001	953000	953004	953005
Flip Chip	8mil 10mil 18mil	204 μ m 254 μ m 457 μ m	953401	953400	953404	953405
Grid Lines	4mil 5mil 6mil 7mil 8mil 9mil 10mil 12mil 14mil 15mil 18mil 20mil	102 μ m 127 μ m 152 μ m 178 μ m 203.2 μ m 229 μ m 254 μ m 304.8 μ m 355.6 μ m 381 μ m 457 μ m 508 μ m	953501	-	953504	953505



Actual Size: 3.25" x 5.5" (83 x 140mm)

Laminate FR4 board for placement and daisy chain continuity testing after assembly.

Each board has coupon sites for mounting 10 flip chips.

Laminate board features multifunctional high temperature FR4 board ($T_g = 170^\circ\text{C}$)

Plating Options:

Ni-Au Standard

Cu-OSP Available

Board Thickness:

.031" - 0.78mm FC317

.062" - 1.57mm FC48~FC220

NOTE

Gerber Data is only available for laminate boards.



FLIP CHIP KITS



KIT ORDERING INFORMATION

CONTENTS	 MANUAL ASSEMBLY				AND  MACHINE RUN		
	ORDER NUMBER 901000 1 KIT	ORDER NUMBER 902000 1 KIT	ORDER NUMBER 903000 1 KIT	ORDER NUMBER 904000 1 KIT	ORDER NUMBER 907000 1 KIT	ORDER NUMBER 908000 1 KIT	ORDER NUMBER 909000 1 KIT
Laminate FR4 Board	1	1	1	1	1	0	1
Ceramic Board	0	0	0	0	0	1	0
FC48 457µm	0	0	0	0	0	25	25
FC88 204µm	0	36	0	0	0	0	0
FC96 457µm	0	0	0	0	9	0	0
FC176 204µm	9	0	0	0	0	0	0
FC220 204µm	0	0	0	10	0	0	0
FC317 254µm	0	0	36	0	0	0	0

Note: 907001 is back side of 909001 board.
908001 is ceramic substrate for FC48.

Lead Free (Pb-Free) Option

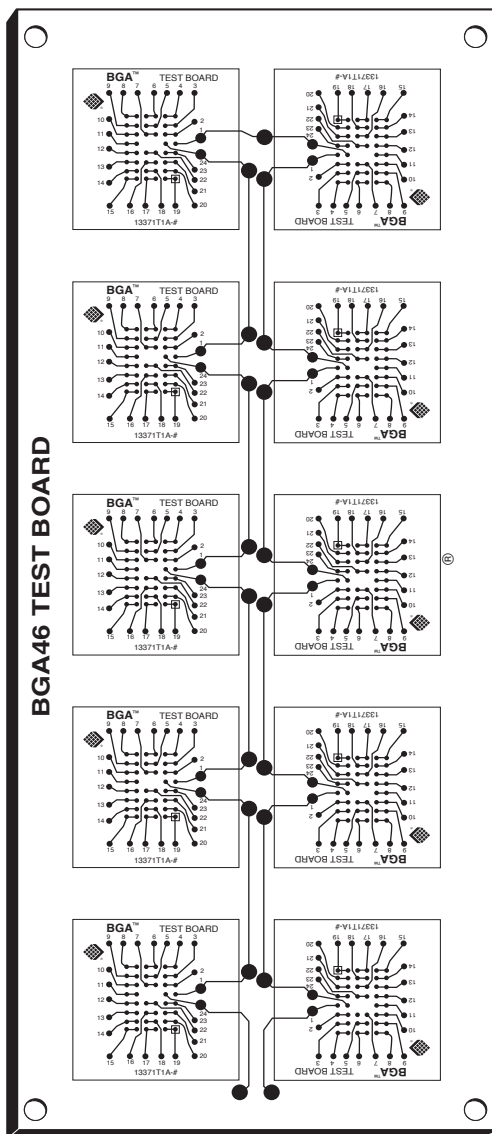
Description	FC48	FC88	FC96	FC176	FC220	FC317
Lead Free Kit						
Gold Board + SnAgCu Flip Chip	909900	902900	907900	901900	904900	903900
Spare Gold Board						
Gold Board + SnPb Flip Chip	909001	902001	907001	901001	904001	903001
Standard Kit						
Gold Board + SnPb Flip Chip	909000	902000	907000	901000	904000	903000

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

TopLine®



BGA46 0.75MM TEST KIT



Test board for 0.75mm pitch BGA46 chip scale components. Each board has 10 coupons which allow continuity testing of individual components as well as series test of all 10 components.

Parts are supplied in trays.

Pad	Diameter
Bump Site	.012" (.3mm)
Local Fiducial	.040" (1.0mm)

FEATURES

- Electroless Nickel Gold Plated
- LPI Solder Mask
- FR4 Board .03" (0.76mm)
- Single Sided, 1/2 oz. copper
- Tooling Holes .125"
- Fiducial Marks

Actual Size 2.75" x 6.5" (70 x 165mm)

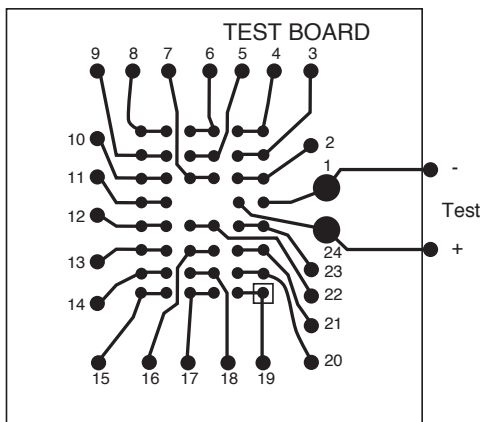
BGA46

0.75MM TEST KIT

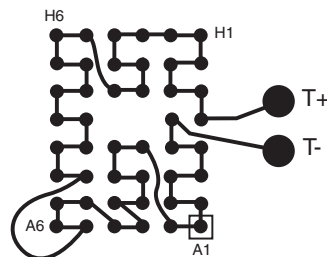


KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN		
		NUMBER 921000 1 Kit	ORDER NUMBER 921010 10 Kits	ORDER NUMBER 921025 25 Kits	ORDER NUMBER 921050 50 Kits
Board BGA46	0.75mm	1 10	10 100	25 250	50 500



SINGLE PCB TEST COUPON



AFTER MOUNTING TO TEST BOARD

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free Gold Board + SnAgCu BGA	921001	921900	921910	921925	921950	921999
Standard Gold Board + SnPb BGA	921001	921000	921010	921025	921050	921100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

TopLine®



UNIVERSAL CSP KIT 0.5~0.8MM PITCH



TopLine's Universal CSP Kits provide pads capable of mounting 0.5mm, 0.75mm and 0.8mm pitch without daisy chain. Includes fiducial marks for vision equipment.

Uses soldermask defined pads.

PAD GEOMETRY		
PAD DIA.	BALL DIA.	PITCH
0.26mm	0.3mm	0.5mm
0.26mm	0.3mm	0.75mm
0.38mm	0.46mm	0.8mm

FEATURES

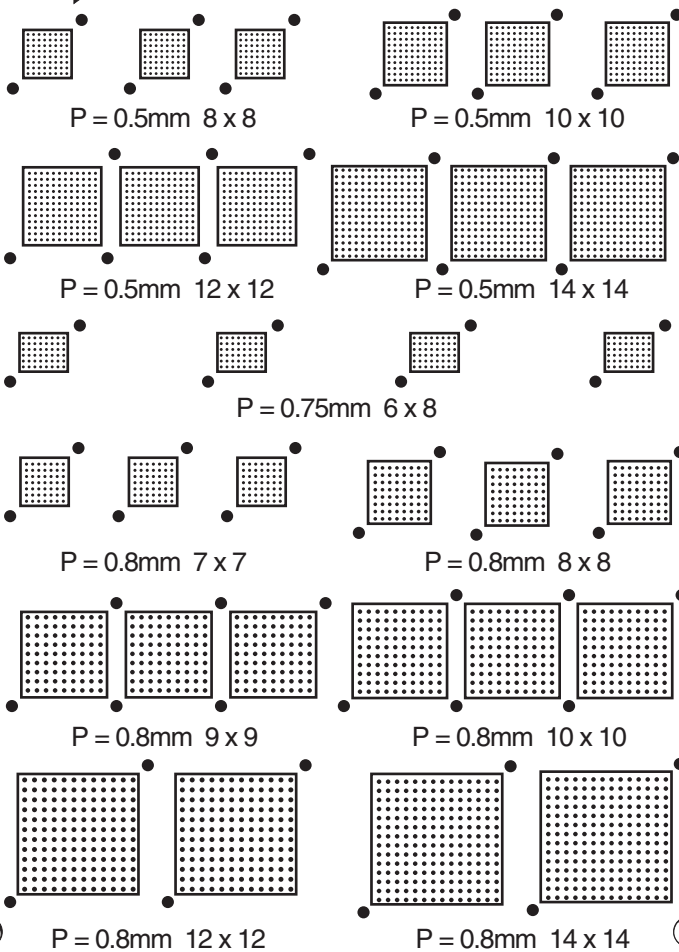
LPI Solder Mask
FR4 Board .062"
Double Sided
Tooling Holes

TopLine CSP Universal Placement

PN963001 Rev A

© 2000 TopLine

www.TopLineDummy.com



Actual Size 4" x 5.5" (100 x 140mm)



UNIVERSAL CSP KIT 0.5~0.8mm PITCH



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY	 MACHINE RUN	
COMPONENT	PITCH	ORDER NUMBER 963000 1 KIT	ORDER NUMBER 963010 10 KITS	ORDER NUMBER 963025 25 KITS
Board		1	10	25
CSP	0.5mm	4	40	100
CSP	0.75mm	4	40	100
CSP	0.8mm	4	40	100

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	963002	963200	963210	963225	963250	963299
Ag – Silver	963006	963600	963610	963625	963650	963699
Cu – OSP	963008	963800	963810	963825	963850	963899
Au – Gold	963009	963900	963910	963925	963950	963999
Standard						
SnPb – HASL	963001	963000	963010	963025	963050	963100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

TopLine®

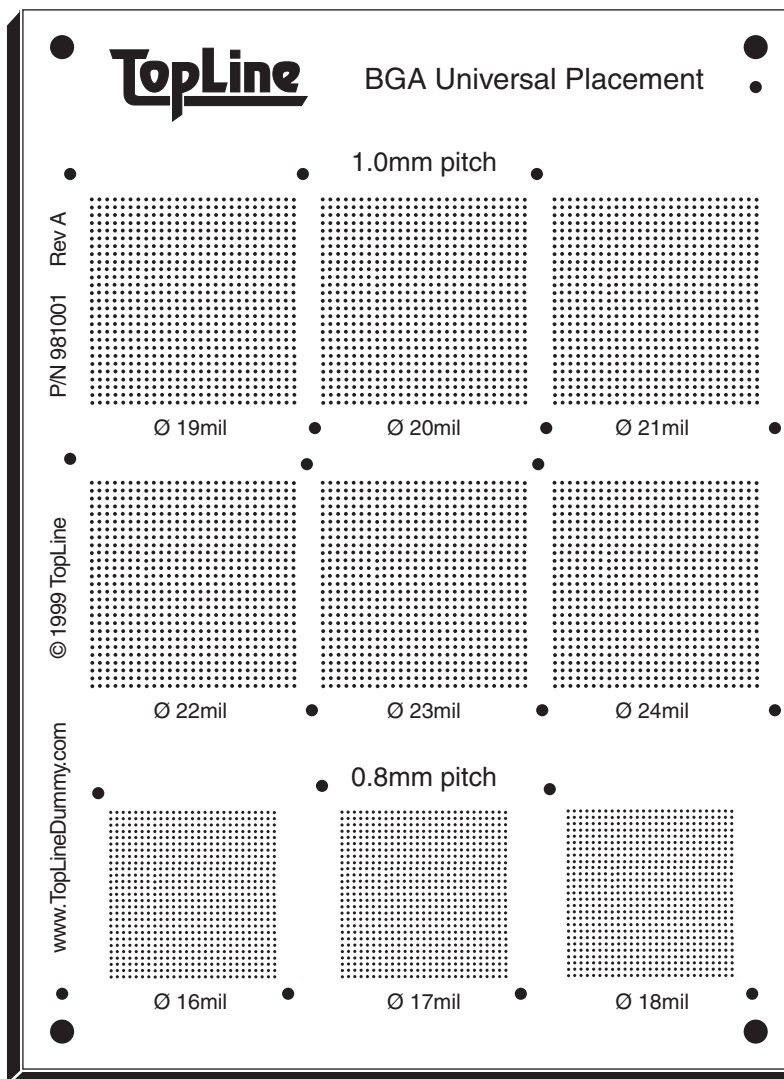


UNIVERSAL BGA KIT 0.8/1.0MM PITCH



TopLine's Universal BGA kits are convenient to use. Includes non-daisy chain BGA components for 1.0mm and 0.8mm pitch for placement and solder practice.

Soldermask defined pads with varying apertures from 16mil to 24mil diameter.



FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes
- Fiducial Marks

Actual Size 4" x 5.5" (100 x 140mm)



UNIVERSAL BGA KIT 0.8/1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN
		ORDER NUMBER 981000 1 KIT	ORDER NUMBER 981010 10 KITS
			ORDER NUMBER 981025 25 KITS
Board 981001	0.8/1.0mm	1	10
BGA	1.0mm	4	40
BGA	0.8mm	4	40

Lead Free (Pb-Free) Option

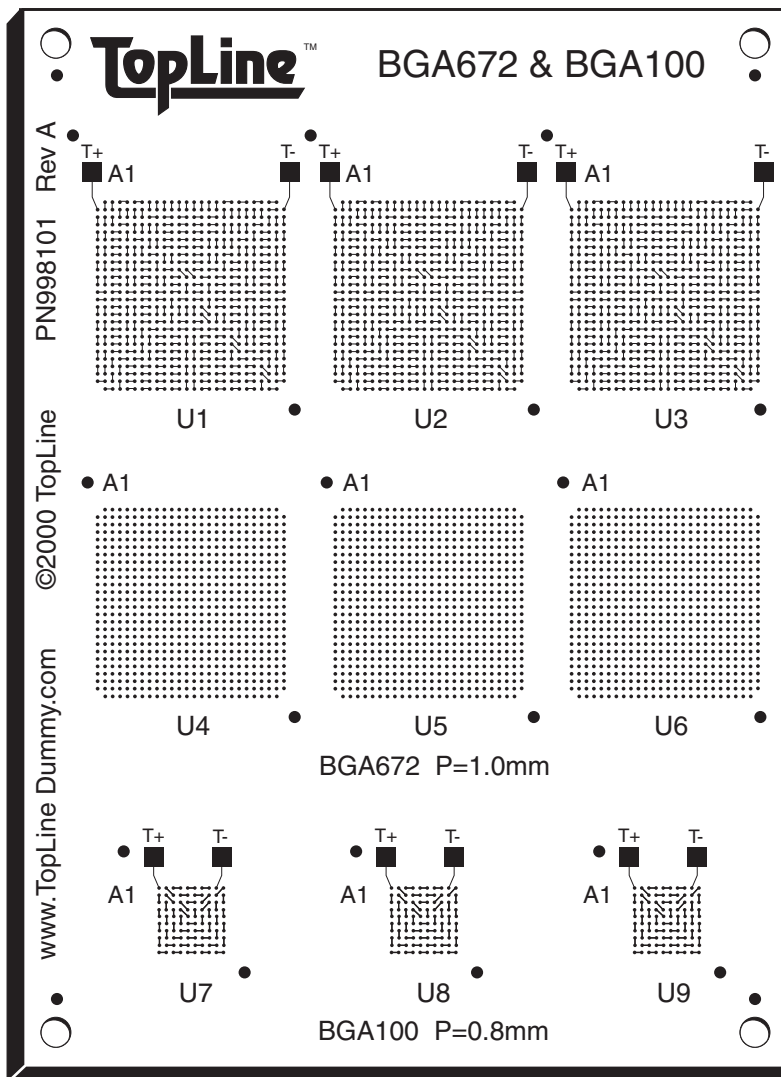
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	981002	981200	981210	981225	981250	981299
Ag – Silver	981006	981600	981610	981625	981650	981699
Cu – OSP	981008	981800	981810	981825	981850	981899
Au – Gold	981009	981900	981910	981925	981950	981999
Standard						
SnPb – HASL	981001	981000	981010	981025	981050	981100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

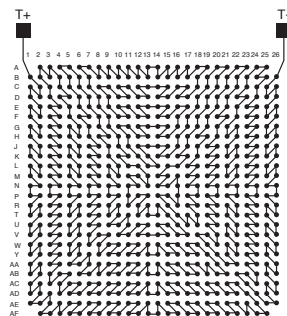
TopLine®



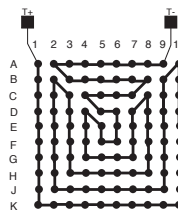
FINE PITCH BGA WITH DAISY CHAIN TEST 0.8MM - 1.0MM PITCH



TopLine makes practicing with Fine Pitch Ball Grid Array technology accessible and affordable. Each board supports BGAs with 0.8mm and 1.0mm grid patterns and daisy chain test points to verify proper placement.



BGA672
AFTER ASSEMBLY



BGA100
AFTER ASSEMBLY

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size 4" x 5.5 (100 x 140mm)



FINE PITCH BGA WITH DAISY CHAIN TEST 0.8MM - 1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 998102 1 KIT	ORDER NUMBER 998110 10 KITS	ORDER NUMBER 998125 25 KITS	ORDER NUMBER 998150 50 KITS	ORDER NUMBER 998100 100 KITS
Board		1	10	25	50	100
BGA100	0.8mm	2	20	50	100	200
BGA672	1.0mm	2	20	50	100	200

Kits are supplied with only 2 BGAs for each daisy chain portion of PC Board.

SOLDERMASK DEFINED PADS

Pitch	Pad Dia.	Ball Dia.
0.8mm	0.38mm	0.46mm
1.0mm	0.508mm	0.63mm

Lead Free (Pb-Free) Option

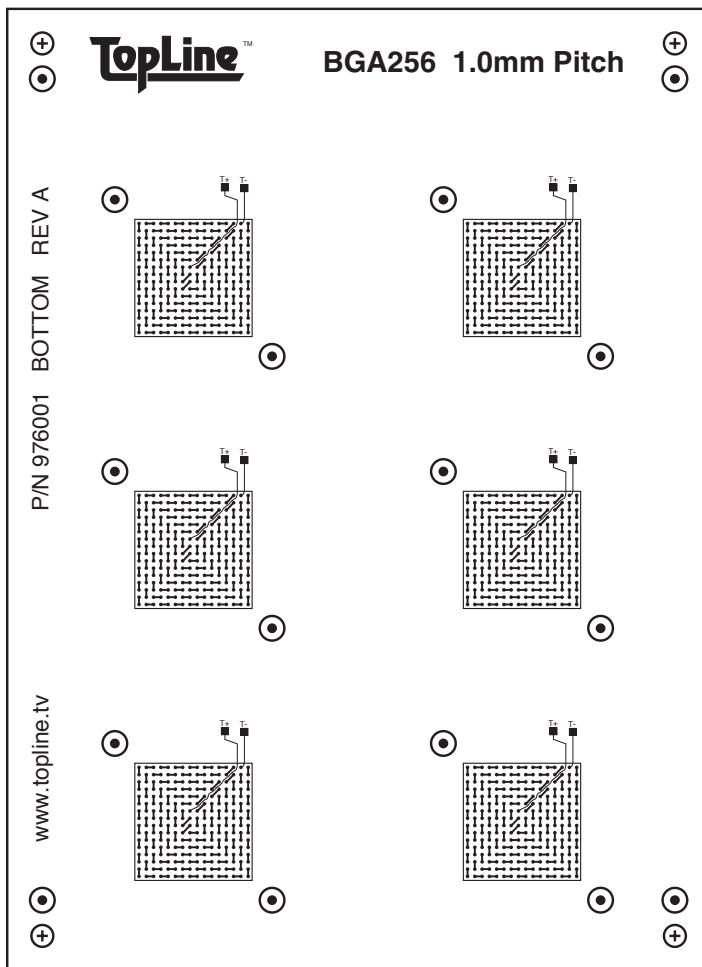
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	998107	998200	998210	998225	998250	998299
Ag – Silver	998106	998600	998610	998625	998650	998699
Cu – OSP	998108	998800	998810	998825	998850	998899
Au – Gold	998109	998900	998910	998925	998950	998999
Standard						
SnPb – HASL	998101	998102	998110	998125	998150	998100

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TopLine®



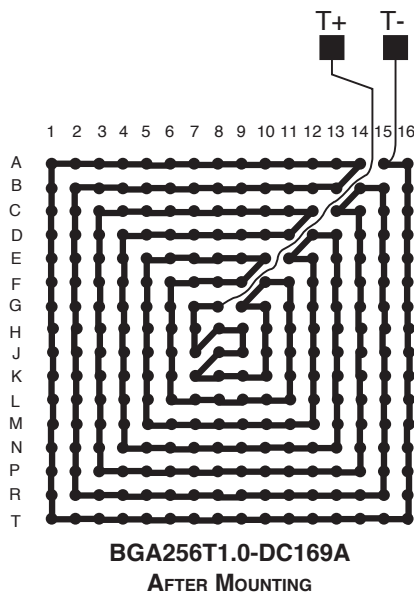
BGA256 DAISY CHAIN KIT 1.0MM PITCH



Actual Size: 4" x 5.5" (100 x 140mm)

Test board for 1.0mm pitch BGA256
Full Array with daisy chain.

Bottom side of board is for SBGA560 (not shown).



FEATURES

- LPI Solder Mask
- Single Sided
- Tooling Holes .125"
- Fiducial Marks



BGA256 DAISY CHAIN KIT 1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	BALL PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 976000 1 KIT	ORDER NUMBER 976010 10 KITS	ORDER NUMBER 976025 25 KITS	ORDER NUMBER 976050 50 KITS	ORDER NUMBER 976100 100 KITS
Board		1	10	25	50	100
BGA256	1.0mm	6	60	150	300	600

Kits are supplied with BGAs for one side of PC Board.

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA256	1.0mm	0.63mm	0.6mm

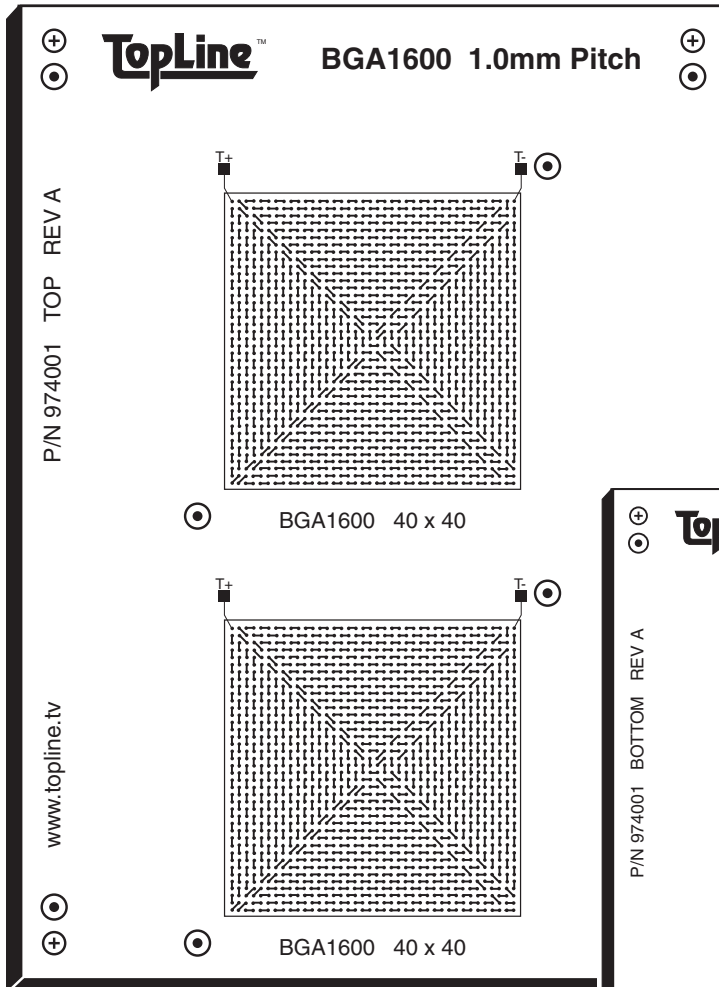
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	976002	976200	976210	976225	976250	976299
Ag – Silver	976006	976600	976610	976625	976650	976699
Cu – OSP	976008	976800	976810	976825	976850	976899
Au – Gold	976009	976900	976910	976925	976950	976999
Standard						
SnPb – HASL	976001	976002	976010	976025	976050	976100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

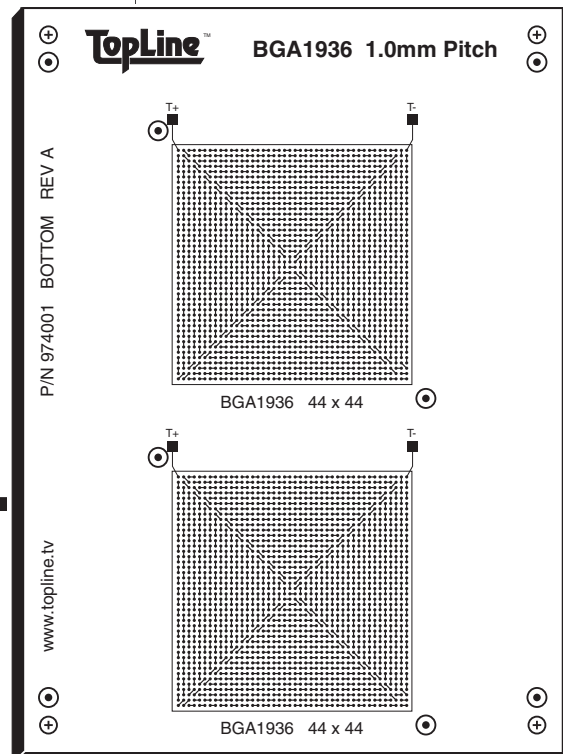


BGA1600/1936 DAISY CHAIN KIT 1.0MM PITCH



TOP SIDE
BOARD

BOTTOM SIDE
BOARD



Actual Size: 4" x 5.5" (100 x 140mm)



BGA1600/1936 DAISY CHAIN KIT 1.0MM PITCH



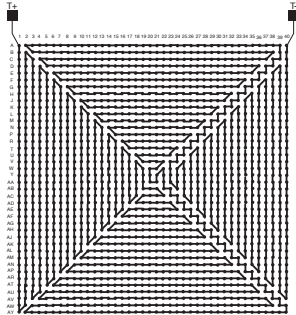
KIT ORDERING INFORMATION

CONTENTS	 MANUAL ASSEMBLY			OR  MACHINE RUN		
	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
	974000	974600	974900	974200	974260	974290
	1 KIT	1 KIT	1 KIT	1 KIT	1 KIT	1 KIT
	Sn Pb BALLS			LEAD FREE SnAgCu BALLS		
BGA1600	2	2	0	2	2	0
BGA1936	2	0	2	2	0	2
Board Sn-Tin	1	1	1	1	1	1

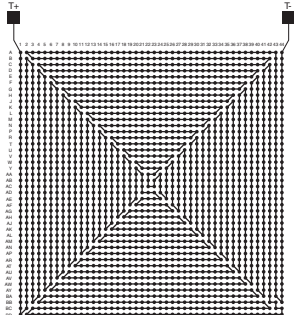
Select the kit that matches your requirements

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA1600/1936	1.0mm	0.635mm	0.6mm



BGA1600T1.0-DC409
After Mounting



BGA1936T1.0-DC449
After Mounting

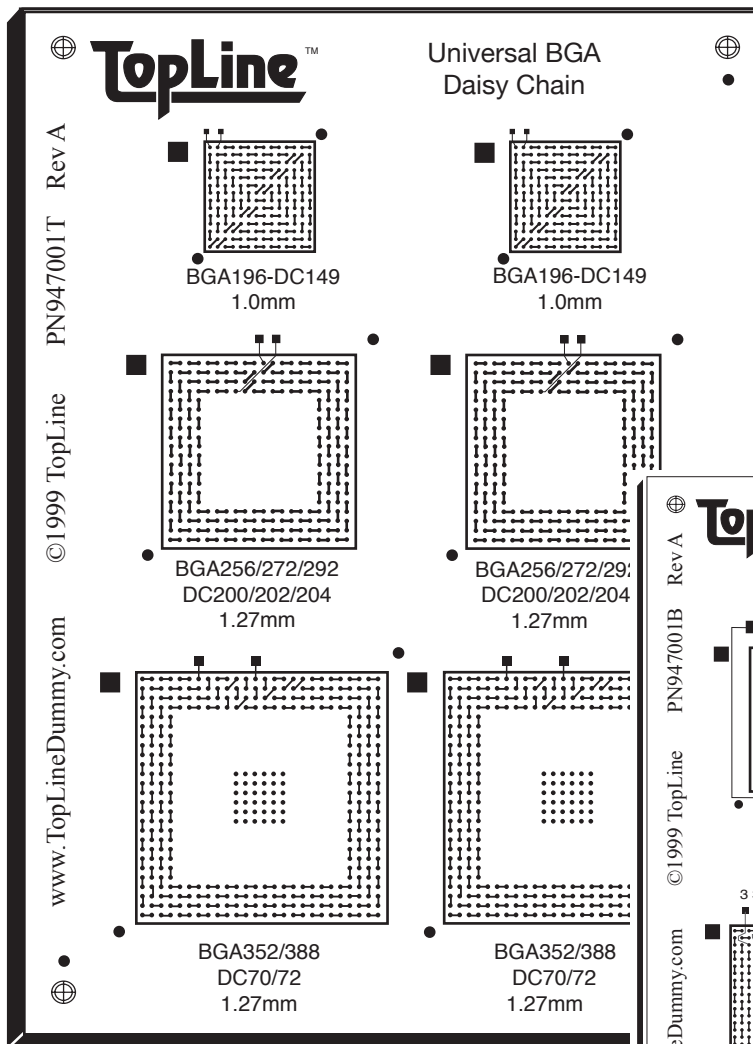
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 974004
SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 974005

BOARD ORDER NUMBER
Sn - Tin 974002
Ag - Silver 974006
Cu - OSP 974008
Au - Gold974009

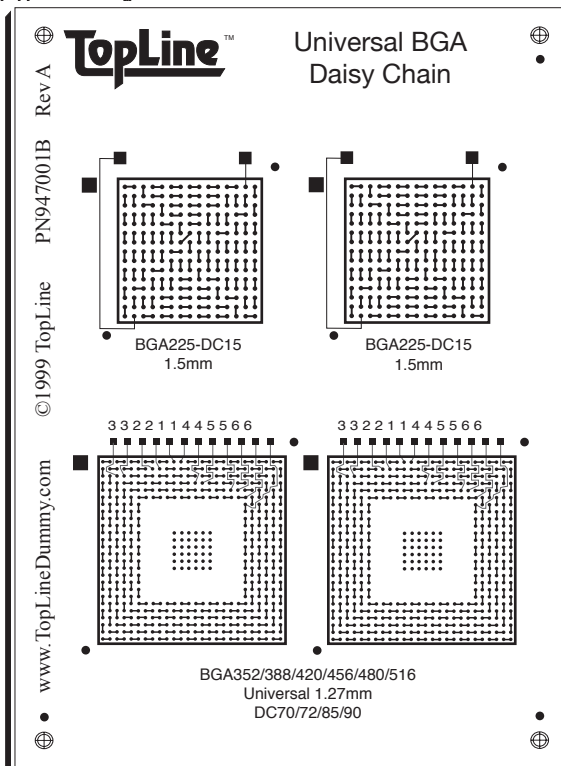


UNIVERSAL BGA DAISY CHAIN KIT 1.0/1.27MM PITCH



TOP SIDE
BOARD

BOTTOM SIDE
BOARD



Actual Size: 4" x 5.5" (100 x 140mm)



UNIVERSAL BGA DAISY CHAIN KIT 1.0/1.27MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 947000 1 KIT	ORDER NUMBER 947010 10 KITS	ORDER NUMBER 947025 25 KITS	ORDER NUMBER 947050 50 KITS	ORDER NUMBER 947100 100 KITS
Board		1	10	25	50	100
BGA196	1.0mm	2	20	50	100	200
BGA256	1.27mm	2	20	50	100	200
BGA352	1.27mm	2	20	50	100	200

Kits are supplied with BGAs for top side of PC Board.

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA196	1.0mm	0.508mm	0.63mm
others	1.27~1.5mm	0.61mm	0.75mm

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	947002	947200	947210	947225	947250	947299
Ag – Silver	947006	947600	947610	947625	947650	947699
Cu – OSP	947008	947800	947810	947825	947850	947899
Au – Gold	947009	947900	947910	947925	947950	947999
Standard						
SnPb – HASL	947001	947000	947010	947025	947050	947100

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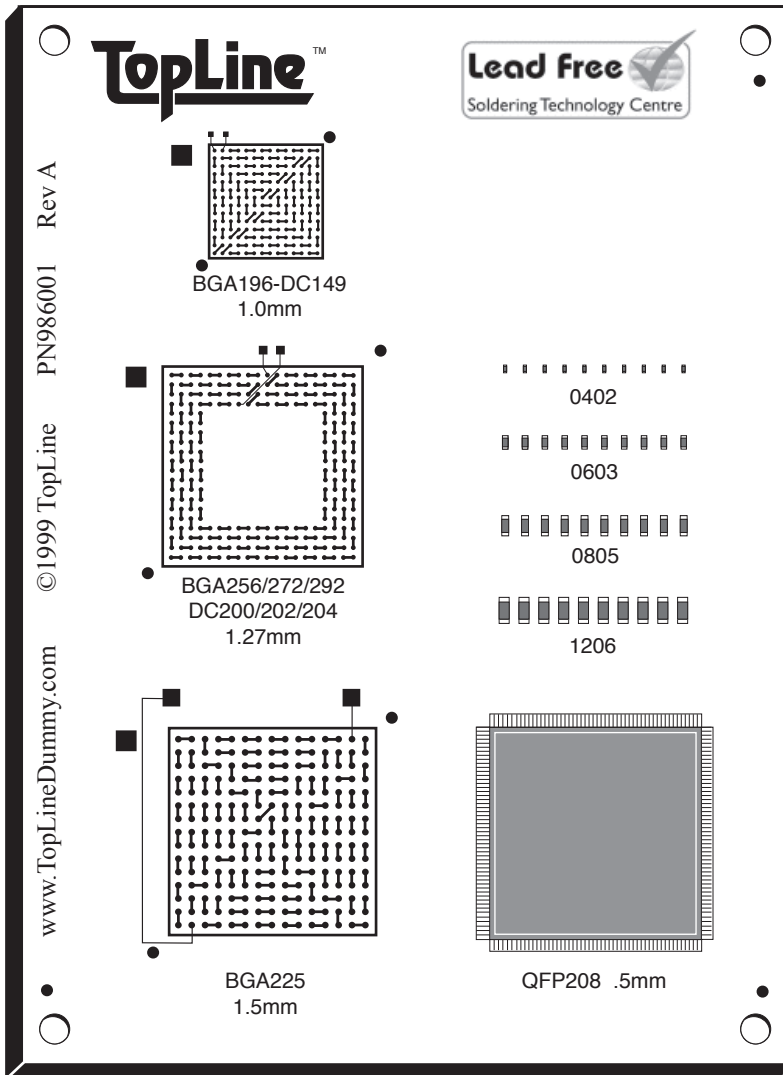
TopLine®



LEAD FREE KIT MULTICOMPONENTS



Practice Lead free assembly using fine-pitch components.



PC BOARD FEATURES

LPI Solder Mask
FR4 Board .062"
Double Sided
Tooling Holes .125"
Fiducial Marks

ASSEMBLY METHODS

Machine Run
Hand Solder
Rework

Actual Size 4" x 5.5 (100 x 140mm)



LEAD FREE KIT MULTICOMPONENTS



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		986000 1 KIT	986010 10 KITS	986024 24 KITS	986050 50 KITS	986100 100 KITS
Board		1	10	24	50	100
BGA196	1.0mm	1	10	24	50	100
BGA225	1.5mm	1	10	24	50	100
BGA256	1.27mm	1	10	24	50	100
QFP208	0.5mm	1	10	24	50	100
0402		10	100	250	500	1000
0603		10	100	250	500	1000
0805		10	100	250	500	1000
1206		10	100	250	500	1000

Lead Free (Pb-Free) Option

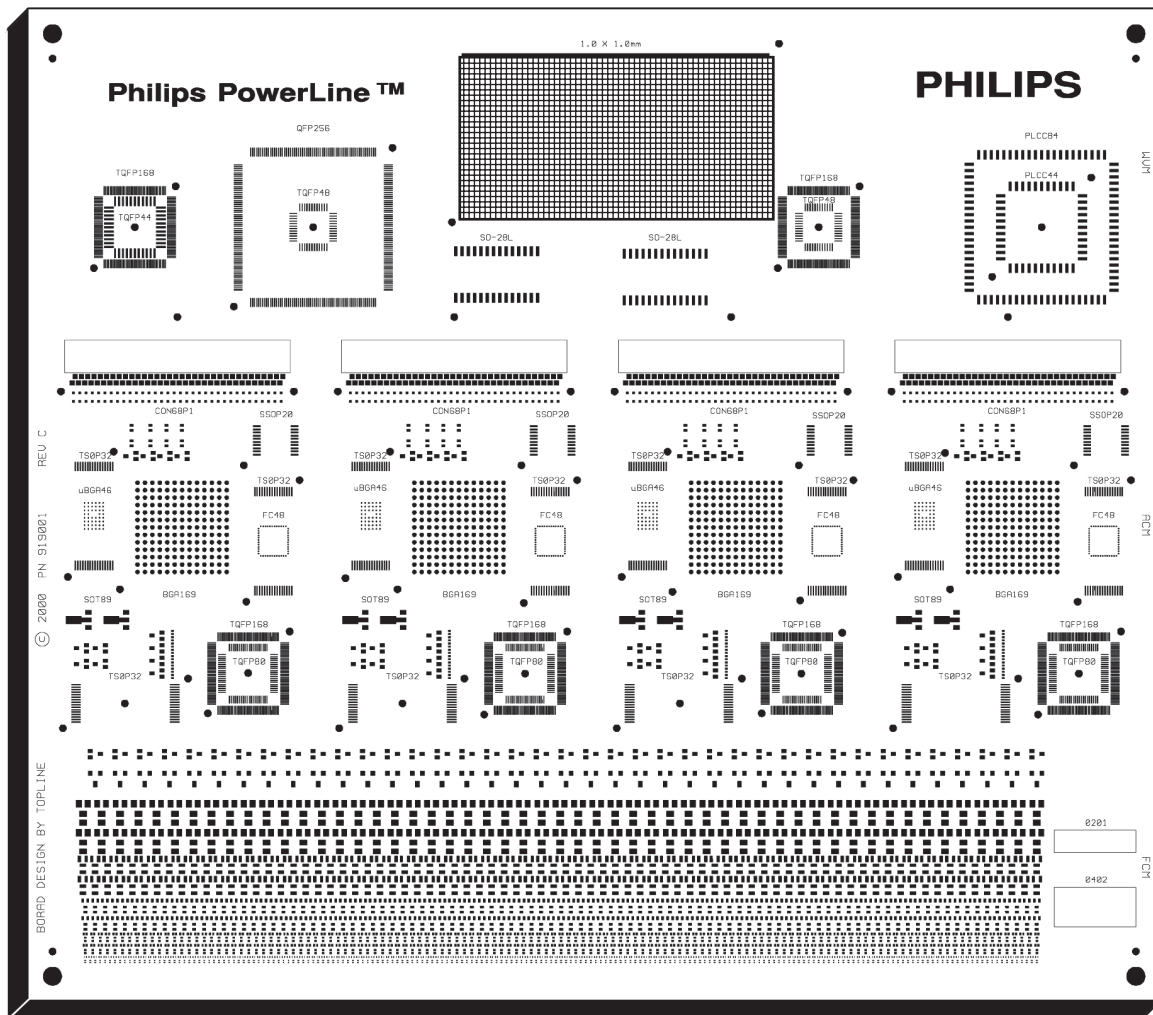
Description	Spare Board	1 Kit	10 Kits	24 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	986002	986200	986210	986224	986250	986299
Ag – Silver	986006	986600	986610	986624	986650	986699
Cu – OSP	986008	986800	986810	986824	986850	986899
Au – Gold	986009	986900	986910	986924	986950	986999

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LARGE MACHINE RUN KIT

**Lead Free
Pb-Free RoHS**



Actual Size: 9" x 8" (230mm x 200mm)

FEATURES

Single Sided
Black LPI Soldermask
Very High Density
0201 Chips

KIT ORDERING INFORMATION

	PER BOARD	PITCH				
			ORDER NUMBER 919010 10 KIT	ORDER NUMBER 919025 25 KITS	ORDER NUMBER 919050 50 KITS	ORDER NUMBER 919100 100 KITS
Board			10	25	50	100
LQFP168	6	0.3mm	0	0	0	0
QFP256	1	0.4mm	10	24	48	96
TQFP48	2	0.5mm	25	50	100	200
TQFP44	1	0.8mm	10	25	50	100
LQFP80	4	0.4mm	40	100	200	400
TSOP32	12	0.5mm	120	300	600	1,200
FLIP CHIP 48	4	457μm	0	0	0	0
μBGA46	4	0.75mm	40	99	198	396
BGA169	4	1.5mm	40	100	180	360
PLCC44	1	1.27mm	10	25	50	100
PLCC84	1	1.27mm	10	25	50	100
SOL28	2	1.27mm	20	50	100	200
SSOP20	4	0.65mm	40	100	200	400
SOT323	68		3,000	3,000	3,000	6,000
SOT23	40		3,000	3,000	3,000	6,000
SOT89	8		100	200	400	800
0201	600		5,000	15,000	30,000	60,000
0402	700		10,000	20,000	40,000	80,000
0603	500		5,000	15,000	25,000	50,000
0805	300		5,000	10,000	15,000	30,000
1206	200		5,000	10,000	15,000	20,000

Lead Free (Pb-Free) Option

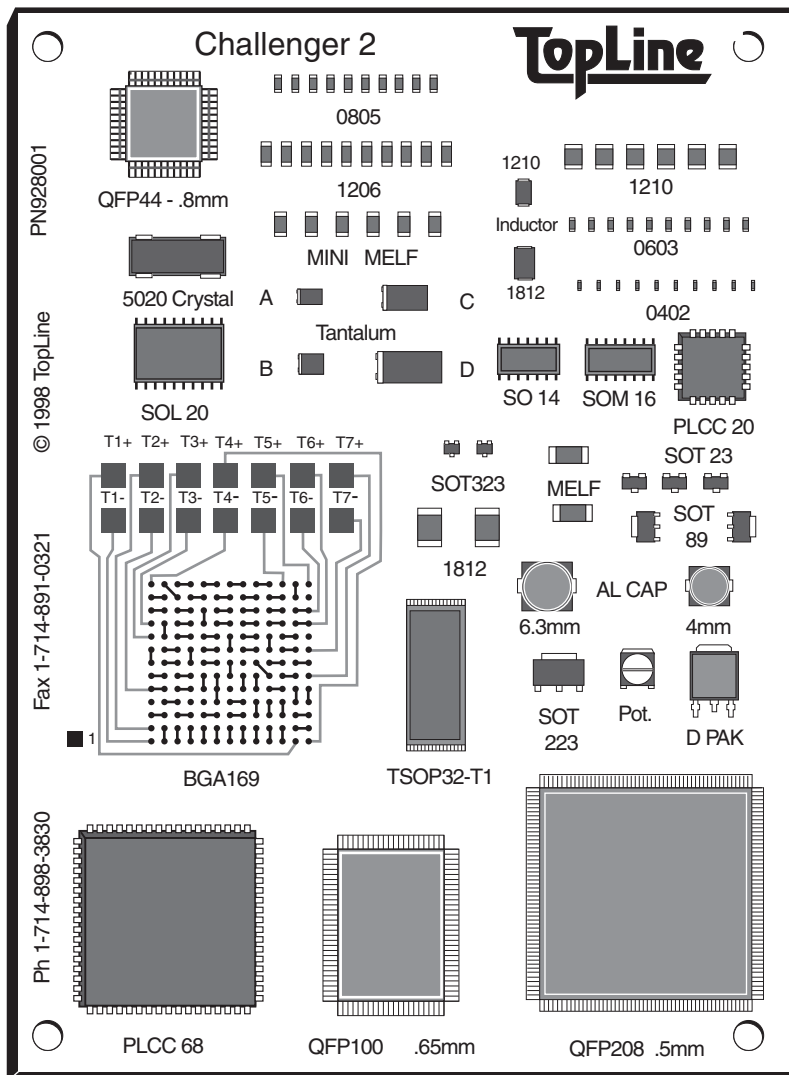
Description	Spare Board	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free					
Sn – Tin	919002	919210	919225	919250	919299
Ag – Silver	919006	919610	919625	919650	919699
Cu – OSP	919008	919810	919825	919850	919899
Au – Gold	919009	919910	919925	919950	919999
Standard					
SnPb – HASL	919001	919010	919025	919050	919100

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TopLine®

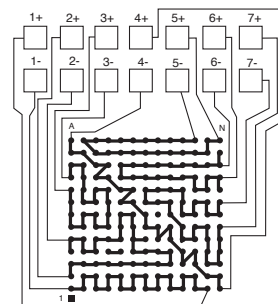


CHALLENGER 2 KIT INTERMEDIATE SMD



The new Challenger 2 Kit gives you a wide selection of 33 different SMD packages. Includes BGA with daisy chain continuity test, fine-pitch components and many discrete components. Double-sided board incorporates "two-front-side" design so only one solder paste stencil is needed.

Put your machine to the test with the new Challenger 2 Kit.



BGA169 AFTER MOUNTING

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



CHALLENGER 2 KIT INTERMEDIATE SMD



KIT ORDERING INFORMATION

 COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 928000 1 KIT	ORDER NUMBER 928010 10 KITS	ORDER NUMBER 928025 25 KITS	ORDER NUMBER 928050 50 KITS	ORDER NUMBER 928100 100 KITS
Board		1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
QFP44	0.8mm	1	10	25	50	100
PLCC20	1.27mm	1	10	25	50	100
PLCC68	1.27mm	1	10	25	50	100
SO14	1.27mm	1	10	25	50	100
SOM16	1.27mm	1	10	25	50	100
SOL20	1.27mm	1	10	25	50	100
BGA169	1.5mm	1	10	25	50	100
SOT23		3	30	75	150	400
SOT89		2	20	50	100	200
SOT223		1	10	25	50	100
SOT323		2	20	50	100	200
DPAK		1	10	25	100	100
Crystal		1	10	25	100	100
Tantalum A & B		1 ea.	10 ea.	25 ea.	50 ea.	100 ea.
Tantalum C & D		1 ea.	10 ea.	25 ea.	100 ea.	100 ea.
Aluminum Cap 4mm & 6.3mm		1 ea.	10 ea.	25 ea.	100 ea.	100 ea.
0402 & 0603 Chip		10 ea.	100 ea.	250 ea.	500 ea.	1000 ea.
0805 & 1206 Chip		10 ea.	100	150	500	1000
1206 mini MELF		6	60	150	500	500
1210 Chip		6	60	25	50	250
1210 Inductor		1	10	25	50	100
1812 Chip		1	10	25	50	100
1812 Inductor		1	10	25	50	100
1812 Potentiometer		1	10	25	50	100
2308 MELF		2	20	50	100	200

Lead Free (Pb-Free) Option

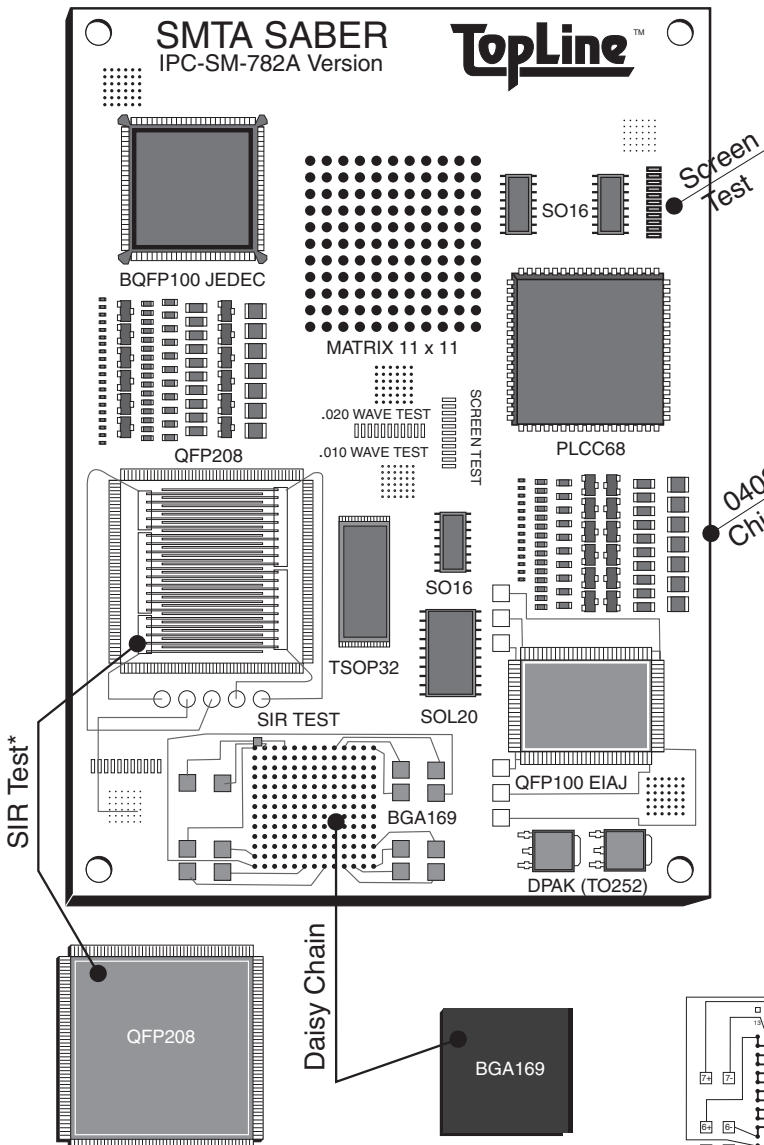
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	928002	928200	928210	928225	928250	928299
Ag – Silver	928006	928600	928610	928625	928650	928699
Cu – OSP	928008	928800	928810	928825	928850	928899
Au – Gold	928009	928900	928910	928925	928950	928999
Standard						
SnPb – HASL	928001	928000	928010	928025	928050	928100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

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SABER 4-BOARD ARRAY ADVANCED MIXED TECHNOLOGY

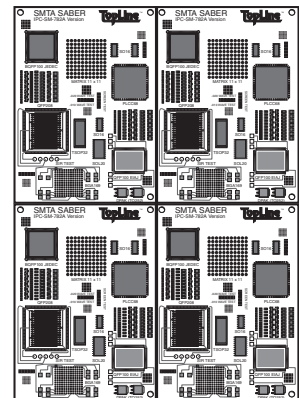


The SABER Board has helped many SMTA members to define and refine their surface mount assembly processes. The SABER Board is used by mainstream surface mount manufacturers throughout the industry to test capabilities such as component placement accuracy, cleanliness (SIR-surface insulation resistance), solder paste screening, solder joint integrity, wave soldering and component placement speed (chip shooting). The SABER Board is supplied as a snap-apart, four board panelized array.

0402/1210
Chips & SOT's

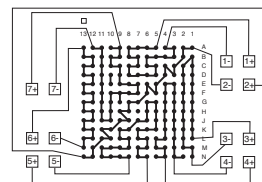
ACTUAL PANEL SIZE:

8" x 11" (200 x 280mm)



FEATURES

- LPI Solder
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks
- 4-Board Routed Array



**BGA AFTER MOUNTING
(TOP SIDE)**



SABER 4-BOARD ARRAY

ADVANCED MIXED TECHNOLOGY



KIT ORDERING INFORMATION

*BQFP100 only in SnPb Kit

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 950000 4 KITS	ORDER NUMBER 950012 12 KITS	ORDER NUMBER 950024 24 KITS	ORDER NUMBER 950048 48 KITS	ORDER NUMBER 950096 96 KITS
SABER Array		1 Array	3 Arrays	6 Arrays	12 Arrays	24 Arrays
QFP208	0.5mm	4	12	25	50	100
TSOP32	0.5mm	4	12	25	50	100
QFP100	0.65mm	4	12	25	50	100
BQFP100*	25mil	4	12	25	50	100
BGA169	1.5mm	4	12	25	50	100
PLCC68	1.27mm	4	12	25	50	100
SO16	1.27mm	12	50	100	200	300
SOL20	1.27mm	4	12	50	50	100
DPAK	1.27mm	10	25	50	100	200
SOT23	1.27mm	100	300	500	1000	3000
0402/0603/0805/1206 Chip	-	100	500	1000	2000	5000
1210 Chip	-	100	200	500	1000	1000
DIP14 ~ 20	100mil	8	25	50	100	200

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10/12 Kits	24/25 Kits	48/50 Kits	96/100 Kits
4-Board Array						
Sn – Tin	950002	950200	950212	950224	950248	950296
Ag – Silver	950006	950600	950612	950624	950648	950696
Cu – OSP	950008	950800	950812	950824	950848	950896
Au – Gold	950009	950900	950912	950924	950948	950996
Standard						
SnPb – HASL	950001	950000	950012	950024	950048	950196
Single (1-up)						
Sn – Tin	950013	950201	950210	950225	950250	950299
Ag – Silver	950016	950601	950610	950625	950650	950699
Cu – OSP	950018	950801	950810	950825	950850	950899
Au – Gold	950007	950901	950910	950925	950950	950999
Standard						
SnPb – HASL	950003	950011	950010	950025	950050	950100

TopLine®



STENCIL EVALUATION KIT



PN935001

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Ph 1-714-898-3830

TopLine™

Stencil Evaluation Kit

QFP 256 .4mm

TSOP32 .5mm

DAISY CHAIN

QFP 208 .5mm

MINI MELF

BGA225 1.5mm Pitch

0402

0603

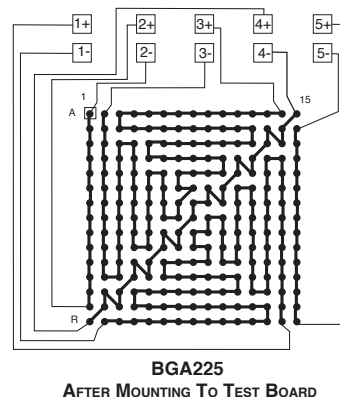
DPAK

SCREEN TEST PATTERN

SOL 20

PLCC 44

We supply the board and components. You provide the stencil. All kits include a ball grid array with daisy chain test and 0.4mm pitch QFP256.



- FEATURES**
- LPI Solder Mask
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



STENCIL EVALUATION KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 936000 1 KIT	ORDER NUMBER 936010 10 KIT	ORDER NUMBER 936025 25 KITS	ORDER NUMBER 936050 50 KITS	ORDER NUMBER 936100 100 KITS
Board		1	10	25	50	100
LQFP168	0.3mm	0	0	0	0	0
QFP256	0.4mm	1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
BGA225	1.5mm	1	10	25	50	100
PLCC44	50mil	1	10	25	50	100
SOL20	50mil	1	10	25	50	100
DKAK		1	10	25	50	100
0402 chip		10	100	250	500	1000
0603 chip		10	100	250	500	1000
mini Melf		6	60	150	300	600

Lead Free (Pb-Free) Option

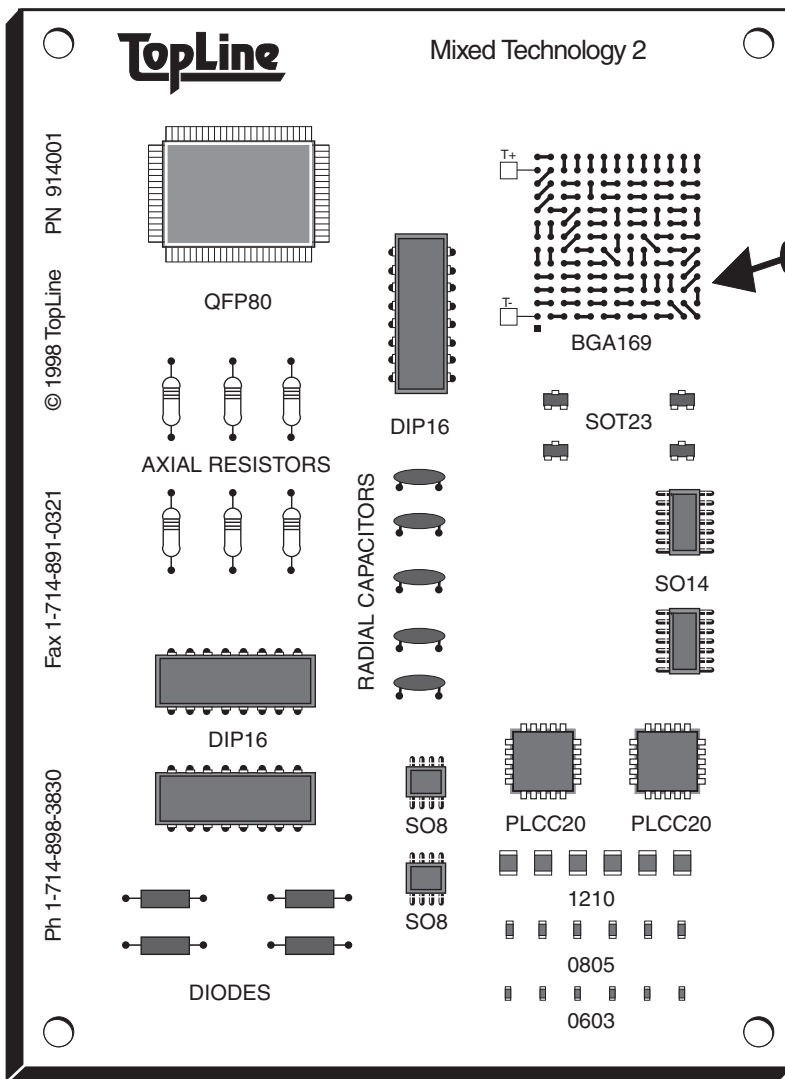
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	935002	936200	936210	936225	936250	936299
Ag – Silver	935006	936600	936610	936625	936650	936699
Cu – OSP	935008	936800	936810	936825	936850	936899
Au – Gold	935009	936900	936910	936925	936950	936999
Standard						
SnPb – HASL	935001	936000	936010	936025	936050	936100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

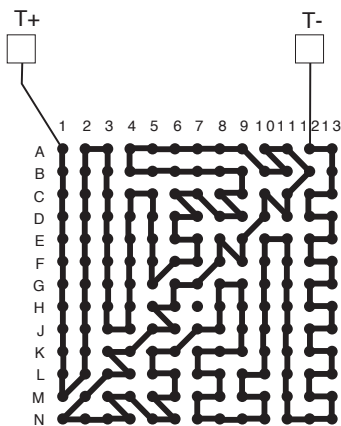
TopLine®



MIXED TECHNOLOGY 2 KIT



The mixed technology 2 kit provides plenty of plated throughholes as well as BGA and an easy-to-solder



**BGA169
AFTER MOUNTING**

FEATURES

- LPI Solder Mask
- FR4 Board .062" (standard)
- Single Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes

Actual Size: 4" x 5.5" (100 x 140mm)



MIXED TECHNOLOGY 2 KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 914000 1 KIT	ORDER NUMBER 914010 10 KITS	ORDER NUMBER 914025 25 KITS	ORDER NUMBER 914050 50 KITS	ORDER NUMBER 914100 100 KITS
Board		1	10	25	50	100
QFP80	0.8mm	1	10	25	50	100
BGA169	1.5mm	1	10	25	50	100
SO8	1.27mm	2	25	50	100	200
SO14	1.27mm	2	25	50	100	200
PLCC20	50mil	2	25	50	100	200
SOT23		4	40	100	200	400
1210 Chip		6	60	150	300	600
0805 Chip		10	100	250	500	1000
0603 Chip		10	100	250	500	1000
THROUGH HOLE COMPONENTS						
DIP16	100mil	3	30	75	150	300
1/4W Resistor	.50"	6	60	150	300	600
DO35 Diodes	.50"	4	40	200	200	400
Ceramic Cap	.20"	5	50	250	250	500

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	914002	914200	914210	914225	914250	914299
Ag – Silver	914006	914600	914610	914625	914650	914699
Cu – OSP	914008	914800	914810	914825	914850	914899
Au – Gold	914009	914900	914910	914925	914950	914999
Standard						
SnPb – HASL	914001	914000	914010	914025	914050	914100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm



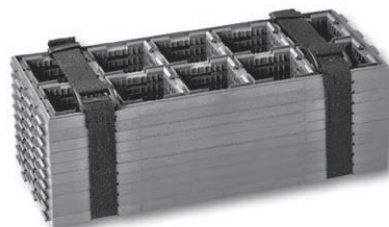
TRAY STRAPS ESD SAFE

Size: 550mm x 25mm



Out performs all existing tray straps on the market. Does not loose ESD properties:

- Fits all JEDEC Matrix Trays
- Quick Release Buckle
- Clean Room Admissible
- Reusable & Recyclable
- Permanently Conductive
- Black conductive polypropylene
- Secures 10 to 12 trays



Order No.

885001

V-GRIP 01

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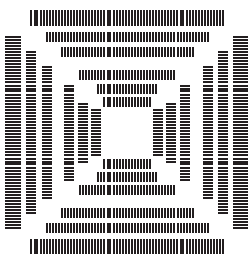


UNIVERSAL QFP LEAD STRAIGHTENER REWORK TOOL

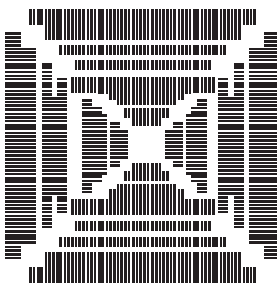


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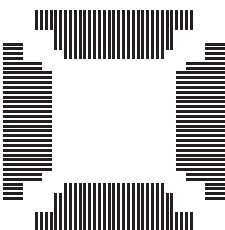
QFP Lead Straightener



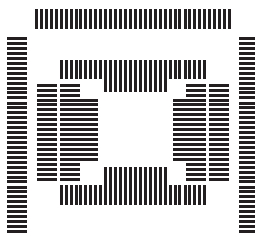
0.4mm Pitch



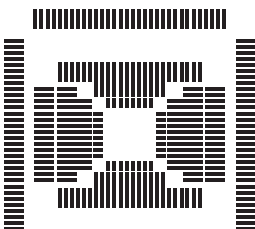
0.5mm Pitch



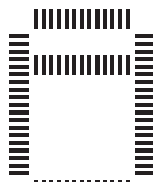
0.635mm Pitch



0.65mm Pitch



0.8mm Pitch



1.0mm Pitch

©2003 TopLine P/N 900000 REV A Design Patent D512,970

Low cost Universal QFP Lead Straightener handles all QFP, TQFP and LQFP with pitch of 0.4mm to 1.0mm.

Complete set includes all template patterns.

Use standard hand tools such as dental picks and tweezers to adjust leads of QFP to match recessed template slots.

Great for rework and recovery of expensive QFP, TQFP and LQFP. Also use for incoming inspection.

Conductive heavy duty stainless steel construction - precision coplanarity. For use on benchtop.

Lead Count and Pitch Includes:

0.4mm	0.5mm	0.65mm	0.8mm
64L	32L	52L	32L
80L	48L	80L	44L
120L	64L	100L	64L
128L	80L	144L	80L
176L	100L	160L	120L
216L	128L		128L
256L	144L	0.635mm	
	160L	84L	1.0mm
	176L	100L	44L
	184L	132L	52L
	208L		64L
	240L		

Order Number: 900000

Design Patent D512,970

Actual Size: 4" x 5.5" (100 x 140mm) .048" (1.2mm) thick