



2003 Catalog

HOW TO ORDER

PAYMENT TERMS

- Credit Terms (Net 30) for established customers.
- American Express, Mastercard and VISA accepted.



CONFIRMING PURCHASE ORDERS

- Confirming purchase orders are required for all orders over \$500.

MINIMUM PER ORDER

- USA/Canada \$50 minimum. • Export \$1000.

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- F.O.B. Garden Grove, California. Please specify preferred method of shipment when placing order.

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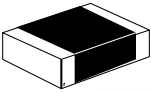






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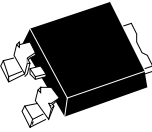
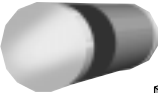
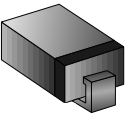
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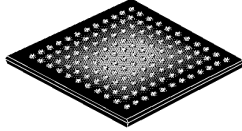
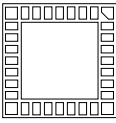
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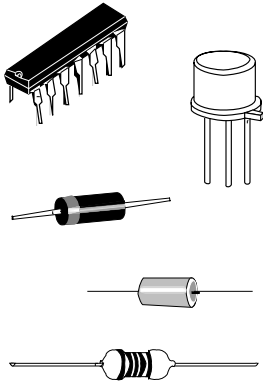
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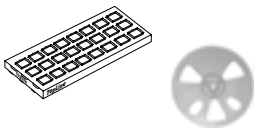
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DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		TAPE INFO		BULK CHIP CASE		4" (100mm)		7" (180mm)		13" (330mm)	
Inch	Metric	WIDTH	PITCH	XD1	QTY	XM1	QTY	XD1	QTY	XD1	QTY
PAPER TAPE											
0201	0603	8mm	2mm	-	-	SC0201P4A	500	SC0201P7A	15,000	-	-
0402	1005	8mm	2mm	SC0402F	50,000	SC0402P4A	500	SC0402P7A	10,000	SC0402P13A	50,000
0603	1608	8mm	4mm	SC0603F	15,000	SC0603P4A	500	SC0603P7A	4000	SC0603P13A	10,000
0805	2012	8mm	4mm	SC0805F-.6	10,000	SC0805P4A	500	SC0805P7A	4000	SC0805P13A	10,000
0805	2012	8mm	4mm	SC0805F-1.25	5000						
1206	3216	8mm	4mm	SC1206F	4000	SC1206P4A	500	SC1206P7A	4000	SC1206P13A	10,000
PLASTIC TAPE											
0805	2012	8mm	4mm	-		SC0805E4A	500	SC0805E7A	3000	SC0805E13A	10,000
1206	3216	8mm	4mm	-		SC1206E4A	500	SC1206E7A	3000	SC1206E13A	10,000
1210	3225	8mm	4mm	-		SC1210E4A	500	SC1210E7A	3000	SC1210E13A	10,000
1812	4532	12mm	8mm	-		SC1812E4A	100	SC1812E7A	1000	SC1812E13A	4000
2225	5664	12mm	8mm	-		SC2225E4A	100	SC2225E7A	1000	SC2225E13A	4000
LEAD-FREE Sn100											
0201	0603	8mm	2mm	-	-	SC0201P4A-TIN	500	SC0201P7A-TIN	15000	-	-
0402	1005	8mm	2mm	-	-	SC0402P4A-TIN	500	SC0402P7A-TIN	10000	-	-
0603	1608	8mm	4mm	-	-	SC0603P4A-TIN	500	SC0603P7A-TIN	4000	-	-
0805	2012	8mm	4mm	-	-	SC0805E4A-TIN	500	SC0805E7A-TIN	4000	-	-
1206	3216	8mm	4mm	-	-	SC1206E4A-TIN	500	SC1206E7A-TIN	4000	-	-
1210	3225	8mm	4mm	-	-	SC1210E4A-TIN	500	SC1210E7A-TIN	4000	-	-
1812	4532	12mm	8mm	-	-	SC1812E4A-TIN	100	SC1812E7A-TIN	1000	-	-

DIMENSION TOLERANCE L x W

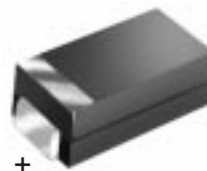
0201 ± 0.03mm	0805 ± 0.15mm
0402 ± 0.05mm	1206 ± 0.15mm
0603 ± 0.1mm	1210 ± 0.30mm

HEIGHT (H)




0201	0.3mm ± 0.03	0805	0.6~1.25mm
0402	0.5mm ± 0.1	1206	0.6~1.25mm
0603	0.8mm ± 0.1	1210	1.25~1.5mm

I N F O Ceramic chip capacitors are standard with Sn/Pb plated Nickel-Barrier terminations. Other sizes such as 0504, 1805, 1806, 2220 are available on special order. Also available lead-free with Sn 100% tin terminations. Nomenclature: The chip size code is the component's LxW dimensions. Example: 0805 = .08" x .05". Chip size may also be expressed in metric code. Example: 2012 = 2.0mm x 1.2mm.


TANTALUM CAPACITOR MOLDED CASE

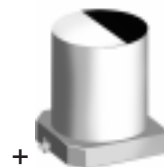


DUMMY COMPONENT ORDERING INFORMATION



CHIP SIZE		TAPE INFO		 Bulk Part Number	QTY	4" (100mm)  Tape & Reel Part Number		7" (180mm)  Tape & Reel Part Number	
METRIC	CODE	WIDTH	PITCH			XM1	QTY	XD1	QTY
3216	A	8mm	4mm	SD3216X-100	100	SD3216E4A	250	SD3216E7A	2000
3528	B	8mm	4mm	SD3528X-100	100	SD3528E4A	250	SD3528E7A	2000
6032	C	12mm	8mm	SD6032X-50	50	SD6032E4A	100	SD6032E7A	500
7343	D	12mm	8mm	SD7343X-50	50	SD7343E4A	100	SD7343E7A	500
1608	J	8mm	4mm	-	-	-	-	SD1608E7A	4000
2012	P/R	8mm	4mm	-	-	-	-	SD2012E7A	2500/3000

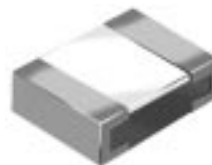
DIMENSIONS			
CASE	LENGTH	WIDTH	HEIGHT
A	3.2mm	1.6mm	1.6mm
B	3.5mm	2.8mm	1.9mm
C	6.0mm	3.2mm	2.5mm
D	7.3mm	4.3mm	2.8mm
J	1.6mm	0.8mm	0.8mm
P/R	2.0mm	1.2mm	1.2mm

I Molded tantalum capacitors are available in six standard footprints. All sizes meet EIA/IECQ dimensions.
N The positive (+) terminal is oriented away from the sprocket holes.
O Nomenclature: The metric code specifies the LxW dimensions in millimeters. Example 3528 = 3.5mm x 2.8mm
 Standard plating is Sn/Pb.  Lead Free Option: Sn100 add -TIN to end of part number.




DUMMY COMPONENT ORDERING INFORMATION

CASE DIAMETER	MAXIMUM HEIGHT	TAPE INFO		7" (180mm)		13" (330mm)	
		WIDTH	PITCH	 Tape & Reel Part Number	QTY	 Tape & Reel Part Number	QTY
				XM1		XD1	
3mm	5.5mm	12mm	8mm	-	-	SE3E13A	2000
4mm	5.5mm	12mm	8mm	SE4E7A	100	SE4E13A	2000
5mm	5.5mm	12mm	12mm	SE5E7A	100	SE5E13A	1000
6.3mm	5.5mm	16mm	12mm	SE6E7A	100	SE6E13A	1000
8mm	6.0mm	16mm	12mm	-	-	SE8E13A	1000
8mm	10mm	24mm	16mm	-	-	SE9E13A	500
10mm	10mm	24mm	16mm	-	-	SE10E13A	500
12.5mm	14mm	32mm	24mm	-	-	SE12E13A	200/250
12.5mm	17mm	32mm	24mm	-	-	SE13E13A	150/200
16mm	17mm	44mm	28mm	-	-	SE16E13A	125/150
16mm	22mm	44mm	28mm	-	-	SE17E13A	75/100
18mm	22mm	44mm	32mm	-	-	SE18E13A	75
18mm	17mm	44mm	32mm	-	-	SE19E13A	75/100
20mm	17mm	44mm	36mm	-	-	SE20E13A	50



DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		TAPE INFO		BULK CHIP CASE PART NUMBER		4" (100mm) Tape & Reel Part Number		7" (180mm) Tape & Reel Part Number		13" (330mm) Tape & Reel Part Number	
Inch	Metric	WIDTH	PITCH	XD1	QTY	XM1	QTY	XD1	QTY	XD1	QTY
PAPER TAPE											
0201	0603	8mm	2mm	SR0201F	50,000	SR0201P4A	1000	SR0201P7A	10,000	-	-
0402	1005	8mm	2mm	SR0402F	50,000	SR0402P4A	1000	SR0402P7A	10,000	SR0402P13A	50,000
0603	1608	8mm	4mm	SR0603F	25,000	SR0603P4A	1000	SR0603P7A	5,000	SR0603P13A	10,000
0805	2012	8mm	4mm	SR0805F	10,000	SR0805P4A	1000	SR0805P7A	5,000	SR0805P13A	10,000
1206	3216	8mm	4mm	SR1206F	5,000	SR1206P4A	1000	SR1206P7A	5,000	SR1206P13A	10,000
1210	3225	8mm	4mm	-	-	SR1210P4A	1000	SR1210P7A	5,000	SR1210P13A	10,000
PLASTIC TAPE											
1210	3225	8mm	4mm	-	-	SR1210E4A	1000	SR1210E7A	4,000	SR1210E13A	10,000
2010	5025	12mm	4mm	-	-	SR2010E4A	250	SR2010E7A	4,000	SR2010E13A	10,000
2512	6332	12mm	8mm	-	-	SR2512E4A	250	SR2512E7A	2,000	SR2512E13A	4,000
ZERO OHM											
0201	0603	8mm	2mm	-	-	-	-	SR0201P7A-ZERO	10,000	-	-
0402	1005	8mm	2mm	-	-	-	-	SR0402P7A-ZERO	10,000	-	-
0603	1608	8mm	4mm	-	-	-	-	SR0603P7A-ZERO	5,000	-	-
0805	2012	8mm	4mm	-	-	-	-	SR0805P7A-ZERO	5,000	-	-
1206	3216	8mm	4mm	-	-	-	-	SR1206P7A-ZERO	5,000	-	-
LEAD FREE  Sn100											
0201	0603	8mm	2mm	-	-	SR0201P4A-TIN	1000	SR0201P7A-TIN	10,000	-	-
0402	1005	8mm	2mm	-	-	SR0402P4A-TIN	1000	SR0402P7A-TIN	10,000	-	-
0603	1608	8mm	4mm	-	-	SR0603P4A-TIN	1000	SR0603P7A-TIN	5,000	-	-
0805	2012	8mm	4mm	-	-	SR0805P4A-TIN	1000	SR0805P7A-TIN	5,000	-	-
1206	3216	8mm	4mm	-	-	SR1206P4A-TIN	1000	SR1206P7A-TIN	5,000	-	-

DIMENSION TOLERANCE

0402 ± 0.05mm
0603 ~ 2512 ± 0.15mm

HEIGHT (H)

0201	0.23mm ± 0.03	0805	0.55mm ± 0.1
0402	0.35mm ± 0.05	1206	0.55mm ± 0.1
0603	0.45mm ± 0.10	1210	0.55mm ± 0.15

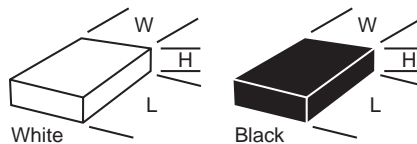
**I
N
F
O** Resistor chips are available in seven standard sizes. Bulk Feeder cassettes are for placement by high-speed chip shooters. Zero ohm jumpers available for continuity checking. Also available Lead Free Sn100% Tin terminations. Nomenclature: The chip size code approximates the LxW dimensions in inches. Example: 0805 = .08" x .05".



DUMMY COMPONENT ORDERING INFORMATION

SIZE CODE		SIZE LENGTH X DIA.	TAPE INFO		4" (100mm)  Tape & Reel Part Number		7" (180mm)  Tape & Reel Part Number	
INCH	NAME		WIDTH	PITCH	XM1	QTY	XD1	QTY
PLASTIC TAPE								
0604		1.6 x 1.0mm	8mm	4mm	SRM0604E4A	500	SRM0604E7P	3000
0805	Micro	2.2 x 1.1 mm	8mm	4mm	SRM0805E4A	500	SRM0805E7P	3000
1206	Mini	3.2 x 1.6mm	8mm	4mm	SRM1206E4A	500	SRM1206E7P	3000
1406	Mini	3.5 x 1.4mm	8mm	4mm	SRM1406E4A	500	SRM1406E7P	3000
2308	MELF	5.9 x 2.2mm	12mm	4mm	SRM2308E4A	250	SRM2308E7P	1500
LEAD FREE  Sn100								
0805	Micro	2.2 x 1.1	8mm	4mm	SRM0805E4A-TIN	500	SRM0805E7A-TIN	3000
1206	Mini	3.2 x 1.6	8mm	4mm	SRM1206E4A-TIN	500	SRM1206E7A-TIN	3000
2308	MELF	5.9 x 2.2	12mm	4mm	SRM2308E4A-TIN	250	SRM2308E7A-TIN	2000
ZERO OHM								
0805	Micro	2.2 x 1.1	8mm	4mm	SRM0805E4A-ZERO	500	SRM0805E7A-ZERO	3000
1206	Mini	3.2 x 1.6	8mm	4mm	SRM1206E4A-ZERO	500	SRM1206E7A-ZERO	3000
2308	MELF	5.9 x 2.2	12mm	4mm	SRM2308E4A-ZERO	250	SRM2308E7A-ZERO	2000

PLACEMENT CHIPS FOR VISION



DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		MAX H	TAPING INFO		7" (180mm)  Tape & Reel Part Number	QTY
INCH	METRIC		WIDTH	PITCH		
XD1						
WHITE CHIPS						
016008	0402	0.2mm	Bulk	Bulk	SCC016008B-WHITE	25,000
0201	0603	0.3mm	8mm	2mm	SCC0201P7A-WHITE	15,000
0402	1005	0.5mm	8mm	2mm	SCC0402P7A-WHITE	10,000
0603	1608	0.45mm	8mm	4mm	SRC0603P7A-WHITE	5,000
0603	1608	0.8mm	8mm	4mm	SCC0603P7A-WHITE	4,000
0805	2012	0.5mm	8mm	4mm	SRC0805P7A-WHITE	5,000
0805	2012	0.9mm	8mm	4mm	SCC0805E7A-WHITE	4,000
1206	3216	0.5mm	8mm	4mm	SRC1206P7A-WHITE	5,000
1206	3216	1.0mm	8mm	4mm	SCC1206P7A-WHITE	4,000
BLACK CHIPS						
016008	0402	0.2mm	Bulk	Bulk	SCC016008B-BLACK	25,000
0201	0603	0.3mm	8mm	2mm	SCC0201P7A-BLACK	15,000
0402	1005	0.5mm	8mm	2mm	SCC0402P7A-BLACK	10,000
0603	1608	0.8mm	8mm	4mm	SCC0603P7A-BLACK	4,000
0805	2012	0.9mm	8mm	4mm	SCC0805E7A-BLACK	4,000
1206	3216	1.0mm	8mm	4mm	SCC1206P7A-BLACK	4,000

DIMENSIONS:

Code	Length	Width
016008	0.016"	0.008"
0201	0.022"	0.012"
0402	0.036"	0.020"
0603	0.058"	0.030"
0805	0.075"	0.040"
1206	0.120"	0.050"

I N F O Placement Ceramic Chips are available in 6 case sizes and in 2 colors: White and Black. Right angle 90° edges for accurate placement by vision equipment. No terminations. Non-Solderable. White chips are mounted on a dark substance such as blue UV tape. Black chips are mounted onto a light substance. Excellent contrast. Easy for vision equipment to see.



INDUCTOR




MOLDED CASE




MULTILAYER INDUCTOR

DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE MAX		HEIGHT	TAPE INFO		4" (100mm)  Tape & Reel Part Number		7" (180mm)  Tape & Reel Part Number	
INCH	METRIC		WIDTH	PITCH	XM1	QTY	XD1	QTY
MULTILAYER INDUCTOR								
0201	0603	0.3mm	8mm	2mm	SI0201P4A	500	SI0201P7A	15,000
0402	1005	0.5mm	8mm	2mm	SI0402P4A	500	SI0402P7A	10,000
0603	1608	0.8mm	8mm	4mm	SI0603E4A	250	SI0603E7A	4000
0805	2012	1.25mm	8mm	4mm	SI0805E4A	250	SI0805E7A	4000
1206	3216	1.60mm	8mm	4mm	SI1206E4A	250	SI1206E7A	2000
MOLDED CASE INDUCTOR								
1008	2520	1.8mm	8mm	4mm	SI1008E4A	250	SI1008E7A	2000
1210	3225	2.2mm	8mm	4mm	SI1210E4A	250	SI1210E7A	2000
1812	4532	3.2mm	12mm	8mm	SI1812E4A	100	SI1812E7A	500

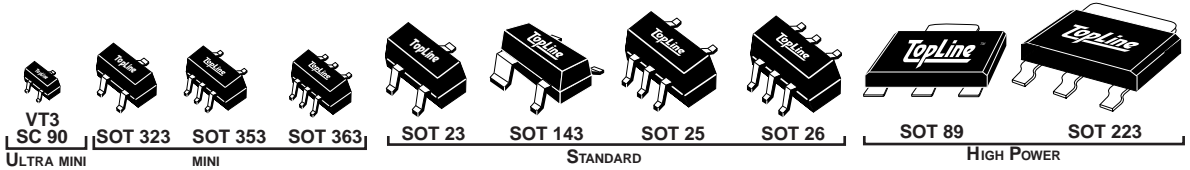
INFO

Inductors are available in a variety of package types and sizes. Molded devices are useful for precision placement where vision processes are required. Multilayer devices handle and place the same as chip capacitors. Nomenclature: The chip size code approximates the LxW footprint dimensions.

 Lead Free Option: Sn100 add -TIN to end of part number.



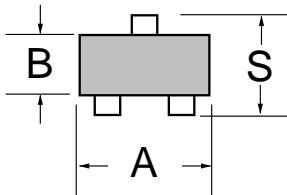
SOT TRANSISTOR



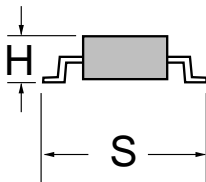
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	TAPE INFO		DEVICE REFERENCE			BODY SIZE NOMINAL (MM)				4" (100mm)		7" (180mm)	
	WIDTH	PITCH	SOT	SC	TO	A	B	S	H	XM1 Tape & Reel Part Number	QTY	XD1 Tape & Reel Part Number	QTY
3	8mm	4mm	-	-	-	1.2	0.8	1.2	0.5	-	-	VT3E7A	3000
3	8mm	4mm	-	SC59	TO236AA	2.9	1.6	2.8	1.1	-	-	SC59E7A	3000
3	8mm	4mm	SOT323	SC70	-	2.0	1.25	2.1	0.9	-	-	SC70E7A	3000
3	8mm	4mm	-	SC75A/SC90	-	1.6	0.8	1.6	0.7	-	-	SC90E7A	3000
3	8mm	4mm	SOT23	-	TO236AB	2.9	1.3	2.4	.95	SOT23E4A	500	SOT23E7A	3000
5	8mm	4mm	SOT23-5	SC74A	-	2.9	1.6	2.8	1.1	-	-	SOT25E7A	3000
6	8mm	4mm	SOT23-6	SC74	-	2.9	1.6	2.8	1.1	-	-	SOT26E7A	3000
3	12mm	8mm	SOT89	SC62	TO243AA	4.5	2.5	4.0	1.5	SOT89E4A	200	SOT89E7A	1000
4	8mm	4mm	SOT143	-	TO253AA	2.9	1.6	2.8	.95	SOT143E4A	100	SOT143E7A	3000
3	12mm	8mm	SOT223	SC73	TO261AA	6.5	3.6	7.0	1.6	SOT223E4A	100	SOT223E7A	1000
3	8mm	4mm	SOT323	SC70	-	2.0	1.25	2.1	0.9	SOT323E4A	300	SOT323E7A	3000
5	8mm	4mm	SOT353	SC88A	-	2.0	1.25	2.1	0.9	-	-	SOT353E7A	3000
6	8mm	4mm	SOT363	SC88	-	2.0	1.25	2.1	0.9	-	-	SOT363E7A	3000
8	8mm	4mm	SOT23-8	-	-	2.9	1.3	2.4	.95	-	-	SOT28E7A	3000

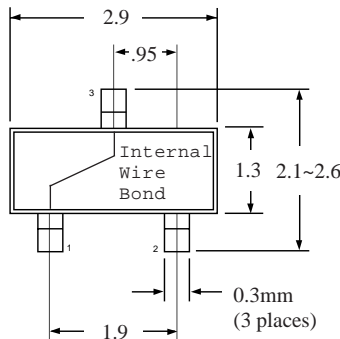
NEW LEAD FREE SOT23 WITH DAISY CHAIN



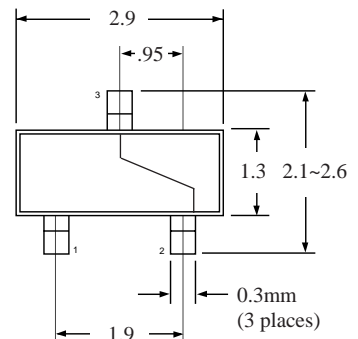
TOP VIEW



SIDE VIEW



SOT23E7A-DC13-TIN
TOP VIEW



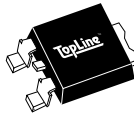
SOT23E7A-DC23-TIN
TOP VIEW

TopLine offers a full range of SOT devices conforming to JEDEC (TO) and EIAJ (SC) standards. 3-lead devices are commonly used for diodes or transistors. 5- and 6-lead devices are used for integrated circuits or diode arrays. Nomenclature: SOT = Small Outline Transistor. The TSOP6 is similar to SOT23 with 6-leads.

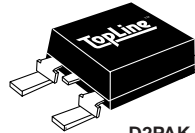


DPAK Power Device

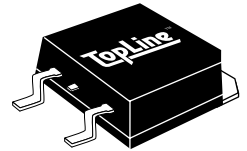
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DPAK



D2PAK

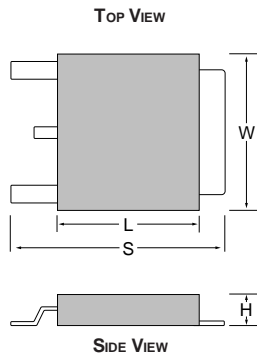


D3PAK

DUMMY COMPONENT ORDERING INFORMATION

PACKAGE SIZE NOMINAL (MM)				JEDEC SMD DEVICE	TAPE INFO		4" (100mm) Tape & Reel Part Number		13" (330mm) Tape & Reel Part Number	
L	W	H	S		WIDTH	PITCH	XM1	QTY	XD1	QTY
6	6.5	2.3	10	TO-252AA	16mm	8mm	DPAK-E4A	100	DPAK-E13A	2500
9.2	10	4.4	15	TO-263AB	24mm	12mm	D2PAK-E4A	100	D2PAK-E13A	750~1000
9.2	10.4	4.4	15	3-LEAD	24mm	12mm	-		D2PAK-3-E13A	750~1000
9.2	10.4	4.4	15	4-LEAD	24mm	12mm	-		D2PAK-4-E13A	750~1000
9.2	10.4	4.4	15	5-LEAD	24mm	12mm	-		D2PAK-5-E13A	750~1000
14	16	4.7	18.8	TO-268AA	24mm	24mm	-		D3PAK-E13A*	500

* For Reference
Check for Availability

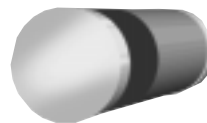


DPAKs are large packages used for power devices such as rectifiers and transistors. The D²PAK is the Surface Mount equivalent of the TO-220 and the D³PAK is the SMD equivalent of TO-247. Call for availability on D³PAK.

Lead Free Option: Sn100 add -TIN to end of part number.






MELF & MINI MELF DIODES



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DUMMY COMPONENT ORDERING INFORMATION

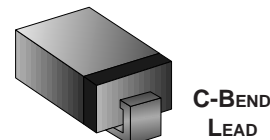
DEVICE	SIZE Dia. x L	TAPE INFO		4" (100mm)		7" (180mm)		13" (330mm)	
		WIDTH	PITCH	 Tape & Reel Part Number X _{M1}	Q _{TY}	 Tape & Reel Part Number X _{D1}	Q _{TY}	 Tape & Reel Part Number X _{D1}	Q _{TY}
mini MELF DO-213AA (LL34)	1.6 x 3.5mm	8mm	4mm	SOD80E4A	500	SOD80E7A	2500	SOD80E13A	10,000
MELF DO-213AB (LL41)	2.5 x 5mm	12mm	4mm	SM1E4A-GLASS	250	SM1E7A-GLASS	1500	SM1E13A-GLASS	5000
MELF DO-213AB (SM1)	2.5 x 5mm	12mm	4mm	SM1E4A-PLASTIC	250	SM1E7A-PLASTIC	1750	SM1E13A-PLASTIC	5000

INFORMATION

MELF and Mini Melf diodes are cylindrical cases constructed of glass or plastic. The SOD80 glass package is commonly used lower power diodes. The SM1 package is used for high current rectifiers and zener diodes. Nomenclature: DO = Diode Outline

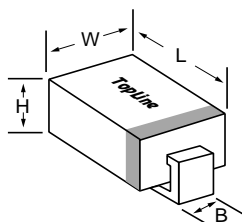


Lead Free suffix -B = Sn/Bi, -Tin = Sn100

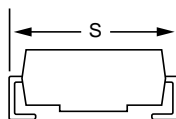


DUMMY COMPONENT ORDERING INFORMATION

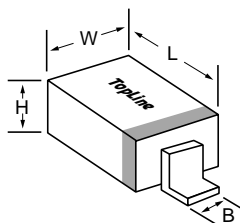
PACKAGE SIZE NOMINAL (MM)					JEDEC DEVICE	TAPE WIDTH		7" (180mm) Tape & Reel Part Number		13" (330mm) Tape & Reel Part Number	
L	W	H	S	B		WIDTH	PITCH	XD1	QTY	XD1	QTY
GULL WING LEAD											
1.2	0.8	0.6	1.6	0.3	SOD523	8MM	4MM	SC79E7A	3000	-	-
1.7	1.25	0.7	2.5	0.3	SOD323	8mm	4mm	SOD323E7A	3000	SOD323E13A	10,000
2.7	1.5	1.3	3.6	0.7	SOD123	8mm	4mm	SOD123E7A	2500	SOD123E13A	-
4.3	2.6	2.2	6.1	1.4	DO215AC	12mm	4mm	SMAG-E7A	1800	SMAG-E13A	5000
4.3	3.6	2.3	6.2	2.0	DO215AA	12mm	8mm	SMBG-E7A	1000	SMBG-E13A	2500
7.0	6.0	2.3	10	3.0	DO215AB	16mm	8mm	SMCG-E7A	900	SMCG-E13A	2500
C-BEND LEAD (MODIFIED J-LEAD)											
4.3	2.6	2.2	5.0	1.5	DO214AC	12mm	4mm	FM1E7A	1500	FM1E13A	7500
4.3	2.6	2.2	5.0	1.5	DO214AC	12mm	4mm	SMAJ-E7A	1800	SMAJ-E13A	7500
4.3	3.6	2.3	5.4	2.0	DO214AA	12mm	8mm	SMBJ-E7A	750	SMBJ-E13A	3200
7.0	6.0	2.3	8.0	3.0	DO214AB	16mm	8mm	SMCJ-E7A	850	SMCJ-E13A	3500



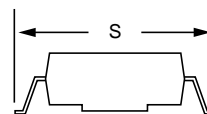
C-BEND (MODIFIED J)



SIDE VIEW



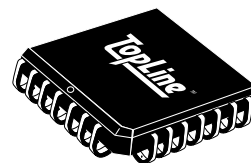
GULL WING LEAD



SIDE VIEW



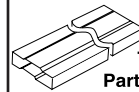


PLCC PLASTIC LEADED CHIP CARRIER



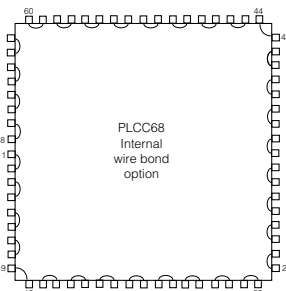
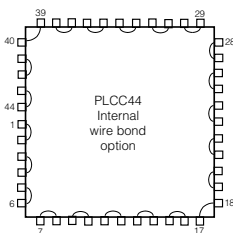
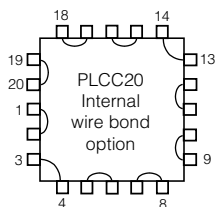
J-LEAD 50MIL PITCH

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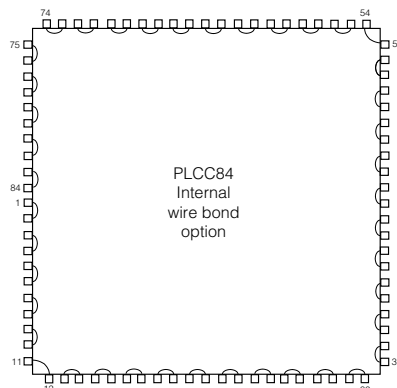
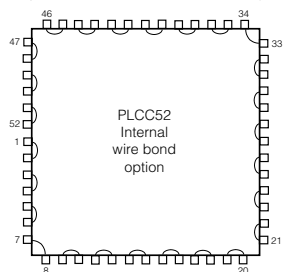
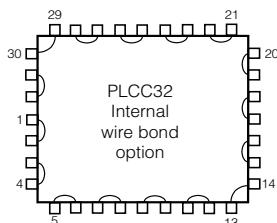
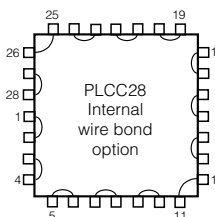
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY SIZE INCHES	TAPE INFO		 Tube Part Number		 7" (180mm) Tape & Reel Part Number		 13" (330mm) Tape & Reel Part Number	
		WIDTH	PITCH	XP1	QTY	XM1	QTY	XP1	QTY
*18	.29" x .43"	24mm	12mm	PLCC18SM	36	-	-	-	-
18	.29" x .49"	24mm	12mm	PLCC18M	36	PLCC18E7A	100	PLCC18E13A	1000
20	.35" sq.	16mm	12mm	PLCC20M	46~50	PLCC20E7A	100	PLCC20E13A	1000
28	.45" sq.	24mm	16mm	PLCC28M	37~40	PLCC28E7A	100	PLCC28E13A	500~900
32	.45" X .55"	24mm	16mm	PLCC32M	30~34	PLCC32E7A	100	PLCC32E13A	500~750
44	.65" sq.	32mm	24mm	PLCC44M	25~28	PLCC44E7A	100	PLCC44E13A	500
52	.75" sq.	32mm	24mm	PLCC52M	24~25	PLCC52E7A	50	PLCC52E13A	500
68	.95" sq.	44mm	32mm	PLCC68M	17~20	PLCC68E7A	50	PLCC68E13A	250~500
84	1.15" sq.	44mm	36mm	PLCC84M	14~17	PLCC84E7A	50	PLCC84E13A	250

*PLCC18S short version is an obsolete design.



Daisy Chain
available on special order
Add -DE to end of part number

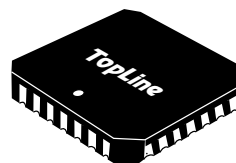


I Standard plating on leads is Sn85/Pb15. Lead pitch is 50 mils (1.27mm). Tube and reel quantities may vary. Add prefix
N SOCKET in front of part number for PLCC Sockets.
F For completely isolated (no internal connections) add - ISO to the end of part number.

O  Lead Free. Add suffix to part number: B = Sn/Bi, C = SnCu, -Tin = Sn100




LCC LEADLESS CHIP CARRIER

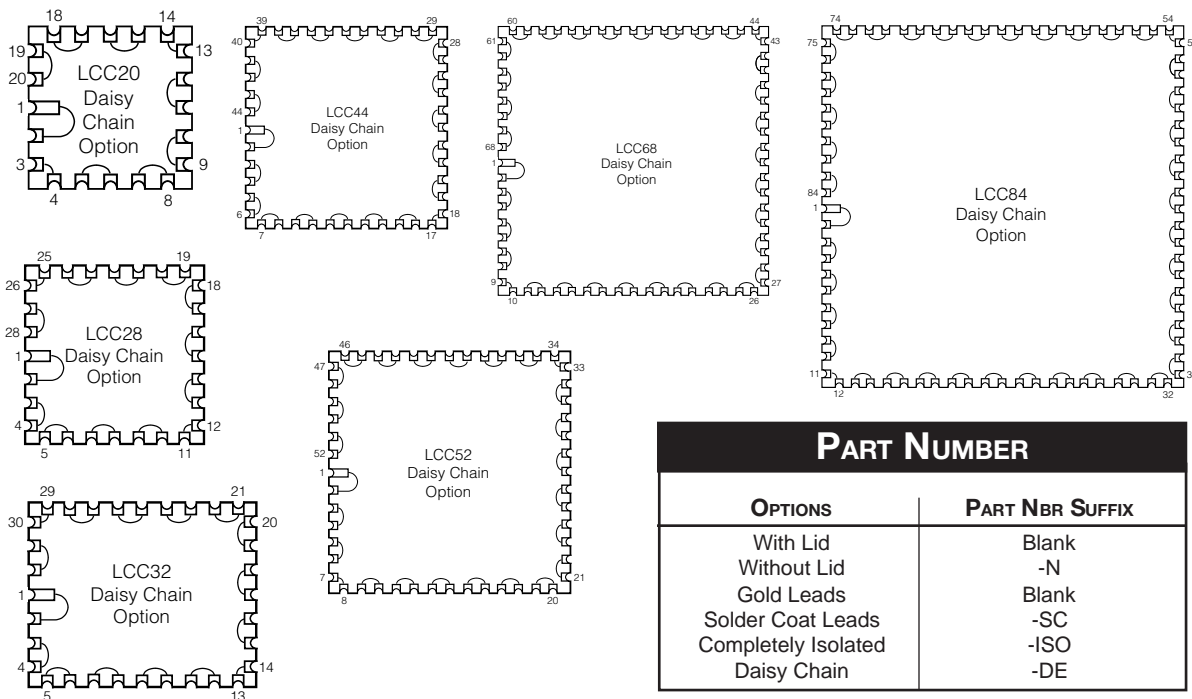


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DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH	CASE SIZES INCHES	 Bulk Part Number
			XL1
20	50 mils	.35" SQ	LCC20B50SQ.35
28	50 mils	.45" SQ	LCC28B50SQ.45
32	50 mils	.45" x .55"	LCC32B50R.45x.55
44	50 mils	.65" SQ	LCC44B50SQ.65
52	50 mils	.75" SQ	LCC52B50SQ.75
68	50 mils	.95" SQ	LCC68B50SQ.95
84	50 mils	1.15" SQ	LCC84B50SQ1.15

OPTIONAL DAISY CHAIN

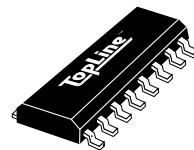


PART NUMBER

OPTIONS	PART NBR SUFFIX
With Lid	Blank
Without Lid	-N
Gold Leads	Blank
Solder Coat Leads	-SC
Completely Isolated	-ISO
Daisy Chain	-DE



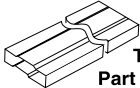


SO - SMALL OUTLINE GULL WING



50 MIL PITCH (1.27MM)

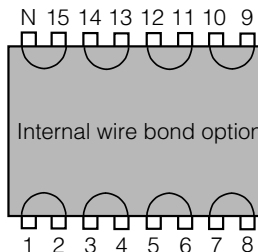
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DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY WIDTH		TAPE INFO		 Tube Part Number	QTY	4" (100mm)		13" (330mm)	
	MILS	METRIC	WIDTH	PITCH			 Tape & Reel Part Number	QTY	 Tape & Reel Part Number	QTY
4	150	3.9mm	12mm	8mm	-	-	SO4E7A	750	SO4E13A	call
4	250	6.4mm	12mm	12mm	SOM4M	50	-	-	SOM4E13A	1500
8	150	3.9mm	12mm	8mm	SO8M	96~100	SO8E4A	100	SO8E13A	2500
14	150	3.9mm	16mm	8mm	SO14M	50~56	SO14E4A	100	SO14E13A	2500
14	208	5.3mm	16mm	12mm	SOP14M	45	-	-	SOP14E13A	2000
14	220	5.6mm	24mm	12mm	SOM14M	58	-	-	SOM14E13A	2000
16	150	3.9mm	16mm	8mm	SO16M	45~50	SO16E4A	100	SO16E13A	2500
16	208	5.3mm	16mm	12mm	SOP16M	43	-	-	SOP16E13A	2000
16	220	5.6mm	24mm	12mm	SOM16M	42	SOM16E4A	100	SOM16E13A	2000
16	300	7.5mm	16mm	12mm	SOL16M	47	SOL16E4A	100	SOL16E13A	1000
18	300	7.5mm	24mm	12mm	SOL18M	41~42	-	-	SOL18E13A	1000
20	300	7.5mm	24mm	12mm	SOL20M	38	SOL20E4A	100	SOL20E13A	1000
20	430	11.0mm	44mm	16mm	HSOP20M-F	30	-	-	HSOP20E13AF	1000
24	300	7.5mm	24mm	12mm	SOL24M	31~33	SOL24E4A	100	SOL24E13A	1000
28	300	7.5mm	24mm	12mm	SOL28M	26~27	SOL28E4A	100	SOL28E13A	1000
28	330	8.4mm	24mm	16mm	SOW28M	26~27	-	-	SOW28E13A	1000
32	300	7.5mm	32mm	16mm	SOL32M	22~25	-	-	SOL32E13A	1000
32	330	8.4mm	32mm	16mm	SOW32M	22~25	-	-	SOW32E13A	1000
32	400	10.1mm	32mm	16mm	SOX32M	22~25	-	-	SOX32E13A	1000
32	450	11.4mm	44mm	16mm	SOY32M	22~25	-	-	SOY32E13A	500
40	400	10.1mm	44mm	16/24mm	SOX40M	18	-	-	SOX40E13A	500
40	450	11.4mm	44mm	16/24mm	SOY40M	18	-	-	SOY40E13A	500
44	525	13.3mm	44mm	24mm	SOZ44M	17	-	-	SOZ44E13A	500

QUICK GUIDE BODY WIDTH

SERIES	MILS	MM	SERIES	MILS	MM
SO	150	3.9	SOW	330~350	8.4~8.9
SOP	208	5.3	SOX	400	10.16
SOM	220	5.6	SOY	450	11.4
SOL	300	7.5	SOZ	525	13.3



Daisy Chain
available on special order
Add -DE to end of part number

TopLine supplies gull-wing packages with 50mil (1.27) lead pitch in a variety of pin counts and body widths.
Standard plating on leads is Sn85/Pb15. For completely isolated (no internal connections) add -ISO to end of part number.

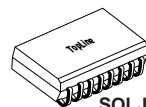


Lead Free. Add suffix to part number: B = Sn/Bi, C = SnCu, -Tin = Sn100



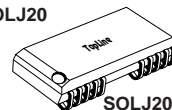
SOJ - SMALL OUTLINE J-LEAD

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SOLJ20

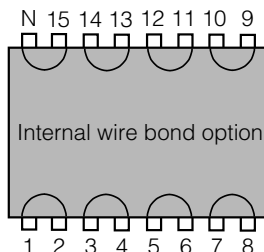
50 MIL PITCH (1.27MM)



SOLJ20/26

DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY WIDTH		TAPE INFO		Tube Part Number	QTY	4" (100mm)		13" (330mm)	
	MILS	METRIC	WIDTH	PITCH			Tape & Reel Part Number	QTY	Tape & Reel Part Number	QTY
18	300	7.5mm	24mm	12mm	SOLJ18M	41	-	-	SOLJ18E13A	1000
20	300	7.5mm	24mm	12mm	SOLJ20M	37	-	-	SOLJ20E13A	1000
20/26	300	7.5mm	24mm	12mm	SOLJ20/26M	25~30	SOLJ20/26E4A	100	SOLJ20/26E13A	1000
24/26	300	7.5mm	24mm	12mm	SOLJ24/26M	25~30	-	-	SOLJ24/26E13A	1000
24/28	400	10.0mm	24/32mm	16mm	SOXJ24/28M	26~30	-	-	SOXJ24/28E13A	1000
28	300	7.5mm	24mm	12mm	SOLJ28M	25~27	SOLJ28E4A	100	SOLJ28E13A	1000
28	400	10.0mm	24/32mm	16mm	SOXJ28M	25~26	-	-	SOXJ28E13A	1000
32	300	7.5mm	32mm	16mm	SOLJ32M	22~23	-	-	SOLJ32E13A	1000
32	400	10.0mm	32mm	16mm	SOXJ32M	22~23	-	-	SOXJ32E13A	500~1000
40	400	10.0mm	44mm	16mm	SOXJ40M	15~18	-	-	SOXJ40E13A	500~1000
42	400	10.0mm	44mm	16mm	SOXJ42M	16~17	-	-	SOXJ42E13A	500~1000
44	400	10.0mm	44mm	16mm	SOXJ44M	17	-	-	SOXJ44E13A	500~1000



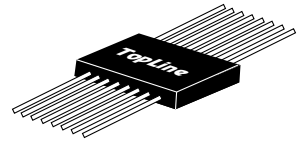
Daisy Chain
available on special order
Add -DE to end of part number

INFO

TopLine supplies a variety of SOJ packages with 50 mil (1.27mm) lead pitch. The DRAM package uses 20 leads on a 26-pin body (6-leads missing) or 24 leads on a 28-lead body. Tube quantities may vary. For completely isolated (no internal connections) add -ISO to end of part number. Solder plating on leads is Sn85/Pb15.



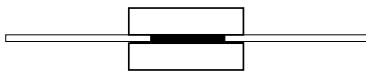
FLAT PACK



DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	CASE SIZE	LEAD PATTERN	LEAD BRAZE	XF1	PART NUMBER
50 MIL PITCH					
10	.25" SQ	All Straight	Bottom		FP10C50SQ.25B
10	.25" SQ	All Straight	Side		FP10F50SQ.25S
14	.26" x .34"	All Straight	Side		FP14C50R.26x.34S
14	.26" x .34"	All Straight	Side		M83401/03
16	.25" x .38"	All Straight	Side		FP16C50R.25x.38S
20	.27" x .40"	L-Ends	Side		FP20F50R.27x.40S
20	.27" x .50"	All Straight	Side		FP20F50R.27X.50S
24	.27" x .40"	L-Ends	Side		FP24C50R.27x.40S
24	.30" x .50"	All Straight	Side		FP24C50R.30x.50S
24	.40" x .50"	All Straight	Bottom		FP24F50R.40X.50B
24	.40" x .60"	All Straight	Bottom		FP24F50R.40X.60B
28	.40" x .72"	All Straight	Side		FP28F50R.40x.72S
28	.50" x .72"	All Straight	Side		FP28F50R.50x.72S
32	.40" x .820"	All Straight	Bottom		FP32F50R.40X.82B
42	.64" x 1.06"	All Straight	Top		FP42F50R.64x1.06T

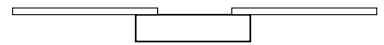
LEAD LOCATIONS



SIDE/SANDWICH
CODE S



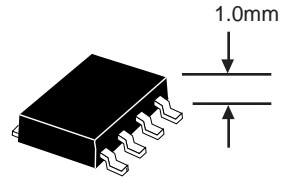
BOTTOM BRAZED
CODE B



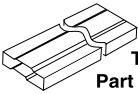

TOP BRAZED
CODE T

PART NUMBER			
PACKAGING	CODE	LEAD PLATING	PART NBR SUFFIX
Carrier	C	Gold	Blank
Lead Frame	F	Solder Coat	-SC
		Daisy Chain	-DE

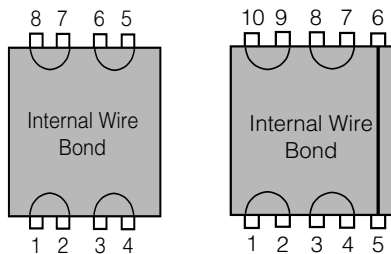
MSOP GULL WING MINIATURE SMALL OUTLINE PACKAGE



DUMMY COMPONENT ORDERING INFORMATION

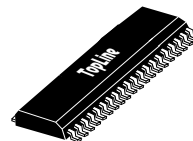
NBR LEADS	BODY WIDTH		TAPE INFO		LEAD PITCH		 XS1	Tube Part Number QTY		 13" (330mm) Tape & Reel Part Number QTY	XS1	QTY
	MILS	METRIC	WIDTH	PITCH	mils	mm						
8	118	3mm	12mm	8mm	25.6mils	0.65mm	MSOP8M	50~98	MSOP8E13A	3000		
10	118	3mm	12mm	8mm	19.7mils	0.50mm	MSOP10M	50~98	MSOP10E13A	3000		

Daisy Chain available
add -DE to end of part number



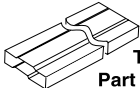



SSOP SHRINK SMALL OUTLINE PACKAGES



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DUMMY COMPONENT ORDERING INFORMATION

BODY WIDTH	NBR LEAD		TAPE INFO		 Tube Part Number	QTY	 13" (330mm) Tape & Reel Part Number	QTY
	LEADS	PITCH	WIDTH	PITCH				
150mil (3.9mm)	16	0.636mm	12mm	8mm	QSOP16M25	99	QSOP16E13A25	1000
	20	0.636mm	16mm	8/12mm	QSOP20M25	55	QSOP20E13A25	1000
	24	0.636mm	16mm	8/12mm	QSOP24M25	55	QSOP24E13A25	1000
	28	0.636mm	16mm	8/12mm	QSOP28M25	48	QSOP28E13A25	1000
	40	0.5mm	16mm	8mm	QVSOP40M19.7	48	QVSOP40E13A19.7	1000
	48	0.4mm	16mm	8mm	QVSOP48M15.7	48	QVSOP48E13A15.7	1000
	80	0.5mm	24mm	12mm	QVSOP80M19.7	24	QVSOP80E13A19.7	1000
208 mil (5.3mm)	8		12mm	8mm	SSOP8M25	160	SSOP8E13A25	2500
	14		12/16mm	12mm	SSOP14M25	77	SSOP14E13A25	1000
	16		12/16mm	12mm	SSOP16M25	77	SSOP16E13A25	1000
	20	.65mm	16mm	12mm	SSOP20M25	66	SSOP20E13A25	1000
	24		16mm	12mm	SSOP24M25	59	SSOP24E13A25	1000
	28		16/24mm	12mm	SSOP28M25	47	SSOP28E13A25	1000
300 mil (7.5mm)	34	1.0mm	24mm	12/16mm	SSOP34M40	27	SSOP34E13A40	1000
	36	0.8mm	24mm	12/16mm	SSOP36M31.5	31	SSOP36E13A31.5	1000
	44	0.8mm	32mm	12/16mm	SSOP44M31.5	27	SSOP44E13A31.5	1000
	48	1.0mm	32mm	12/16mm	SSOP48M40	30	SSOP48E13A40	1000
	48	0.636mm	32mm	12/16mm	SSOP48M25	30	SSOP48E13A25	1000
	56	0.636mm	32mm	12/16mm	SSOP56M25	26	SSOP56E13A25	1000
472 mil (12mm)	64	0.80mm	44mm	24mm	SSOP64M31.5	24	SSOP64E13A31.5	500
270mil (6.8mm)	16	0.8mm	24mm	16mm	PFP16M30F	68	PFP16E13A30F	1000
433mil (11mm) Exposed Heat Sink	20	1.27mm	44mm	24mm	HSOP20M	30	HSOP20E13A	500
	24	1.0mm	44mm	24mm	HSOP24M40	30	HSOP24E13A40	500
	30	0.8mm	44mm	24mm	HSOP30M31.5	30	HSOP30E13A31.5	500
	36	0.65mm	44mm	24mm	HSOP36M25	30	HSOP36E13A25	500
	44	0.65mm	44mm	24mm	HSOP44M25	30	HSOP44E13A25	500

TopLine supplies SSOP - Shrink Small Outline Packages in 0.65mm (25.7 mil) and 0.80mm (31.5 mil) lead pitch. Package height is 1.63mm for 150 mil wide body, 1.75mm for 208 mil wide body and 2.3mm high for 300 mil wide body. The QSOP package is a true 25.0 mil lead pitch (0.636mm). Standard plated leads Sn85/Pb15.



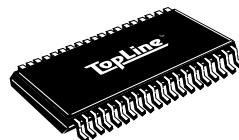
Lead Free Option -F = NiPd. Option B = Sn/Bi. Option C = Sn/Cu. Option -TIN = Sn100.



TSSOP

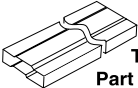

THIN SHRINK

SMALL OUTLINE PACKAGE

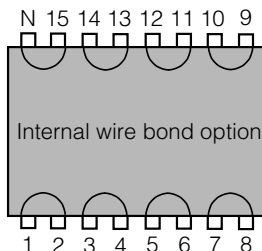


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DUMMY COMPONENT ORDERING INFORMATION

BODY LENGTH	NBR LEAD		TAPE INFO		 Tube Part Number		 13" (330mm) Tape & Reel Part Number	
	LEADS	PITCH	WIDTH	PITCH	XS1	QTY	XS1	QTY
173 mil (4.4mm) Wide								
3.0mm	8	0.65mm	12/16mm	8mm	TSSOP8M25	100	TSSOP8E13A25	1000-3000
5.0mm	14	0.65mm	12/16mm	8mm	TSSOP14M25	96	TSSOP14E13A25	1000-3000
5.0mm	16	0.65mm	12/16mm	8mm	TSSOP16M25	96	TSSOP16E13A25	1000-3000
6.5mm	20	0.65mm	16mm	8/12mm	TSSOP20M25	74-76	TSSOP20E13A25	1000-3000
7.8mm	24	0.65mm	16mm	8/12mm	TSSOP24M25	62-63	TSSOP24E13A25	1000-3000
9.7mm	28	0.65mm	16mm	8/12mm	TSSOP28M25	50	TSSOP28E13A25	1000-3000
7.8mm	30	0.5mm	16mm	8/12mm	TSSOP30M19.7	62	TSSOP30E13A19.7	1000-3000
9.7mm	38	0.5mm	16mm	8/12mm	TSSOP38M19.7	50	TSSOP38E13A19.7	1000-3000
11.3mm	44	0.5mm	24mm	12mm	TSSOP44M19.7	42	TSSOP44E13A19.7	1000-3000
9.7mm	48	0.4mm	16mm	8/12mm	TSSOP48M15.7	50	TSSOP48E13A15.7	1000-3000
11.3mm	56	0.4mm	24mm	12mm	TSSOP56M15.7	42	TSSOP56E13A15.7	1000-3000
240 mil (6.1mm) Wide								
9.7mm	28	0.65mm	24mm	12mm	TSSOPW28M25	50	TSSOPW28E13A25	1000-3000
11.0mm	32	0.65mm	24mm	12mm	TSSOP32M25	44	TSSOP32E13A25	1000-3000
12.5mm	38	0.65mm	24mm	12mm	TSSOP38M25	39	TSSOP38E13A25	1000-3000
12.5mm	48	0.5mm	24mm	12mm	TSSOP48M19.7	39	TSSOP48E13A19.7	1000-3000
14.0mm	56	0.5mm	24mm	12mm	TSSOP56M19.7	35	TSSOP56E13A19.7	1000-3000
17.0mm	64	0.5mm	24mm	12mm	TSSOP64M19.7	28	TSSOP64E13A19.7	1000-3000
17.0mm	80	0.4mm	24mm	12mm	TSSOP80M15.7	28	TSSOP80E13A15.7	1000-3000

Daisy Chain
available on special order
Add -DE to end of part number



TopLine supplies TSSOP - Thin Shrink Small Outline Packages in 1.0mm height. Tape width and pitch may vary. Tube quantities may vary. Call TopLine for details. Standard plated leads Sn85/Pb15.



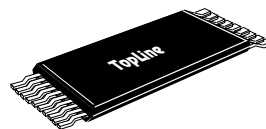
Lead Free. Suffix -B = Sn/Bi, suffix -C = Sn/Cu, suffix -TIN = Sn100.



TSOP - TYPE 1

THIN SMALL

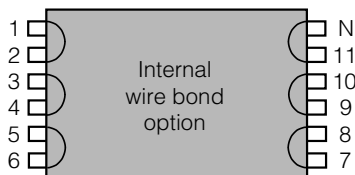
OUTLINE PACKAGE



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DUMMY COMPONENT ORDERING INFORMATION

LEAD		CASE SIZE INCLUDES LEADS	TAPE INFO		 Tray Part Number	QTY	 13" (330mm) Tape & Reel Part Number	QTY
NBR	PITCH		WIDTH	PITCH				
28	0.55mm	8 x 13.4mm	24mm	12mm	TSOP28ST21.6-T1	234	TSOP28SE13A21.6-T1	1000
28/32	0.5mm	8 x 20mm	32mm	12/16mm	TSOP28/32T19.7-T1	156	TSOP28/32E13A19.7-T1	1000
32	0.5mm	8 x 20mm	32mm	12/16mm	TSOP32T19.7-T1	156	TSOP32E13A19.7-T1	1000
32	0.5mm	8 x 14mm	24mm	12mm	TSOP32ST19.7-T1	208	TSOP32SE13A19.7-T1	1000
40	0.5mm	10 x 14mm	24mm	16mm	TSOP40ST19.7-T1	160	TSOP40SE13A19.7-T1	1000
40	0.5mm	10 x 20mm	32mm	16mm	TSOP40T19.7-T1	120	TSOP40E13A19.7-T1	1000
48	0.5mm	12 x 20mm	32mm	16mm	TSOP48T19.7-T1	96	TSOP48E13A19.7-T1	1000
56	0.5mm	14 x 20mm	32mm	24mm	TSOP56T19.7-T1	97	TSOP56E13A19.7-T1	1000



Daisy Chain
available on special order
Add -DE to end of part number

TopLine offers TSOP-Type 1 packages in lead counts from 28 to 56. Package thickness is 1.0mm with maximum seated height of 1.2mm. Type 1 indicates leads extending from narrow end of body. For Daisy Chain available on special order, add -DE to end of part number. For completely isolated (no internal connections) add -ISO to end of part number. TSOP contain internal die. Standard plated leads Sn85/Pb15.



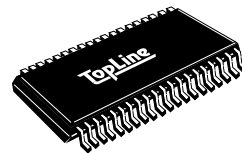
Lead Free. Suffix -B = Sn/Bi, suffix -TIN = Sn100.



TSOP - TYPE 2



THIN SMALL

OUTLINE PACKAGE



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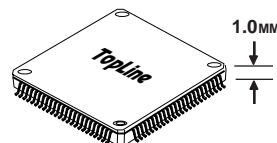
DUMMY COMPONENT ORDERING INFORMATION

LEAD		CASE SIZE EXCLUDES LEADS	TAPE INFO		 Tray Part Number	QTY	 13" (330mm) Tape & Reel Part Number	QTY
NBR	PITCH		WIDTH	PITCH				
20/26	1.27mm	7.6 x 17.14mm	24mm	12mm	TSOP20/26T50-T2	176	TSOP20/26E13A50-T2	500~1000
24/28	1.27mm	10 x 18.4mm	32mm	16mm	TSOP24/28T50-T2	135	TSOP24/28E13A50-T2	500~1000
32	1.27mm	10 x 21.0mm	32mm	16mm	TSOP32T50-T2	117	TSOP32E13A50-T2	500~1000
40/44	0.8mm	10 x 18.4mm	32mm	16mm	TSOP40/44T30-T2	135	TSOP40/44E13A30-T2	500~1000
44	0.8mm	10 x 18.4mm	32mm	16mm	TSOP44T30-T2	135	TSOP44E13A30-T2	500~1000
44/50	0.8mm	10 x 21mm	32mm	16mm	TSOP44/50T30-T2	117	TSOP44/50E13A30-T2	500~1000
50	0.8mm	10 x 21mm	32mm	16mm	TSOP50T30-T2	117	TSOP50E13A30-T2	500~1000
54	0.8mm	10 x 22.2mm	32mm	16mm	TSOP54T30-T2	108	TSOP54E13A30-T2	500~1000

INFO

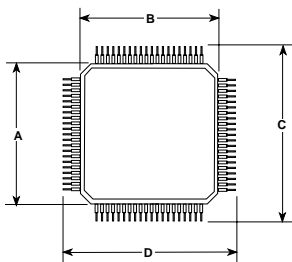
TSOP Type II have leads protruding from the wide side of the package. Maximum seated height is 1.2mm. Tray and tape quantities may vary. TSOP contain internal die. Solder plated leads Sn85/Pb15.

TQFP 1.0MM THICK THIN QUAD FLAT PACK

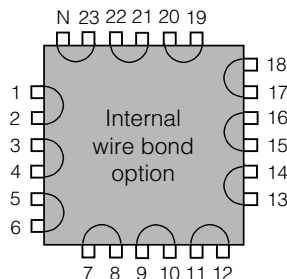


DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH		BODY SIZE A x B	TAPE INFO		XQ1	Tray Part Number	QTY	13" (330mm) Tape & Reel Part Number	QTY
	MM	MILS		WIDTH	PITCH					
32	0.5	19.7	5mm	16mm	12mm		TQFP32T19.7	360	TQFP32E13A19.7	2500
32	0.8	31.5	7mm	16mm	12mm		TQFP32T30	250	TQFP32E13A30	1000
44	0.8	31.5	10mm	24mm	16mm		TQFP44T30	160	TQFP44E13A30	1000
48	0.5	19.7	7mm	16mm	12mm		TQFP48T19.7	250	TQFP48E13A19.7	1000
52	0.65	25.6	10mm	24mm	16mm		TQFP52T25	160	TQFP52E13A25	1000
64	0.4	15.7	7mm	16mm	12mm		TQFP64T15.7	250	TQFP64E13A15.7	1000
64	0.5	19.7	10mm	24mm	24mm		TQFP64T19.7	160	TQFP64E13A19.7	1000
64	0.8	31.5	14mm	24mm	16mm		TQFP64T30	90	TQFP64E13A30	1000
80	0.4	15.7	10mm	24mm	16mm		TQFP80T15.7	160	TQFP80E13A15.7	1000
80	0.5	19.7	12mm	24mm	24mm		TQFP80T19.7	119	TQFP80E13A19.7	1000
80	0.65	25.6	14mm	24mm	24mm		TQFP80T25	90	TQFP80E13A25	1000
100	0.5	19.7	14mm	24mm	24mm		TQFP100T19.7	90	TQFP100E13A19.7	1000
120	0.4	15.7	14mm	24mm	24mm		TQFP120T15.7	90	TQFP120E13A15.7	1000
128	0.4	15.7	14mm	24mm	24mm		TQFP128T15.7	90	TQFP128E13A15.7	1000
144	0.5	19.7	20mm	44mm	24mm		TQFP144T19.7	60	TQFP144E13A19.7	1000
176	0.4	15.7	20mm	44mm	24mm		TQFP176T15.7	60	TQFP176E13A15.7	1000



For "C" and "D" dimensions add 2.0mm to dimension "A" or "B"



Daisy Chain
available on special order
Add -DE to end of part number

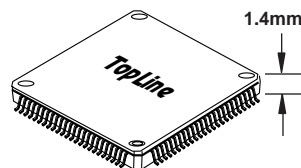
Thin Quad Flat Packs (TQFP) are 1.0mm thick. Lead length is 1.0mm per side. Add 2.0mm to body dimension for tip to tip of leads. Tape quantities may vary. For Daisy Chain "Even" available on special order, add -DE to end of part number. For completely isolated (no internal connections) add -ISO to end of part number. Solder plating Sn85/Pb15



LQFP 1.4MM THICK

LOW PROFILE

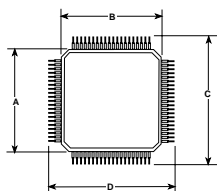
QUAD FLAT PACK



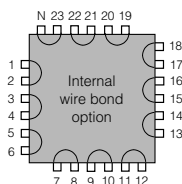
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DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH		BODY SIZE A x B	TAPE INFO		Tray Part Number	QTY	13" (330mm) Tape & Reel Part Number	
	MM	MILS		WIDTH	PITCH			XQ1	QTY
32	0.5	19.7	5mm	16mm	12mm	LQFP32T19.7	360	LQFP32E13A19.7	2500
32	0.8	31.5	7mm	16mm	12mm	LQFP32T30	250	LQFP32E13A30	1000
44	0.8	31.5	10mm	24mm	16/24mm	LQFP44T30	160	LQFP44E13A30	1000
48	0.5	19.7	7mm	16mm	12mm	LQFP48T19.7	250	LQFP48E13A19.7	1000
52	0.65	25.6	10mm	24mm	16/24mm	LQFP52T25	160	LQFP52E13A25	1000
64	0.4	15.7	7mm	16mm	12mm	LQFP64T15.7	250	LQFP64E13A15.7	1000
64	0.5	19.7	10mm	24mm	16/24mm	LQFP64T19.7	160	LQFP64E13A19.7	1000
64	0.8	31.5	14mm	24mm	20/24mm	LQFP64T30	90	LQFP64E13A30	1000
80	0.4	15.7	10mm	24mm	16/24mm	LQFP80T15.7	160	LQFP80E13A15.7	1000
80	0.5	19.7	12mm	24mm	16/24mm	LQFP80T19.7	119	LQFP80E13A19.7	1000
80	0.65	25.6	14mm	24mm	20/24mm	LQFP80T25	90	LQFP80E13A25	1000
100	0.5	19.7	14mm	24mm	20/24mm	LQFP100T19.7	90	LQFP100E13A19.7	1000
100	0.65	25.6	14x20mm	44mm	24mm	LQFP100T25	72	LQFP100E13A25	1000
120	0.4	15.7	14mm	24mm	20/24mm	LQFP120T15.7	90	LQFP120E13A15.7	1000
128	0.4	15.7	14mm	24mm	20/24mm	LQFP128T15.7	90	LQFP128E13A15.7	1000
128	0.5	19.7	14x20mm	44mm	24mm	LQFP128T19.7	72	LQFP128E13A19.7	1000
144	0.5	19.7	20mm	44mm	24mm	LQFP144T19.7	60	LQFP144E13A19.7	1000
160	0.5	19.7	24mm	44mm	32mm	LQFP160T19.7	40	LQFP160E13A19.7	1000
168	0.3	11.8	14mm	24mm	20/24mm	LQFP168T11.8	90	LQFP168E13A11.8	1000
176	0.4	15.7	20mm	44mm	24mm	LQFP176T15.7	60	LQFP176E13A15.7	1000
176	0.5	19.7	24mm	44mm	32mm	LQFP176T19.7	40	LQFP176E13A19.7	500
208	0.5	19.7	28mm	44mm	32mm	LQFP208T19.7	36	LQFP208E13A19.7	500
216	0.4	15.7	24mm	44mm	32mm	LQFP216T15.7	40	LQFP216E13A15.7	500
256	0.4	15.7	28mm	44mm	32mm	LQFP256T15.7	36	LQFP256E13A15.7	500



For dimension "C" or "D" add
2.0mm to dimension "A" or "B".



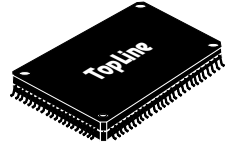
Daisy Chain "Even"
available on special order
Add -DE to end of part number

LQFPs are slightly thicker than TQFPs. Leads are 1.0mm long. Add 2.0mm to body size for total overall dimensions. For Daisy Chain "Even," add -DE to end of part number. For completely isolated (no internal connections) add -ISO to end of part number. Standard plating Sn85/Pb15.

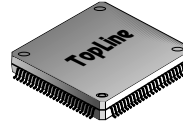
Lead Free. Suffix B = Sn/Bi, C= Sn/Cu, TIN = Sn100.



QFP QUAD FLAT PACK






RECTANGULAR BODY



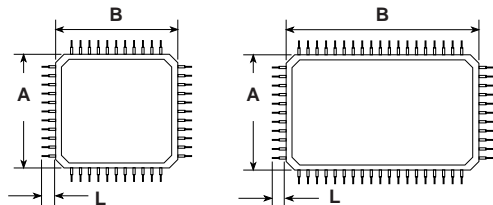
SQUARE BODY

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DUMMY COMPONENT ORDERING INFORMATION

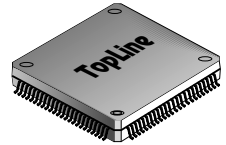
NBR LEADS	2xL FOOTPRINT ADDER MM		LEAD PITCH MILS MM		 Tray Part Number XQ1 QTY	7" (180mm)  Tape & Reel Part Number XM1 QTY		13" (330mm)  Tape & Reel Part Number XQ1 QTY	
10MM SQUARE BODY									
44	3.2mm	31.5	0.8	QFP44T30-3.2	96	QFP44E7A30-3.2	50	QFP44E13A30-3.2	500
44	3.9mm	31.5	0.8	QFP44T30-3.9	96	QFP44E7A30-3.9	50	QFP44E13A30-3.9	500
52	3.2mm	25.6	0.65	QFP52T25-3.2	96	-	-	QFP52E13A25-3.2	500
52	3.9mm	25.6	0.65	QFP52T25-3.9	96	-	-	QFP52E13A25-3.9	500
64	3.2mm	19.7	0.5	QFP64T19.7-3.2	96	-	-	-	-
14MM SQUARE BODY									
44	3.2mm	40	1.0	QFP44T40-3.2	84	-	-	QFP44E13A40-3.2	350
52	3.2mm	40	1.0	QFP52T40-3.2	84	-	-	QFP52E13A40-3.2	350
64	3.2mm	31.5	0.8	QFP64T30-3.2-2.0H	84	-	-	QFP64E13A30-3.2-2.0H	350
64	3.2mm	31.5	0.8	QFP64T30-3.2-2.7H	84	-	-	QFP64E13A30-3.2-2.7H	350
80	3.2mm	25.6	0.65	QFP80T25-3.2-2.0H	84	-	-	QFP80E13A25-3.2-2.0H	350
80	3.2mm	25.6	0.65	QFP80T25-3.2-2.7H	84	-	-	QFP80E13A25-3.2-2.7H	350
14MM x 20MM RECTANGULAR BODY									
64	3.2mm	40	1.0	QFP64T40-3.2	60	-	-	QFP64E13A40-3.2	200
64	3.9mm	40	1.0	QFP64T40-3.9	66	QFP64E7A40-3.9	50	QFP64E13A40-3.9	200
80	3.9mm	31.5	0.8	QFP80T30-3.9	66	QFP80E7A30-3.9	50	QFP80E13A30-3.9	200
100	3.2mm	25.6	0.65	QFP100T25-3.2	66	-	-	QFP100E13A25-3.2	200
100	3.9mm	25.6	0.65	QFP100T25-3.9	66	QFP100E7A25-3.9	50	QFP100E13A25-3.9	200
100	5.6mm	25.6	0.65	QFP100T25-5.6	60	-	-	-	-
128	3.2mm	19.7	0.5	QFP128T19.7-3.2	66	-	-	-	-

BODY SIZE	TYPICAL THICKNESS	TAPE INFO	
		WIDTH	PITCH
10mm Sq.	2.0mm	24mm	16/24mm
14mm Sq.	2.0mm	32mm	24mm
14mm Sq.	2.7mm	32mm	24mm
14 x 20mm	2.7mm	44mm	32mm
28mm Sq.	3.6mm	44mm	40mm
32mm Sq.	3.8mm	-	-
40mm Sq.	3.8mm	-	-








QFP QUAD FLAT PACK

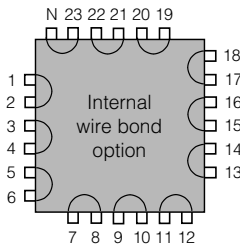


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DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	2xL FOOTPRINT ADDER		LEAD PITCH		 Tray Part Number		7" (180mm)  Tape & Reel Part Number		13" (330mm)  Tape & Reel Part Number	
	MM	MILS	MM	XQ1	QTY	XM1	QTY	XQ1	QTY	
28MM SQUARE BODY										
120	3.2mm	31.5	0.8	QFP120T30-3.2	24	-	-	QFP120E13A30-3.2	200	
120	3.9mm	31.5	0.8	QFP120T30-3.9	24	QFP120E7A30-3.9	50	QFP120E13A30-3.9	200	
128	3.2mm	31.5	0.8	QFP128T30-3.2	24	-	-	QFP128E13A30-3.2	200	
128	3.9mm	31.5	0.8	QFP128T30-3.9	24	-	-	QFP128E13A30-3.9	200	
136	3.2mm	25.6	0.65	QFP136T25-3.2	24	-	-	QFP136E13A30-3.2	200	
144	2.6mm	25.6	0.65	QFP144T25-2.6	24	-	-	QFP144E13A25-2.6	200	
144	3.2mm	25.6	0.65	QFP144T25-3.2	24	QFP144E7A25-3.2	50	QFP144E13A25-3.2	200	
144	3.9mm	25.6	0.65	QFP144T25-3.9	24	-	-	QFP144E13A25-3.9	200	
160	2.6mm	25.6	0.65	QFP160T25-2.6	24	-	-	QFP160E13A25-2.6	200	
160	3.2mm	25.6	0.65	QFP160T25-3.2	24	QFP160E7A25-3.2	50	QFP160E13A25-3.2	200	
160	3.9mm	25.6	0.65	QFP160T25-3.9	24	QFP160E7A25-3.9	50	QFP160E13A25-3.9	200	
184	2.6mm	19.7	0.5	QFP184T19.7-2.6	24	-	-	QFP184E13A19.7-2.6	200	
208	2.6mm	19.7	0.5	QFP208T19.7-2.6	24	QFP208E7A19.7-2.6	50	QFP208E13A19.7-2.6	200	
256	2.6mm	15.7	0.4	QFP256T15.7-2.6	24	QFP256E7A15.7-2.6	50	QFP256E13A15.7-2.6	200	
32MM SQUARE BODY										
240	2.6mm	19.7	0.5	QFP240T19.7-2.6	24	-	-			
40MM SQUARE BODY										
304	2.6mm	19.7	0.5	QFP304T19.7-2.6	12	-	-	-	-	

Daisy Chain
available on special order
Add -DE to end of part number
See page 35



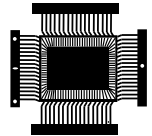
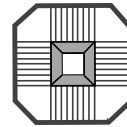
**I
N
F
O** TopLine supplies a wide assortment of Quad Flat Packs in metric packages. Add 2 x L foot print to the body size for total tip-to-tip dimension. Coplanarity guaranteed to 4 mils (0.1mm). Tray quantities may vary. Some QFP contain internal die. For completely isolated (no internal connections) add -ISO to end of part number. Standard plating Sn85/Pb15.

 Lead Free option B = Sn/Bi, C = Sn/Cu, TIN = Sn100.

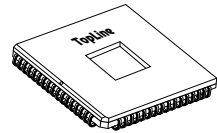


CERQUAD & CLCC


CERAMIC QUAD FLAT PACK



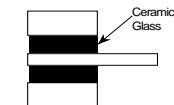
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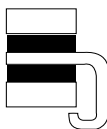
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH		LEAD STYLE	SQUARE BODY SIZE		 Tray Part Number
	MILS	MM		INCH	METRIC (MM)	
28	50	1.27	Flat	.40	10.0	CERQUAD28F50
28	50	1.27	J-lead	.45	11.5	CLCC28J50
44	50	1.27	Flat	.562	14.3	CERQUAD44F50
44	50	1.27	J-lead	.65	16.5	CLCC44J50
52	50	1.27	Flat	.75	19.0	CERQUAD52F50
52	50	1.27	J-lead	.75	19.0	CLCC52J50
68	50	1.27	Flat	.95	24.1	CERQUAD68F50
68	50	1.27	J-lead	.95	24.1	CLCC68J50
84	25	0.635	Flat	.65	16.5	CERQUAD84F25
84	50	1.27	Flat	1.06	27.0	CERQUAD84F50
84	50	1.27	J-lead	1.15	29.3	CLCC84J50
132	25	0.635	Flat	.95	24.1	CERQUAD132F25
132	25	0.635	Gull-wing	.87	22.1	CERQUAD132G25
172	25	0.635	Flat	1.15	29.3	CERQUAD172F25
196	25	0.635	Flat	1.26	32.0	CERQUAD196F25
208	19.7	0.5	Flat	1.10	28.0	CERQUAD208F19.7
208	19.7	0.5	Gull-wing	1.10	28.0	CERQUAD208G19.7

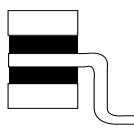
Note: To assure an accurate quotation, please complete the order form on next page. Ceramic lids sold separately.
Leads may be solder coated, kovar or gold. Add -DE to end of part number for daisy chain.



FLAT LEAD
ON LEAD FRAME



J-LEAD
CLCC



GULL-WING
WITH TIE-BAR

PART NUMBER

OPTIONS	PART NBR SUFFIX
With Lid	Blank
Without Lid	-N
Gold Leads	Blank
Solder Coat Leads	-SC
Completely Isolated	-ISO
Daisy Chain	-DE



CERQUAD SPECIFICATION FORM

Name _____ Title _____

Company _____ Phone _____

email _____ Fax _____

1. Quantity Required _____

7. ☐ Need Delivery By _____

2. Body Size _____ x _____ ☐ mm
☐ inch

3. Number of Leads _____

8. Cavity Location

4. Lead Pitch _____ ☐ mm
☐ mils

☐ Cavity Up

☐ Cavity Down

☐ Any Available

5. Lead Plating _____

9. Lids

☐ Alloy 42

☐ Gold

☐ No lids (standard)

☐ Solder Tinned

☐ Any Available

☐ Attached lids are required

☐ Any Available

6. Lead Style

☐ Flat (with tie Bar)

☐ J-Lead

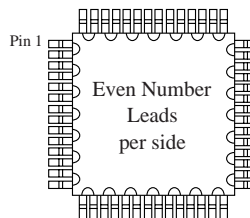
☐ Gull-Wing with Tie-Bar

10. Part Number _____

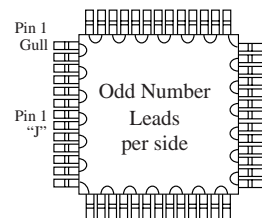
Additional Comments or Requirements:

Signature

Typical Daisy Chain



Total Leads:
64, 80,
120, 144, 160,
208, 240, 256



Total Leads:
28, 44,
52, 68, 84,
100, 132, 164,
172, 196, 244

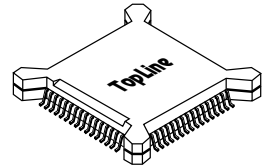
FAX BACK TO TOPLINE 1-714-891-0321



BQFP




BUMPER QUAD FLAT PACK

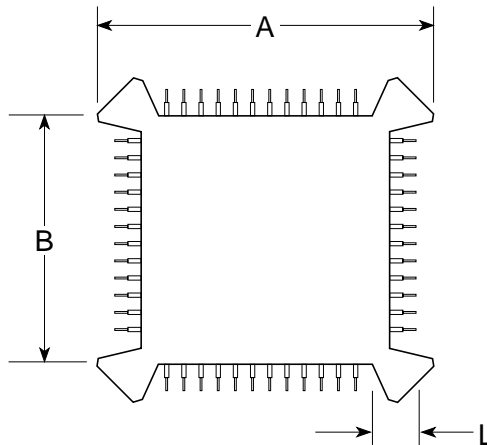
TRUE 25 MIL PITCH



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DUMMY COMPONENT ORDERING INFORMATION

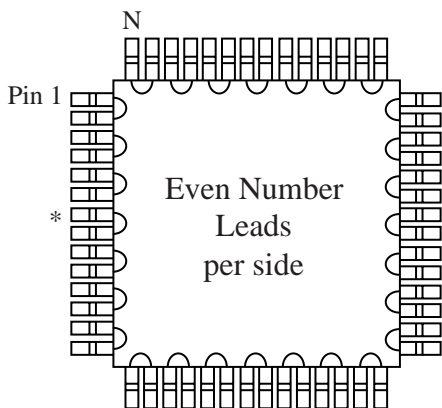
NBR LEADS	2xL FOOTPRINT ADDER MM	LEAD PITCH MM	B BODY SIZE MM Sq.	 Tray Part Number XQ1	QTY	7" (180mm)  Tape & Reel Part Number XM1	QTY	13" (330mm)  Tape & Reel Part Number XQ1	QTY
100	3.3	0.636	19	BQFP100T25	55	BQFP100E7A25	50	BQFP100E13A25	300
132	3.3	0.636	24.1	BQFP132T25	36	BQFP132E7A25	50	BQFP132E13A25	300



INFO

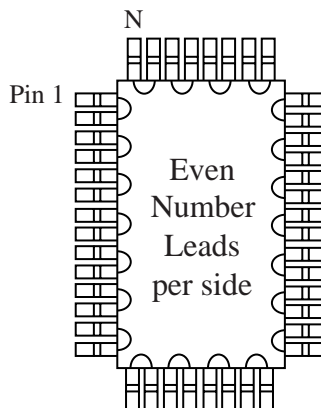
BQFP Bumper Quad Flat Packs are built to JEDEC (non-metric) standards with true 25mil (0.636mm) lead pitch. The bumpers protect leads from damage during transport in the carrier. Plating Sn85/Pb15.

SQUARE BODY



TOTAL NUMBER LEADS
24, 32, 48, 64, 80, 120, 128, 144
160, 168, 176, 184, 208, 216, 240, 256, 304
* Location of Pin 1 for CLCC J-Lead

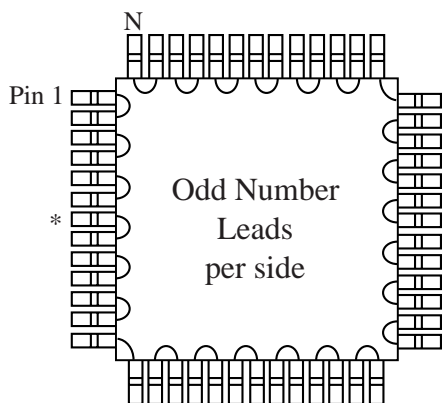
RECTANGLE BODY



TOTAL NUMBER LEADS
80, 100, 128

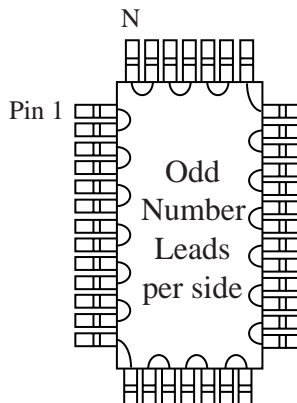
Not to Scale

SQUARE BODY



TOTAL NUMBER LEADS
28, 44, 52, 68, 84, 100, 132, 164, 172, 196, 244
* Location of Pin 1 for CLCC J-Lead


RECTANGLE BODY



TOTAL NUMBER LEADS
64



DUMMY COMPONENT ORDERING INFORMATION

NBR BUMPS	BUMP INFORMATION				DIE SIZE METRIC	NOTES	DIE PER BUMPED 5" WAFER QTY	 WAFFLE 2" SQ Tray Part Number	QTY
	PITCH	HIGH	Ø DIA	MATERIAL					
48	457µm	140	190µm	Eutectic	6.3mm SQ	PB18	236	FC48D6.3E457	25
88	204µm	125	135µm	Eutectic	5.08mm SQ	PB08	340	FC88G5.08E204	36
96	457µm	140	190µm	Eutectic	12.7mm SQ	PB18	46	FC96D12.7E457	9
112	152µm	85	88µm	Eutectic	5.08mm SQ	PB06	340	FC112K5.08E152	36
176	204µm	125	135µm	Eutectic	10.2mm SQ	PB08	80-86	FC176G10E204	9
220	204µm	125	135µm	Eutectic	10.2 x 15.25mm	PB08	46-50	FC220G10x15E204	6
317	254µm	119	135µm	Eutectic	5.08mm SQ	FA10	340	FC317G5.08E254	36
1268	254µm	119	135µm	Eutectic	10.2mm SQ	FA10	80-86	FC1268G10E254	9

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

Number Bumps

Actual Count

Bump Diameter

A = 100 x 127µm H = 105µm SQ
B = 115µm SQ K = 88µm
C = 160µm G = 135µm
D = 190µm R = 100µm SQ
E = 56µm SQ T = 50µm SQ

Die Size

In millimeter
6.3 = 6.3mm SQ
10 x 15 = 10mm x 15mm

Bump Material

E = Eutectic Sn63
G = Gold over Nickel
C = Lead Free Sn/Ag/Cu

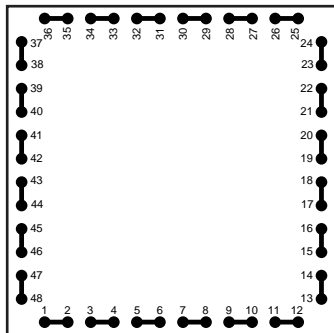
Bump Pitch

in µm
(1000µm = 1.0mm)

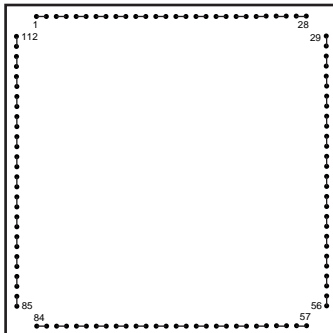
Daisy Chain

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

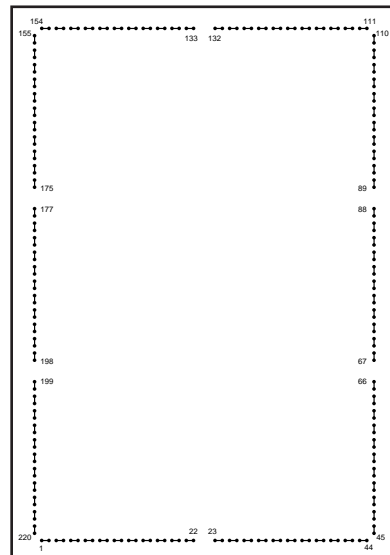
O  Lead Free available, change "E" to "C" in part number for Sn95.5/Ag3.5/Cu1.0 Lead Free Eutectic Bumps.



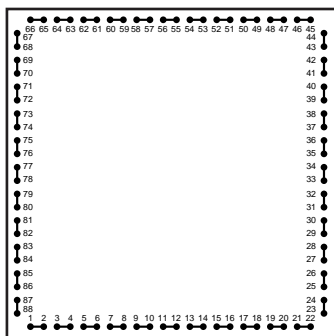
FC48 (PB18 - 250x250)



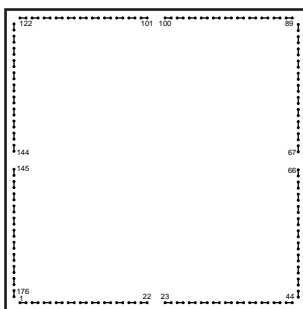
FC112 (PB06 - 200x200)



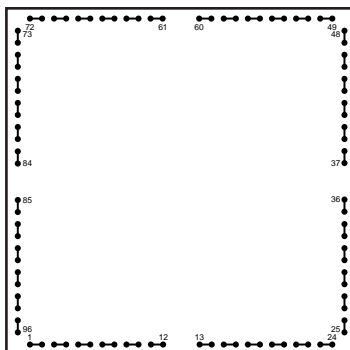
FC220 (PB08 - 400x600)



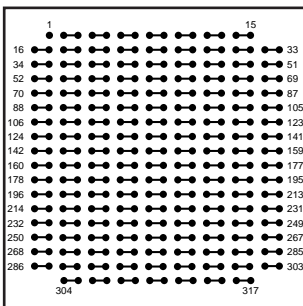
FC88 (PB08 - 200x200)



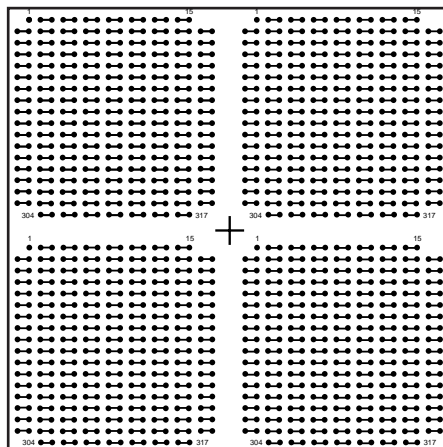
FC176 (PB08 - 400x400)



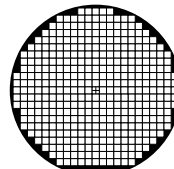
FC96 (PB18 - 500x500)






FC317 (FA10-200x200)



FC1268 (FA10 - 400x400)



DUMMY WAFER ORDERING INFORMATION

WAFER DIAMETER	WAFER TYPE	 WAFER IN JAR PART NUMBER	 WAFER IN CASSETTE PART NUMBER	 DIE UV TAPE 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 -UV WED4- mm x mm -UV
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 -UV WED5- mm x mm -UV
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 -UV WED6- mm x mm -UV
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 -UV WED8- mm x mm -UV
12-inch (300mm)	Mirrored/Polished Wafer Wafer with Etched Pattern Wafer with Sawn Mirror Die Wafer with Sawn Etched Die	WM12-J - - -	WM12-C - - -	- - WMD12- mm x mm -UV -

TYPICAL WAFER THICKNESS BEFORE BACK GRINDING

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

OPTIONS

Back Grinding: Add suffix -BG after wafer size
in part number

UV Tape & Ring = UVR suffix

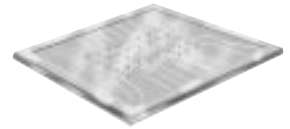
Die in 2" Waffle Pack:

Etch Die: ED-10mm x 5mm -WP2

Mirror Die = MD-10mm x 5mm -WP2



μ BGA[®] CSP MICRO BALL GRID ARRAY CHIP SCALE PACKAGE



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DUMMY COMPONENT ORDERING INFORMATION


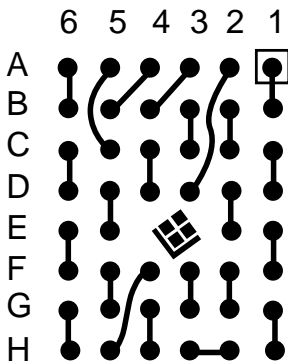
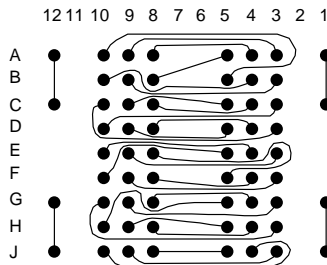
FIG	NBR	PITCH	TAPE INFO		BODY SIZE	BALL DIAMETER	BUMP MATRIX	4" SQ	
	BALLS		WIDTH	PITCH				<div>Tray Part Number</div>	QTY
EUTECTIC Sn63 BALLS									
1	46	0.75mm	16mm	12mm	5.76mm x 7.87mm	0.325mm	6 x 8	CSP46T.75-DC24	99
2	62	.8~1.0mm			9.3mm x 11.5mm	0.325mm	9 x 12	CSP62T.8-1.0-DC912	48
3	208	0.5mm			9.3mm SQ	0.300mm	15 x 15	CSP208T.5-DC156	49
LEAD FREE									
1	46	0.75mm	Sn96.5/Ag3.5			0.325mm	6 x 8	CSP46T.75F-DC24	99
1	46	0.75mm	Sn96.3/Ag3.2/Cu0.5			0.325mm	6 x 8	CSP46T.75C-DC24	99

Fig. 1



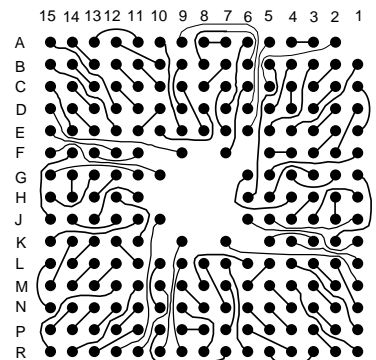
CSP46T.75-DC24
VIEW OF BUMPS

Fig. 2



CSP62T.8-1.0-DC912
VIEW OF BUMPS

Fig. 3



CSP208T.5-DC156
VIEW OF BUMPS

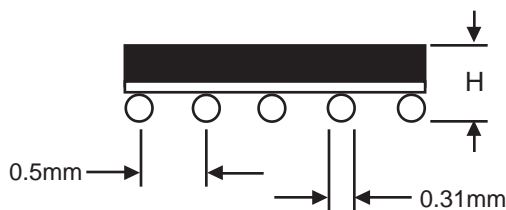
INFO Tessera's μ BGA[®] package is a chip scale package. Ball material - Eutetic 63Sn/37Pb. For Test Boards see kit section of catalog. Tray size is 4" (100mm) square. Rated at JEDEC Level 1 moisture insensitivity and does not require baking prior to assembly.

CSP & fBGA 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	40	5mm	2-Row	1.24mm	8 x 8	BT	CSP40T.5-DC082	624
2	48	5mm	2-Row	1.24mm	8 x 8	BT	CSP48T.5-ISO	490
3	56	6mm	2-Row	1.24mm	10 x 10	BT	CSP56T.5-DC102	608
4	96	8mm	2-Row	1.24mm	14 x 14	flex Polyimide	fBGA96T.5-DC144	360
5	108	8mm	3-Row	1.24mm	14 x 14	BT	CSP108T.5-ISO	360



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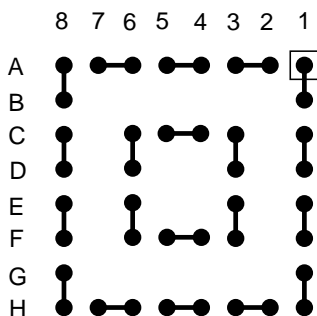
fBGA - Flex Polyimide substrate. Total package height 1.02mm. Ball diameter is 0.31mm. Sawn molded cap.
For Interior Die, add suffix -DIE to end of part number
CSP - BT substrate. Total package height 1.24mm. Ball diameter is 0.31mm.
For Internal Die, add suffix -DIE to end of part number

CSP & fBGA BALL GRID ARRAY 0.5MM PITCH



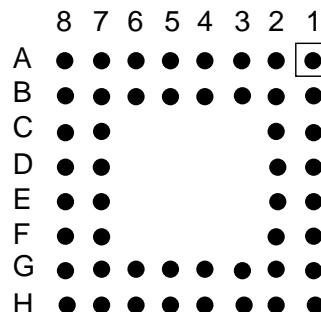
BALL VIEW

fig. 1



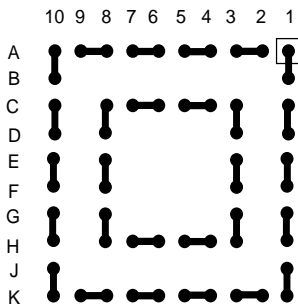
CSP40T.5-DC082

fig. 2



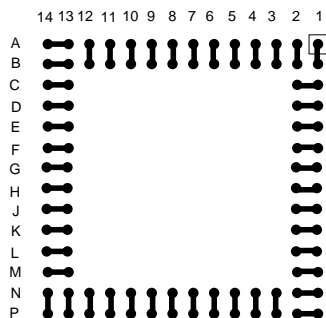
CSP48T.5-ISO

fig. 3



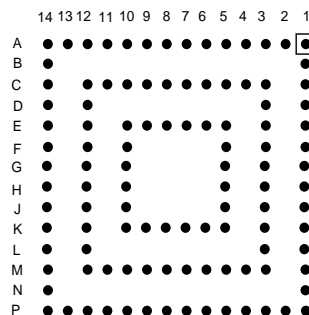
CSP56T.5-DC102

fig. 4



fBGA96T.5-DC144

fig. 5




CSP108T.5-ISO

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
1B	46	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA46T.75-ISO	160
1C	48	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA48T.75-ISO-6x8	160
1D	36	6mm	Full	0.8mm	6 x 6	BT	BGA36T.8-DC069	608
1C	48	8 x 9mm	Full		6 x 8	BT	BGA48T.8-ISO-6x8	297
2	49	6mm	Full		7 x 7	BT	BGA49T.8-DC077	476
3	64	8mm	Full		8 x 8	Flex Polyimide	fBGA64T.8-DC089	360
4	81	8mm	Full		9 x 9	Flex Polyimide	fBGA81T.8-DC099	360
5	100	9mm	Full		10 x 10	Flex Polyimide	fBGA100T.8-ISO	308
6	100	10mm	Full		10 x 10	BT	BGA100T.8-DC109	250
7	112	10mm	4-Row		11 x 11	Flex Polyimide	fBGA112T.8-ISO	240/250
8	132	12mm	3-Row		14 x 14	Flex Polyimide	fBGA132T.8-ISO	198
9	144	12mm	4-Row		13 x 13	Flex Polyimide	fBGA144T.8-DC134	198
10	180	12mm	5-Row		14 x 14	Flex Polyimide	fBGA180T.8-ISO	198
11	192	14mm	4-Row		16 x 16	BT	BGA192T.8-DC165	119/152
12	208	15mm	4-Row		17 x 17	Polyimide	LBGA208T.8-DC170	126
13	280	16mm	5-Row		19 x 19	Flex Polyimide	fBGA280T.8-DC195	119

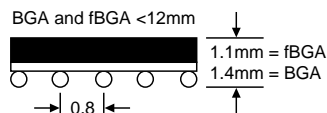
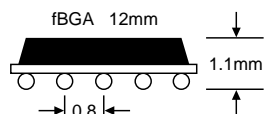
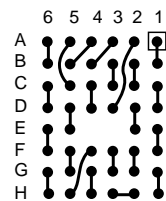
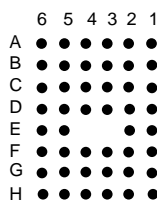


fig. 1A



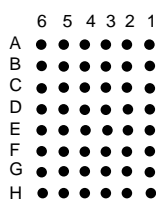
BGA46T.75-DC24

fig. 1B



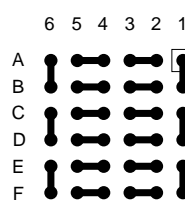
BGA46T.75-ISO-6x8

fig. 1C



BGA48T.8-ISO-6x8
BGA48T.75-ISO-6x8

fig. 1D



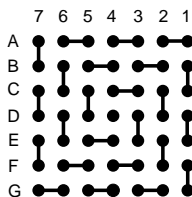
BGA36T.8-DC069

BGA & fBGA BALL GRID ARRAY 0.75~0.8MM PITCH

BALL VIEW

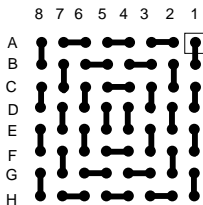


fig. 2



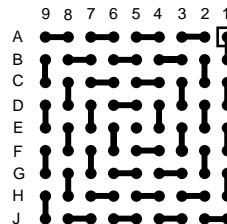
BGA49T.8-DC077

fig. 3



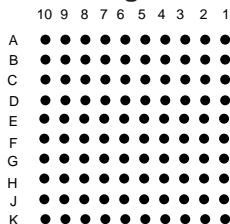
fBGA64T.8-DC089

fig. 4



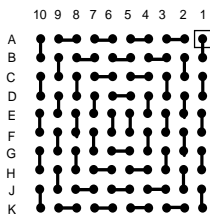
fBGA81T.8-DC099

fig. 5



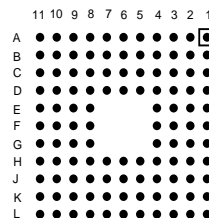
fBGA100T.8-ISO

fig. 6



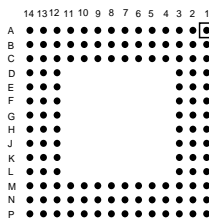
BGA100T.8-DC109

fig. 7



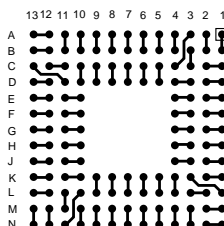
fBGA112T.8-ISO

fig. 8



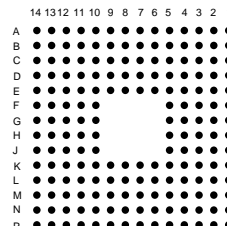
fBGA132T.8-ISO

fig. 9



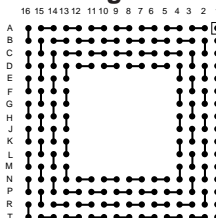
fBGA144T.8-DC134

fig. 10



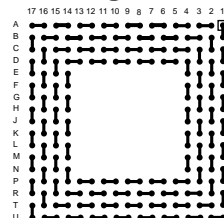
fBGA180T.8-ISO

fig. 11



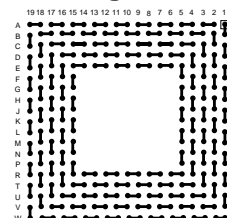
BGA192T.8-DC165

fig. 12



LBGA208T.8-DC170

fig. 13





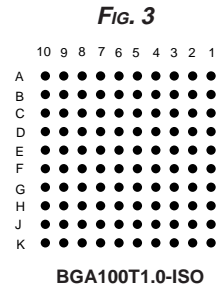
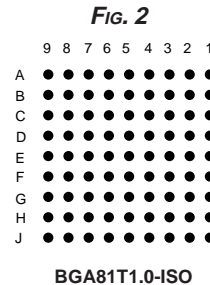
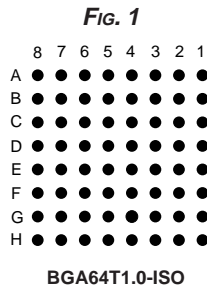
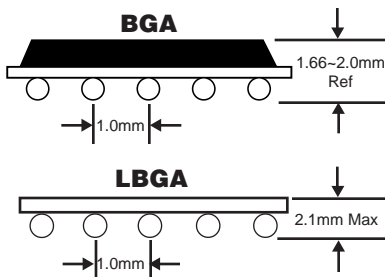
fBGA280T.8-DC195

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 XJ1 STANDARD	 Tray Part Number XJ1 UNENCAPSULATED	QTY
1	64	9mm	Full Array	NA	8 x 8	BGA64T1.0-ISO	-	308
2	81	10mm	Full Array	NA	9 x 9	BGA81T1.0-ISO	-	250
3	100	11mm	Full Array	NA	10 x 10	BGA100T1.0-ISO	-	176
4	144	13mm	Full Array	NA	12 x 12	BGA144T1.0-DC128	-	160
5	156	15mm	4-Row	-0-	14 x 14	BGA156T1.0-DC140	-	126
6	160	15mm	4-Row	2 x 2	14 x 14	BGA160T1.0-DC142	-	126
7	192	17mm	4-Row	NA	16 x 16	BGA192T1.0-DC160A	-	90
8/9	196	15mm	Full Array	NA	14 x 14	BGA196T1.0-DC149A	LBGA196T1.0-DC149	126
10	208	17mm	4-Row	4 x 4	16 x 16	BGA208T1.0-DC164A	-	90
11	256	17mm	Full Array	NA	16 x 16	BGA256T1.0-DC169A	-	90
12	288	23mm	4-Row	-0-	22 x 22	BGA288T1.0-ISO	-	60
13	324	23mm	4-Row	6 x 6	22 x 22	BGA324T1.0-ISO	-	60
14	400	21mm	Full Array	NA	20 x 20	eBGA400T1.0-D209D	LBGA400T1.0-DC209	60
15	484	23mm	Full Array	NA	22 x 22	eBGA484T1.0-D229AD	LBGA484T1.0-DC229A	60
16	672	27mm	Full Array	NA	26 x 26	eBGA672T1.0-D268D	LBGA672T1.0-DC268	40
web	1156	35mm	Full Array	NA	34 x 34	eBGA1156T1.0-D349D	LBGA1156T1.0-DC349	24
web	1600	42.5mm	Full Array	NA	40 x 40	eBGA1600T1.0-D409D	LBGA1600T1.0-DC409	12
web	1936	45mm	Full Array	NA	44 x 44	eBGA1936T1.0-D449D	LBGA1936T1.0-DC449	12



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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) diameter. Has molded plastic or glob encapsulated top.

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) Sn62 balls for soldering at 210°C. Since there is no molded or encapsulated top, LBGA does not require baking prior to assembly.

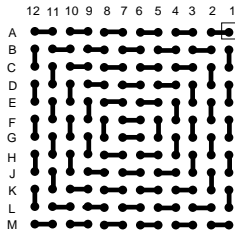


BGA PLASTIC BALL GRID ARRAY 1.0MM PITCH

BALL VIEW

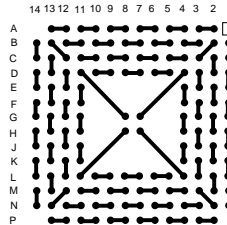


Fig. 4



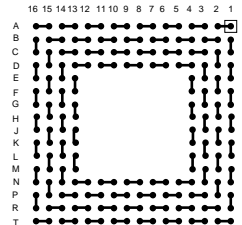
BGA144T1.0-DC128

Fig. 5/6



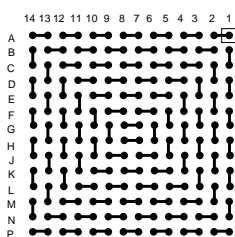
BGA156T1.0-DC140
BGA160T1.0-DC142

Fig. 7



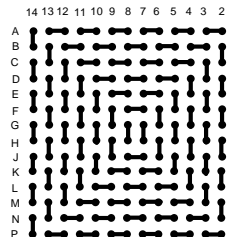
BGA192T1.0-DC160A

Fig. 8



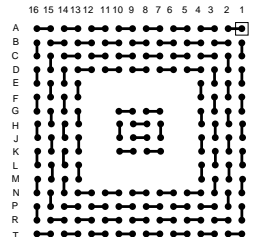
BGA196T1.0-DC149A

Fig. 9



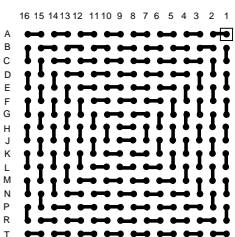
LBGA196T1.0-DC149

Fig. 10



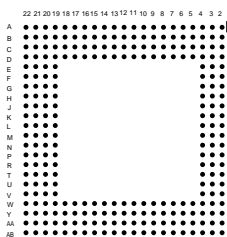
BGA208T1.0-DC164A

Fig. 11



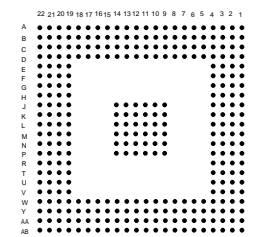
BGA256T1.0-DC169A

Fig. 12



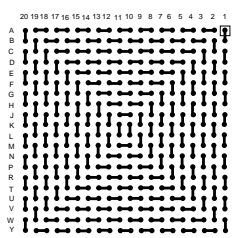
BGA288T1.0-ISO

Fig. 13



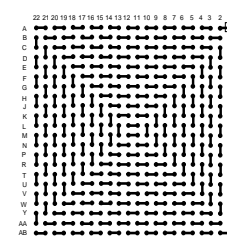
BGA324T1.0-ISO

Fig. 14



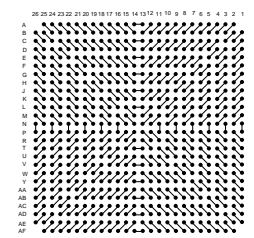
LBGA400T1.0-DC209

Fig. 15



LBGA484T1.0-DC229A

Fig. 16



LBGA672T1.0-DC268





BGA PLASTIC BALL GRID ARRAY 1.27MM PITCH



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DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	CENTER BALL	BALL MATRIX	 Tray Part Number STANDARD	 Tray Part Number UNENCAPSULATED	QTY
						XJ1	UNENCAPSULATED	
1	119	14 x 23mm	Full	NA	7 x 17	BGA119T1.27-DIE	-	84
2	208	23mm	4-Row	N/A	17 x 17	BGA208T1.27-DC170	-	60
3	217	23mm	4-Row	3 x 3	17 x 17	BGA217T1.27-DC171	-	60
4	256	27mm	4-Row	-0-	20 x 20	BGA256T1.27-DC62	-	40
5/6	256	27mm	4-Row	-0-	20 x 20	BGA256T1.27-DC200	LBGA256T1.27-DC200A	40
7	272	27mm	4-Row	4 x 4	20 x 20	BGA272T1.27-DC202	-	40
8	292	27mm	4-Row	6 x 6	20 x 20	BGA292T1.27	-	40
9	352	35mm	4-Row	-0-	26 x 26	BGA352T1.27-DC70	-	24
10	388	35mm	4-Row	6 x 6	26 x 26	BGA388T1.27-DC72	-	24
11	357	25mm	Full	NA	19 x 19	-	LBGA357T1.27-DC73	24
12	1225	45mm	Full	-0-	35 x 35	-	LBGA1225T1.27-DC359	12

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

SIDE VIEW

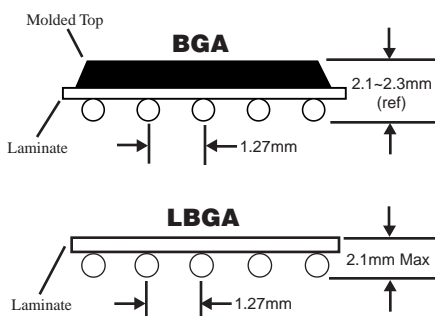
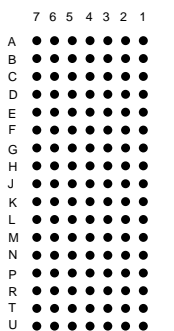
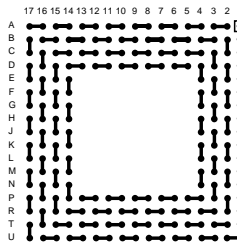


FIG. 1



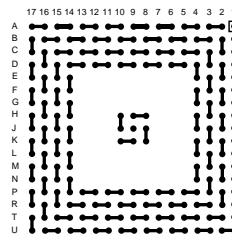
BGA119T1.27-DIE

FIG. 2



BGA208T1.27-DC170

FIG. 3



BGA217T1.27-DC171

BALL VIEW

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 63/37 SnPb 30mil (0.75mm) diameter. Has molded plastic or glob encapsulated top.

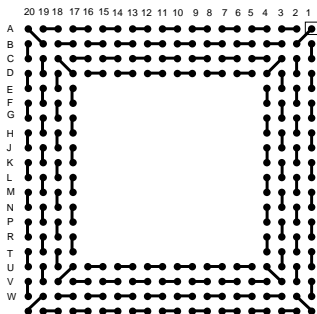
LBGA - Laminate Ball Grid Arrays offer the lowest cost when placement practice is the primary concern. Includes daisy chain laminate with 30mil (0.75mm) 62/36/2 SnPbAg balls for soldering at 210°C. Since there is no molded or encapsulated top, LBGA does not require baking prior to assembly. Lead Free available with Sn96 balls. Add -F to part number.



BGA PLASTIC BALL GRID ARRAY 1.27MM PITCH

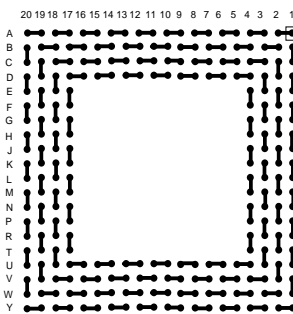


FIG. 4



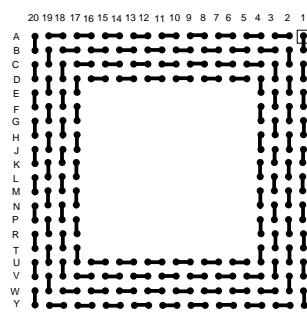
BGA256T1.27-DC62

FIG. 5 BALL VIEW



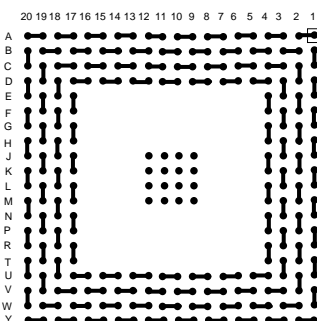
BGA256T1.27-DC200

FIG. 6



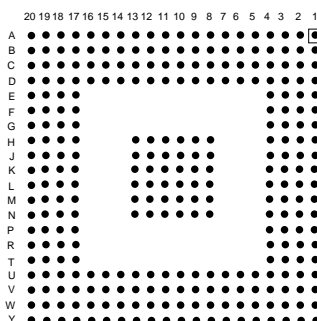
LPGA256T1.27-DC200A

FIG. 7



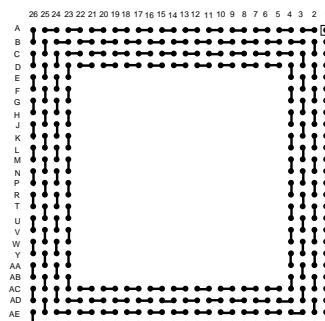
BGA272T1.27-DC202

FIG. 8



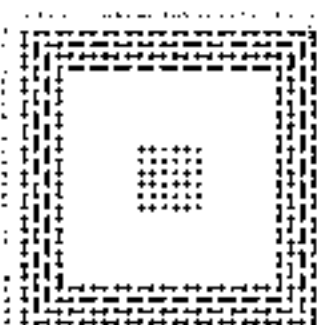
BGA292T1.27

FIG. 9



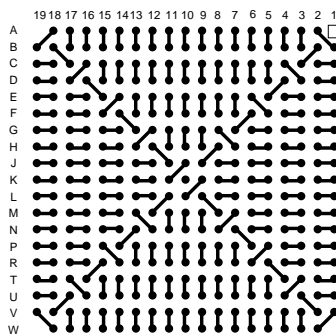
BGA352T1.27-DC70

FIG. 10



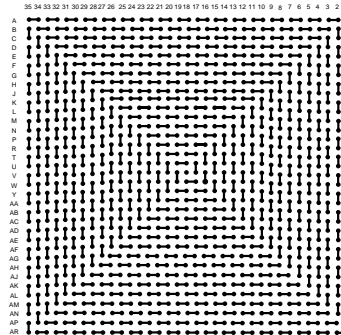
BGA388T1.27-DC72

FIG. 11



LBGA357T1.27-DC73

FIG. 12

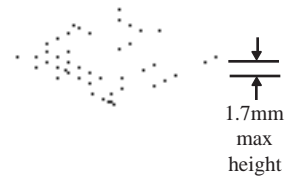


LBGA1225T1.27-DC359

CBGA

CERAMIC BALL GRID ARRAY

1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION



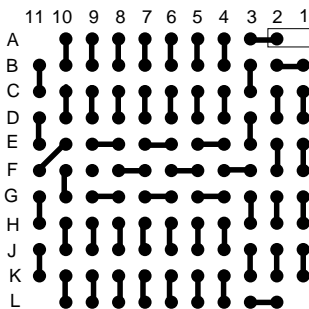
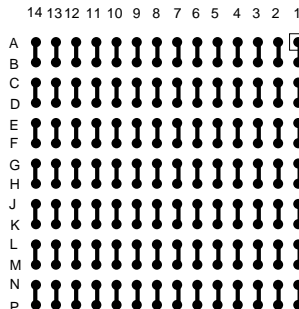
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	BALL MATRIX	 Tray Part Number LOW TEMP 210°C XJ1 62/36/2 SnPbAg	 Tray Part Number HIGH TEMP 320°C XJ1 10/90 SnPb	QTY
1	121	15mm	Full Grid	11 x 11	CBGA121T1.27L-DC5	CBGA121T1.27-DC5	126
2	196	19mm	Full Grid	14 x 14	CBGA196T1.27L-DC11	CBGA196T1.27-DC11	84
3	240	32.5mm	Perimeter	24 x 24	CBGA240T1.27L-ISO	CBGA240T1.27-ISO	24
4	256	21mm	Full Grid	16 x 16	CBGA256T1.27L-DC61	CBGA256T1.27-DC61	60
5	304	21 x 25mm	Full Grid	16 x 19	CBGA304T1.27L-DC63	CBGA304T1.27-DC63	55
6	361	25mm	Full Grid	19 x 19	CBGA361T1.27L-DC71	CBGA361T1.27-DC71	44
7	400	27mm	Full Grid	20 x 20	CBGA400T1.27L-DC21	CBGA400T1.27-DC21	40
8	625	32.5mm	Full Grid	25 x 25	-	CBGA625T1.27-DC81	24
9	1089	42.5mm	Full Grid	33 x 33	-	CBGA1089T1.27-DC339	12

Fig. 1



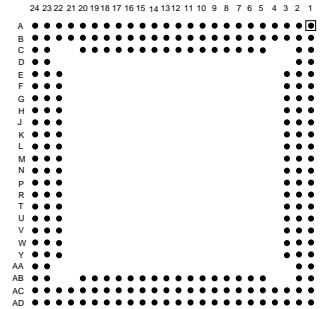
CBGA121T1.27-DC5
(BALL VIEW)

Fig. 2



CBGA196T1.27-DC11
(BALL VIEW)

Fig. 3

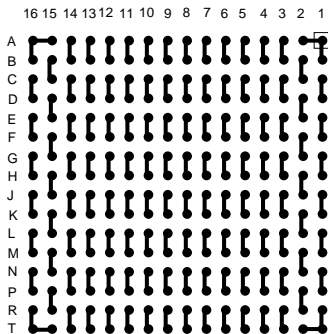


CBGA240T1.27-ISO
(BALL VIEW)

**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 10/90 SnPb for high temperature soldering at 320°C to ceramic substrate. For low temperature soldering at 210°C to laminate substrate, specify 62/36/2 SnPbAg solder balls by adding -L to part number. Custom sizes and ball counts available.

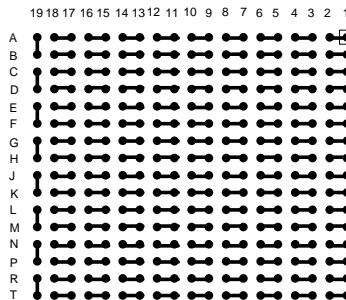
CBGA - CERAMIC BALL GRID ARRAY - 1.27MM PITCH

Fig. 4 (BALL VIEW)



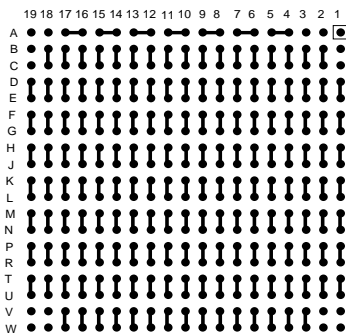
CBGA256T1.27-DC61

Fig. 5



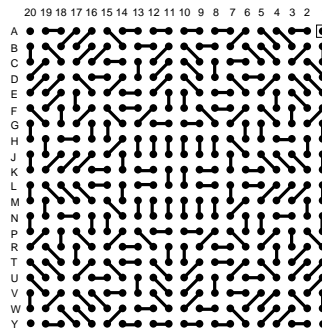
CBGA304T1.27-DC63

Fig. 6



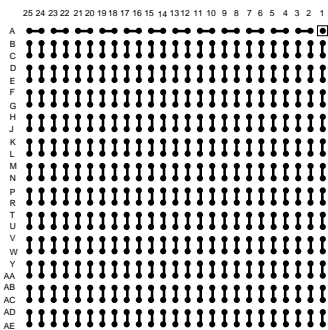
CBGA361T1.27-DC71

Fig. 7



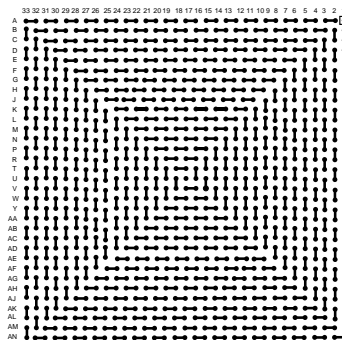
CBGA400T1.27-DC21

Fig. 8



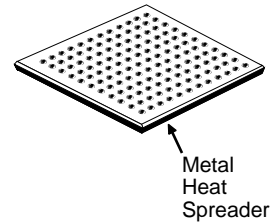
CBGA625T1.27-DC81

Fig. 9



CBGA1089T1.27-DC339

S-BGA METAL BALL GRID ARRAY 1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION


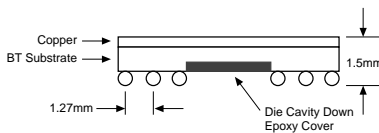
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	PITCH	BALL MATRIX	DIE SIZE MINI-MAX	 Tray Part Number	QTY
1	256	27mm	4-Row	1.27mm	20 x 20	6.8 - 9.8mm	SBGA256T1.27-DC200	40
2	304	31mm	4-Row	1.27mm	23 x 23	8.0 - 11mm	SBGA304T1.27-DC230	27
3	352	35mm	4-Row	1.27mm	26 x 26	11.3 - 14.3mm	SBGA352T1.27-DC70	24
4	432	40mm	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-DC335	12

FIG. 1



**BALL VIEW
DAISY CHAIN**

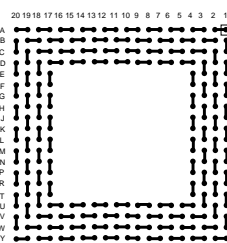


FIG. 2

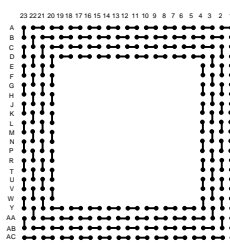


FIG. 3

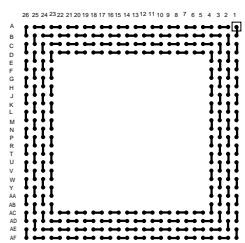


FIG. 4

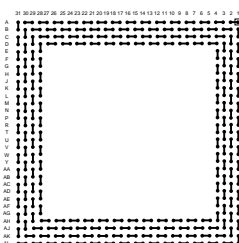


FIG. 5

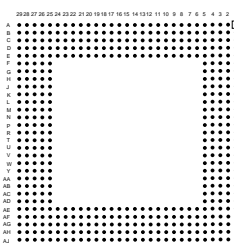


FIG. 6

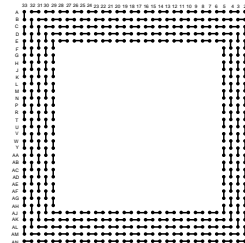
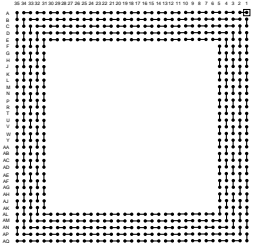


FIG. 7



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	LBGA225T1.5-DC15	40
3	400	35mm	Full Array	20 x 20	-	LBGA400T1.5-DC20	24

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

Fig. 1

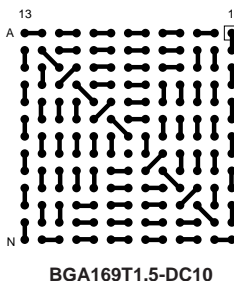
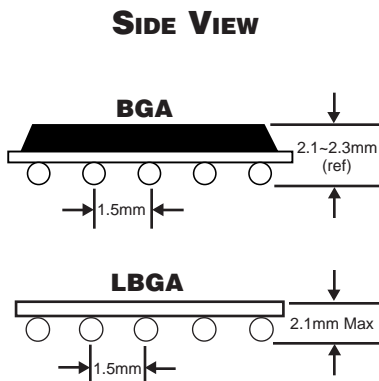


Fig. 2

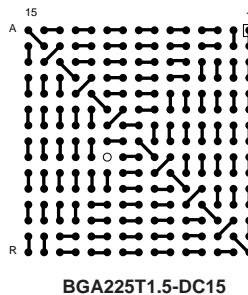
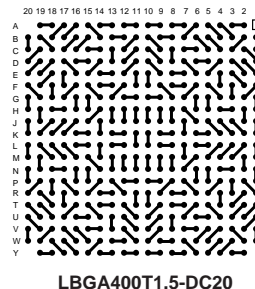
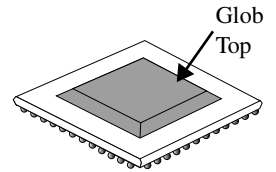



Fig. 3

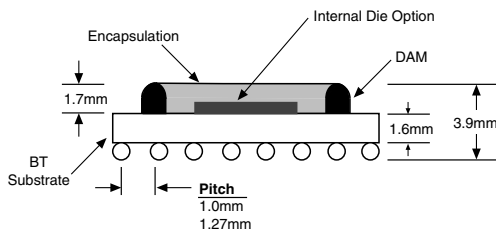


BGA - Standard BGA plastic packages should be baked at 125°C for 24 hours prior to assembly to prevent delamination and the "popcorn" phenomena during the assembly process. Solder balls are eutectic 63/37 SnPb 30mil (0.75mm) diameter. Has molded plastic or glob encapsulated top.

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) 62/36/2 SnPbAg balls for soldering at 210°C. Since there is no molded or encapsulated top, LBGA does not require baking prior to assembly.



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	12
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 **1225** **T** **1.27** **D** **359** **D**
Type **Balls** **Trays** **Pitch** **Circuit** **Die**
eBGA = eBGA = eBGA = eBGA = eBGA = eBGA =
Liquid Liquid Liquid Liquid Liquid Liquid
Encapsulated Encapsulated Encapsulated Encapsulated Encapsulated Encapsulated
Ball Matl
D = Sn62 Eutectic
F = Sn96 Lead Free



CLGA

CERAMIC LAND GRID ARRAY

SPECIFICATION FORM

NAME _____

TITLE _____

COMPANY _____

PHONE _____

EMAIL _____

FAX _____

1. Quantity Required _____

8. Need Delivery By _____

2. Body Size _____ x _____ mm

9. Ceramic Thickness

☐ 1.0mm (Standard)

☐ 1.5mm

☐ 3.0mm

☐ other _____

3. Number I/O Pads _____

4. Pitch ☐ 1.27mm ☐ 1.0mm ☐ other _____

5. Pad Material

☐ Palladium Silver (Standard)

☐ 5mil Raised Pad Sn62 (5mil high)

☐ Ball Attach by Customer

10. Application

☐ Hand Insertion into Socket

☐ Ball Attach by Customer

☐ other _____

6. Pad Diameter

☐ Standard

☐ other _____ mm

11. Circuit

☐ Daisy Chain Required

☐ All Pads Shorted

☐ All Pads Isolated

☐ Any Available

7. Markings

☐ None ☐ Standard

Part Number Configuration

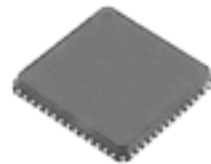
CLGA	625	T	1.27	- DC61	A	3
Substrate	I/O	Packaging	Pitch	Circuit	Options	Substrate
Ceramic		T = Trays	mm	DC = Daisy Chain Pads BUS = All Pads Shorted ISO = All Pads Isolated	Blank = Standard for Socket E = Raised Pad 5mil B = Ball Attach by Customer X = Customer Spec	Blank = 1.0mm thick (Standard) 2 = 1.5mm thick 3 = 3mm thick

INFO


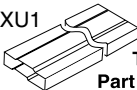
CLGA - Ceramic Land Grid Arrays for socket insertion and Ball Attach
Available in a variety of configurations and pad heights.
Contact TopLine for details.

LEADLESS QFP

MLF, MCC, SLP, QFN



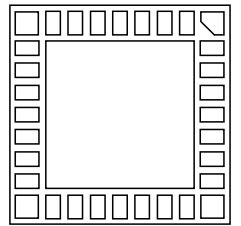
DUMMY COMPONENT ORDERING INFORMATION

BODY SIZE SQ	NBR LEAD		TAPE INFO		 Tray Part Number	QTY	 Tube Part Number	QTY
	LEADS	PITCH	WIDTH	PITCH				
MCC 5mm	28	0.5mm	12mm	8mm	-		MCC28M.5F-DE	99
MLF								
3mm	16	0.5mm	12mm	8mm	MLF16T.5	714	MLF16M.5	100
4mm	20	0.5mm			MLF20T.5	540	MLF20M.5	75
4mm	24	0.5mm			MLF24T.5	540	MLF24M.5	75
5mm	28	0.5mm			MLF28T.5	490	MLF28M.5	60
5mm	32	0.5mm	16mm	12mm	MLF32T.5	490	MLF32M.5	60
6mm	36	0.5mm			MLF36T.5	490	MLF36M.5	50
6mm	40	0.5mm			MLF40T.5	490	MLF40M.5	50
7mm	44	0.5mm			MLF44T.5	260	MLF44M.5	43
7mm	48	0.5mm			MLF48T.5	260	MLF48M.5	43
8mm	52	0.5mm			MLF52T.5	260	MLF52M.5	37
8mm	56	0.5mm			MLF56T.5	260	MLF56M.5	37
SLP/QFN								
2mm	5	0.65mm	8mm	8mm	-	-	SLP5B.65	Bulk
3mm	16	0.5mm	12mm	8mm	-	-	SLP16M.5	121
4mm	16	0.65mm			SLP16T.65	540	SLP16M.65	91
4mm	20	0.5mm			SLP20T.5	540	SLP20M.5	91
4mm	24	0.5mm			SLP24T.5	540	SLP24M.5	91
5mm	28	0.5mm	16mm	12mm	SLP28T.5	490	SLP28M.5	73
5mm	32	0.5mm			SLP32T.5	490	SLP32M.5	73
6mm	28	0.65mm			SLP28T.65	490	SLP28M.65	61
6mm	40	0.5mm			SLP40T.5	490	SLP40M.5	61
7mm	48	0.5mm			SLP48T.5	260	SLP48M.5	62
8mm	44	0.65			SLP44T.65	260	SLP44M.65	46

Bottom View of Pads



MLF



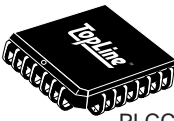




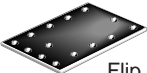
QFN, MCC, SLP

I N F O Bumpless Chip Carrier (BCC) also known as MLF. Perimeter lead CSP utilize lead frame in an epoxy molded plastic case. Offered with daisy chain, add -DE to end of part number. Available in tubes, trays and on reels. Standard Lead Plating 85Sn/15Pb.

 Lead Free. Suffix -TIN = Sn100.

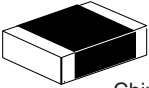







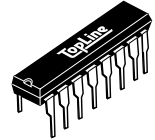
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH	BODY SIZE	LEAD MATERIAL	VIEW	PACKAGE	PART NUMBER	QTY												
8 8 14 14 16 16 16 20 28	1.27mm	150mil 150mi 150mil 150mil 150mil 150mil 300mil 300mil 300mil	Tin Sn100 Sn97/Bi3.0 Tin Sn100 Sn97/Bi3.0 Tin Sn100 Sn97/Bi3.0 Tin Sn100 Tin Sn100 Tin Sn100	 Gull	Tube	SO8M-TIN SO8M-B SO14M-TIN SO14M-B SO16M-TIN SO16M-B SOL16M-TIN SOL20M-TIN SOL28M-TIN Other SSOP, TSSOP available	97 100 55 57 48 50 47 38 27												
28 32 44 52 68 84		1.27mm	.45" SQ .45 x .55" .65" SQ .75" SQ .95" SQ 1.15" SQ			Tin Sn100	 PLCC	Tube	PLCC28M-TIN PLCC32M-TIN PLCC44M-TIN PLCC52M-TIN PLCC68M-TIN PLCC84M-TIN	39 32 28 23 19 16									
48/64 208 208			0.8mm 0.5mm 0.5mm						14mm 28mm 28mm	Ni-Pd Sn97/Bi3.0 Tin Sn100	 QFP	Tray	HQFP48/64T.8F-DE QFP208T19.7-B-2.6 QFP208T19.7-TIN-2.6 Other TQFP, LQFP, QFP available	84 24 24					
46 46 81 169 169 196 225 256 256 352			0.75mm 0.75mm 0.8mm 1.5mm 1.5mm 1.0mm 1.5mm 1.27mm 1.27mm 1.27mm						5.8x7.8mm 5.8x7.8mm 8mm 23mm 23mm 15mm 27mm 27mm 27mm 35mm				Sn96.5/Ag3.5 Sn96.3/Ag3.2/Cu0.5 Sn96.5/Ag3.5 Sn96.5/Ag3.5 Sn95.5/Ag4.0/Cu0.5 Sn96.5/Ag3.5 Sn95.5/Ag4.0/Cu0.5 Sn96.5/Ag3.5 Sn95.5/Ag4.0/Cu0.5 Sn96.5/Ag3.5 Sn96.5/Ag4.0/Cu0.5	 BGA	Tray	CSP46T.75F-DC24 CSP46T.75C-DC24 BGA81T.8F-ISO BGA169T1.5F-DC10 BGA169T1.5C-DC10 LBGA196T1.0F-DC149 BGA225T1.5F-DC15 BGA256T1.27C-DC200 LBGA256T1.27F-DC200A BGA352T1.27C-DC70A Other BGA available	99 99 348 60 60 126 40 40 40 24		
15 14 16			1.27mm 2.54mm 2.54mm						SIP 300mil 300mil							Ni-Pd Ni-Pd Ni-Pd	 SIP  DIP	Tube	HSIP15M-F DIP14M3F-DE DIP16M3F-DE
16 20 24 28 28			0.5mm 0.5mm 0.5mm 0.5mm 0.5mm						3mm 4mm 4mm 5mm 5mm	Tin Sn100 Tin Sn100 Tin Sn100 Tin Sn100 Ni-Pd	 QFN/SLP/MLF	Tube				SLP16M.5-TIN-DE SLP20M.5-TIN-DE SLP24M.5-TIN-DE SLP28M.5-TIN-DE MCC28M.5F-DE Other SLP, MLF, MCC available			123 92 92 73 99
48 88 317			457µm 204µm 254µm						6.3mm 5.08mm 5.08mm	Sn95.5/Ag3.5/Cu1.0						 Flip Chip			Tray

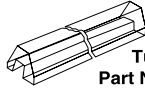


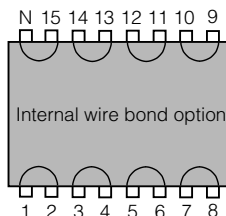
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH	BODY SIZE	LEAD MATERIAL	VIEW	PACKAGE	PART NUMBER	QTY
2	Capacitor	0201	Tin Sn100	 Chip	Reel	SC0201P7A-TIN	15,000
		0402				SC0402P7A-TIN	10,000
		0603				SC0603P7A-TIN	4000
		0805				SC0805E7A-TIN	4000
		1206				SC1206E7A-TIN	4000
		1210				SC1210E7A-TIN	4000
		1812				SC1812E7A-TIN	1000
		2225				SC2225E7A-TIN	1000
2	Resistor	0201	Tin Sn100	 Chip	Reel	SR0201P7A-TIN	10000
		0402				SR0402P7A-TIN	10000
		0603				SR0603P7A-TIN	5000
		0805				SR0805P7A-TIN	5000
		1206				SR1206P7A-TIN	5000
2	Resistor Zero Ohm	0201	Tin Sn100	 Chip	Reel	SR0201P7A-ZERO-TIN	10000
		0402				SR0402P7A-ZERO-TIN	10000
		0603				SR0603P7A-ZERO-TIN	5000
		0805				SR0805P7A-ZERO-TIN	5000
		1206				SR1206P7A-ZERO-TIN	5000
2	MELF	0805	Tin Sn100	 MELF	Reel	SRM0805E7A-TIN	3000
		1206			Reel	SRM1206E7A-TIN	3000
		2306				SRM2308E7A-TIN	2000
2	MELF Zero Ohm	0805	Tin Sn100	 MELF	Reel	SRM0805E7A-ZERO-TIN	3000
		1206				SRM1206E7A-ZERO-TIN	3000
		2306				SRM2308E7A-ZERO-TIN	2000
2		SC79	Tin Sn100	 SOT	Reel	SC79E7A-TIN	3000
3		SOT23				SOT23E7A-DC13-TIN	3000
3		SOT23				SOT23E7A-DC23-TIN	3000
3		SOT89				SOT89E7A-TIN	1000
3		SOT223				SOT223E7A-TIN	1000
3		SOT323				SOT323E7A-TIN	3000
3		D2PAK				D2PAK-E13A-TIN	1000
4		SOT143				SOT143E7A-TIN	3000
4		SOT343				SOT343E7A-TIN	3000
5		SOT25				SOT25E7A-TIN	3000
5		SOT353				SOT353E7A-TIN	3000
5		D2PAK-5				D2PAK5-E13A-TIN	1000
6		SOT26				SOT26E7A-TIN	3000
6		SOT363				SOT363E7A-TIN	3000




DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	CASE LENGTH INCH	CASE LENGTH METRIC	XN1  Tube Part Number	QTY
300 MIL WIDE BODY				
2	.100	2.54mm	CKR22M	200
8	.360"	9.1mm	DIP8M3	50
14	.760"	19.3mm	DIP14M3	25
16	.760"	19.3mm	DIP16M3	25
18	.890"	22.6mm	DIP18M3	21
20	.960"	24.1mm	DIP20M3	18
24	1.25"	31.7mm	DIP24M3	15
28	1.35"	34.5mm	DIP28M3	14
600 MIL WIDE BODY				
24	1.25"	31.7mm	DIP24M6	15
28	1.45"	36.8mm	DIP28M6	13
32	1.65"	41.9mm	DIP32M6	11
40	2.05"	52.0mm	DIP40M6	9
48	2.40"	60.9mm	DIP48M6	9
SDIP 70MIL PITCH				
30	.4" x 1.095"	10.16 x 27.8mm	SDIP30M4	20
42	.6" x 1.45"	15.24 x 36.8mm	SDIP42M6	14
52	.6" x 1.81"	15.24 x 46.0mm	SDIP52M6	11
56	.3" x 2.06"	15.24 x 52.3mm	SDIP56M6	9
64	.75" x 2.27"	19.05 x 57.6mm	SDIP64M7.5	9


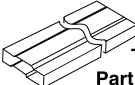



Daisy Chain
available on special order
Add -DE to end of part number

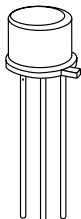
**I
N
F
O** TopLine supplies DIP Plastic Dual Inline Packages with lead pitch of 0.100" (2.54mm). Also available with Ceramic Case on special order, by adding "CER" prefix to front of part number. SDIP packages have lead pitch of 0.07" (1.778mm). For completely isolated (no internal connections) add -ISO to end of part number.

 For Lead Free option, add -TIN to end of part number.

DUMMY COMPONENT ORDERING INFORMATION

MATERIAL			Bulk Part Number		Tube Part Number		Tape & Reel Part Number
CASE	LEAD	XT1	QTY	XT1	QTY	XT1	QTY
Metal	Solder	TO5	25	-	-	-	-
Metal	Solder	TO18	25	-	-	-	-
Metal	Solder	TO39	25	-	-	-	-
Metal	Solder	TO75	25	-	-	-	-
Plastic	Solder	TO92	100	-	-	TO92T	2000
Plastic	Solder	TO92-.2"	100	-	-	TO92T-.2"	2000
Metal	Solder	TO99	25	-	-	-	-
Plastic	Solder	TO220-3	25	TO220M-3	50	TO220T-3	1000

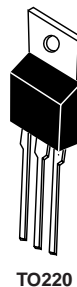
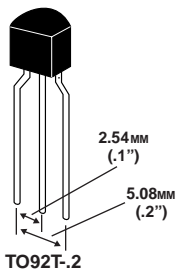
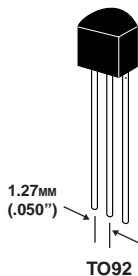
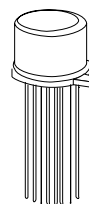
TO5 (1.25" LEAD LENGTH)
TO39 (.75" LEAD LENGTH)



TO18



TO75 6 LEAD
TO99 8 LEAD







DO DIODES & RECTIFIER



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DUMMY COMPONENT ORDERING INFORMATION

SIZE TYPICAL INCH DIA X L	SIZE TYPICAL METRIC DIA X L	Ø LEAD DIA.		 Bulk Part Number XA1	QTY	 Tape & Reel Part Number XA1	QTY
		INCH	METRIC				
GLASS CASE .070" X .154"	1.78 X 3.9mm	.020"	0.5mm	DO35	100	DO35T	10,000
MOLDED CASE .107" x .205"	2.72 x 5.2mm	.031"	0.8mm	DO41	100	DO41T	5000



INFO

TopLine supplies axial lead glass diodes and molded case rectifiers in bulk and on tape and reel. Other DO packages available.

CS TANTALUM CAPACITOR





DUMMY COMPONENT ORDERING INFORMATION

CASE SIZE INCH	CASE SIZE METRIC	CASE CODE EQUIVALENT	 Bulk Part Number XA1	QTY	 Tape & Reel Part Number XA1	QTY
.185" x .475"	4.7 x 12mm	B	CS2	100	CS2T	1000

INFO

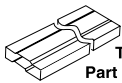


TopLine's CS metal case tantalum is equivalent to the mil-spec CSR13 M39003/01. Other case sizes A, C and D available.

DUMMY COMPONENT ORDERING INFORMATION

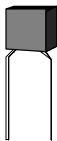
SIZE INCH Dia X L	SIZE METRIC Dia X L	LEAD DIA. INCH	BODY	 Bulk Part Number QTY	 Tape & Reel Part Number QTY
.062" x .145"	1/8 Watt Size	.016"	Conformal	CF18 XA1	100 CF18T 5000 Ammo 5000
.090" X .250"	1/4 Watt Size	.025"	Conformal	CF14 XA1	100 CF14T 5000 Ammo 5000
.140" X .375"	1/2 Watt Size	.028"	Conformal	CF12 XA1	100 CF12T 2500 Ammo 2500

RADIAL LEAD COMPONENTS

DUMMY COMPONENT ORDERING INFORMATION

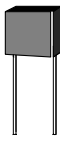
LEAD SPACE		CASE SIZE		 Tube Part Number		 Bulk Part Number		 Tape & Reel Part Number	
INCH	METRIX	INCH	METRIC	XR1	QTY	XR1	QTY	XR1	QTY
.1"	2.54mm	.2" x .6"	5 x 15mm	RS6M	35-40	RS6	200	Call	Call
		.2" x .8"	5 x 20mm	RS8M	25-30	RS8	200		
		.2" x 1.0"	5 x 26mm	RS10M	20-24	RS10	200		
.2"	5.08mm	.2" SQ	5.08mm	-		CK05	100	CK05T	2000
		.3" SQ	7.60mm	-		CK06	100	CK06T	1500
		.2 x .31	5 x 8mm	-		DD2	100	DD2T	2000
		.16 x .28	4 x 7mm	-			100	EH4X7T	2000
		.24 x .43	6 x 11mm	-		EH6X11	100	EH6X11T	1000

CK05



.2"

CK06



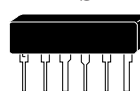
.2"

DD2



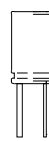
.2"

RS



.1"

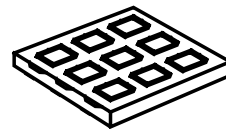
EH



.2"



WAFFLE TRAYS FOR BARE DIE



WP	2	5.0 x 5.0 x 0.8	B	Option
Series	Tray Size	Pocket Dimension (mm)	Type	Material
WP = Waffle Pack	2 = 2" SQ 4 = 4" SQ	Length x Width x Depth of Tray Bottom (blank if bottom tray)	B = Bottom Tray K = Set of Bottom, Cover + Clips Cover Suffix COVER = Standard Black Cover Clip Holds Covers + Bottom CLIP1 = Single Clip Holds Tray + Cover CLIP2 = Clip Pair Holds Tray + Cover CLIP5 = Clip Pair Holds 5 Trays + Cover CLIP6 = Clip Pair Holds 6 Trays + Cover CLIP10 = Clip Pair Holds 10 Trays + Cover Insert INSERT-PAPER = Rice Paper INSERT-TYVEK = White Accessories JIGTRAY = Jedec size holds 10 WP2 LABEL = 1.5" SQ Removable (Roll = 1000)	Blank = Black (standard) A = Amber N = Natural

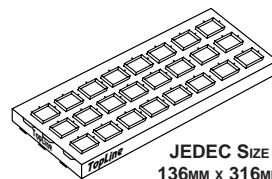
WAFFLE TRAY CAPACITY (EXAMPLE)*

Pocket Size Sq	2" Square WP2		4" Square WP4	
	Matrix	Pockets	Matrix	Pockets
1mm Sq	20 x 20	400	30 x 30	900
2mm Sq	10 x 10	100	29 x 30	870
3mm Sq	10 x 10	100	20 x 20	400
4mm Sq	8 x 8	64	16 x 16	256
5mm Sq	7 x 7	49	12 x 12	144
6mm Sq	6 x 6	36	11 x 11	121
6mm Sq	5 x 5	25	10 x 10	100
7mm Sq	6 x 6	36	10 x 10	100
7mm Sq	5 x 5	25	10 x 10	100
8mm Sq	4 x 4	16	9 x 9	81
9mm Sq	4 x 4	16	8 x 8	64
10mm Sq	3 x 3	9	7 x 7	49
12mm Sq	3 x 3	9	6 x 6	36
13mm Sq	3 x 3	9	6 x 6	36
14mm Sq	3 x 3	9	5 x 5	25
15mm Sq	2 x 2	4	5 x 5	25
17mm Sq	2 x 2	4	4 x 4	16
19mm Sq	2 x 2	4	4 x 4	16
21mm Sq	2 x 2	4	3 x 3	9

*OTHER SIZES AVAILABLE




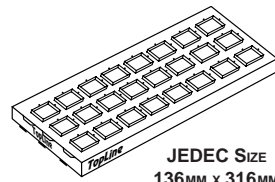
MATRIX TRAYS For BGA BALL GRID ARRAY




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TRAY ORDERING INFORMATION

COMPONENT SIZE	COMPONENTS PER TRAY	MATRIX Row COLUMN	 Tray Part Number
			XZ1
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	429	13 x 33	BGATRAY6mm-13x33
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	260	10 x 26	BGATRAY9mm-10x26
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	160	8 x 20	BGATRAY14mm-8x20
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

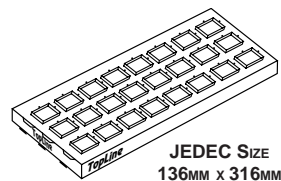


TRAY ORDERING INFORMATION

COMPONENT BODY SIZE	COMPONENT HEIGHT	COMPONENTS PER TRAY	MATRIX COLUMN X ROW	 Tray Part Number
XZ1				
QFP TRAY				
10mm Sq.	2.0-2.7mm	96	6 x 16	QTRAY10mm-6x16
14mm Sq.	2.0-2.7mm	84	6 x 14	QTRAY14mm-6x14
14 x 20mm	2.7mm	50	5 x 10	QTRAY14x20mm-5x10
14 x 20mm	2.7mm	60	6 x 10	QTRAY14x20mm-6x10
14 x 20mm	2.7mm	66	6 x 11	QTRAY14x20mm-6x11
28mm Sq.	3.6mm	24	3 x 8	QTRAY28mm-3x8
32mm Sq.	3.8mm	24	3 x 8	QTRAY32mm-3x8
40mm Sq.	3.8mm	12	3 x 4	QTRAY40mm-3x4
LQFP TRAY				
5mm Sq.	1.4mm	360	12 x 30	LQTRAY5mm-12x30
7mm Sq.		250	10 x 25	LQTRAY7mm-10x25
10mm Sq.		160	8 x 20	LQTRAY10mm-8x20
12mm Sq.		119	7 x 17	LQTRAY12mm-7x17
14mm Sq.		90	6 x 15	LQTRAY14mm-6x15
14 x 20mm		72	6 x 12	LQTRAY14x20mm-6x12
20mm Sq.		60	5 x 12	LQTRAY20mm-5x12
24mm Sq.		40	4 x 10	LQTRAY24mm-4x10
28mm Sq.		36	4 x 9	LQTRAY28mm-4x9
TQFP TRAY				
5mm Sq.	1.0mm	360	12 x 30	TQTRAY5mm-12x30
7mm Sq.		250	10 x 25	TQTRAY7mm-10x25
10mm Sq.		160	8 x 20	TQTRAY10mm-8x20
12mm Sq.		119	7 x 17	TQTRAY12mm-7x17
14mm Sq.		90	6 x 15	TQTRAY14mm-6x15
14 x 20mm		72	6 x 12	TQTRAY14x20mm-6x12
20mm Sq.		60	5 x 12	TQTRAY20mm-5x12
BCC/MLF TRAY				
4mm Sq.	0.9mm	540	15 x36	MLFTRAY4mm-15x36
5mm Sq.		490	14 x 35	MLFTRAY5mm-14x35
6mm Sq.		490	14 x 35	MLFTRAY6mm-14x35
7mm Sq.		260	10 x 26	MLFTRAY7mm-10x26
8mm Sq.		260	10 x 26	MLFTRAY8mm-10x26




MATRIX TRAYS FOR TSOP




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TRAY ORDERING INFORMATION

COMPONENT SIZE	COMPONENT HEIGHT	COMPONENTS PER TRAY	MATRIX ROW X COLUMN	 Tray Part Number
XZ1				
TYPE 1 (INCLUDING LEADS)	1.0-1.2mm			
8 x 13.4mm		234	13 x 18	TTRAY8x13.4mm-13x18
8 x 14mm		208	16 x 13	TTRAY8x14mm-16x13
10 x 14mm		160	16 x 10	TTRAY10x14mm-16x10
6 x 16mm		240	15 x 16	TTRAY6x16mm-15x16
8 x 16mm		195	15 x 13	TTRAY8x16mm-15x13
10 x 16mm		150	15 x 10	TTRAY10x16mm-10x15
12 x 16mm		120	15 x 8	TTRAY12x16mm-15x8
14 x 16mm		112	16 x 7	TTRAY14x16mm-16x7
8 x 20mm		156	12 x 13	TTRAY8x20mm-12x13
10 x 20mm		120	12 x 10	TTRAY10x20mm-12x10
12 x 20mm		96	12 x 8	TTRAY12x20mm-12x8
14 x 20mm		96	12 x 8	TTRAY14x20mm-12x8
TYPE II (BODY SIZE)	1.0-1.2mm			
.3" x .675" (7.62 x 17.1mm)		176	11 x 16	TT2TRAY7.6x17-1116
.4" x .725" (10.16 x 18.4mm)		135	9 x 15	TT2TRAY10x18.4-9x15
.4" x .825" (10.16 x 20.95mm)		117	9 x 13	TT2TRAY10x21-9x13
.4" x .875" (10.16 x 22.22)		108	9 x 12	TT2TRAY10x22-9x12
.4" x 1.02" (10.16 x 26mm)		99	9 x 11	TT2TRAY10x26-9x11

TRAY FOR J-LEAD, PLCC, LCC AND CLCC

COMPONENT SIZE	COMPONENT HEIGHT	COMPONENTS PER TRAY	MATRIX ROW X COLUMN	 Tray Part Number
XZ1				
PLCC44	4.4mm	40	4 x 10	PLCC44TRAY-4x10
PLCC52	4.4mm	36	4 x 9	PLCC52TRAY-4x9
PLCC68	4.4mm	21	3 x 7	PLCC68TRAY-3x7
PLCC84	4.4mm	21	3 x 7	PLCC84TRAY-3x7



Kit PART NUMBERING SYSTEM

WebCODE XK1



926

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 Laminates	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 = 300 mil DIP *	958 = LBG1089/1225
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 = Custom *
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 = Custom *	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 = Unassigned *
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 Kit 1	982 = QFP208 Lead Free
938 = Econo Kit 2	983 = 0805/1206 Lead Free
939 = Econo Kit 3	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	9603 = TSOP32 *
944 = Rework 2 Practice	9613 = BQFP132 *

025

SPECIFICATIONS

000 = Single Pack Kit (Hand Solder)
001 = Standard PC Board
002 = Lead Free Tin Plated PC Board
003 = Populated PC Board
004 = X, Y, Theta Parts Placement ASCII File
005 = Gerber File For Stencil
006 = Kit Of 6
007 = Polyimide PC Board
008 = Bare Copper PC Board (OSP) Entek
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.

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.

GERBER DATA: (ACCESSORY)

For solder paste stencil.

LEAD-FREE (OPTIONAL)

Available with Sn100 tin or gold over electroless nickel.

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 component.

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.

STANDARD BOARD SPEC

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

Layers: Double-sided

Board Material: FR4

Metalization: 1-ounce copper

Solder Mask: LPI (Liquid Photoimageable)

Silk Screen: White Ink

Tinning: HASL (Hot Air Solder Leveling)

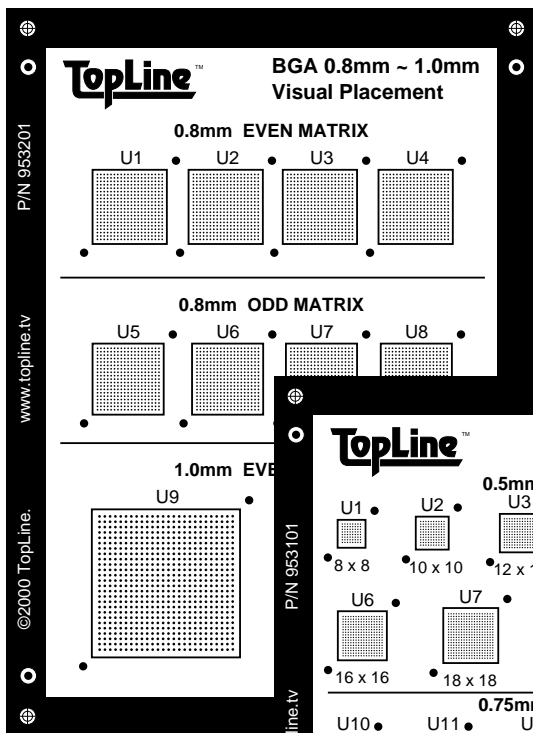
Tooling Holes: .125" (3.18mm) 4-places

Stencil Information

In some cases, TopLine's boards use 2-front sides, eliminating the need for separate "front" and "back" stencils.



VISUAL PLACEMENT SEE THRU ACRYLIC BOARD



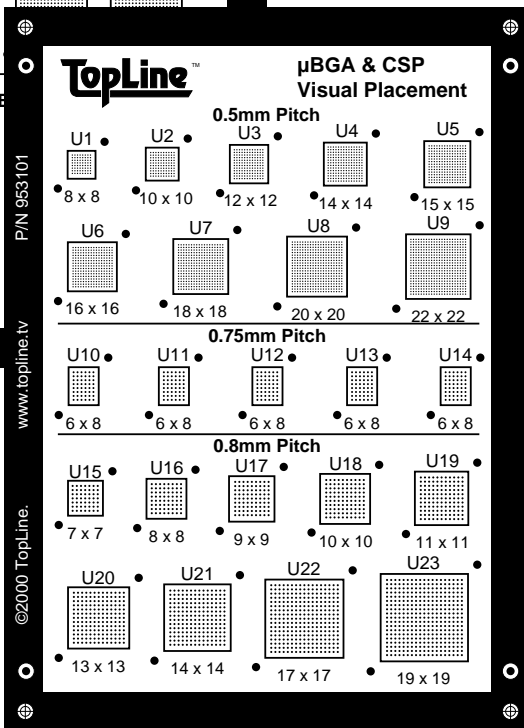
Order
953201

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

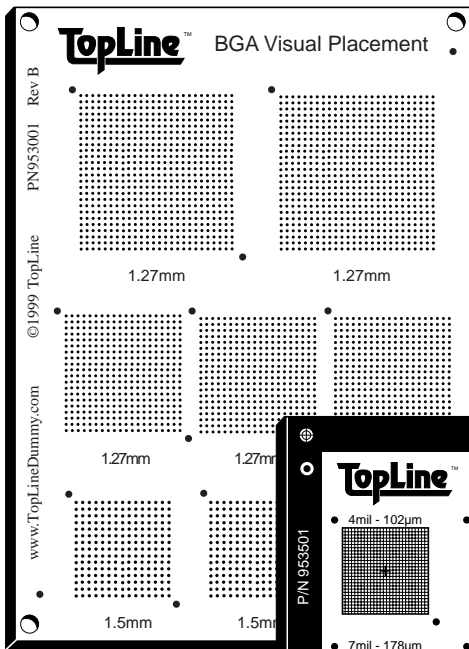
BOARD TYPES

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



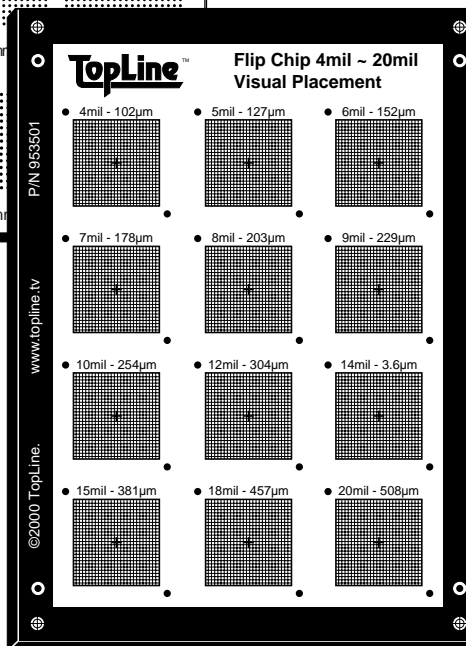
Order
953001

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
953501



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

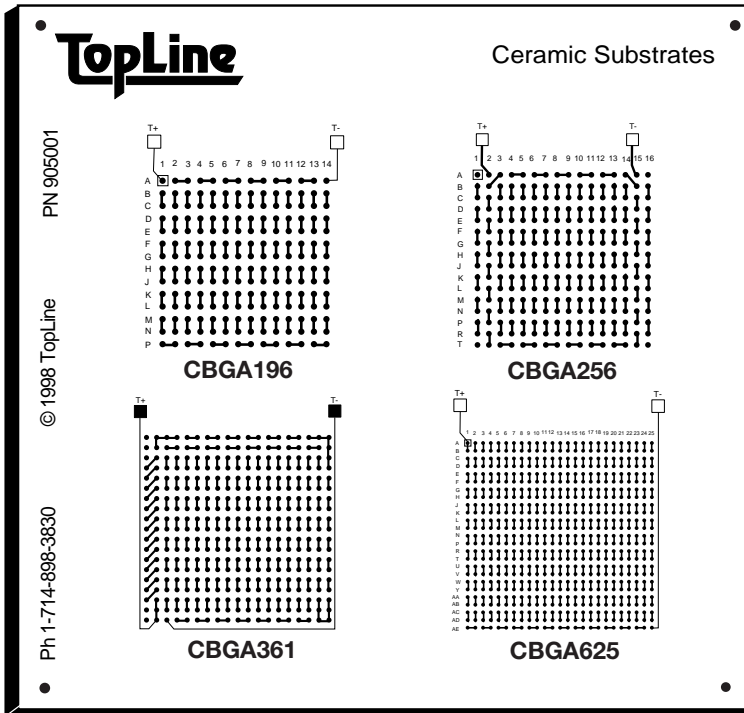


KIT ORDERING INFORMATION

			 MANUAL ASSEMBLY OR  MACHINE RUN			
	MIL PITCH	MM PITCH	STICKY ACRYLIC BOARD	KITS WITH COMPONENTS	PARTS PLACEMENT DATA	GERBER DATA
μBGA & 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	204μm 254μm 457μm	953401	953400	953404	953405
Grid Lines	4mil 5mil 6mil 7mil 8mil 9mil 10mil 12mil 14mil 15mil 18mil 20mil	102μm 127μm 152μm 178μm 203.2μm 229μm 254μm 304.8μm 355.6μm 381μm 457μm 508μm	953501	-	953504	953505



CERAMIC CBGA 1.27mm CERAMIC SUBSTRATES WITH DAISY CHAIN



TopLine offers a full range of high temperature ceramic substrates for placement and rework of ceramic CBGA. Specifically designed and compatible with TopLine's CBGA series with daisy chain.

SEE FOLLOWING PAGE
FOR OTHER SUBSTRATE DESIGNS

FEATURES

- Ceramic 40mil (1.0mm)
- Single Sided
- No Tooling Holes
- Fiducial Marks
- Overglaze Soldermask
- Pad Site .023" dia.
- TCE = 6.5ppm/°C



Actual Size 4.5" x 4.5" (114mm SQ)



CERAMIC CBGA 1.27mm CERAMIC SUBSTATES WITH DAISY CHAIN



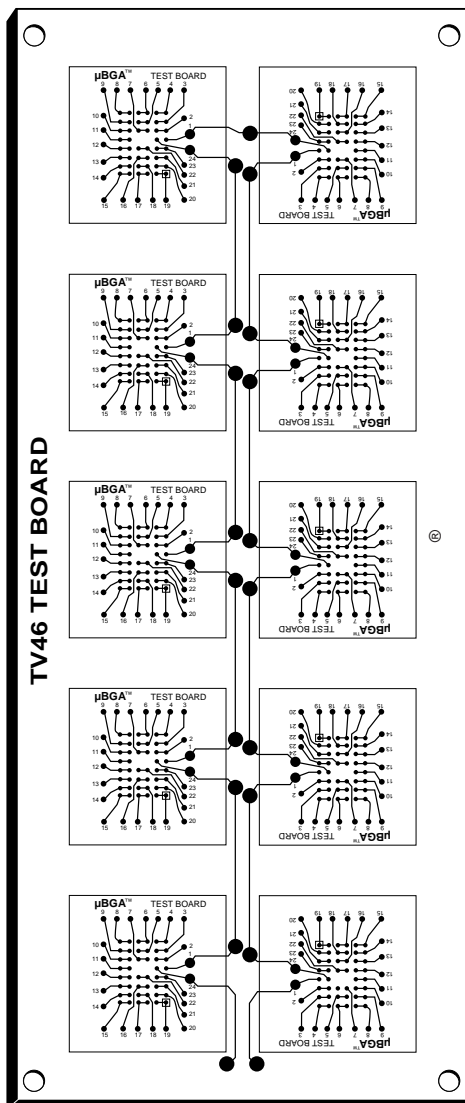
Kit ORDERING INFORMATION

COMPONENT SELECTION	BALL MATRIX	NBR SITES PER SUBSTRATE	 MANUAL ASSEMBLY OR  MACHINE RUN			
			SUBSTRATE ONLY	SOLDER PASTE GERBER	ORDER NUMBER 1 KIT	ORDER NUMBER 10 KITS
CBGA196	14 x 14	1X	905001	905005	905000	905010
CBGA256	16 x 16					
CBGA361	19 x 19					
CBGA625	25 x 25					
CBGA121	11 x 11	4X	905101	905105	905100	905110
CBGA196	14 x 14		905201	905205	905200	905210
CBGA256	16 x 16		905401	905405	905400	905410
CBGA304	16 x 19		905501	905505	905500	905510
CBGA361	19 x 19		905601	905605	905600	905610
CBGA400	20 x 20		905701	905705	905700	905710
CBGA625	25 x 25		905801	905805	905800	905810
CBGA1089	33 x 33	2X	905901	905905	905900	905910

Drawings for above substrates available on request.



μ BGA[®] TV46 TESSERA TEST KIT CSP46



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

Test board for Tessera 46 bump μ BGA 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 4" square waffle 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

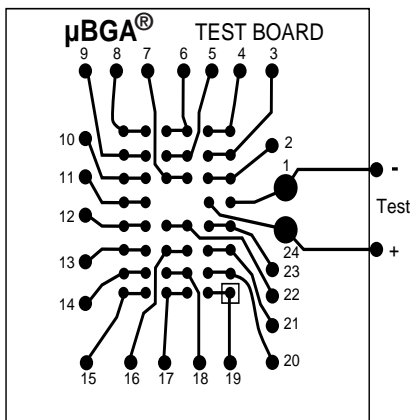


μ BGA[®] TV46 TESSERA TEST KIT CSP46

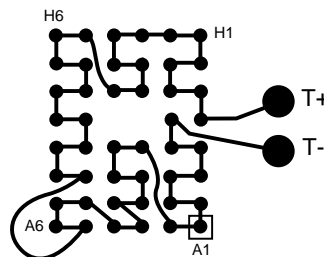


KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN		
		ORDER NUMBER 921000 1 Kit	ORDER NUMBER 921006 6 Kits	ORDER NUMBER 921010 10 Kits	ORDER NUMBER 921025 25 Kits
Board TV46 μ BGA CSP46	0.75mm	1 10	6 60	10 100	25 250



SINGLE PCB TEST COUPON



AFTER MOUNTING TO TEST BOARD

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 921004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 921005

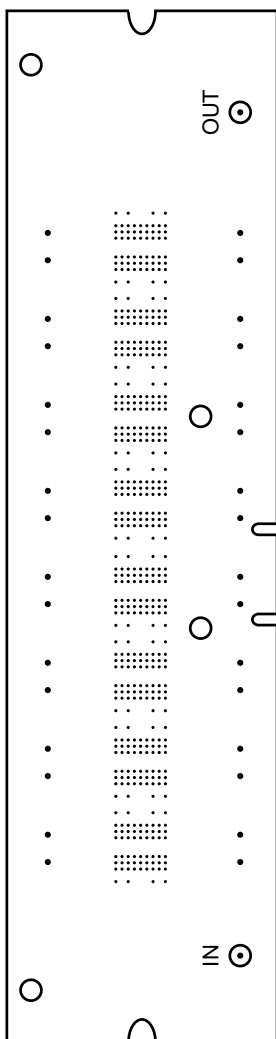
PC BOARD
ORDER NUMBER 921001



μ BGA[®] RAMBUS TV62 TESSERA TEST KIT



TV62



Actual Size
1.375" x 5.25"
(35mm x 133.5mm)

Rambus test boards for Tessera TV62 chip scale mechanical package.

The TV62 test board features asymmetrical pitch 0.8mm/1.0mm.

Board is double-sided with repeat patterns on both sides. It has sites for mounting 8 components with fan out test pints. Also includes go/no-go test points for checking continuity on fully populated board.

FEATURES



- Electroless Nickel Gold Plated
- LPI Soldermask
- FR4 Hight Temp Board
- Multilayer Construction
- .045" thick (1.1mm)
- Fiducial Marks
- Tooling Holes



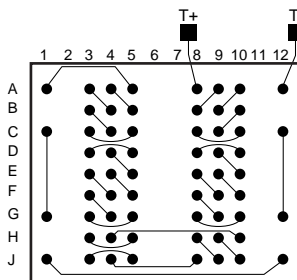
μ BGA[®] RAMBUS TV62 TESSERA TEST KIT



KIT ORDERING INFORMATION

COMPONENT	 MANUAL ASSEMBLY	 MACHINE RUN
	ORDER NUMBER 1 Kit 932000	ORDER NUMBER 10 Kits 932010
Board TV46 TV62 Components	1 8	10 80

TV62 - CSP62



PC BOARD

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 932004

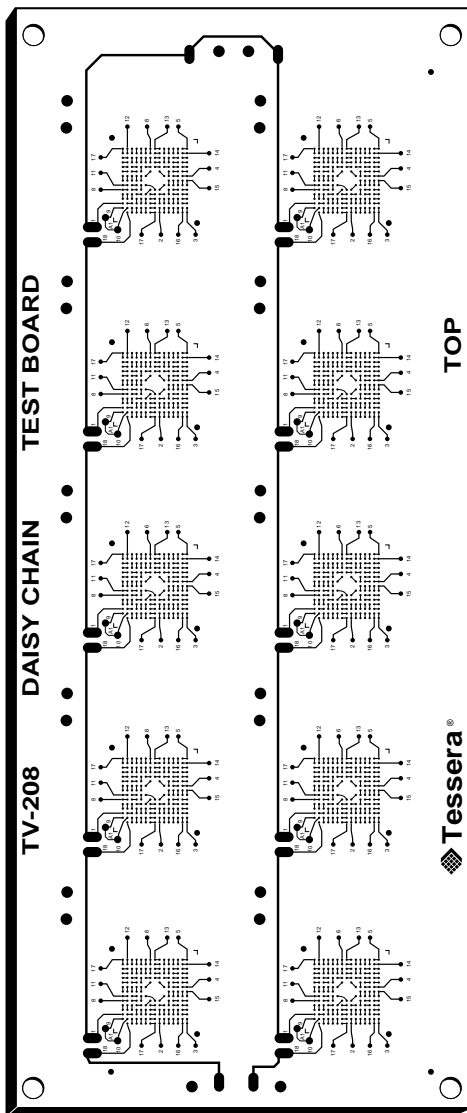
SOLDER PASTE ARTWORK
GERBER FILE -NOT AVAILABLE

PC BOARD
ORDER NUMBER 932001

DRAWING
ORDER NUMBER 932005



μ BGA[®] TV208 TESSERA TEST KIT 0.5MM PITCH

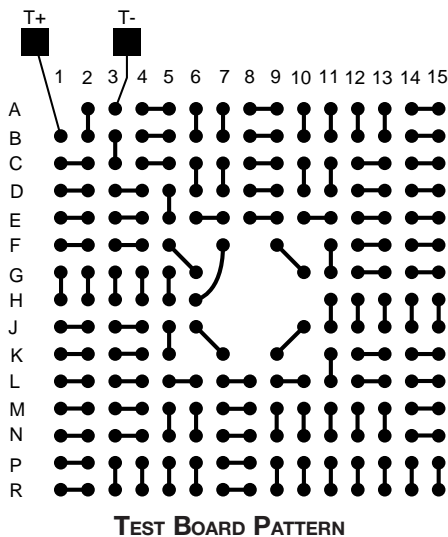


Actual Size: 2.75" x 6.5" (70 x 165mm)

Test board for Tessera 208 bump μ BGA chip scale components. Each board has coupons which allow continuity testing of individual components.

Parts are supplied in 4" square waffle trays.

Pad	Diameter
Bump Site	0.3mm



FEATURES



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



μ BGA[®] TV208 TESSERA TEST KIT 0.5MM PITCH

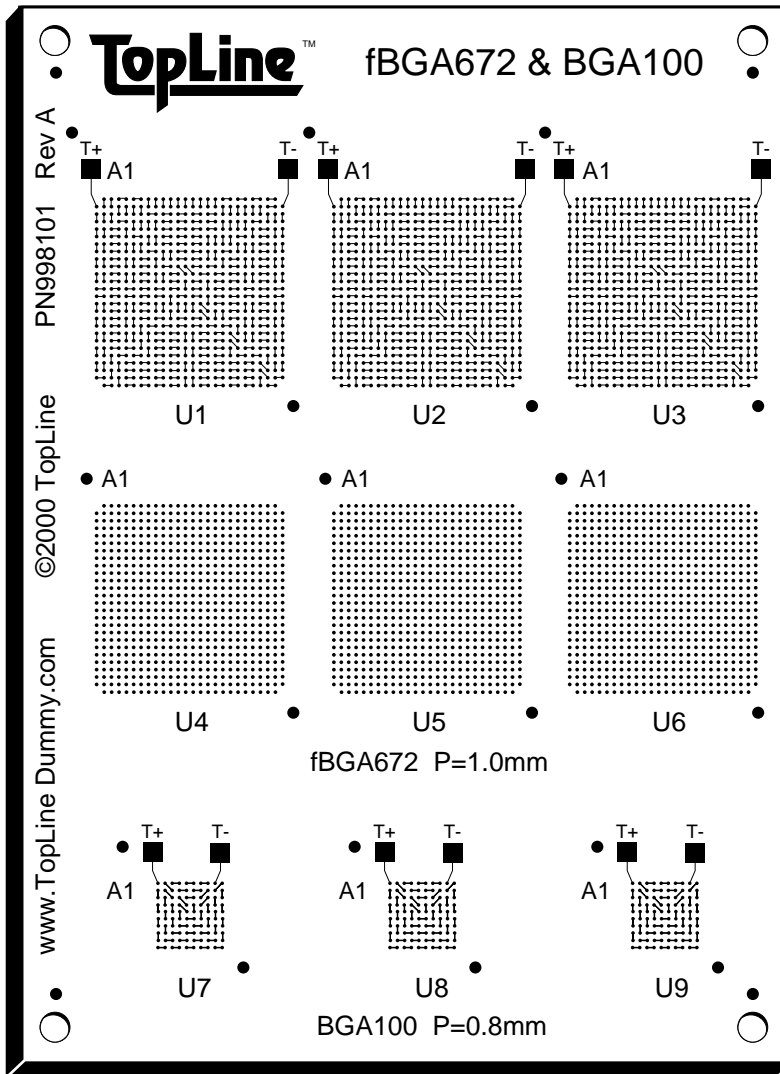


KIT ORDERING INFORMATION

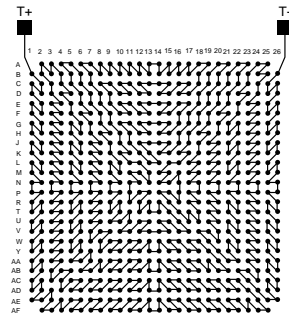
		 MANUAL ASSEMBLY	 MACHINE RUN		
COMPONENT	PITCH	ORDER NUMBER 934000 1 Kit	ORDER NUMBER 934003 3 Kits	ORDER NUMBER 934006 6 Kits	ORDER NUMBER 934010 10 Kits
Board TV208		1	3	6	10
μ BGA TV208	0.5mm	10	30	60	100

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 934004	PC BOARD ORDER NUMBER 934001
SOLDER PASTE ARTWORK DRAWING FILE ORDER NUMBER 934005	

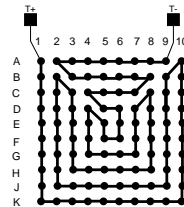


TopLine makes practicing with Fine Pitch Ball Grid Array technology accessible and affordable. Each board supports BGAs with 0.8mm and 1.0mm grid patterns and daisy chain test points to verify proper placement.



fBGA672

AFTER ASSEMBLY



BGA100

AFTER ASSEMBLY

FEATURES

- Hot Air Solder Leveling
- 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



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 998102	ORDER NUMBER 998110	ORDER NUMBER 998125	ORDER NUMBER 998150	ORDER NUMBER 998100
		1 KIT	10 KITS	25 KITS	50 KITS	100 KITS
Board		1	10	25	50	100
BGA100	0.8mm	2	20	50	100	200
fBGA672	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

<u>Pitch</u>	<u>Pad Dia.</u>	<u>Ball Dia.</u>
0.8mm	0.38mm	0.46mm
1.0mm	0.508mm	0.63mm

OPTIONAL ACCESSORIES

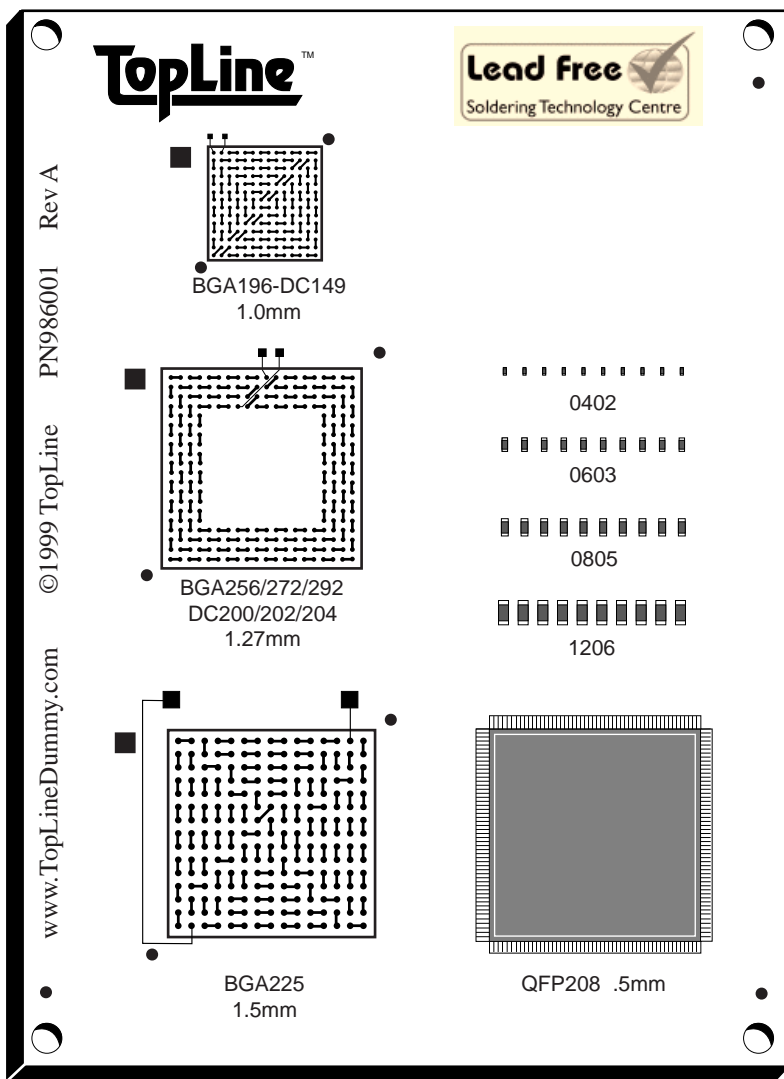
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 998104

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 998105

PC BOARD
ORDER NUMBER 998101



LEAD FREE KIT MULTICOMPONENTS



Practice Lead free assembly using fine-pitch components.

PC BOARD FEATURES

Tin Plated (100% Sn)
LPI Solder Mask
FR4 Board .062"
Double Sided
Tooling Holes .125"
Fiducial Marks

All kits include free Gerber file for stencil. Parts placement data included for machine run kits.

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 986000 1 KIT	ORDER NUMBER 986010 10 KITS	ORDER NUMBER 986024 24 KITS	ORDER NUMBER 986050 50 KITS	ORDER NUMBER 986100 100 KITS
Board		1	10	24	50	100
LBGA196	1.0mm	1	10	24	50	100
LBGA225	1.5mm	1	10	24	50	100
LBGA256	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
Gerber File		1	1	1	1	1
Parts Placement		0	0	1	1	1

OPTIONAL ACCESSORIES

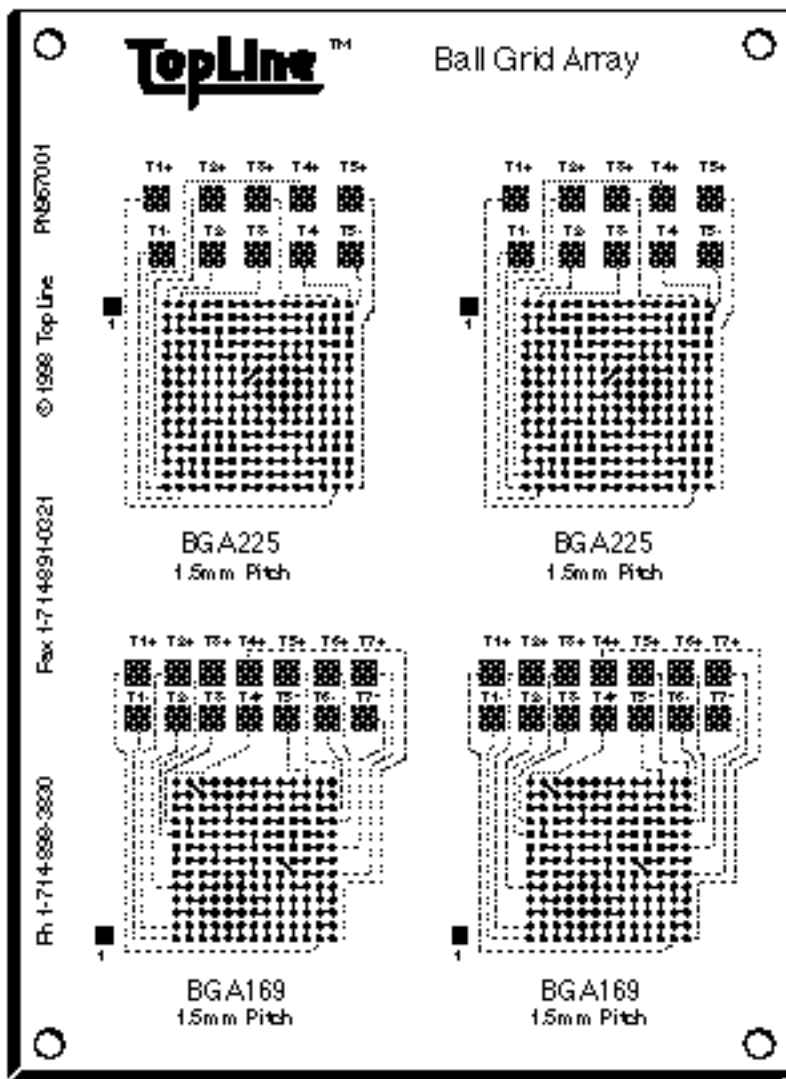
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 986004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 986005

PC BOARD
ORDER NUMBER 986001



BALL GRID ARRAY KIT BGA169 & BGA225 WITH DAISY CHAIN TEST



TopLine makes practicing with Ball Grid Array technology accessible and affordable. Each board supports four BGAs with 1.5mm grid pattern and daisy chain test points to verify proper placement.

Double sided board incorporates "two front side" design so only one solder paste stencil is needed.

FEATURES

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



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

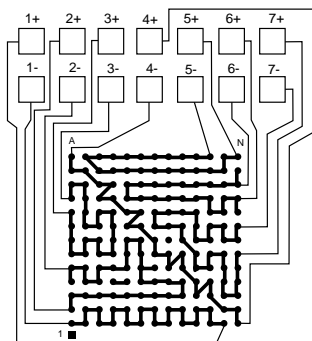


BALL GRID ARRAY KIT BGA169 & BGA225 WITH DAISY CHAIN TEST

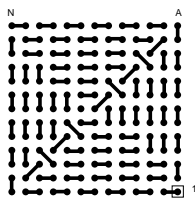


KIT ORDERING INFORMATION

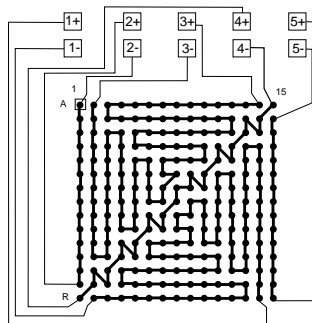
COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 967000 1 KIT	ORDER NUMBER 967012 12 KITS	ORDER NUMBER 967025 25 KITS	ORDER NUMBER 967050 50 KITS	ORDER NUMBER 967100 100 KITS
Board		1	12	25	50	100
BGA 169	1.5mm	2	25	50	100	200
BGA 225	1.5mm	2	25	50	100	200



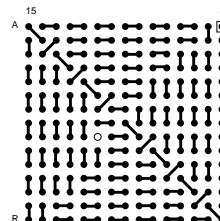
BGA169
AFTER MOUNTING TO TEST BOARD



BGA169
VIEW OF SOLDER BALLS



BGA225
AFTER MOUNTING TO TEST BOARD



BGA225
VIEW OF SOLDER BALLS

OPTIONAL ACCESSORIES

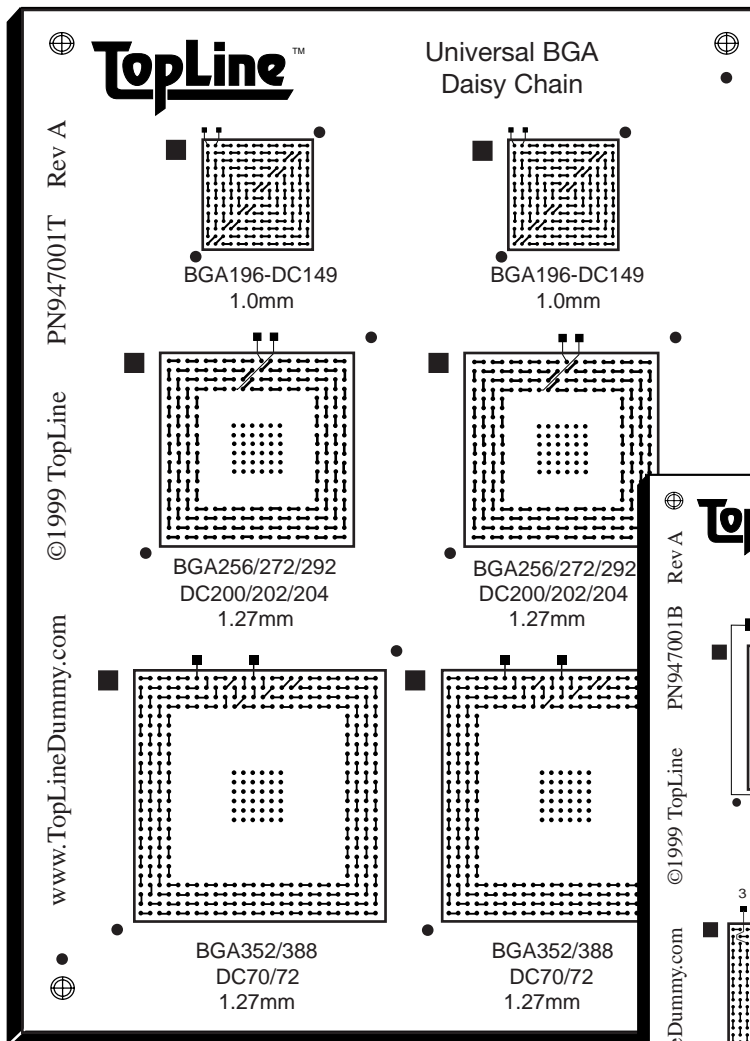
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 967004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 967005

PC BOARD
ORDER NUMBER 967001

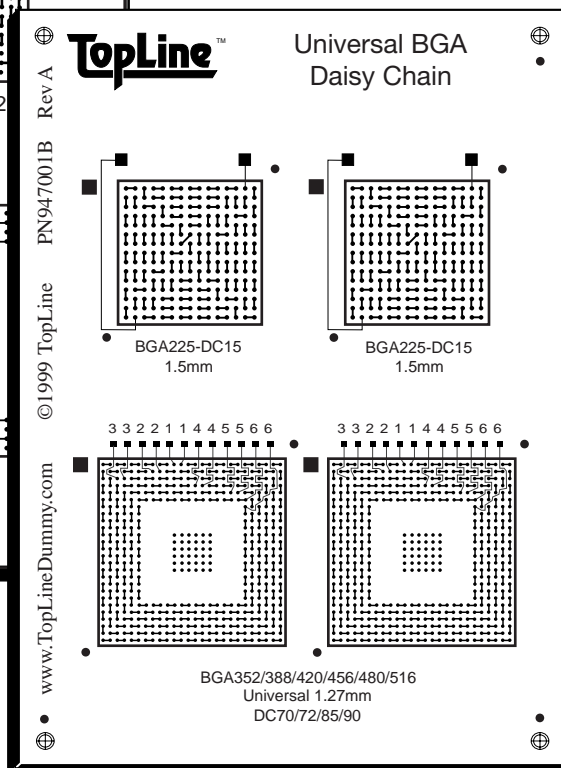


UNIVERSAL BGA DAISY CHAIN KIT



TOP SIDE
BOARD

BOTTOM SIDE
BOARD





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



UNIVERSAL BGA DAISY CHAIN KIT



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

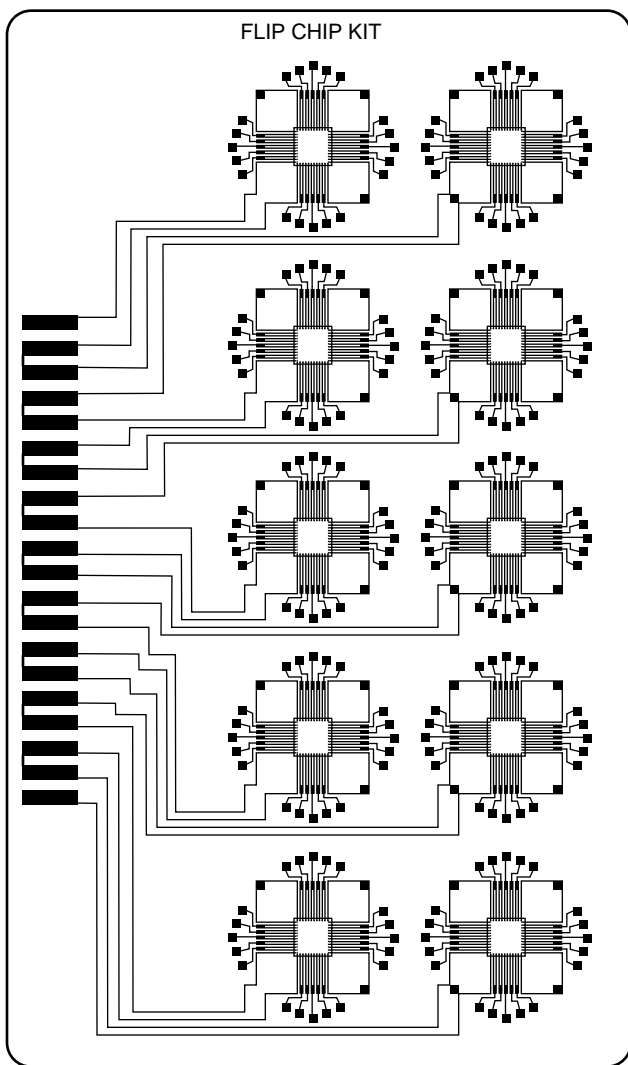
Component	Pitch	Pad Dia.	Ball Dia.
BGA196	1.0mm	0.508mm	0.63mm
others	1.27~1.5mm	0.61mm	0.75mm

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 947004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 947005

PC BOARD
ORDER NUMBER 947001



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.

Plating Options:

Ni-Au Standard

Cu-OSP Available

Board Thickness:

.031" - 0.78mm Standard

.062" - 1.57mm Available

NOTE



Gerber Data is only available for laminate boards.



FLIP CHIP KITS



KIT ORDERING INFORMATION

CONTENTS	 MANUAL ASSEMBLY				 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	9	0	0	0
FC317 254μm	0	0	36	0	0	0	0

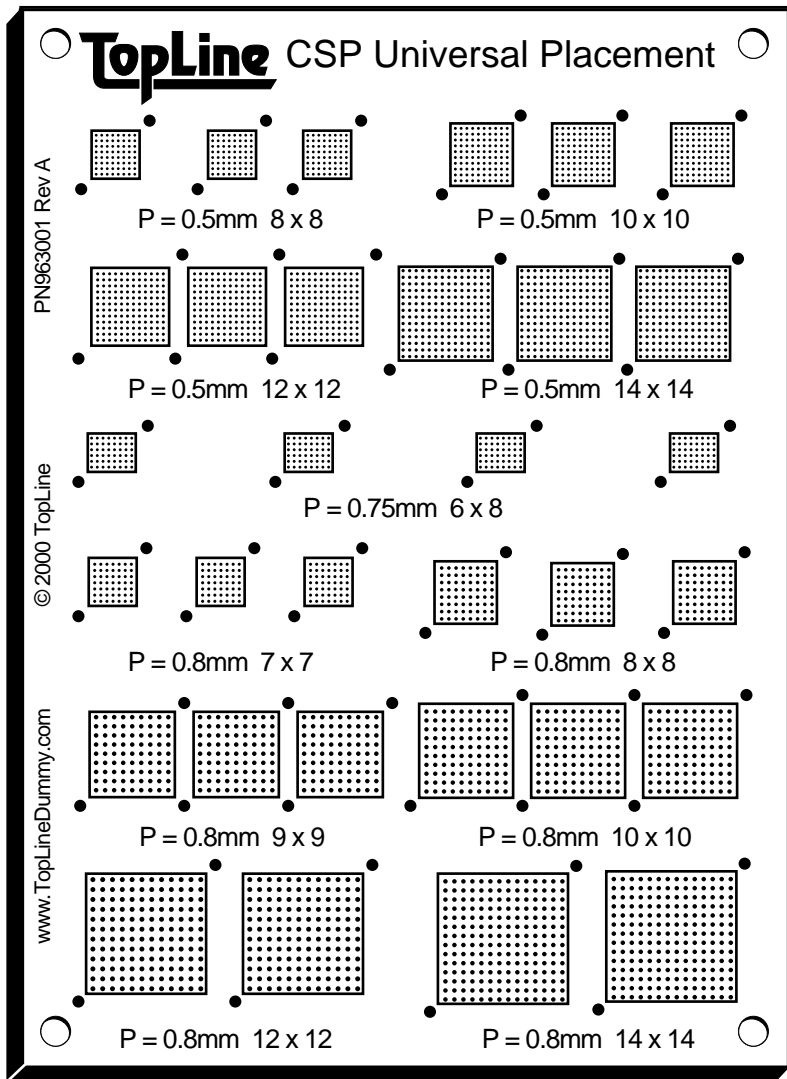
Note: 907001 is back side of 909001 board.
904001 is back side of 902001 board.
908001 is ceramic substrate for FC48.

SPARE PARTS

BOARD ONLY	ORDER NBR
FC176 204μm	901001 FR4
FC88 204μm	902001 FR4
FC317 254μm	903001 FR4
FC220 204μm	904001 FR4
FC96 457μm	907001 FR4
FC48 457μm	908001 Ceramic
FC48 457μm	909001 FR4

OPTIONAL ACCESSORIES

BOARD TYPE	PLACEMENT	GERBER
FC176	901004	901005
FC88	902004	902005
FC317	903004	903005
FC220	904004	904005
FC96	907004	907005
FC48	909004	909005



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

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





UNIVERSAL CSP KIT

0.5~0.8MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN	
		ORDER NUMBER 963000 1 KIT	ORDER NUMBER 963006 6 KITS	ORDER NUMBER 963010 10 KITS	ORDER NUMBER 963025 25 KITS
Board		1	6	10	25
CSP	0.5mm	4	24	40	100
CSP	0.75mm	4	24	40	100
CSP	0.8mm	4	24	40	100

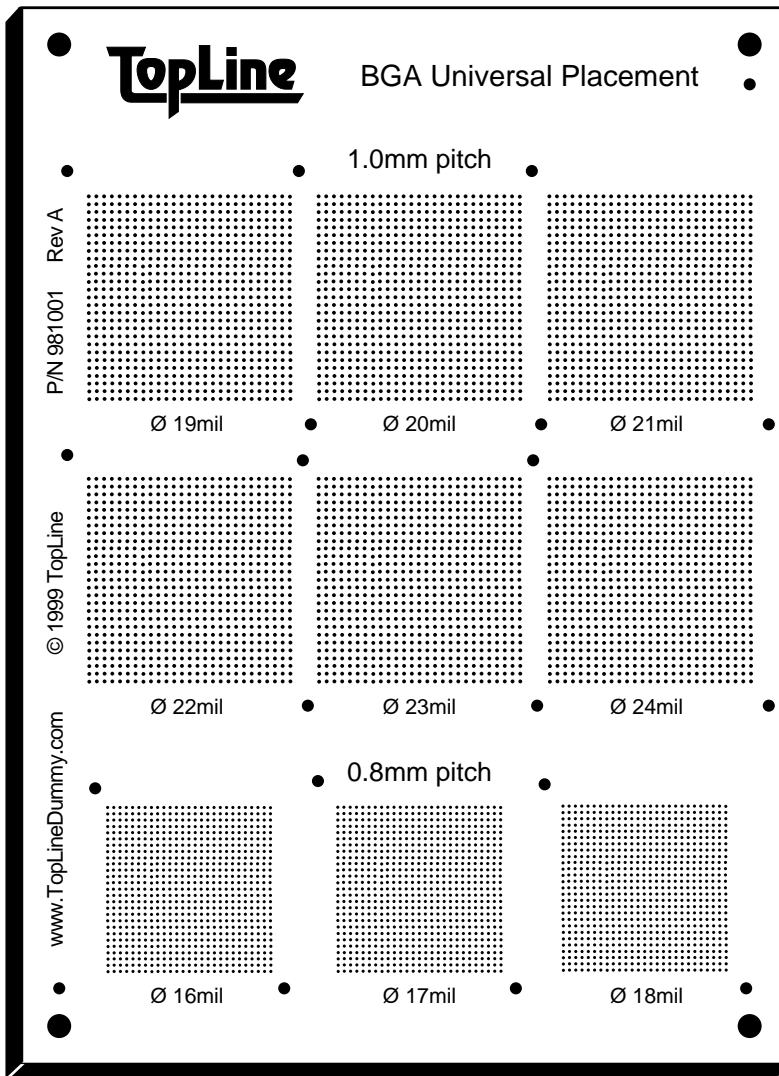
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 963004	PC BOARD ORDER NUMBER 963001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 963005	



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

- Hot Air Solder Leveling
- 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

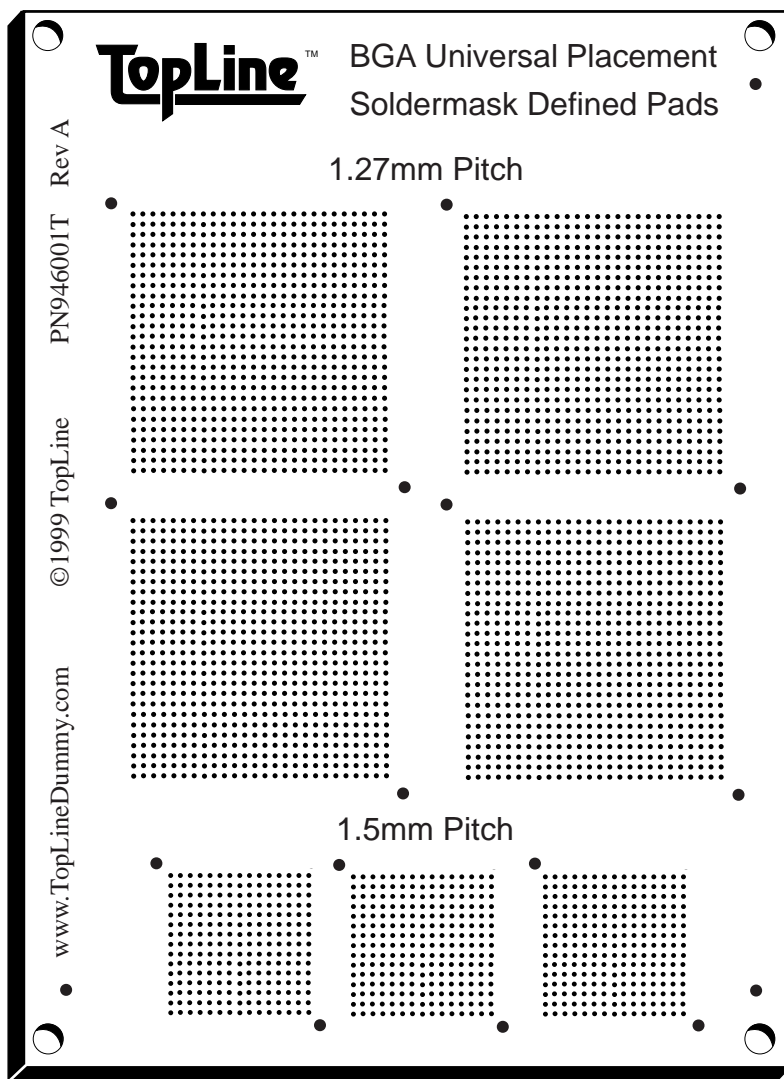
COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN	
		ORDER NUMBER 981000 1 KIT	ORDER NUMBER 981006 6 KITS	ORDER NUMBER 981010 10 KITS	ORDER NUMBER 981025 25 KITS
Board 981001	0.8/1.0mm	1	6	10	25
BGA	1.0mm	4	24	40	100
BGA	0.8mm	4	24	40	100

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 981004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 981005

PC BOARD
ORDER NUMBER 981001



TopLine's Universal BGA Kits are economical. Includes non-daisy-chain BGA components. Kit has 1.27mm and 1.5mm pitch for placement and solder practice.

Pad Geometries

Pad	Ball	
Dia.	Dia.	Pitch
23mil	30mil	1.5
23mil	30mil	1.27mm

Top Side-
Soldermask defined pads

Bottom Side-
Etched defined pads

FEATURES

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

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





UNIVERSAL BGA KIT

1.27MM & 1.5MM PITCH



KIT ORDERING INFORMATION

COMPONENT		PITCH		 MANUAL ASSEMBLY		 MACHINE RUN	
				ORDER	ORDER	ORDER	ORDER
				NUMBER	NUMBER	NUMBER	NUMBER
		946000	946006	946010	946025		
		1 KIT	6 KITS	10 KITS	25 KITS		
Board 946001	1.27/1.5mm	1	6	10	25		
BGA169 or BGA225	1.5mm	4	24	40	100		
BGA256 or BGA352	1.27mm	4	24	40	100		

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 946004	PC BOARD ORDER NUMBER 946001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 946005	

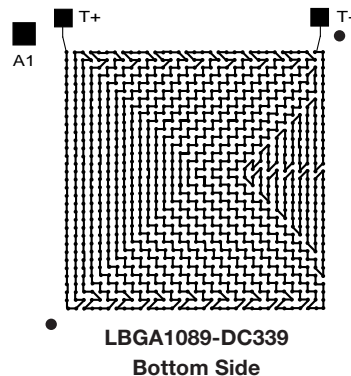
LBGA1225 KIT VERY LARGE BALL GRID ARRAY



Experiment with large size Ball Grid Arrays. Kit comes consists of PC Board with daisy chain and matching 45mm square LBGA Component with 1225 solder balls.

Top Side:
35 x 35 matrix LBGA1225

Bottom Side: see below
33 x 33 matrix LBGA1089



Soldermask defined
pad diameter 0.6mm

FEATURES

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

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





LBGA1225 KIT

VERY LARGE BALL GRID ARRAY

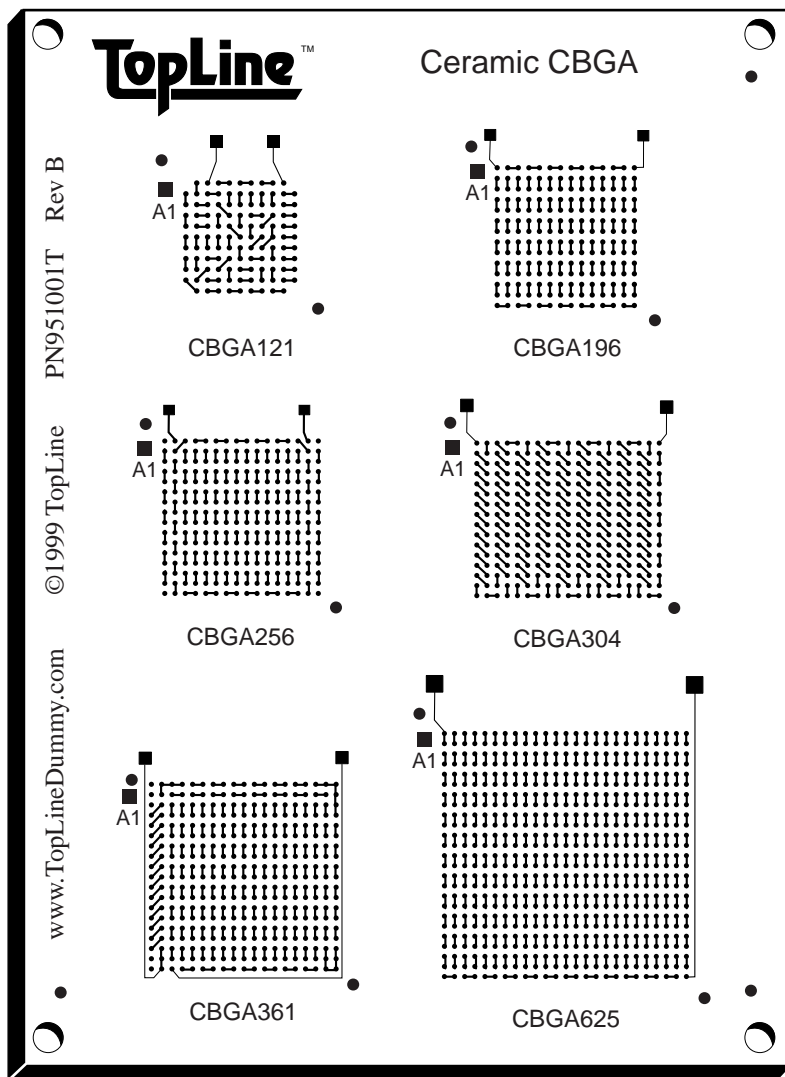


KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY		 MACHINE RUN	
		ORDER NUMBER 958000 1 KIT	ORDER NUMBER 958006 6 KITS	ORDER NUMBER 958012 12 KITS	ORDER NUMBER 958024 24 KITS
COMPONENT	PITCH				
Board 958001 LBGA1225	1.27mm	1 2	6 12	12 24	24 48

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 958004	PC BOARD ORDER NUMBER 958001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 958005	



TopLine's Ceramic Ball Grid Array. Kit includes one PC board and 6-different CBGAs.

New Rev "B" design is daisy chain, double sided with same land patterns on both sides of board.

FEATURES

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

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



CERAMIC CBGA KIT

1.27MM PADS



KIT ORDERING INFORMATION

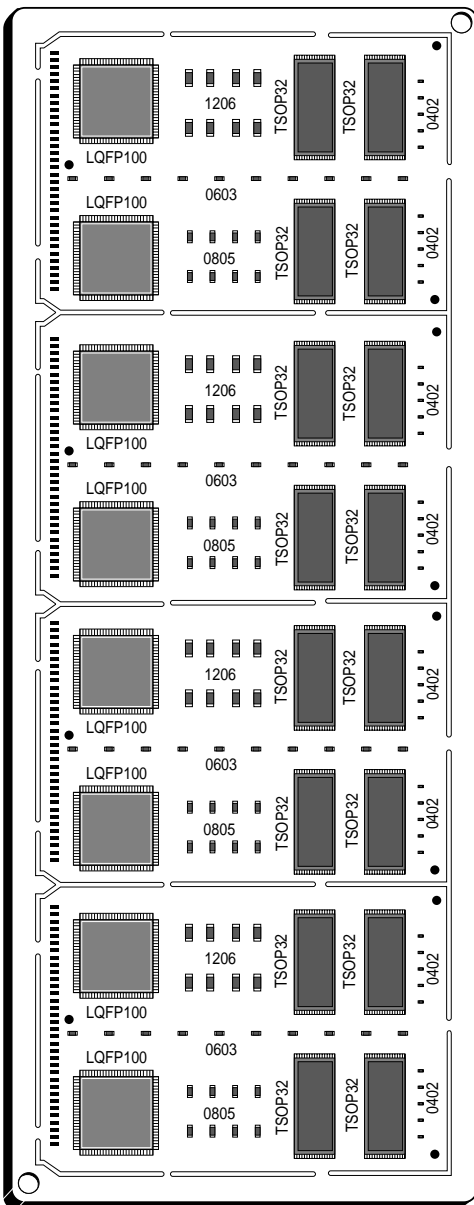
COMPONENT	PITCH	 MANUAL ASSEMBLY			 MACHINE RUN	
		ORDER NUMBER 951000 1 KIT	ORDER NUMBER 951006 6 KITS	ORDER NUMBER 951010 10 KITS	ORDER NUMBER 951012 12 KITS	ORDER NUMBER 951025 25 KITS
Board		1	6	10	12	25
CBGA121 11 x 11	1.27mm	1	6	10	12	25
CBGA196 14 x 14	1.27mm	1	6	10	12	25
CBGA256 16 x 16	1.27mm	1	6	10	12	25
CBGA304 21 x 25	1.27mm	1	6	10	12	25
CBGA361 19 x 19	1.27mm	1	6	10	12	25
CBGA625 25 x 25	1.27mm	1	6	10	12	25

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 951004 B

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 951005 B

PC BOARD
ORDER NUMBER 951001 B





Actual Size: 3.5" x 8.625" (90 x 220mm)

The PCMCIA Kit is an economical way to experiment with thin board technology. Designed to PCMCIA (Personal Computer Memory Card International Association) Type 1 standards with a maximum physical thickness of 3.3mm after assembly. Boards are double-sided (.018" thick). PCMCIA boards are configured in a 4-card panelized array. Each array is equivalent to 4 Kits. Also meets Japan's JEIDA standard.

FEATURES

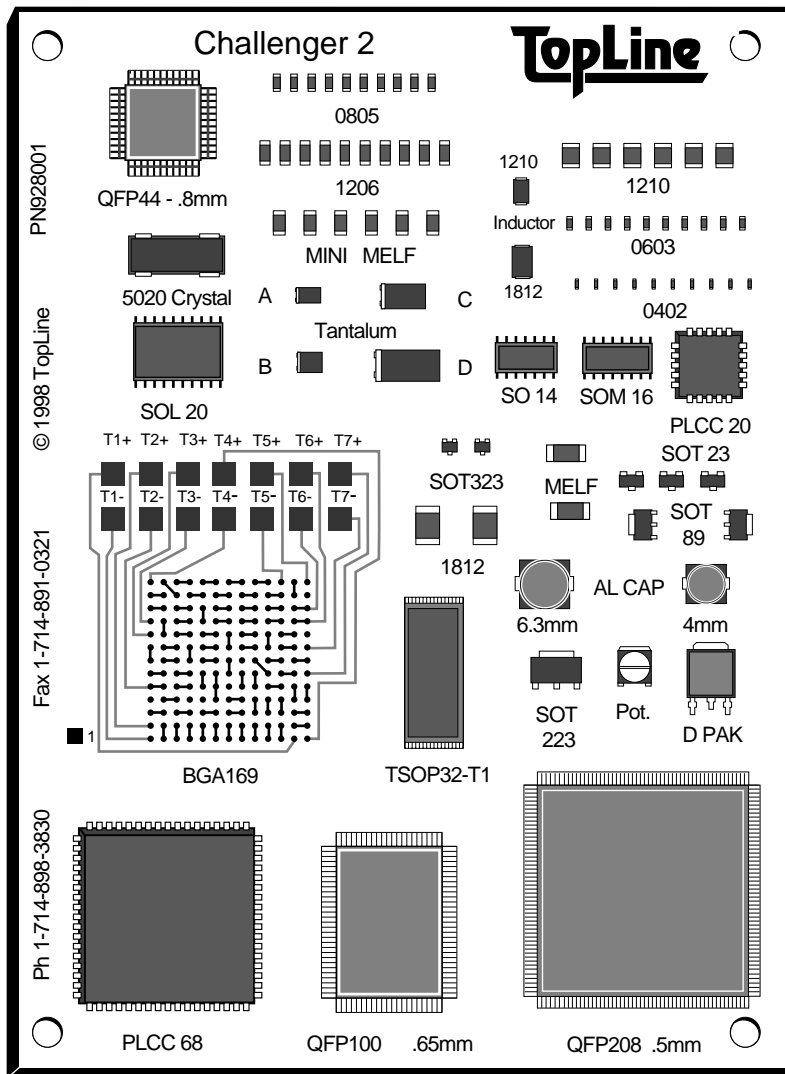
- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .018" (0.45mm)
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 945000 4 KITS	ORDER NUMBER 945012 12 KITS	ORDER NUMBER 945024 24 KITS	ORDER NUMBER 945048 48 KITS	ORDER NUMBER 945096 96 KITS
Board		1 Array	3 Arrays	6 Arrays	12 Arrays	24 Arrays
LQFP100	0.5mm	8	25	50	100	200
TSOP32	0.5mm	25	50	100	200	400
0402 Chip		100	500	500	500	1000
0603 Chip		100	500	500	500	1000
0805 Chip		100	500	500	500	1000
1206 Chip		100	250	250	500	1000

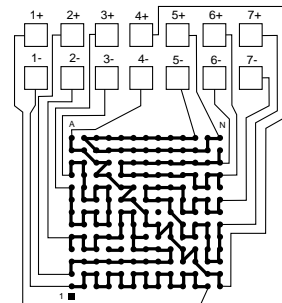
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 945005	4-BOARD ARRAY ORDER NUMBER 945001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 945004	



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

- Hot Air Solder Leveling
- 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

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA

X,Y,THETA ASCII FILE

ORDER NUMBER 928004

SOLDER PASTE ARTWORK

GERBER FILE

ORDER NUMBER 928005

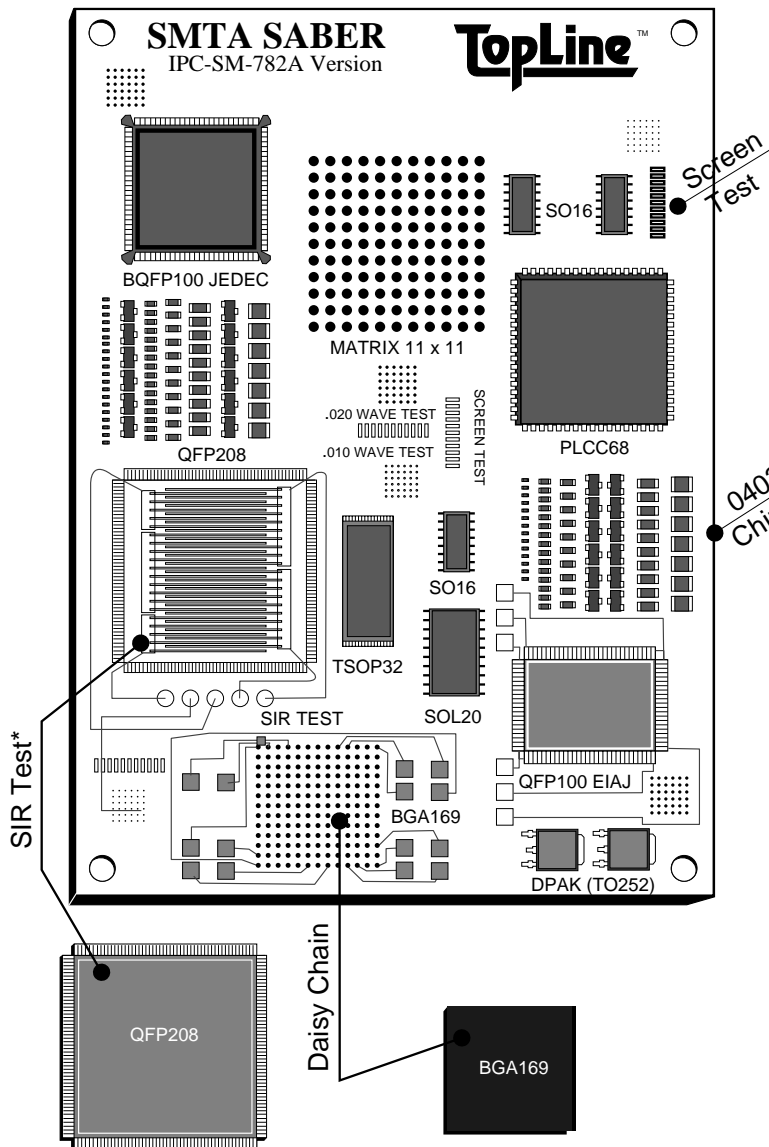
PC BOARD

ORDER NUMBER 928001



SABER 4-BOARD ARRAY

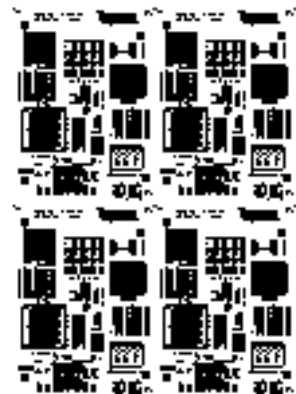
ADVANCED MIXED TECHNOLOGY



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.

ACTUAL PANEL SIZE:

8" x 11" (200 x 280mm)



FEATURES

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





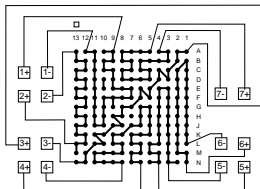
SABER 4-BOARD ARRAY

ADVANCED MIXED TECHNOLOGY

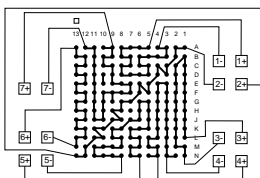


KIT ORDERING INFORMATION

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 Chip	-	100	500	1000	2000	5000
0603 Chip	-	100	500	1000	2000	5000
0805 Chip	-	100	500	1000	2000	5000
1206 Chip	-	100	250	1000	2000	5000
1210 Chip	-	100	200	500	1000	1000
DIP14 ~ 20	100mil	8	25	50	100	200



**BGA AFTER
MOUNTING
(BACK SIDE)**



**BGA AFTER
MOUNTING
(TOP SIDE)**

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 950004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 950005

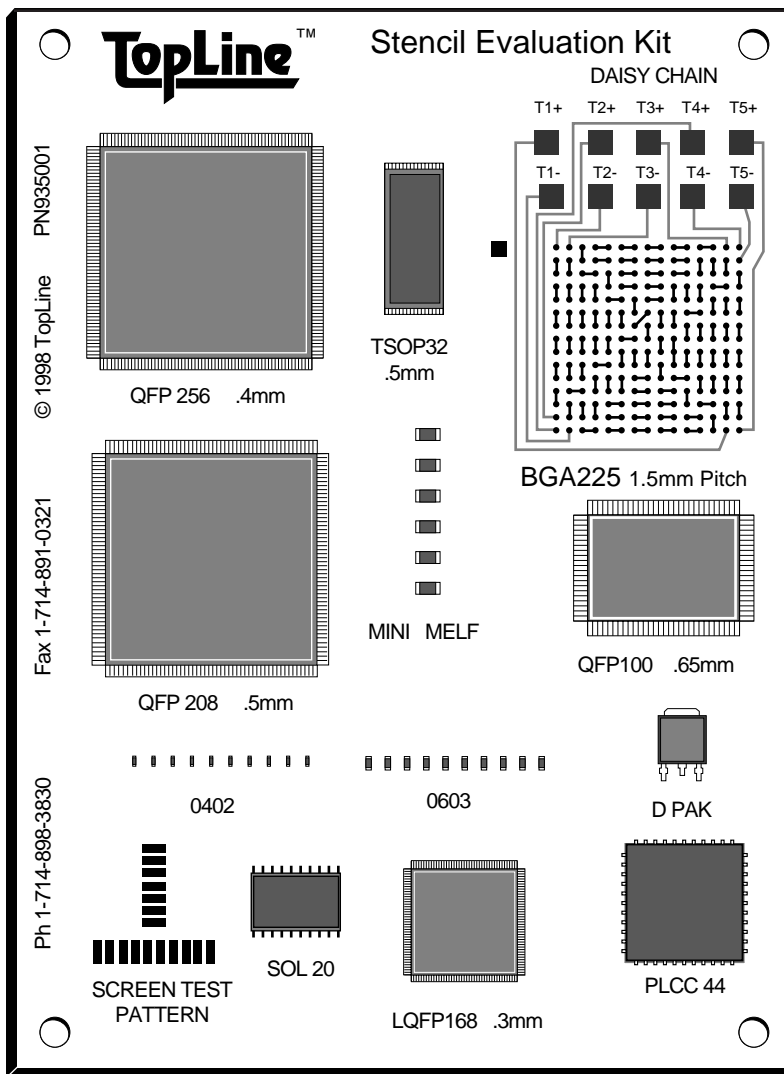
4-BOARD PANELIZED ARRAY
ORDER NUMBER 950001

SINGLE BOARD
NON-PANEL
ORDER NUMBER 950003



STENCIL EVALUATION KIT

WITH OPTIONAL 0.3MM PITCH



We supply the board and components. You provide the stencil. Kit is available with or without the low profile 0.3mm pitch LQFP168. All kits include a ball grid array with daisy chain test and 0.4mm pitch QFP256.

FEATURES

- Hot Air Solder Leveling
- 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

WITH OPTIONAL

0.3MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 935000 1 KIT	ORDER NUMBER 936000 1 KIT	ORDER NUMBER 935025 25 KITS	ORDER NUMBER 936025 25 KITS	ORDER NUMBER 936050 50 KITS
Board		1	1	25	25	50
LQFP168	0.3mm	1	0	25	0	0
QFP256	0.4mm	1	1	25	25	50
QFP208	0.5mm	1	1	25	25	50
TSOP32	0.5mm	1	1	25	25	50
QFP100	0.65mm	1	1	25	25	50
BGA225	1.5mm	1	1	25	25	50
PLCC44	50mil	1	1	25	25	50
SOL20	50mil	1	1	25	25	50
DPAK		1	1	25	25	50
0402 chip		10	10	250	250	500
0603 chip		10	10	250	250	500
mini Melf		6	6	150	150	300

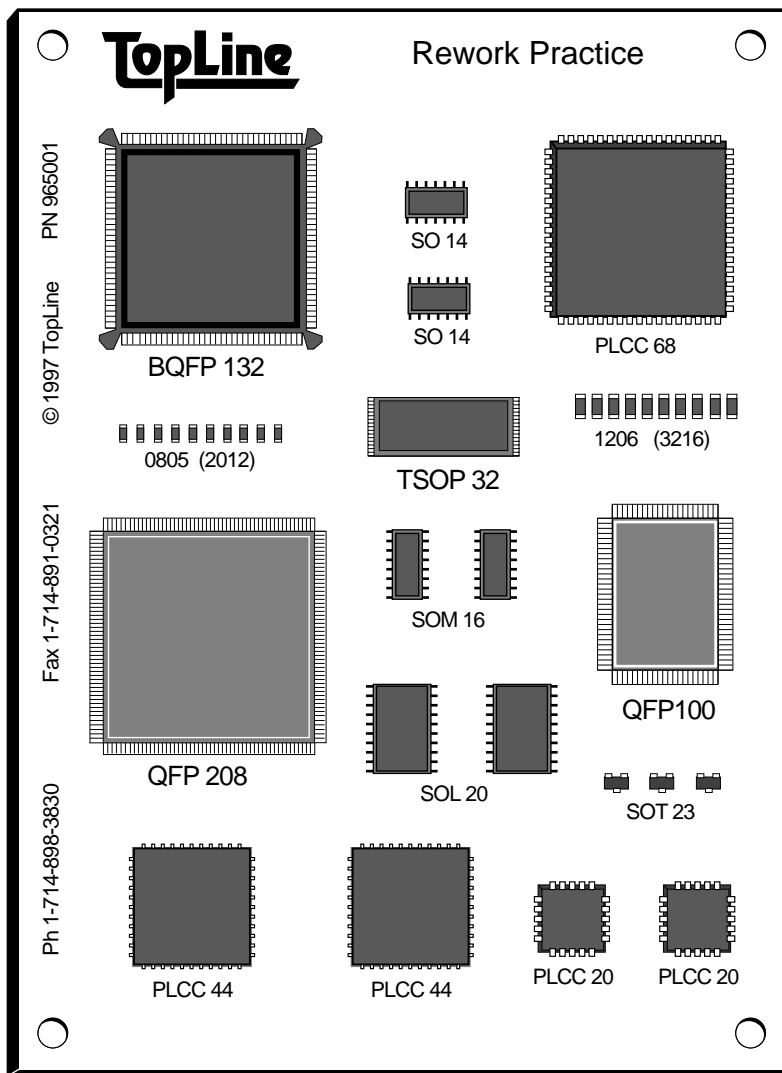
Also Available 10 piece kits for hand assembly:
935010 with LQFP168 0.3mm pitch
936010 without LQFP168

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 935004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 935005

PC BOARD
ORDER NUMBER 935001



This Rework Practice Kit is designed for all skill levels. Includes fine-pitch components often found in real world rework situations.

FEATURES

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



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



REWORK 1 PRACTICE KIT



KIT ORDERING INFORMATION

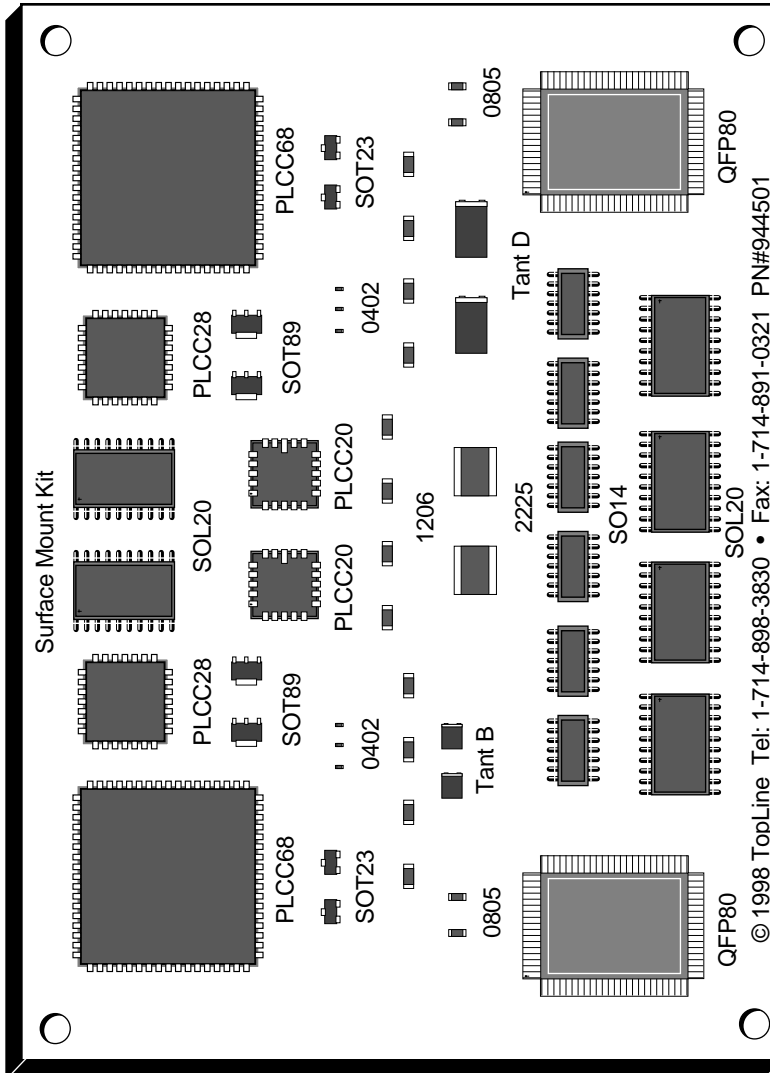
COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 965000 1 KIT	ORDER NUMBER 965010 10 KITS	ORDER NUMBER 965026 25 KITS	ORDER NUMBER 965050 50 KITS	ORDER NUMBER 965100 100 KITS
Board		1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
BQFP132	25mils	1	10	25	50	100
PLCC20	50mils	2	25	50	100	200
PLCC44	50 mils	2	25	50	100	200
PLCC68	50mils	1	10	25	50	100
SO14	50mils	2	25	50	100	200
SOM16	50mils	2	25	50	100	200
SOL20	50mils	2	25	50	100	200
SOT23		10	100	500	500	500
0805 Chip		10	100	500	500	1000
1206 Chip		10	100	250	500	1000

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 965004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 965005

PC BOARD
ORDER NUMBER 965001



Topline provides this kit for rework practice. Kit contains popular components including fine pitch Quad Flat Pack. For manual assembly only.

FEATURES

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


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



REWORK 2 PRACTICE KIT



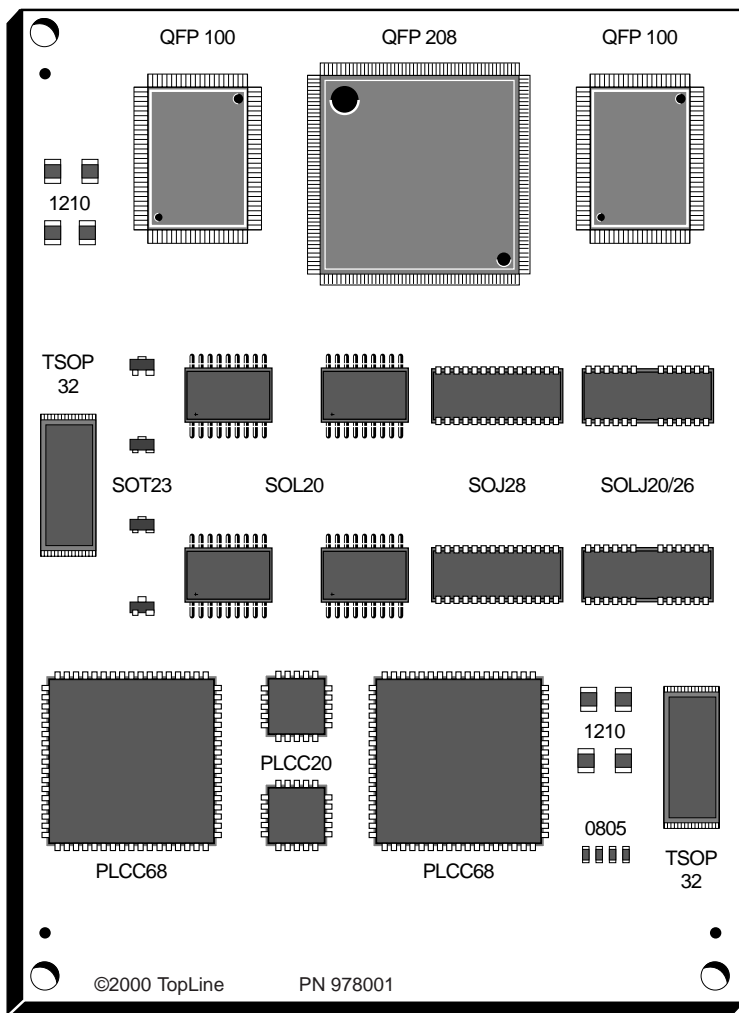
KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY			
COMPONENT	PITCH	ORDER NUMBER 944500 1 KIT	ORDER NUMBER 944510 10 KITS	ORDER NUMBER 944525 25 KITS	ORDER NUMBER 944550 50 KITS
Board		1	10	25	50
QFP80	0.8mm	2	20	50	100
PLCC20	1.27mm	2	20	50	100
PLCC28	1.27mm	2	20	50	100
PLCC68	1.27mm	2	20	50	100
SO14	1.27mm	6	60	150	300
SOL20	1.27mm	6	60	150	300
0402 Chips		6	60	150	500
0805 Chips		8	80	200	500
1206 Chips		12	120	300	1000
2225 Cap		2	20	50	100
Tantalum 3528	B-Case	2	20	50	250
Tantalum 7343	D-Case	2	20	50	100
SOT23		4	40	100	500
SOT89		4	40	100	200

OPTIONAL ACCESSORIES

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBERR 944505

PC BOARD
ORDER NUMBERR 944501



This Rework Practice Kit is available populated and unassembled. Includes fine-pitch components often found in real work situations.

FEATURES

- Hot Air Solder Leveling
- LPI Soldermask
- FR4 Board .062"
- Single Sided
- Tooling Holes
- Fiducial Marks



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



REWORK 3 PRACTICE KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY			 MACHINE RUN	
		ORDER NUMBER 978000 1 KIT	ORDER NUMBER 978010 10 KITS	ORDER NUMBER 978025 25 KITS	ORDER NUMBER 978050 50 KITS	ORDER NUMBER 978100 100 KITS
Board		1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
QFP100	0.65mm	2	20	50	100	200
TSOP32	0.5mm	2	20	50	100	200
PLCC20	50mil	2	20	50	100	200
PLCC68	50mil	2	20	50	100	200
SOL20	50mil	4	40	100	200	400
SOJ28	50mil	2	20	50	100	200
SOJ20/26	50mil	2	20	50	100	200
SOT23		4	50	100	200	400
0805		4	50	100	200	400
1210		8	1 00	200	400	800

OPTIONAL ACCESSORIES

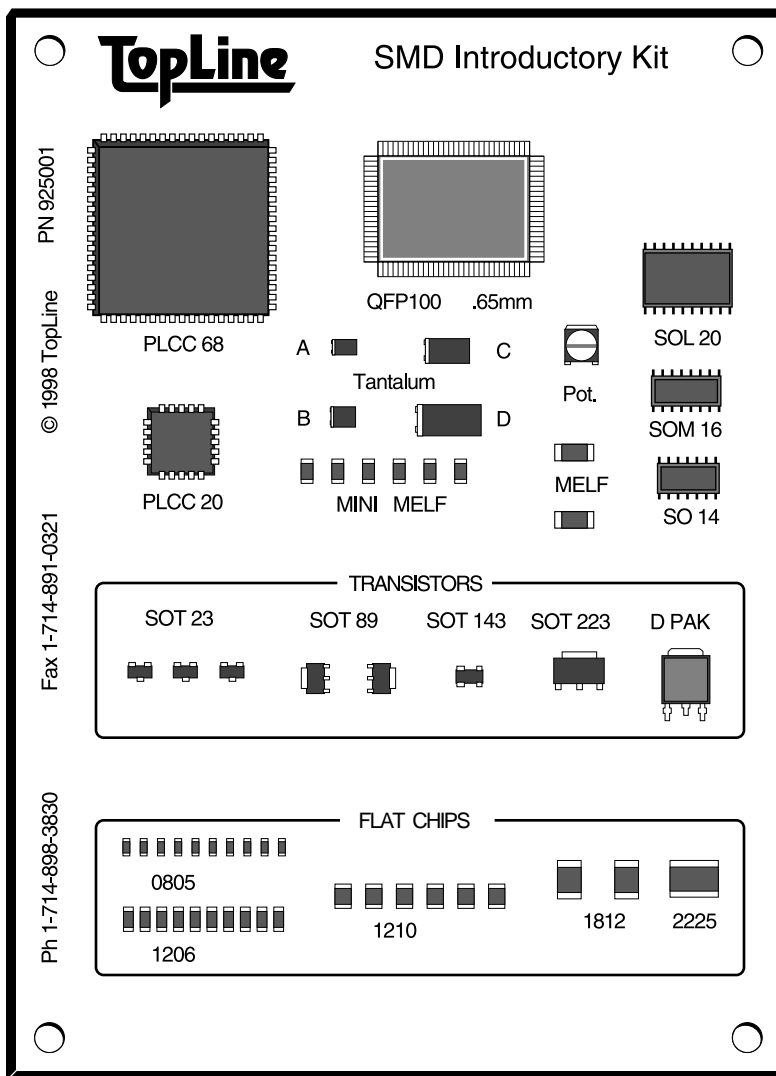
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 978004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 978005

PC BOARD
ORDER NUMBER 978001



The SMD Introductory Kit includes a wide range of popular easy-to-handle components.





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

FEATURES

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

KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 925000 1 KIT	ORDER NUMBER 925010 10 KITS	ORDER NUMBER 925025 25 KITS	ORDER NUMBER 925050 50 KITS	ORDER NUMBER 925100 100 KITS
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
SO14	50mils	1	10	100	50	100
SOM16	50mils	1	10	100	50	100
SOL20	50mils	1	10	50	50	100
PLCC20	50mils	1	10	50	50	100
PLCC68	50mils	1	10	25	50	100
SOT23		4	30	250	500	500
SOT89		4	20	100	100	200
SOT143		10	10	100	100	100
SOT223		10	10	100	100	100
DPAK		1	10	50	100	100
Tantalum-A		2	10	100	100	250
Tantalum-B		2	10	100	100	250
Tantalum-C		2	10	100	100	100
Tantalum-D		2	10	100	100	100
MELF		10	20	250	250	250
mini-MELF		10	100	500	500	500
Potentiometer		1	10	100	100	100
0805 Chip		10	100	500	500	500
1206 Chip		10	100	250	500	1000
1210 Chip		10	100	250	500	1000
1812 Chip		2	20	100	100	200
2225 Chip		1	10	100	100	100

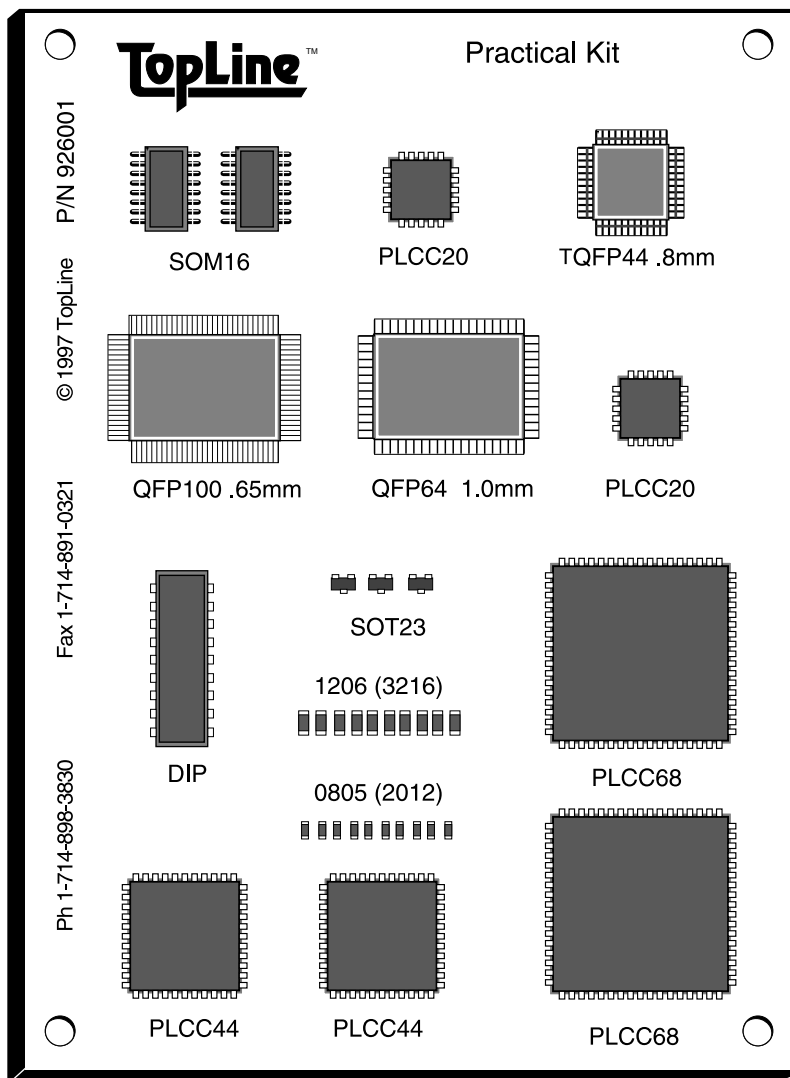
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 925004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 925005

PC BOARD
ORDER NUMBER 925001

PRACTICAL MIXED TECHNOLOGY KIT



A low-cost, mixed technology kit for rework and solder practice. Includes simple-to-handle components. Excellent for beginners. Can also be used for medium speed assembly.

FEATURES

- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes



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



PRACTICAL MIXED TECHNOLOGY KIT



KIT ORDERING INFORMATION

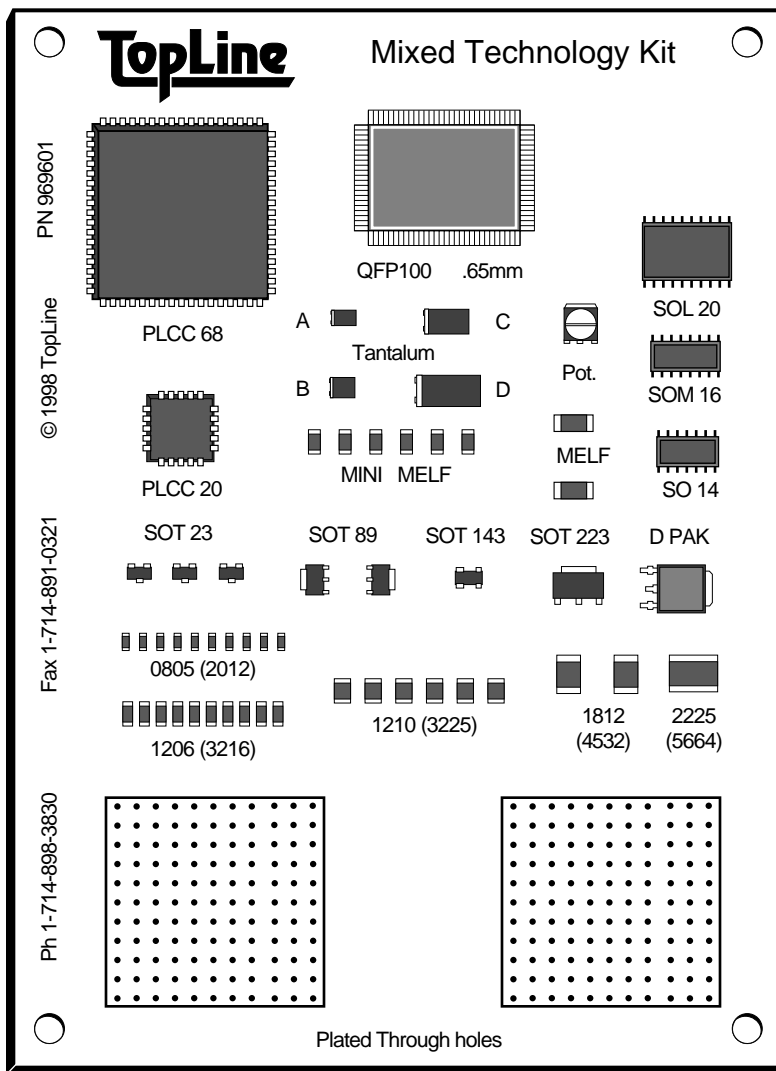
COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 926000 1 KIT	ORDER NUMBER 926010 10 KITS	ORDER NUMBER 926025 25 KITS	ORDER NUMBER 926050 50 KITS	ORDER NUMBER 926100 100 KITS
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
TQFP44	0.80mm	1	10	25	50	100
QFP64	1.00mm	1	10	25	50	100
PLCC20	50mils	2	25	50	100	200
PLCC44	50mils	2	25	50	100	200
PLCC68	50mils	2	25	50	100	200
SOM16	50mils	2	25	50	100	200
DIP14~18	100mils	1	10	25	50	100
SOT23		10	50	500	500	500
0805 Chip		10	100	500	500	1000
1206 Chip		10	100	250	500	1000

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 926004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 926005

PC BOARD
ORDER NUMBER 926001



Experiment with mixed technology. Combines easy-to-handle SMD components plus plenty of throughhole components on 100mil grid.

FEATURES

- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes



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



MIXED TECHNOLOGY 1 KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 969600 1 KIT	ORDER NUMBER 969610 10 KITS	ORDER NUMBER 969625 25 KITS	ORDER NUMBER 969650 50 KITS	ORDER NUMBER 969699 100 KITS
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
SO14	50mils	1	10	25	50	100
SOM16	50mils	1	10	25	50	100
SOL20	50mils	1	10	25	50	100
PLCC20	50mils	1	10	25	50	100
PLCC68	50mils	1	10	25	50	100
DIP14~20	100mils	4	40	100	200	400
SOT23 & SOT89		3	30	250	500	500
SOT143		1	10	25	50	100
SOT223		1	10	25	50	100
DPAK		1	10	25	50	100
Tantalum-A		1	10	25	50	250
Tantalum-B		1	10	25	50	250
Tantalum-C		1	10	25	50	100
Tantalum-D		1	10	25	50	100
MELF		2	20	50	100	250
mini-MELF		6	60	500	500	500
Potentiometer		1	10	25	50	100
0805 Chip		10	100	500	500	500
1206 Chip		10	100	250	500	1000
1210 Chip		10	100	250	500	1000
1812 Chip		2	20	100	100	200
2225 Chip		1	10	100	100	100

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA

X,Y,THETA ASCII FILE

ORDER NUMBER 969604

SOLDER PASTE ARTWORK

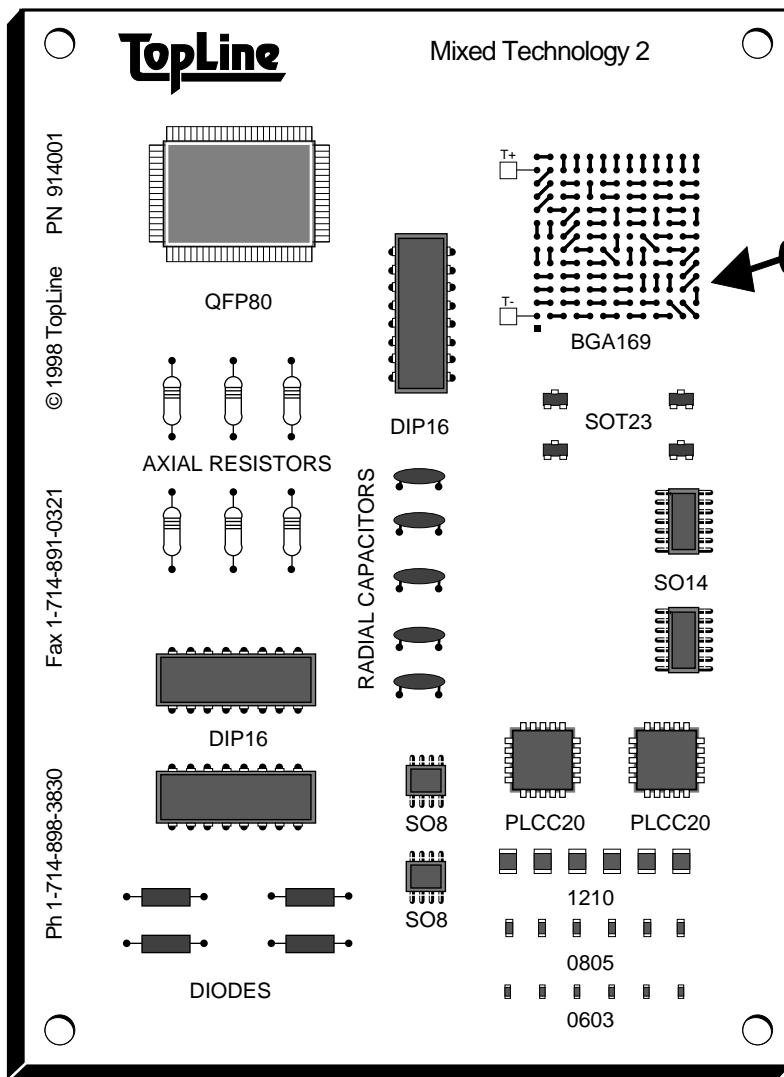
GERBER FILE

ORDER NUMBER 969605

PC BOARD

ORDER NUMBER 969601

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



DAISY CHAIN

FEATURES

- Hot Air Solder Leveling
- 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	100	250	250	500
1210 Chip		10	100	500	500	1000
0805 Chip		10	100	500	500	1000
0603 Chip		10	100	500	500	1000
THROUGH-HOLE COMPONENTS						
DIP16	100mil	3	30	75	150	300
1/4W Resistor	.50"	10	50	500	1000	2500
DO35 Diodes	.50"	10	50	500	1000	2500
Ceramic Cap	.20"	10	50	500	1000	2500

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 914004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 914005

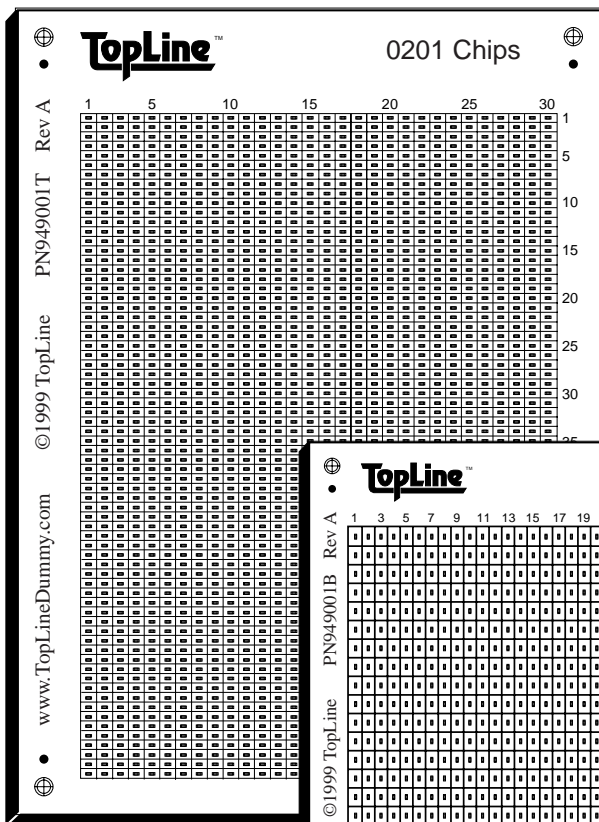
PC BOARD
ORDER NUMBER 914001



CHIP SHOOTER KIT 0201 AND 0402 CHIPS

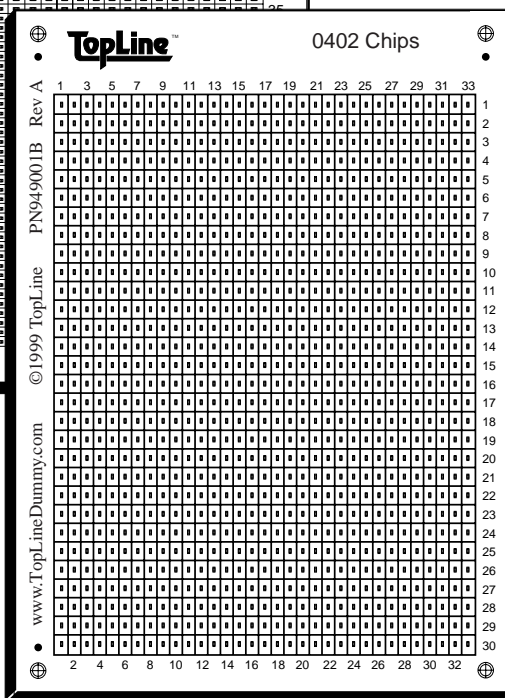


Top Side of Board

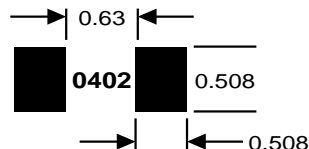
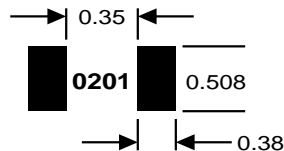


Put your machine to the test with TopLine's new 0201/0402 kits. Double sided board has 2000 pads for ultra-miniature 0201 chips on the front side and 1000 pads for 0402 chips on the back side. Components are supplied on 2mm pitch tape. Kit can be used for placement, soldering or epoxy dispenser testing.

Bottom Side of Board



Pad Dimensions (mm) Rev-A



FEATURES

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


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



CHIP SHOOTER KIT 0201 AND 0402 CHIPS



KIT ORDERING INFORMATION

COMPONENT	TAPE PITCH	 MACHINE RUN				
		ORDER NUMBER 949000 1 KIT	ORDER NUMBER 949010 10 KITS	ORDER NUMBER 949025 25 KITS	ORDER NUMBER 949050 50 KITS	ORDER NUMBER 949100 100 KITS
Board	-	1	10	25	50	100
0201 Chip	2mm	2000	15,000	45,000	100,000	200,000
0402 Chip	2mm	1000	10,000	25,000	50,000	100,000

OPTIONAL ACCESSORIES

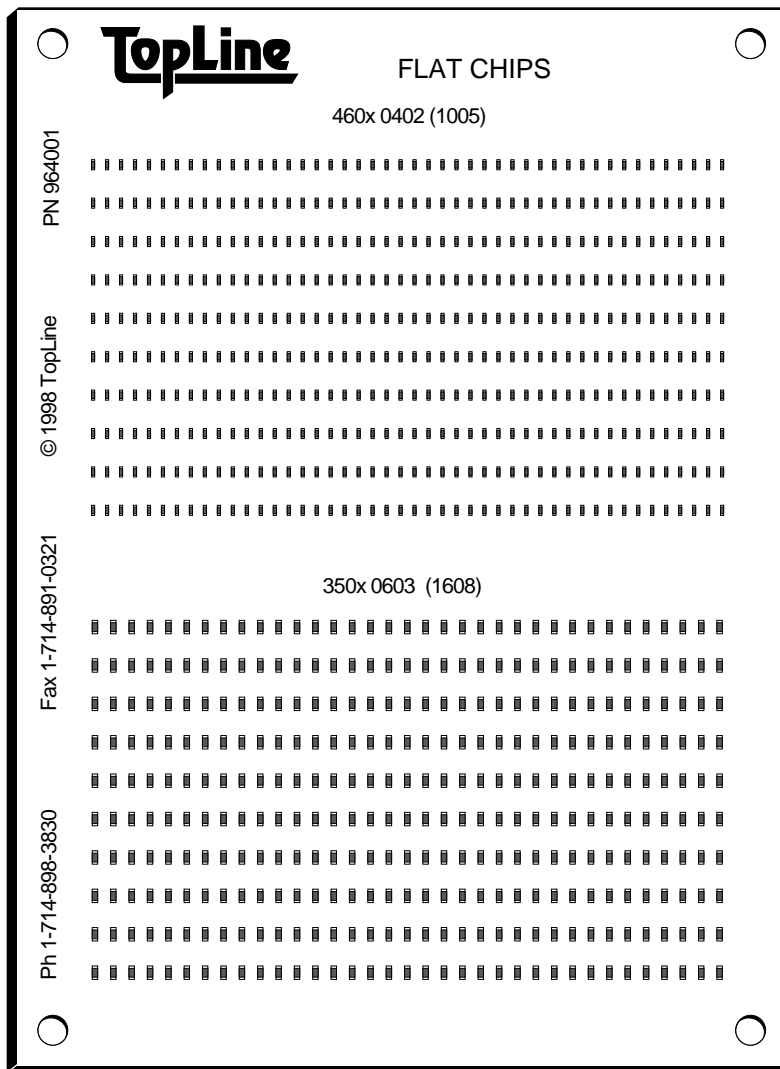
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 949004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 949005

PC BOARD
ORDER NUMBER 949001



CHIP SHOOTER KIT 0402 AND 0603 CHIPS



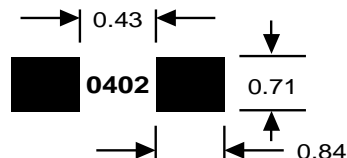
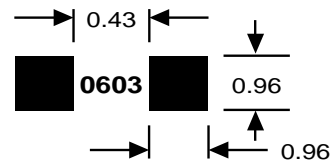
Actual Size: 4" x 5.5" (100 x 140mm)

TopLine has thousands of 0402 and 0603 resistors for your machine to place. 0402 chips are supplied on tape with 2mm pitch and the 0603 chips with 4mm pitch tape.

Double sided board has 460 pads for 0402 chip and 350 pads for 0603 chip per side. 1600 pads total!

This kit can be used for placement, soldering or epoxy dispenser testing.

Pad Dimensions (mm)
Rev-A



FEATURES



- Hot Air Solder Leveling
- LPI Solder Mask opening 0.076mm
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks



CHIP SHOOTER KIT 0402 AND 0603 CHIPS



KIT ORDERING INFORMATION

COMPONENT	 MACHINE RUN					
	ORDER NUMBER 964000 1 KIT	ORDER NUMBER 984000 1 KIT	ORDER NUMBER 964010 10 KITS	ORDER NUMBER 984010 10 KITS	ORDER NUMBER 964025 25 KITS	ORDER NUMBER 984025 25 KITS
STANDARD KIT						
Board Sn63	1	-	10	-	25	-
0402 Chip Resistor	1000	-	10,000	-	20,000	-
0603 Chip Resistor	1000	-	10,000	-	15,000	-
 LEAD FREE KIT						
Board Sn100 Tin Plated	-	1	-	10	-	25
0402 Chip Sn100 Tin	-	1000	-	10,000	-	20,000
0603 Chip Sn100 Tin	-	1000	-	10,000	-	15,000

OPTIONAL ACCESSORIES

**PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 964004**

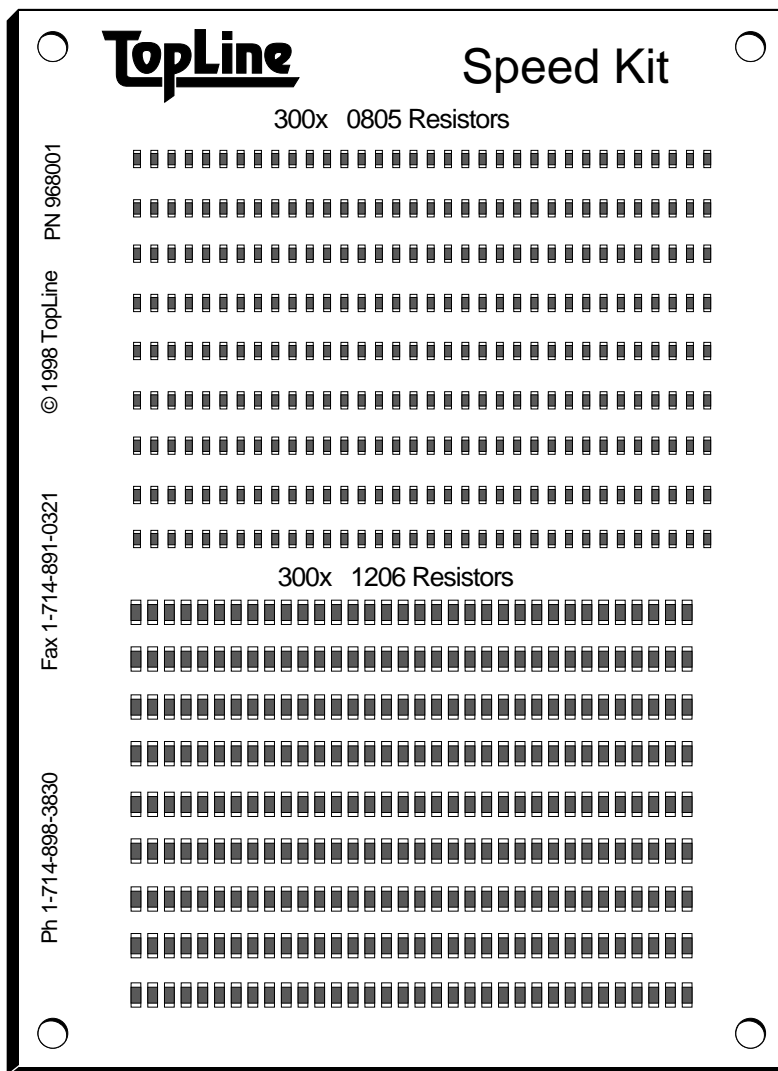
**SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 964005**

**PC BOARD
ORDER NUMBER 964001**

**PC BOARD - LEAD FREE
ORDER NUMBER 984001**



CHIP SHOOTER KIT 0805 AND 1206 CHIPS

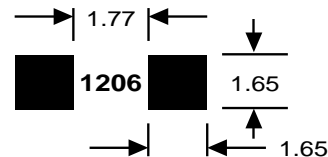


Put your machine to the test . This Kit is a low cost way for you to measure the component per hour (CPH) rating of pick & place machines. Use to benchmark and compare the performance of different machines.

Each side has land patterns for 300 each 0805 and 1206. Total of 1200 pads on the board.

This kit can be used for placement, soldering or epoxy dispenser testing.

Pad Dimensions (mm)
Rev-A



FEATURES

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


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



CHIP SHOOTER KIT 0805 AND 1206 CHIPS



KIT ORDERING INFORMATION

COMPONENT	 MACHINE RUN				
	ORDER NUMBER 968000 1 KIT	ORDER NUMBER 968010 10 KIT	ORDER NUMBER 968025 25 KITS	ORDER NUMBER 968050 50 KITS	ORDER NUMBER 968100 100 KITS
STANDARD KIT					
Board Sn63 HASL	1	10	25	50	100
0805 Chip Resistor	1000	10,000	25,000	50,000	100,000
1206 Chip Resistor	100	10,000	25,000	50,000	100,000

OPTIONAL ACCESSORIES

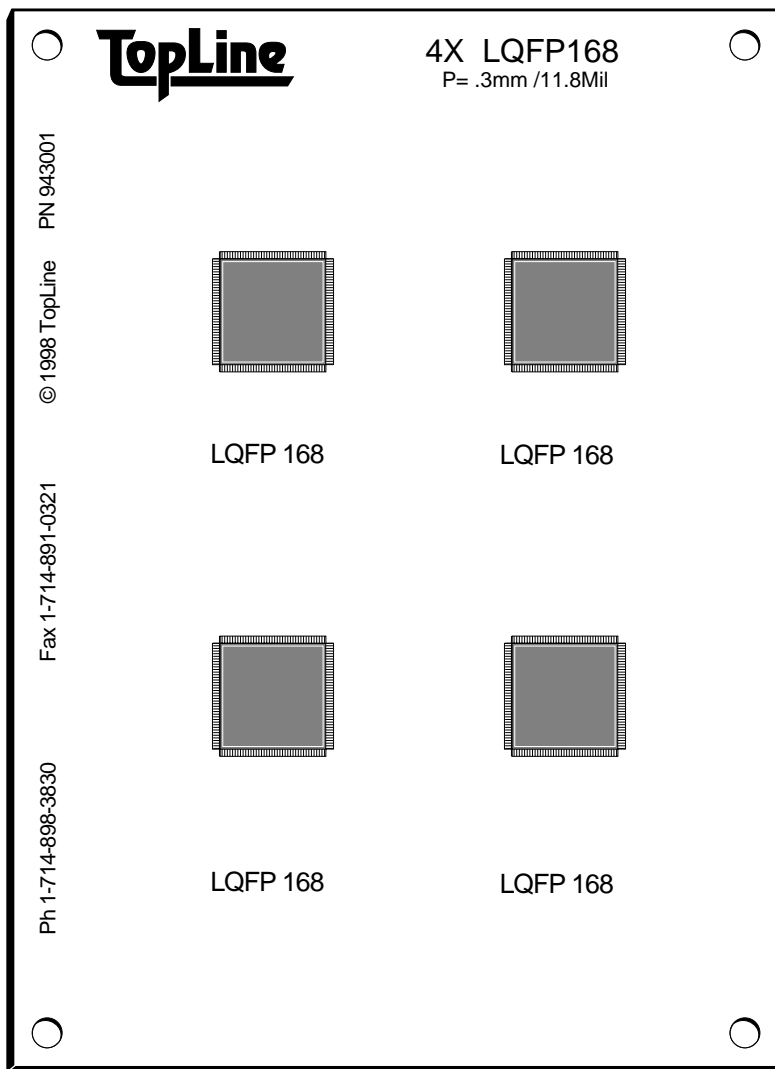
<i>PARTS PLACEMENT DATA</i> <i>X,Y,THETA ASCII FILE</i> <i>ORDER NUMBER 968004</i>	<i>PC BOARD</i> <i>ORDER NUMBER 968001</i>
<i>SOLDER PASTE ARTWORK</i> <i>GERBER FILE</i> <i>ORDER NUMBER 968005</i>	



LQFP168 KIT 0.3MM PITCH



Put your machine to the test with
0.3mm components.



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

FEATURES

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





LQFP168 KIT

0.3MM PITCH



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY	 MACHINE RUN				
		ORDER NUMBER 943000 1 KIT	ORDER NUMBER 943006 6 KITS	ORDER NUMBER 943012 12 KITS	ORDER NUMBER 943025 25 KITS	ORDER NUMBER 943050 50 KITS	
COMPONENT	PITCH						
Board LQFP168	0.3mm	1 4	6 25	12 50	25 90	50 180	

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 943004	PC BOARD ONLY ORDER NUMBER 943001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 943005	



28MM QFP ASSORTMENT KIT 0.4MM TO 0.8MM PITCH



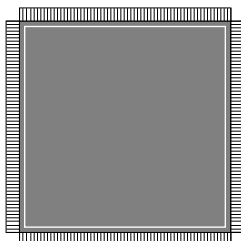
28mm QFP Assortment

PN 962001

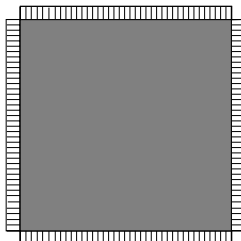
© 1997 TopLine

Fax 1-714-891-0321

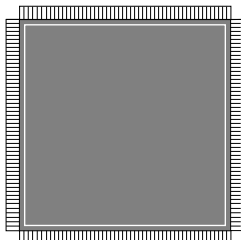
Ph 1-714-898-3830



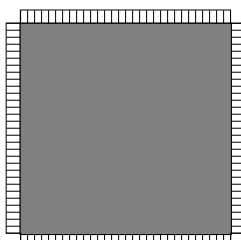
QFP 256 .4mm



QFP 160 .65mm



QFP 208 .5mm



QFP 120 .8mm

Try them all. We give you four different lead pitches: 0.4mm, 0.5mm, 0.65mm and 0.8mm. Experience the differences in levels as you progress to 0.4mm pitch.

FEATURES

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



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



28MM QFP ASSORTMENT KIT 0.4MM TO 0.8MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 962000 1 KIT	ORDER NUMBER 962006 6 KITS	ORDER NUMBER 962024 24 KITS	ORDER NUMBER 962048 48 KITS	ORDER NUMBER 962096 96 KITS
Board		1	6	24	48	96
QFP256	0.4mm	1	6	24	48	96
QFP208	0.5mm	1	6	24	48	96
QFP160	0.65mm	1	6	24	48	96
QFP120	0.80mm	1	6	24	48	96

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 962004

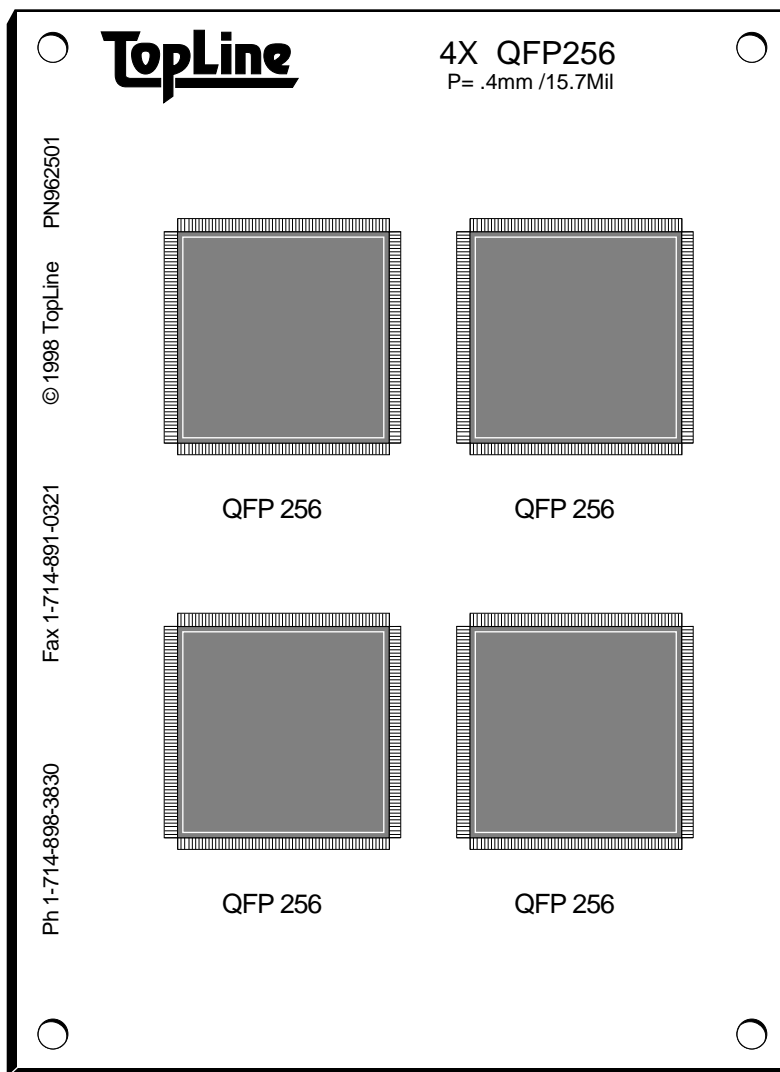
SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 962005

PC BOARD
ORDER NUMBER 962001



QFP256 KIT

0.4MM PITCH



Be on the cutting edge with 0.4mm (15.7Mil) pitch. It's guaranteed to push vision and soldering equipment to its limits.

FEATURES

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

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





QFP256 KIT

0.4MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 962500 1 KIT	ORDER NUMBER 962506 6 KITS	ORDER NUMBER 962512 12 KITS	ORDER NUMBER 962524 24 KITS	ORDER NUMBER 962548 48 KITS
Board QFP256	0.4mm	1 4	6 24	12 48	24 96	48 192

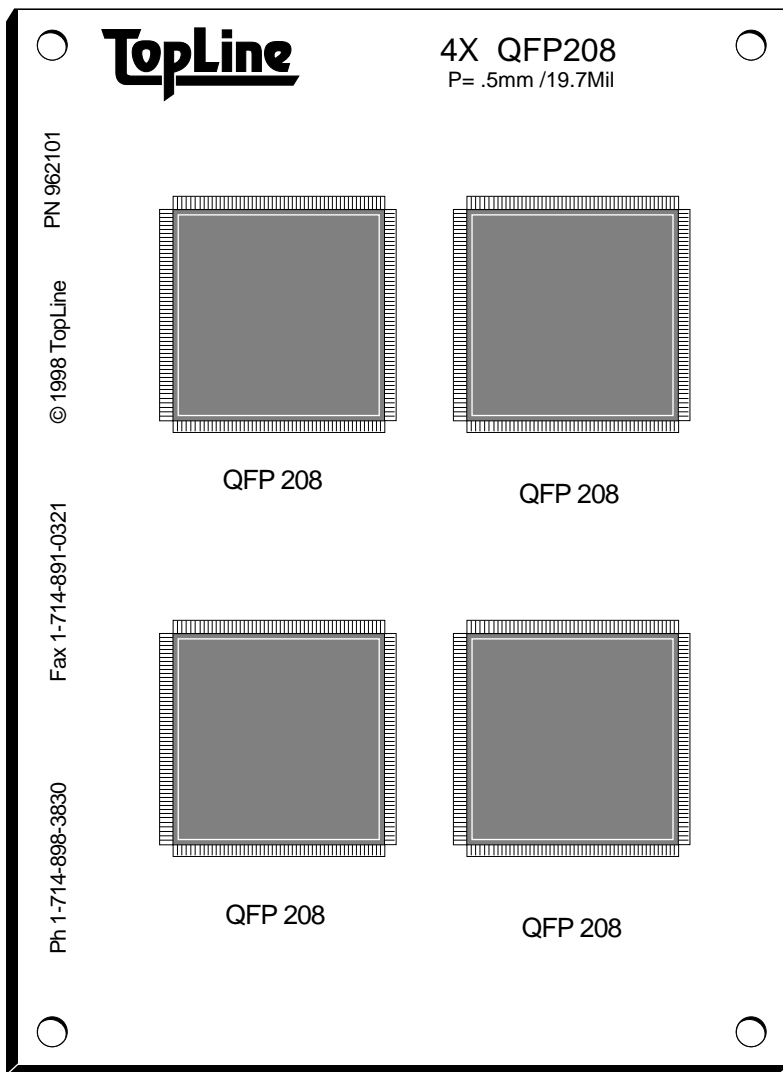
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 962504	PC BOARD ORDER NUMBER 962501
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 962505	



QFP208 KIT

0.5MM PITCH



Practice assembling 0.5mm (19.7Mil) pitch. The QFP208 is a very popular package. Components are provided on tape and reel.

FEATURES

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

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





QFP208 KIT

0.5MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 962100 1 KIT	ORDER NUMBER 962106 6 KITS	ORDER NUMBER 962112 12 KITS	ORDER NUMBER 962124 24 KITS	ORDER NUMBER 962148 48 KITS
Board QFP208	0.5mm	1 4	6 24	12 48	24 96	48 192

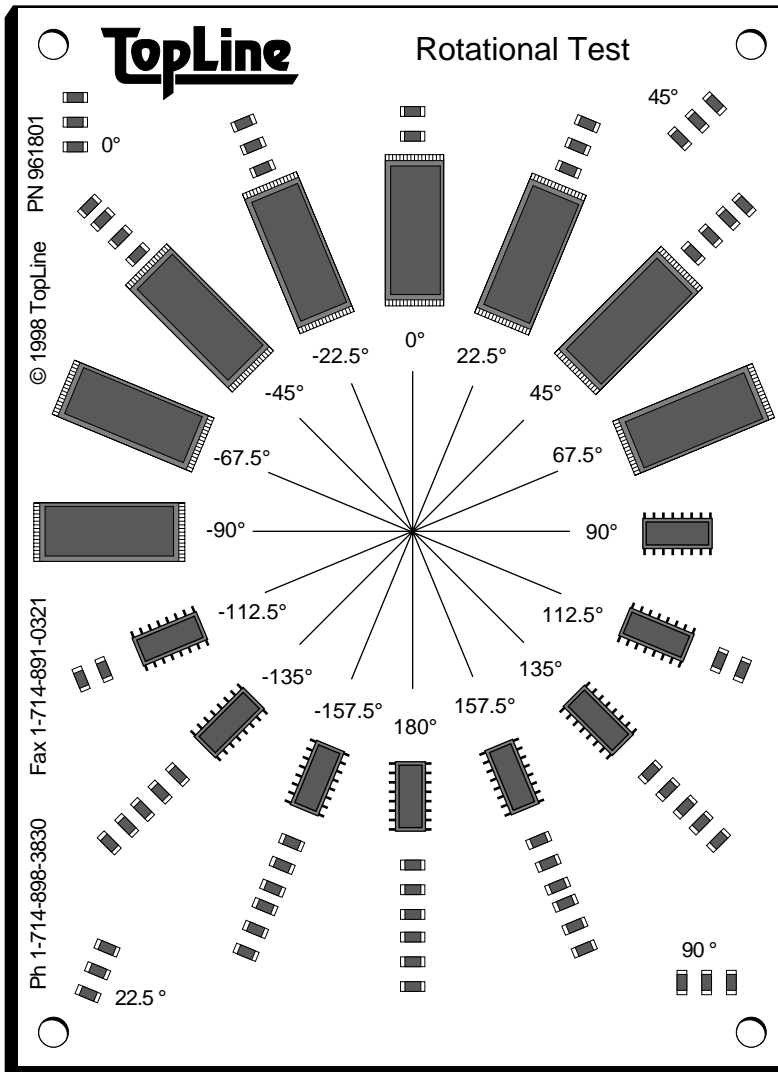
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 962104	PC BOARD ORDER NUMBER 962101
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 962105	



ROTATIONAL PLACEMENT KIT

TESTS ACCURACY TO $\pm 0.5^\circ$



Be on target! Some problems do not become evident until you start rotating components. TopLine's Rotational Placement Kit is designed to test the rotational accuracy on your system to $\pm 0.5^\circ$.

FEATURES

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

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





ROTATIONAL PLACEMENT KIT

TESTS ACCURACY TO $\pm 0.5^\circ$



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 961800 1 KIT	ORDER NUMBER 961803 3 KITS	ORDER NUMBER 961806 6 KITS	ORDER NUMBER 961812 12 KITS	ORDER NUMBER 961825 25 KITS
Board		1	3	6	12	25
TSOP32	0.5mm	8	25	50	100	200
SO16	1.27mm	8	25	50	100	200
1206 Chips		100	250	500	1000	5000

OPTIONAL ACCESSORIES

**PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 961804**

**SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 961805**

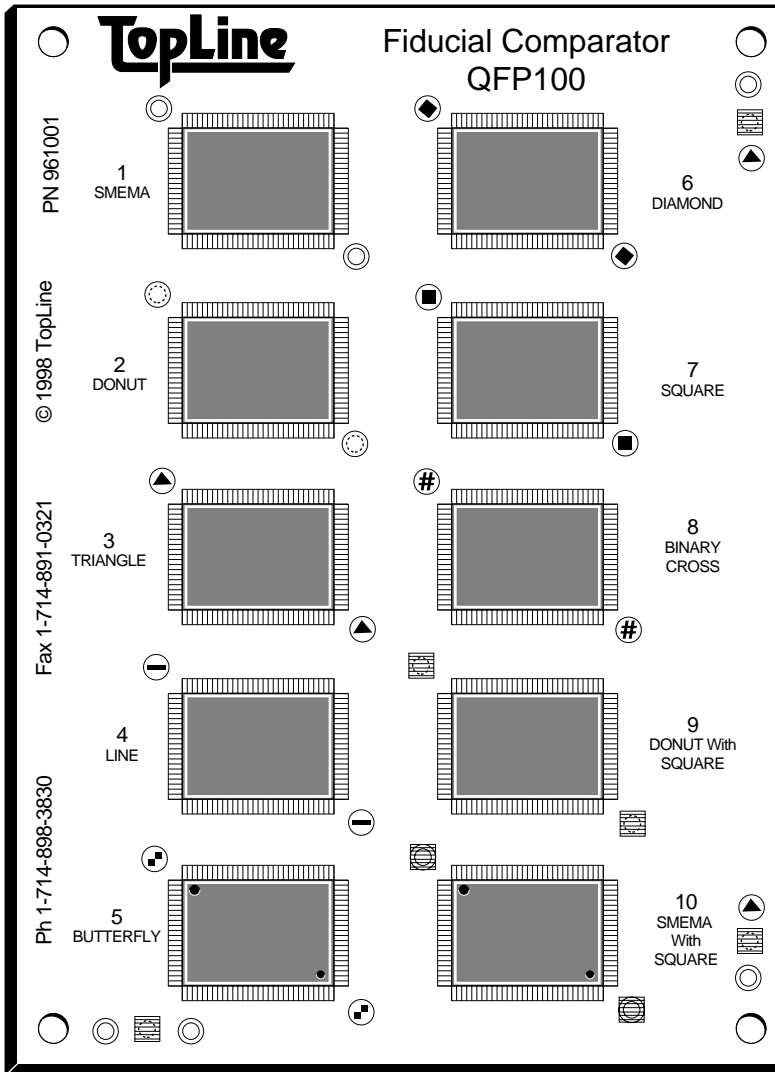
**PC BOARD
ORDER NUMBER 961801**



FIDUCIAL EVALUATION KIT

QFP100

0.65MM PITCH



Find the right fiducial for your system. This kit includes an assortment of 10 different fiducial geometries and solder mask clearances to check compatability of your vision placement equipment. Don't take chances with your boards. "Zero-in" on the right fiducial by experimenting with our kit. Components are provided on tape and reel.

FEATURES

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

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





FIDUCIAL EVALUATION KIT

QFP100

0.65MM PITCH



KIT ORDERING INFORMATION

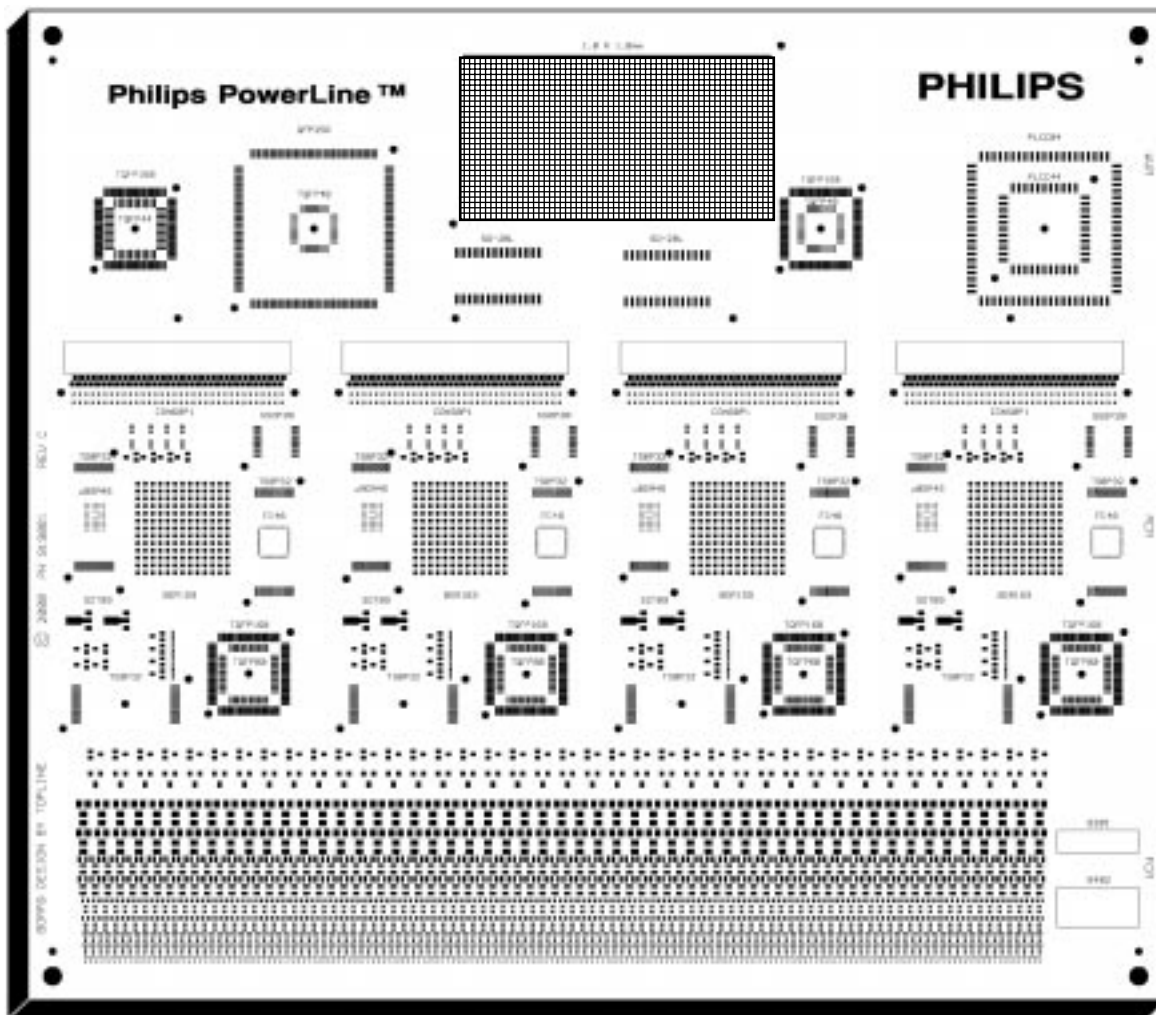
COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 961000 1 KIT	ORDER NUMBER 961003 3 KITS	ORDER NUMBER 961010 10 KITS	ORDER NUMBER 961025 25 KITS	ORDER NUMBER 961050 50 KITS
Board QFP100	0.65mm	1 10	3 25	10 100	25 250	50 500

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA X,Y,THETA ASCII FILE ORDER NUMBER 961004	PC BOARD ORDER NUMBER 961001
SOLDER PASTE ARTWORK GERBER FILE ORDER NUMBER 961005	



LARGE MACHINE RUN KIT



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

FEATURES

- Single Sided
- Black LPI Soldermask
- Very High Density
- 0201 Chips
- 0.3mm Pitch TQFP



LARGE MACHINE RUN KIT



KIT ORDERING INFORMATION



MACHINE RUN

COMPONENT	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

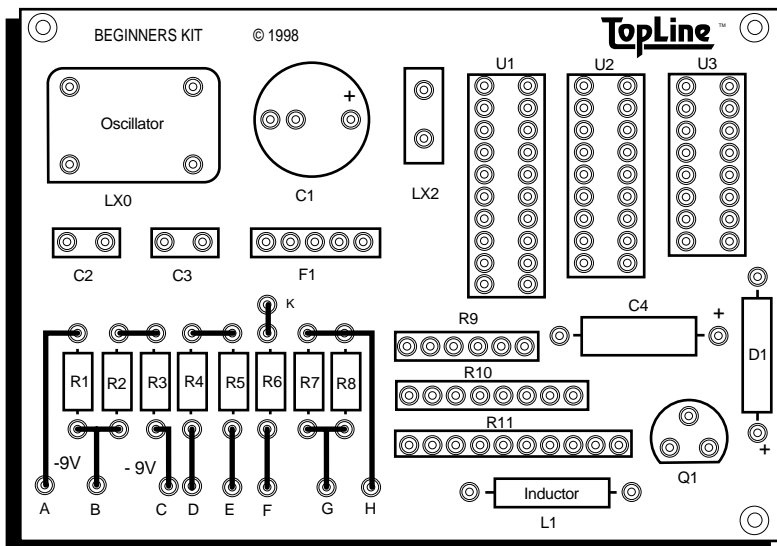
OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 919004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 919005

PC BOARD
ORDER NUMBER 919001

This kit is for serious machine users.
It has everything.




Actual Size: 2.75" x 4.0" (70 x 100mm)

The beginners Throughhole Kit is a low-cost, entry level kit for practicing with a wide range of components. Total of 24 easy-to-identify components are provided in kit.

FEATURES

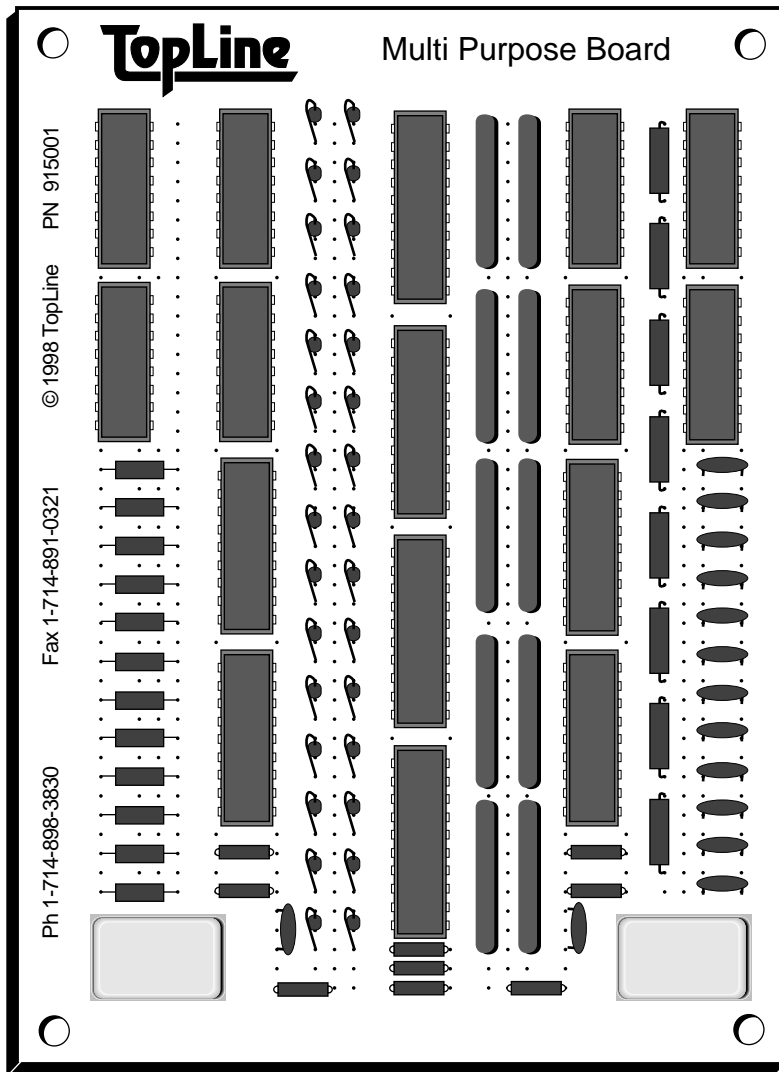
- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Plated Throughholes

KIT ORDERING INFORMATION

COMPONENT	BOARD LOCATION	 MANUAL ASSEMBLY				
		ORDER NUMBER 910000 1 KIT	ORDER NUMBER 910010 10 KITS	ORDER NUMBER 910025 25 KITS	ORDER NUMBER 910050 50 KITS	ORDER NUMBER 910100 100 KITS
Board		1	10	25	50	100
Oscillator	LX0	1	10	25	50	100
Crystal	LX2	1	10	25	50	100
Radial Aluminum Cap	C1	1	10	25	50	100
Ceramic Capacitor	C2	1	10	25	50	100
Film Capacitor	C3	1	10	25	50	100
Axial Aluminum Cap	C4	1	10	25	50	100
Axial Inductor	L1	1	10	25	50	100
Resistor Network SIP6	R9	1	10	25	50	100
Resistor Network SIP8	R10	1	10	25	50	100
Resistor Network SIP10	R11	1	10	25	50	100
SAW Filter SIP5	F1	1	10	25	50	100
Transistor TO92	Q1	1	10	25	50	100
Rectifier DO35/DO41	D1	1	10	25	50	100
Integrated Circuit DIP16	U1	1	10	25	50	100
Integrated Circuit DIP18	U2	1	10	25	50	100
Integrated Circuit DIP20	U3	1	10	25	50	100
Resistor 1/8 W	R1-4	4	40	100	200	400
Resistor 1/4 W	R5-8	4	40	100	200	400

SPARE PARTS

Components	Quantity	Order Nbr
PC BOARD ONLY	1	910002



We supply the board and a wide assortment of components. This board has room for at least 200 different components. You decide where to insert the components.

Kits are available for machine or manual insertion.

FEATURES

- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- 920 Plated Throughholes



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



MULTIPURPOSE THROUGHHOLE KIT



KIT ORDERING INFORMATION

COMPONENT	 MANUAL ASSEMBLY				 MACHINE RUN	
	ORDER NUMBER 916000 1 KIT	ORDER NUMBER 916025 25 KITS	ORDER NUMBER 916050 50 KITS	ORDER NUMBER 916100 100 KITS	ORDER NUMBER 915050 50 KITS	ORDER NUMBER 915100 100 KITS
Board	1	25	50	100	50	100
2-PIN DIP	25	400	800	1600	800	1600
8-PIN DIP	5	100	200	400	200	400
14-PIN DIP	5	100	200	400	200	400
16-PIN DIP	5	100	200	400	200	400
18-PIN DIP	5	100	200	400	200	400
20-PIN DIP	5	50	100	200	100	200
SIP Resistor Network	10	100	200	400	200	400
Oscillator	2	40	100	200	100	200
Radial Capacitor	10	250	500	1000	500	1000
Radial Inductor	10	250	500	1000	500	1000
1/8 W Axial Resistor	50	1000	2500	5000	2500	5000
1/4 W Axial Resistor	50	1000	2500	5000	2500	5000
1/2 W Axial Resistor	20	1000	2500	5000	2500	5000
TOTAL PIECES	225	4500	10,500	21,000	10,500	21,500

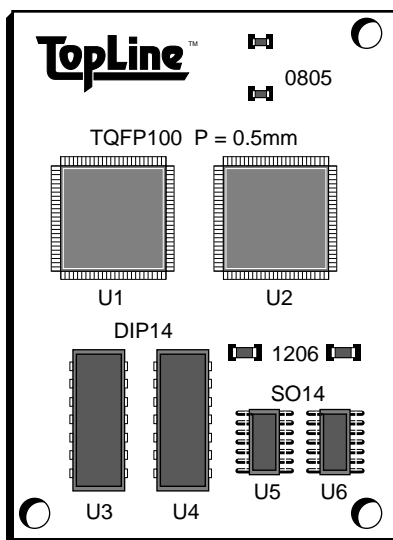
SPARE PARTS

Components	Quantity	Order Nbr
PC BOARD ONLY	1	915001



ECONO KIT II

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



ACTUAL SIZE: 2" x 2.75" (50 x 70mm)

TopLine offers an economical, mixed technology kit with fine pitch.

This kit is used by employment agencies for soldering certification.

FEATURES

- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Plated Throughholes




ECONO KIT II

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY				
		ORDER NUMBER 938000 1 KIT	ORDER NUMBER 938010 10 KITS	ORDER NUMBER 938025 25 KITS	ORDER NUMBER 938050 50 KITS	ORDER NUMBER 938100 100 KITS
Board		1	10	25	50	100
LQFP100	0.5mm	2	20	50	100	200
SO14	50mil	2	20	50	100	200
DIP14	100mil	2	20	50	100	200
0805 Chip		2	20	50	100	250
1206 Chip		2	20	50	100	250

Note: Kits of 10, 25, 50 and 100 are bulk packed

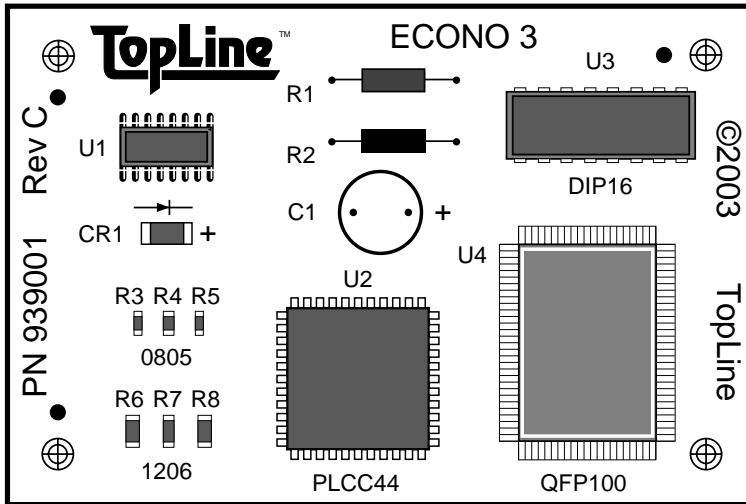
SPARE PARTS

Components	Quantity	Order Nbr
PC BOARD ONLY	1	938001



ECONO KIT III

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



TopLine offers an economical, mixed technology kit with popular components including fine pitch.

This kit is used by employment agencies for soldering certification of assemblers.

FEATURES

- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Plated Throughholes
- Fiducial Marks
- Tooling Holes

ACTUAL SIZE: 2" x 3" (50mm x 76mm)




ECONO KIT III

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY				
		ORDER NUMBER 939000 1Kit	ORDER NUMBER 939010 10 Kits	ORDER NUMBER 939025 25 Kits	ORDER NUMBER 939050 50 Kits	ORDER NUMBER 939100 100 Kits
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
PLCC44	1.27mm	1	10	25	50	100
SO16	1.27mm	1	10	25	50	100
DIP16	2.54mm	1	10	25	50	100
0805 Chip		3	30	75	150	300
1206 Chip		3	30	75	150	300
MELF		1	10	25	50	100
1/4W resistor	.5 inch	2	20	50	100	200
AL CAP	.2 inch	1	10	25	50	100

Note: Kits of 10, 25, 50 and 100 are bulk packed

OPTIONAL ACCESSORIES

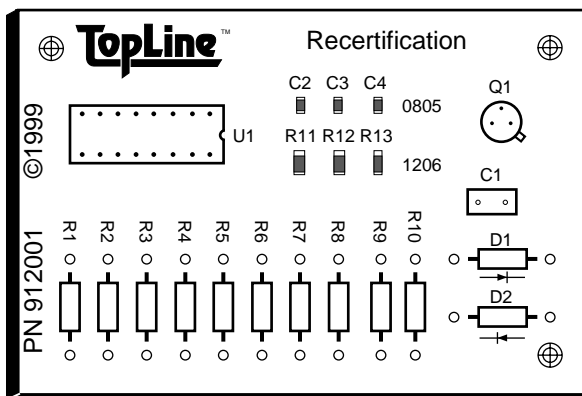
PARTS PLACEMENT DATA
X,Y,THETA ASCII FILE
ORDER NUMBER 939004

SOLDER PASTE ARTWORK
GERBER FILE
ORDER NUMBER 939005

SOLDER PASTE STENCIL
ORDER NUMBER 939001



Econo IV MIXED TECHNOLOGY RECERTIFICATION KIT



ACTUAL SIZE: 2" x 2.75" (50 x 70mm)

The Econo IV Kit offers an economical mixed technology kit with simple components.

This kit is used for soldering re-certification of assemblers.

FEATURES


- Hot Air Solder Leveling
- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Plated Throughholes
- Tooling Holes



ECONO IV MIXED TECHNOLOGY RECERTIFICATION KIT



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY				
COMPONENT	PITCH	ORDER NUMBER 912000 1KIT	ORDER NUMBER 912010 10 KITS	ORDER NUMBER 912025 25 KITS	ORDER NUMBER 912050 50 KITS	ORDER NUMBER 912100 100 KITS
Board		1	10	25	50	100
DIP16	IC	1	10	25	50	100
TO-5	Transistor	1	10	25	50	100
CK05	Capacitor	1	10	25	50	100
DO-35	Diode	2	20	50	100	200
0805 Chip	SMD	3	30	75	150	300
1206 Chip	SMD	3	30	75	150	300
1/4 W Resistor	Axial Lead	10	100	250	500	1000

Note: Kits of 10, 25, 50 and 100 are bulk packed.

OPTIONAL ACCESSORIES

PC BOARD

ORDER NUMBER 912001

SAMPLE DISPLAY BOARDS FOR SHOW & TELL



Display boards make an excellent visual reference. Everything you need is represented on nine (7" x 8") display boards. Wall mount with velcro. Components are mounted on yellow card stock in a clear acrylic case. Order individually or set of 9 boards: Order #970000.

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970001

TopLine™ Dummy Components

Quad Flat Packs

Thin TQFP
5mm (19.7 Mils)
1.0mm Thick

Thin LQFP
5mm (19.7 Mils)
1.4mm Thick

QFP120
8mm (31.5mils)
20mm Sq.

QFP160
65mm (25.6 Mils)
28mm Sq.

QFP208
5mm (19.7 Mils)
28mm Sq.

QFP256
4mm (15.7 Mils)
28mm Sq.

QFP100
65mm (25.6 Mils)
14 x 20mm

QFP80
8mm (31.5 Mils)
14 x 20mm

QFP64
1.0mm (40 Mils)
28 x 20

Tel: 1-714-898-3830 • Fax: 1-714-891-0321 www.TopLineDummy.com

TopLine™ Dummy Components

Ceramic ICs

Pin Grid Array

CERQUAD

FLATPACK

LCC

CERDIP

CBGA
Ceramic Ball Grid Array

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ORDER
970002

ORDER
970003

TopLine™ Dummy Components

SMD Passives

Ceramic Capacitors

0402 (1808)	0603 (1608)	0805 (2012)	1206 (3125)
1210 (3225)	1812 (4525)	1825 (4628)	2225 (5642)

Resistors

0402 (1808)	0603 (1608)	0805 (2012)	1206 (3125)
1210 (3225)	2010 (5127)	2512 (6431)	MELF

Tantalum Capacitors

A (2516)	B (3225)	C (6032)	D (7343)
----------	----------	----------	----------

Aluminum Electrolytics

4mm	5mm	6.3mm
-----	-----	-------

Diodes & Rectifiers

MELF	Rectangular Cased	mini MELF
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Transistors

SOT23	SOT89	SOT143	SOT223	DPAK
-------	-------	--------	--------	------

Networks

SOM16	Array
-------	-------

Inductors

0805	1206	1008	1210	1812
------	------	------	------	------

Crystals & Oscillators

Crystal	Oscillator
---------	------------

Trimmer & Pot.

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TopLine™ Dummy Components

SMD Assortment

Quad Flat Pack Family

QFP Rectangular	QFP Square	TQFP Thin
-----------------	------------	-----------

TSOP

TSOP Type 1	TSOP Type 2
-------------	-------------

Chip Carriers

LCC	BGA	PLCC
-----	-----	------

Small Outline Integrated Circuit

SO 1.27mm Pitch	SSOP 65mm Pitch	TSSOP	SOL Wide	SOL J-Lead
-----------------	-----------------	-------	----------	------------

Passive & Discrete

Ceramic Capacitor	Crystal	SOT23	Tantalum	AL CAP
-------------------	---------	-------	----------	--------

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TopLine™

SAMPLE DISPLAY BOARDS FOR SHOW & TELL



Set of 9
Order #970000

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970005

TopLine™
Dummy Components

PLCC J-Lead

PLCC 18

PLCC 20

PLCC 28

PLCC 32

PLCC 44

PLCC 52

PLCC 68

PLCC 84

SOCKET

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970007

TopLine™
Dummy Components

Throughhole Passives

Ceramic Capacitor

Resistor

Tantalum Capacitor

Aluminum Electrolytic

Diodes & Rectifier

Ferrite & Filter

Resistor Network

Inductor

Oscillator

Crystal

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970006

TopLine™
Dummy Components

SOIC & TSOP

TSOP Type 1
Pitch = .5mm (19.7mil)

TSOP Type 2

TSSOP
Pitch = .65mm

SSOP Shrink
Pitch .65mm

SOIC Small Outline IC

SO 156mil SOL 300mil SOLJ 300mil J-Lead

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Order
970012

TopLine™
Dummy Components

Ball Grid Array

DP9570012A

1.5mm BGA

1.27mm BGA

1mm BGA

1.27mm CBGA
Ceramic

CSP
Chip Scale Package

Flip Chip

Tel: 1-714-898-3830 • Fax: 1-714-891-0321 www.TopLineDummy.com

NOT SHOWN 970008
THROUGH HOLE SEMICONDUCTOR

VACUUM PICK & PLACE TOOL

Order
#222444
WEB CODE XY1

The Elme *Turbo Vampire* hand-held vacuum pick-up tool is ideal for picking up and moving electronic components, large and small. Durable, lightweight and completely portable. The Vampire's fountain pen dimensions easily fit into your pocket. New high power probes have longer holding action for inserting components in sockets.



Check These Features

- Lifts up to 120 grams with 9mm Cup
- Ergonomically Designed for Comfort
- ESD Safe $\leq 100k\Omega$
- Heavy Duty Internal Piston for Longer Holding Action
- No Batteries Required

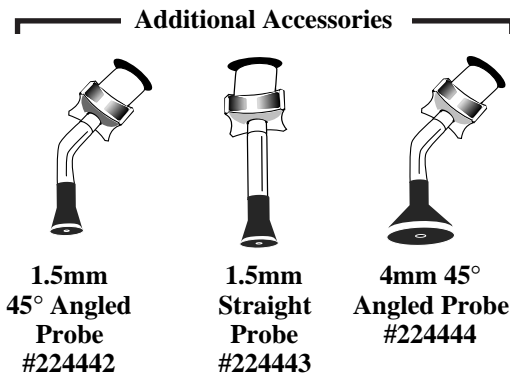
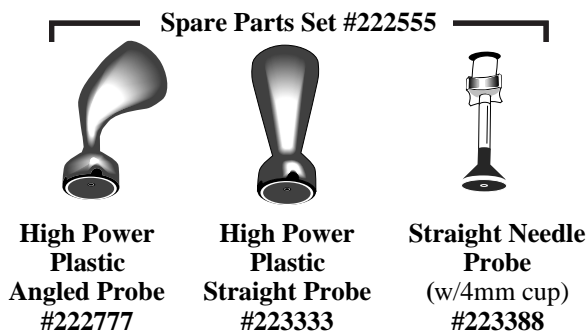
Order No.	Description
222444	Complete Vampire Tool, with the following: 1 - straight High Power tip with 9mm cup 1 - angled High Power tip with 9mm cup 1 - straight needle with 4mm and 6mm cups 1 - lubricant, instruction sheet and box

Probes

222555	Spare Parts Set (3 pcs.) see fig.
223333	9mm High Power Straight Probe
222777	9mm High Power Angled Probe
223388	4mm Straight Probe
224444	4mm 45° Angled Probe
224442	1.5mm 45° Angled Probe
224443	1.5mm Straight Probe

Cups

333335	4mm Cup
333336	6mm Cup
333334	9mm Cup





www.tapesplicer.com

SMD TAPE SPLICING TOOL

PREVENTS LINE SHUTDOWN



The HRS5 manual tape splicer joins together all sizes of SMD carrier tape.

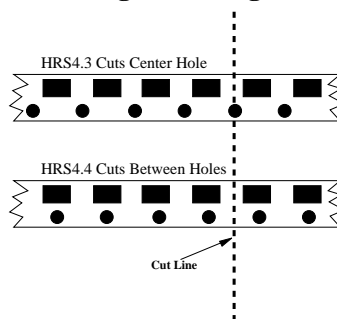
Use during pick & place assembly to splice the end of a depleted reel to the beginning of a fresh reel of components without line shutdown. Fits all tape widths without tooling changes. Joins 8, 12, 16, 24, 32 & 44mm tape. Splices plastic, paper, or metal carrier tape. Completely portable. Hand-held.



HRS5 Tape Splicing Tool

Order No.	Description
210011	HRS5 Tool (Includes -100 pcs. HRS5.01 splicing tape and HRS4.3 cutting tool)
210003	Spare HRS4.3 Cutting Tool (Red)
210009	Spare HRS4.4 Cutting Tool (Green)
210002	HRS5.01 Splicing Tape (1000 pcs.) (with HRS4.02 cover tape included)
210005	Spare HRS4.02, 4.3x60mm Cover Tape (1000 pcs.) 8mm
210010	Spare HRS4.03, 7.3x60mm Cover Tape (500 pcs.) 12-44mm

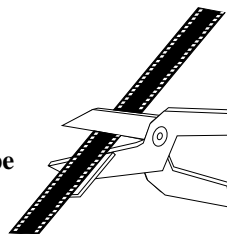
Cutting Tool Diagram

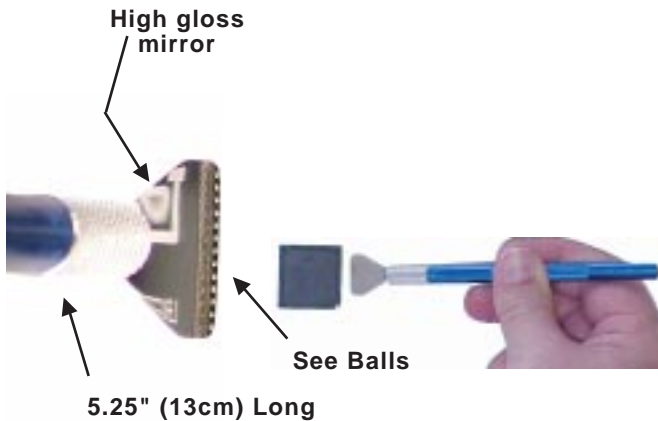


How to Use

See website www.tapesplicer.com for full color photos showing step-by-step instructions on how to use the HRS5.

Cuts SMD tape
up to 24mm





Order No.

Mini Mirror

301000

Highly polished stainless steel mirror allows inspection of perimeter balls after assembly of BGA to mother board. Works best when used with high intensity lamp and 10X magnifying lens. Size: 5.25" (13cm) long. Mirror surface is 0.7" (17.8mm) wide.



Be ESD Safe!

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



Taylor reel Twists

STACKABLE FLANGES

WHEN STORING



13" Reel
4" Hub or
6" Hub

Combine Flange 1 + Flange 2 to make complete Reel

13" Reel 4" Hub (100mm)	TAPE WIDTH	FLANGE 1	FLANGE 2	ORDER QTY PER CARTON
	8mm	4mm TW-REEL13i-4F-4H	4mm TW-REEL13i-4F-4H	60 pcs
	12mm	4mm TW-REEL13i-4F-4H	8mm TW-REEL13i-8F-4H	60pcs=4mm 50pcs=8mm
	16mm	8mm TW-REEL13i-8F-4H	8mm TW-REEL13i-8F-4H	50 pcs
	24mm	8mm TW-REEL13i-8F-4H	16mm TW-REEL13i-16F-4H	50 pcs
	32mm	16mm TW-REEL13i-16F-4H	16mm TW-REEL13i-16F-4H	50 pcs
	44mm	16mm TW-REEL13i-16F-4H	28mm TW-REEL13i-28F-4H	50pcs=16mm 35pcs=28mm
	56mm	28mm TW-REEL13i-28F-4H	28mm TW-REEL13i-28F-4H	35 pcs

Combine Flange 1 + Flange 2 to make complete Reel

13" Reel 6" Hub (150mm)	TAPE WIDTH	FLANGE 1	FLANGE 2	ORDER QTY PER CARTON
	16mm	8mm TW-REEL13i-8F-6H	8mm TW-REEL13i-8F-6H	50 pcs
	24mm	8mm TW-REEL13i-8F-6H	16mm TW-REEL13i-16F-6H	50 pcs
	32mm	16mm TW-REEL13i-16F-6H	16mm TW-REEL13i-16F-6H	50 pcs
	44mm	16mm TW-REEL13i-16F-6H	28mm TW-REEL13i-28F-6H	50pcs=16mm 35pcs=28mm
	56mm	28mm TW-REEL13i-28F-6H	28mm TW-REEL13i-28F-6H	35 pcs

I Taylor reel Twists® flanges are manufactured from virgin high-impact polystyrene. Contains no CFCs, lead or mercury.
N Blue reel part nbr suffix -AS for anti-static Staticide 3000G coating with 10^{11} ohms/square inch resistivity.
F White reel part nbr suffix -AWT anti-static impregnated in the polystyrene during manufacturing 10^{12} ohms/square.
O Black reel part nbr suffix -BC conductive carbon is completely encapsulated in the thermoplastic 10^4 to 10^5 ohms/square.
Also available 15" and 22" diameter monster reels.

ESD Shoes for every occasion



ZAD 9000 Clog

8500xx- Open
8520xx- With Strap



**Clean Room
Booty**



Moka Slip On

8540xx



GYM-ss Safety Shoe

8560xx



ECO 570 Safety Shoe

8570xx



Stringa-ss Safety Shoe

8580xx



Flexa Comfort Shoe

8590xx



Classic Man Dress Shoe

8530x



Classic Lady Dress Shoe

8550xx



ESD STATIC CONTROL PRODUCTS



Visit our ESD website
www.esd.tv

TopLine offers a full range of ESD Static Control Products:



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& Smocks**



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Web Site: www.intract.com.br

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E-mail JuanGP@elkonet.com

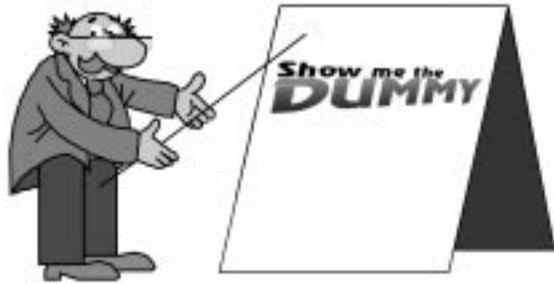
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POIROT

Tel + 56-2-639-1369

E-mail poirot@cmet.net

Pick the correct Dummy for your application...



Select the Correct Dummy							
Dummy Properties		Application					
		Parts Placement (Note 1)	Solder Practice (Note 2)	Rework Practice (Note 3)	Continuity Checking (Note 4)	S.I.R. Testing (Note 5)	Temp Cycling (Note 6)
With Daisy Chain	Die with Wire Bonding	Yes			Yes	No	Yes
	Die, with No Wire Bonding				Yes	No	Yes
	No Die, with Wire Bonding				Yes	No	No
	No Die, with No Wire Bonding				Yes	No	No
No Daisy Chain	Die with Wire Bonding	Yes			No	No	Yes
	Die, with No Wire Bonding				No	Yes	Yes
	No Die, with Wire Bonding				No	No	No
	No Die, with No Wire Bonding				No	Yes	No

Application Notes:

1. Machine or Hand Placement
2. Solderability and Wetting
3. Rework, Removal and Placement
4. Continuity Test after Mounting
5. Surface Insulation Resistance after Cleaning
6. Temperature Profiling and Cycling

Website:

www.TopLine.tv

General: TopLine will supply dummy of TopLine's choice unless specified by customer.