

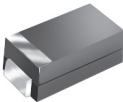
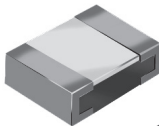
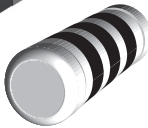
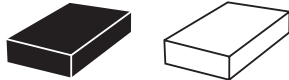
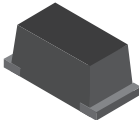
2012

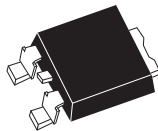
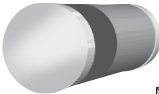
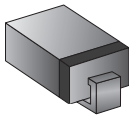
Product Guide

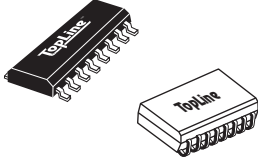
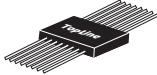
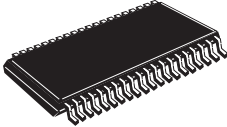
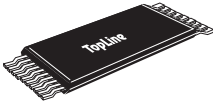
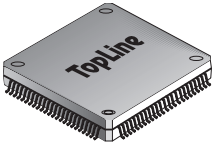
TopLine®

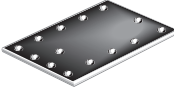
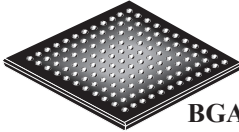
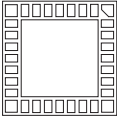


**Lead Free
Dummy Components
Practice Kits**

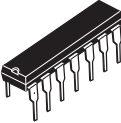
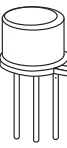
SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
SC	Ceramic Chip Capacitor		XD1	7
SD	Molded Tantalum		XD1	8
SE	Aluminum Capacitor		XD1	9
SR	Resistor Chip		XD1	10
SRM	Melf Resistor		XD1	11
SCC	Black & White Chips	 Edge 90°	XD1	12
SSL	Solderable Spacers		XD1	13

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
SOT	Transistor		XD1	14
DPAK	Power Discrete		XD1	15
SOD, SM	Melf Diode/Rectifier		XD1	16
SMA~SMC	Rectangular Diode/Rectifier		XD1	17

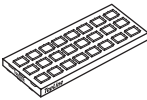
SERIES	DESCRIPTION	VIEW	WEB CODE	PAGE
PLCC	Chip Carrier		XP1	18
LCC	Chip Carrier		XL1	19
SOIC	Gull Wing		XS1	20
SOJ	J-Lead		XS1	21
FP	Flat Pack		XF1	22
MSOP	Mini Small Outline Package		XS1	23
SSOP	Shrink Small Outline Package		XS1	24
TSSOP	Thin Shrink Outline Package		XS1	25
TSOP	Type 1		XO1	26
TSOP	Type 2		XO1	27
TQFP	Thin Quad Flat Pack 1.0mm		XQ1	28
LQFP	Low Quad Flat Pack 1.4mm		XQ1	29
QFP	Quad Flat Pack		XQ1	30-31
CERQUAD	Ceramic Quad Flat Pack		XC1	32

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
W	Silicon Wafers & Die	 FLIP CHIP	XE1	33
TD	Test (Si) Die for Practice		XE1	156-157
FC	Flip Chip		Xi1	34-35
WLP - CSP	0.3mm Pitch	 BGA		36
WLP - CSP	0.4mm Pitch			37-38
WLP - CSP	0.5mm Pitch			39-41
BGA	0.65mm, 0.75mm, 0.8mm Pitch			42-43
BGA	1.0mm Pitch	 QFN	XJ1	44-45
BGA	1.27mm Pitch			46-47
CBGA	Ceramic 1.27mm Pitch			48-49
CLGA	Ceramic Land Grid Array			50
BGA	1.5mm Pitch			51
BGA	Ball Count Chart			52
eWLP	Embedded CSP Cu Post			53
QFN	Quad Flat Lead		XU1	54-56
M-QFN	Open Cavity QFN		XH1	151-155

THROUGHHOLE DEVICES

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
DIP	Dual Inline Package	 	XN1	57
TO	Transistor		XT1	58
Terminal	Solder Terminals	  	XR1	59
CF & DO	Resistors & Diodes	CF   DO	XA1	60

TRAYS

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
	Waffle Pack for Bare Die 2" and 4"		XZ1	61
	JEDEC Matrix Component Trays		XZ1	62-64

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
---	General Kit Information			65-67
953	BGA Visual Placement	BALL & BUMP KITS	XK1	68
956	CLGA 0.5~0.8mm pitch			69
901~909	Flip Chip Kit			70-71
921	BGA46 0.75mm pitch			72-73
963	Universal CSP 0.5/0.75/0.8mm			74-75
981	Universal BGA 0.8/1.0mm pitch			76-77
9981	BGA 1.0mm & 0.8mm pitch			78-79
976	BGA256 1.0mm/SBGA560 1.27mm pitch			80-81
974	LBGA1600/1936 Very Large 1.0mm			82-83
947	Universal BGA Daisy Chain			84-85
937	BGA 256/272 1.27mm pitch			86-87
967	BGA169/225			88-89
946	Universal BGA 1.27/1.5mm pitch			90-91
958	LBGA1225 Very Large 1.27mm			92-93
951	Ceramic CBGA			94-95
986	Lead Free Multicomponents			96-97
919	Large Machine Run	FINE PITCH KITS	XK1	98-99
928	Challenger 2			100-101
950	SMTA SABER Array			102-103
935/936	Stencil Evaluation			104-105
965	Rework 1 Practice	REWORK KITS	XK1	106-107
944	Rework 2 Practice			108-109
977	Rework 3 Practice			110-111
925	SMD Introductory			112-113
926	Practical Mixed Technology	MIXED TECHNOLOGY KITS		114-115
9696	Mixed Technology 1			116-117
914	Mixed Technology 2			118-119
938	Econo Kit II			142-143
939	Econo Kit III			144-145
912	Econo IV Recertification	MACHINE DIAGNOSTIC KITS	XK1	146-147
949	0201/0402 Chip Shooter			120-121
964	0402/0603 Chip Shooter			122-123
968	0805/1206 Chip Shooter			124-125
9618	Rotational Placement			134-135
9610	Fiducial Evaluation			136-137
931	Advanced QFP Assortment	QUAD FLAT PACK KITS	XK1	126-127
962	QFP Assortment			128-129
9625	QFP256 .4mm Pitch			130-131
9621	QFP208 .5mm Pitch			138-139

SOLDER PRACTICE KITS

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
910	Beginners Throughhole	THROUGH HOLE KITS	XK1	138-139
913	12 Layer Daisy Chain			148-149
915~916	Multipurpose Throughhole			140-141
979	NASA Solder Practice			150

LEAD FREE KITS & COMPONENTS



**Pb-Free
Lead-Free
RoHs Compliant**

Most Kits and Components
are available with Lead-Free Option.
Please send Inquiry

TOOLS & ACCESSORIES

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
900000	QFP Lead Straightener		XY1	160

OPEN CAVITY QFN AIR CAVITY

SERIES	DESCRIPTION	VIEW	WEBCODE	PAGE
M-QFN	Open (Air) Cavity QFN Package		XH1	151-153
R-CAP	Dome Lid		XH9	154
T-LID	Flat Lid		XH9	155
TD	Test (Si) Die for Practice		XE1	156-157



CERAMIC CHIP CAPACITOR



DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		TAPE INFO		4" (100mm)  Tape & Reel Part Number		7" (180mm)  Tape & Reel Part Number	
Inch	Metric	WIDTH	PITCH	XM1	QTY	XD1	QTY
PAPER TAPE							
01005	0402	8mm	2mm	SC01005P4A	1000	SC01005P7A	20,000
0201	0603	8mm	2mm	SC0201P4A	1000	SC0201P7A	15,000
0402	1005	8mm	2mm	SC0402P4A	500	SC0402P7A	10,000
0603	1608	8mm	4mm	SC0603P4A	500	SC0603P7A	4000
0805	2012	8mm	4mm	SC0805P4A	500	SC0805P7A	4000
1206	3216	8mm	4mm	SC1206P4A	500	SC1206P7A	4000
PLASTIC TAPE							
0805	2012	8mm	4mm	SC0805E4A	500	SC0805E7A	4000
1206	3216	8mm	4mm	SC1206E4A	500	SC1206E7A	3000
1210	3225	8mm	4mm	SC1210E4A	500	SC1210E7A	3000
1812	4532	12mm	8mm	SC1812E4A	100	SC1812E7A	1000
2225	5664	12mm	8mm	SC2225E4A	100	SC2225E7A	1000
LEAD-FREE  Sn100							
01005	0402	8mm	2mm	SC01005P4A-TIN	1000	SC01005P7A-TIN	20,000
0201	0603	8mm	2mm	SC0201P4A-TIN	1000	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	3000
1812	4532	12mm	8mm	SC1812E4A-TIN	100	SC1812E7A-TIN	1000
2225	5664	12mm	8mm	SC2225E4A-TIN	100	SC2225E7A-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)		HEIGHT (H)		HEIGHT (H)	
01005	0.2mm ± 0.03	0603	0.8mm ± 0.1	1210	1.25~1.5mm
0201	0.3mm ± 0.03	0805	0.6~1.25mm	1812	2.0mm MAX
0402	0.5mm ± 0.1	1206	0.6~1.25mm	2225	2.0mm MAX

**I
N
F
O**

Other sizes such as 0504, 1805, 1806, 2220 are available on special order

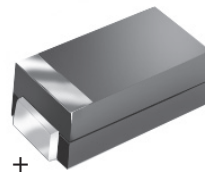
The chip size code is the component's LxW dimensions. Example: 0805 = .08" x .05".

Chip size may also be expressed in metric code. Example: 2012 = 2.0mm x 1.2mm.

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



TANTALUM CAPACITOR MOLDED CASE



DUMMY COMPONENT ORDERING INFORMATION

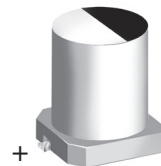
CHIP SIZE		TAPE INFO		 Bulk Part Number	QTY	4" (100mm)  Tape & Reel Part Number		7" (180mm)  Tape & Reel Part Number	
METRIC	CODE	WIDTH	PITCH			XM1	QTY	XD1	QTY
3216	A	8mm	4mm	SD3216X-100	100	SD3216E4A	250	SD3216E7A	2000
3528	B	8mm	4mm	SD3528X-100	100	SD3528E4A	250	SD3528E7A	2000
6032	C	12mm	8mm	SD6032X-50	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	-	-	SD2012E4A	250	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.
F Nomenclature: The metric code specifies the LxW dimensions in millimeters. Example 3528 = 3.5mm x 2.8mm
O  Lead Free Option: Sn100 add -TIN to end of part number.



ALUMINUM CAPACITOR

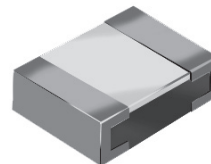


DUMMY COMPONENT ORDERING INFORMATION

CASE DIAMETER	MAXIMUM HEIGHT	TAPE INFO		7" (180mm) Tape & Reel Part Number QTY		13" (330mm) Tape & Reel Part Number QTY	
		WIDTH	PITCH	XM1		XD1	
3mm	5.5mm	12mm	8mm	SE3E7A	100	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	SE8E7A	100	SE8E13A	1000
8mm	10mm	24mm	16mm	SE9E7A	100	SE9E13A	500
10mm	10mm	24mm	16mm	SE10E7A	100	SE10E13A	300-500
10mm	14~22mm	32mm	20mm	-	-	SE11E13A	250-300
12.5mm	14mm	32mm	24mm	-	-	SE12E13A	200-250
12.5mm	17mm	32mm	24mm	-	-	SE13E13A	150-200
12.5mm	22mm	32mm	24mm	-	-	SE14E13A	125-150
16mm	17mm	44mm	28mm	-	-	SE16E13A	125-150
16mm	22mm	44mm	28mm	-	-	SE17E13A	75-100
18mm	17mm	44mm	32mm	-	-	SE18E13A	125-150
18mm	22mm	44mm	32mm	-	-	SE19E13A	75-100
20mm	17mm	44mm	36mm	-	-	SE20E13A	50

I N F O Aluminum electrolytic capacitors are available in 16 case sizes. Aluminum capacitors are polarized devices and require proper orientation during placement. The negative terminal (black mark on top of component) faces the sprocket holes on the carrier tape. For 15" (380mm) reel change "E13A" to "E15P"

Lead Free Option: Sn97/Bi3.0 add -SnBi to end of part number for 3mm ~ 10mm case diameter.



DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		TAPE INFO		4" (100mm)		7" (180mm)	
Inch	Metric	WIDTH	PITCH	XM1	Tape & Reel Part Number	QTY	XD1
							Tape & Reel Part Number
							QTY
PAPER TAPE							
01005	0402	8mm	2mm		SR01005P4A	1000	SR01005P7A
0201	0603	8mm	2mm		SR0201P4A	1000	SR0201P7A
0402	1005	8mm	2mm		SR0402P4A	1000	SR0402P7A
0603	1608	8mm	4mm		SR0603P4A	1000	SR0603P7A
0805	2012	8mm	4mm		SR0805P4A	1000	SR0805P7A
1206	3216	8mm	4mm		SR1206P4A	1000	SR1206P7A
1210	3225	8mm	4mm		SR1210P4A	1000	SR1210P7A
PLASTIC TAPE							
1210	3225	8mm	4mm		SR1210E4A	1000	SR1210E7A
2010	5025	12mm	4mm		SR2010E4A	250	SR2010E7A
2512	6332	12mm	4mm		-	-	SR2512E7A
2512	6332	12mm	8mm		SR2512E4A	250	SR2512E7A
ZERO OHM							
01005	0402	8mm	2mm	-	-	-	SR01005P7A-ZERO
0201	0603	8mm	2mm	-	-	-	SR0201P7A-ZERO
0402	1005	8mm	2mm	-	-	-	SR0402P7A-ZERO
0603	1608	8mm	4mm	-	-	-	SR0603P7A-ZERO
0805	2012	8mm	4mm	-	-	-	SR0805P7A-ZERO
1206	3216	8mm	4mm	-	-	-	SR1206P7A-ZERO
LEAD FREE  Sn100							
01005	0402	8mm	2mm		SR01005P4A-TIN	1000	SR01005P7A-TIN
0201	0603	8mm	2mm		SR0201P4A-TIN	1000	SR0201P7A-TIN
0402	1005	8mm	2mm		SR0402P4A-TIN	1000	SR0402P7A-TIN
0603	1608	8mm	4mm		SR0603P4A-TIN	1000	SR0603P7A-TIN
0805	2012	8mm	4mm		SR0805P4A-TIN	1000	SR0805P7A-TIN
1206	3216	8mm	4mm		SR1206P4A-TIN	1000	SR1206P7A-TIN

DIMENSION TOLERANCE

0402 ± 0.05mm
0603 ~ 2512 ± 0.15mm

HEIGHT (H)

01005	0.12mm ± 0.02	0603	0.45mm ± 0.10	1210	0.55mm ± 0.15
0201	0.23mm ± 0.03	0805	0.55mm ± 0.1	2010	0.55mm +/-0.15
0402	0.35mm ± 0.05	1206	0.55mm ± 0.1	2512	0.55mm +/-0.15

I 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.

N The chip size code approximates the LxW dimensions in inches. Example: 0805 = .08" x .05".

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



MELF RESISTOR



DUMMY COMPONENT ORDERING INFORMATION

SIZE CODE INCH NAME		SIZE LENGTH X DIA.	TAPE INFO WIDTH PITCH		4" (100mm)  Tape & Reel Part Number QTY		7" (180mm)  Tape & Reel Part Number QTY	
					XM1		XD1	
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

Cross Reference

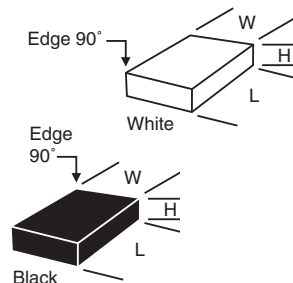
Code	TopLine
0102	SRM0805
0204	SRM1206
0207	SRM2308

I N F O MELF resistors are cylindrical. Extra care is required during placement to prevent rolling during assembly. These devices are often called by their nicknames relative to size such as micro-melf, mini-melf and melf. Nomenclature: MELF = Metal Electrode Face Bonded. Lead Free version is tin over nickel plating.

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



BLACK & WHITE CERAMIC CHIPS FOR CALIBRATION



DUMMY COMPONENT ORDERING INFORMATION

CHIP SIZE		TAPE MAT'L	TAPING INFO		7" (180mm)  Tape & Reel Part Number	QTY
INCH	METRIC		WIDTH	PITCH		
XD1						
WHITE CHIPS						
01005	0402	Paper	8mm	2mm	SCC01005P7A-WHITE	20,000
0201	0603	Paper	8mm	2mm	SCC0201P7A-WHITE	15,000
0402	1005	Paper	8mm	2mm	SCC0402P7A-WHITE	10,000
0603	1608	Paper	8mm	4mm	SCC0603P7A-WHITE	4,000
0805	2012	Plastic	8mm	4mm	SCC0805E7A-WHITE	4,000
1206	3216	Paper	8mm	4mm	SCC1206P7A-WHITE	4,000
BLACK CHIPS						
0201	0603	Paper	8mm	2mm	SCC0201P7A-BLACK	15,000
0402	1005	Paper	8mm	2mm	SCC0402P7A-BLACK	10,000
0603	1608	Paper	8mm	4mm	SCC0603P7A-BLACK	4,000
0805	2012	Plastic	8mm	4mm	SCC0805E7A-BLACK	4,000
1206	3216	Paper	8mm	4mm	SCC1206P7A-BLACK	4,000

INCH DIMENSIONS:

Inch Code	L	W	H	Tol
01005	0.016	0.008	0.008	+/- 0.001
0201	0.0225	0.0115	0.0115	+/- 0.001
0402	0.036	0.019	0.019	+/- 0.003
0603	0.058	0.031	0.029	+/- 0.003
0805	0.075	0.052	0.037	+/- 0.003
1205	0.119	0.060	0.048	+/- 0.003

METRIC DIMENSIONS:

Metric Code	L	W	H	Tol
0402	0.40	0.20	0.20	+/- 0.025
0603	0.57	0.29	0.29	+/- 0.025
1005	0.91	0.48	0.48	+/- 0.076
1608	1.47	0.79	0.74	+/- 0.076
2012	1.91	1.32	0.94	+/- 0.076
3216	3.02	1.52	1.22	+/- 0.076

INFO

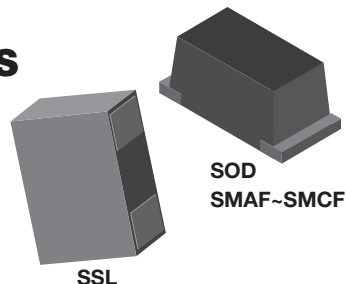
Placement Ceramic Chips are available in 6 case sizes and in 2 colors: White and Black.

Right angle 90° edges for accurate placement by vision equipment. No terminations. Non-Solderable.

White chips are mounted on a dark substrate such as blue Nitto tape.

Black chips are mounted on a light substrate. Excellent contrast. Easy for vision equipment to see.

SOLDERABLE SPACERS Non-CONDUCTIVE Bottom Terminal

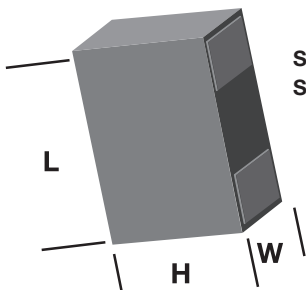


SSL

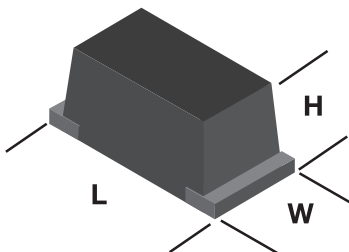
SOD
SMAF-SMCF

DUMMY COMPONENT ORDERING INFORMATION

L METRIC	W METRIC	BODY MAT'L	HEIGHT (H)		Tape & Reel Part Number	QTY
			INCH	METRIC		
3.2mm	1.6mm	FR4	+/- 10%			
			0.060	1.6mm	SSL120660E7A-T	1000
			0.070	1.8mm	SSL120670E7A-T	1000
			0.075	1.9mm	SSL120675E7A-T	1000
			0.080	2.0mm	SSL120680E7A-T	1000
			0.085	2.2mm	SSL120685E7A-T	1000
			0.095	2.4mm	SSL120695E7A-T	1000
3.5 ~ 3.9mm	1.5 ~ 1.9mm	Molded Plastic	0.050 - 0.067	1.3~1.7mm	SOD123FW-E7A-T-ISO	2500
4.5 ~ 4.9mm	2.3 ~ 2.7mm		0.060~0.070	1.5~1.8mm	SMAF-E7A-T-ISO	2000
5.0 ~ 5.4mm	3.2 ~ 3.6mm		0.067~0.075	1.7~1.9mm	SMBF-E13A-T-ISO	4000
6.3 ~ 6.9mm	4.2 ~ 4.8mm		0.075~0.10	1.9~2.5mm	SMCF-E13A-T-ISO	3000



SSL
Series



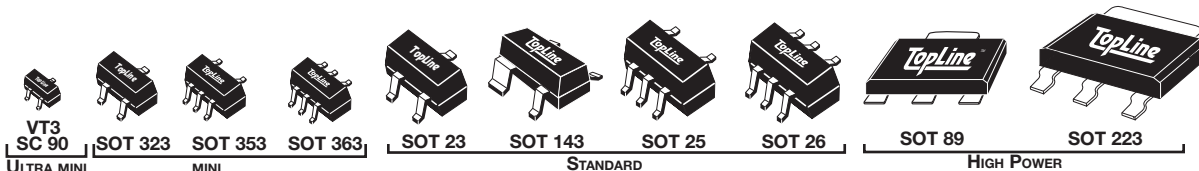
SOD123FW
SMAF
SMBF
SMCF

SSL solderable spacers are constructed with high grade RoHS FR4. Bottom tin (Sn) plated copper (Cu) terminals provide compact footprint. Customized heights (0.5 to 3.2mm) and body sizes available.

SOD, SMA, SMB and SMC (ISO suffix) solderable spacers are fully isolated open circuit - no internal connections . Constructed with wide tin (Sn) copper (Cu) terminals to provide strong attachment to PCB. Optional (DC12 suffix) fully shorted zero ohm jumpers are available.



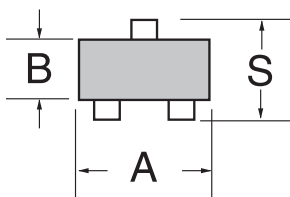
SOT TRANSISTOR



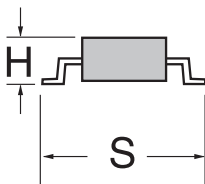
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	TAPE INFO		DEVICE REFERENCE			BODY SIZE NOMINAL (MM)				4" (100mm)		7" (180mm)	
	WIDTH	PITCH	SOT	SC	TO	A	B	S	H	Tape & Reel Part Number QTY	QTY	Tape & Reel Part Number QTY	QTY
3	8mm	4mm	SOT723	-	-	1.2	0.8	1.2	0.5	-	-	VT3E7A	8000
3	8mm	4mm	SOT346	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	SOT416	SC75A/SC90	-	1.6	0.8	1.6	0.7	-	-	SC90E7A	3000
3	8mm	4mm	SOT523F	-	-	1.6	0.8	1.6	0.7	-	-	SOT523E7A	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	SOT25E4A	500	SOT25E7A	3000
6	8mm	4mm	SOT23-6	SC74	SOT457	2.9	1.6	2.8	1.1	SOT26E4A	500	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	500	SOT143E7A	3000
3	16mm	8mm	SOT223	SC73	TO261AA	6.5	3.6	7.0	1.6	SOT223E4A	100	SOT223E13A	2500
3	8mm	4mm	SOT323	SC70	-	2.0	1.25	2.1	0.9	SOT323E4A	500	SOT323E7A	3000
4	8mm	4mm	SOT343	-	-	2.0	1.25	2.1	0.9	-	-	SOT343E7A	3000
5	8mm	4mm	SOT353	SC88A	-	2.0	1.25	2.1	0.9	SOT353E4A	500	SOT353E7A	3000
6	8mm	4mm	SOT363	SC88	-	2.0	1.25	2.1	0.9	SOT363E4A	500	SOT363E7A	3000
8	8mm	4mm	SOT23-8	-	-	2.9	1.6	2.9	1.2	-	-	SOT28E7A	3000

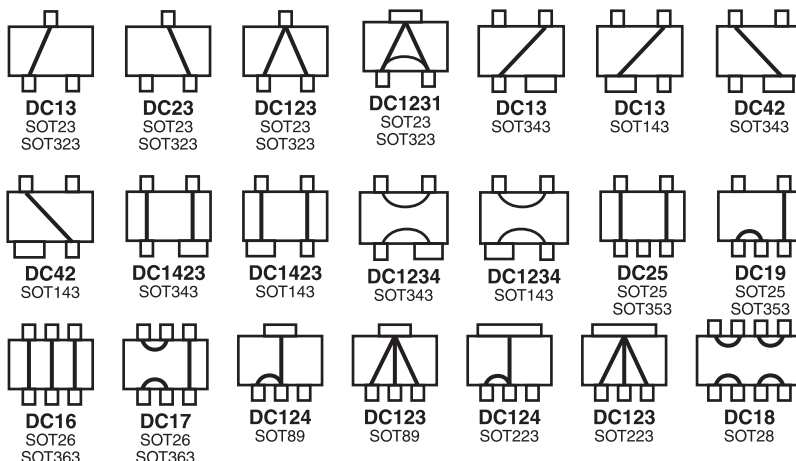
Daisy Chain - TopView



TOP VIEW



SIDE VIEW

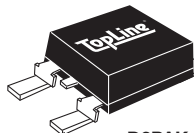


TopLine offers a full range of SOT devices conforming to JEDEC (TO) and EIAJ (SC) standards. 3-lead devices are commonly used for diodes or transistors. 5- and 6-lead devices are used for integrated circuits or diode arrays. Nomenclature: SOT = Small Outline Transistor. AEC-Q100 are MIL-S-883 standards available.

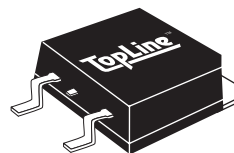
Lead Free Option: Sn100 add -TIN to end of part number.



DPAK



D2PAK

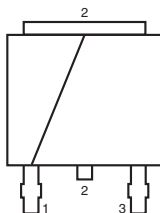
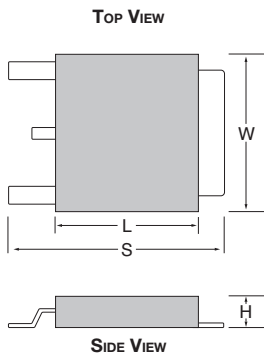


D3PAK

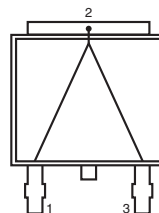
DUMMY COMPONENT ORDERING INFORMATION

PACKAGE SIZE NOMINAL (MM)				JEDEC SMD DEVICE	TAPE INFO		7" (180mm)		13" (330mm)	
L	W	H	S		WIDTH	PITCH	XM1	QTY	XD1	QTY
6	6.5	2.3	10	TO-252AA	16mm	8mm	DPAK-E7A	100	DPAK-E13A	2500
9.2	10	4.4	15	TO-263AB	24mm	16mm	D2PAK-E7A	100	D2PAK-E13A	500~800
9.2	10	4.4	15	5-LEAD	24mm	16mm	-		D2PAK-5-E13A	500~800
9.2	10	4.4	15	7-LEAD	24mm	16mm	-		D2PAK-7-E13A	500~800
14	16	4.7	18.8	TO-268AA	24mm	24mm	-		D3PAK-E13A*	500

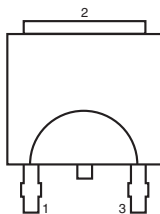
* For Reference. Check for Availability



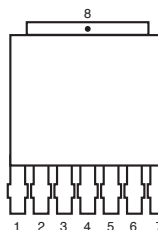
DC12
DPAK
D2PAK



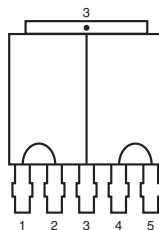
DC123
DPAK
D2PAK



DC13
DPAK
D2PAK



D2PAK7

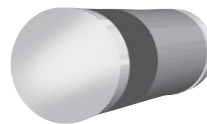


DC1245
D2PAK5

Daisy Chain Options

TO-220 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.

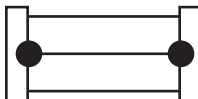
Lead Free Option: Sn100 add -TIN to end of part number.



DUMMY COMPONENT ORDERING INFORMATION

DEVICE	SIZE DIA. x L	TAPE INFO		4" (100mm)		7" (180mm)		13" (330mm)	
		WIDTH	PITCH	 Tape & Reel Part Number XM1	QTY	 Tape & Reel Part Number XD1	QTY	 Tape & Reel Part Number XD1	QTY
mini MELF DO-213AA (LL34)	1.6 x 3.5mm	8mm	4mm	SOD80E4A	500	SOD80E7A	2500	SOD80E13A	10,000
MELF DO-213AB (LL35/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

Daisy Chain (Optional)

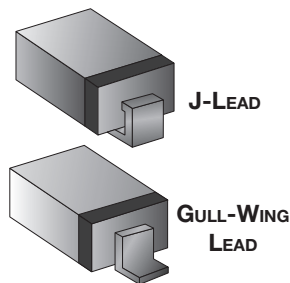
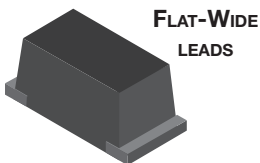


DC12



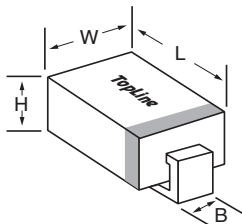


RECTANGULAR DIODE

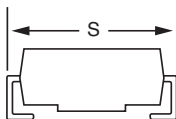


DUMMY COMPONENT ORDERING INFORMATION

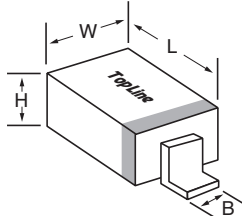
PACKAGE SIZE NOMINAL (MM)					JEDEC DEVICE	TAPE WIDTH		7" (180mm) Tape & Reel Part Number		13" (330mm) Tape & Reel Part Number	
L	W	H	S	B		WIDTH	PITCH	XD1	QTY	XD1	QTY
FLAT-NARROW LEADS											
0.8	0.6	0.4	1.0	0.2	SOD923	8mm	2mm	SOD923E7A	8000	-	-
1.0	0.6	0.5	1.4	0.3	SOD723	8mm	2mm	SOD723E7A	8000	-	-
1.2	0.8	0.6	1.6	0.3	SOD523	8mm	4mm	SC79E7A	3000	-	-
1.2	0.8	0.6	1.6	0.3	SOD523	8mm	4mm	SOD523E7A	3000	-	-
FLAT-WIDE LEADS											
3.2	1.6	1.5	3.6	1.6	-	8mm	4mm	SOD123FW-E7A	2500	-	-
4.0	2.5	1.6	4.7	2.5	-	12mm	4mm	SMAF-E7A	2000	SMAF-E13A	7500
4.5	3.5	1.8	5.2	3.5	-	12mm	8mm	-	-	SMBF-E13A	4000
6.0	4.5	2.3	6.7	4.5	-	12mm	8mm	-	-	SMCF-E13A	3000
GULL WING LEADS											
1.7	1.25	0.7	2.5	0.3	SOD323	8mm	4mm	SOD323E7A	3000	-	10,000
2.7	1.5	1.3	3.6	0.7	SOD123	8mm	4mm	SOD123E7A	3000	-	-
4.3	2.6	2.2	6.1	1.4	DO215AC	12mm	4mm	SMAG-E7A	1800	SMAG-E13A	-
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
J-LEAD											
4.3	2.6	2.2	5.0	1.5	DO214AC	12mm	4mm	SMAJ-E7A	1800	SMAJ-E13A	5000 - 7500
4.3	3.6	2.3	5.4	2.0	DO214AA	12mm	8mm	SMBJ-E7A	750	SMBJ-E13A	3000 - 3200
7.0	6.0	2.3	8.0	3.0	DO214AB	16mm	8mm	SMCJ-E7A	850	SMCJ-E13A	3000 - 3500



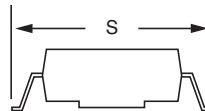
J-LEAD



SIDE VIEW



GULL WING LEAD



SIDE VIEW

Daisy Chain, add -DC12 to end of part number.

Rectangular diodes Gull-wing, J-LEAD or Flat Leads (Narrow and wide versions)

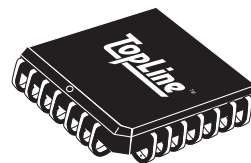
Lead Free Option add -TIN to end of part number.



PLCC

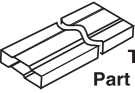
PLASTIC LEADED

CHIP CARRIER

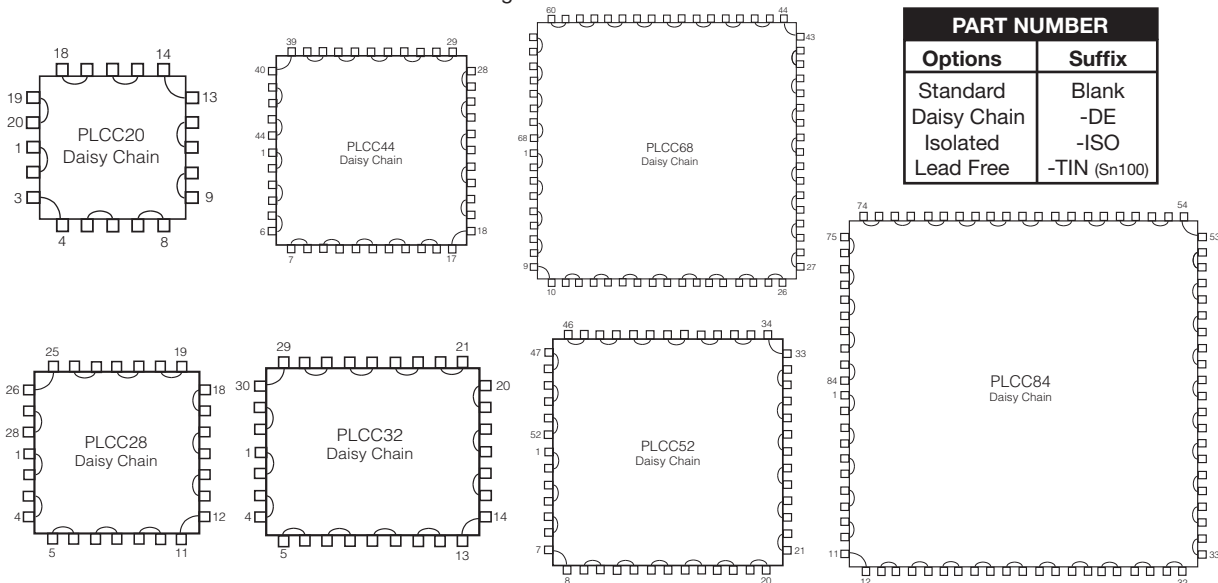


J-LEAD 50MIL PITCH

DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY SIZE INCHES	TAPE INFO		 Tube Part Number	QTY	7" (180mm)  Tape & Reel Part Number		13" (330mm)  Tape & Reel Part Number	
		WIDTH	PITCH			XP1	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	500-1000
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	400-500
52	.75" sq.	32mm	24mm	PLCC52M	24~25	PLCC52E7A	50	PLCC52E13A	500
68	.95" sq.	44mm	32mm	PLCC68M	17~20	PLCC68E7A	50	PLCC68E13A	250
84	1.15" sq.	44mm	36mm	PLCC84M	14~17	PLCC84E7A	50	PLCC84E13A	250

*PLCC18S short version is an obsolete design.



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

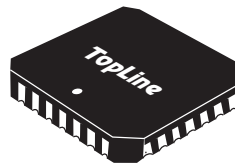
ISO

Standard plating on leads is Sn85/Pb15. Lead pitch is 50 mils (1.27mm). Tube and reel quantities may vary.
For completely isolated (no internal connections) add - ISO to the end of part number.

 Lead Free. Add suffix to part number: -Tin = Sn100



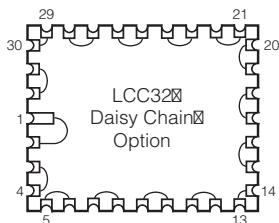
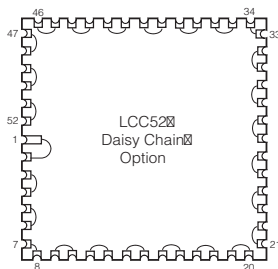
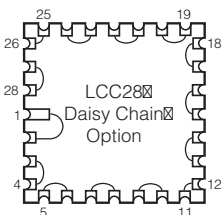
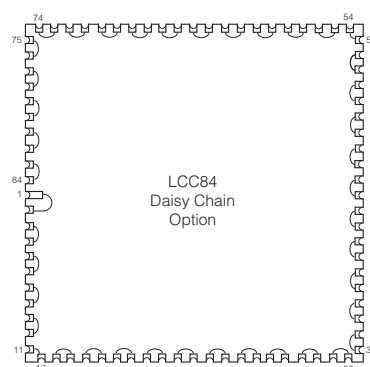
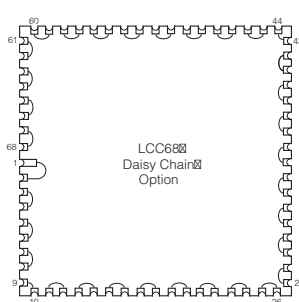
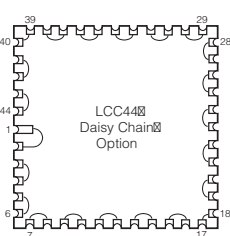
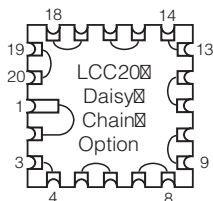
LCC LEADLESS CHIP CARRIER



DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH	CASE SIZES INCHES	 Bulk Part Number
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

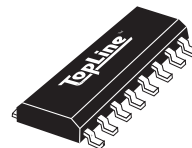


PART NUMBER

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



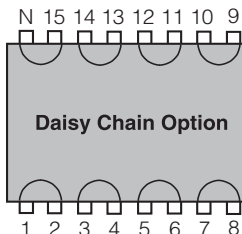
50 MIL PITCH (1.27MM)

DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY WIDTH		TAPE INFO		 Tube Part Number XS1	QTY	7" (180mm) 		13" (330mm) 	
	MILS	METRIC	WIDTH	PITCH			Tape & Reel Part Number XM1	QTY	Tape & Reel Part Number XS1	QTY
8	150	3.9mm	12mm	8mm	SO8M	96~100	SO8E7A	100	SO8E13A	2500
8	210	5.3mm	16mm	12mm	SOP8M	100	-	-	SOP8E13A	2000
14	150	3.9mm	16mm	8mm	SO14M	50~56	SO14E7A	100	SO14E13A	2500
14	208	5.3mm	16mm	12mm	SOP14M	46~58	-	-	SOP14E13A	2000
14	220	5.6mm	24mm	12mm	SOM14M	46~58	-	-	SOM14E13A	2000
16	150	3.9mm	16mm	8mm	SO16M	45~50	SO16E7A	100	SO16E13A	2500
16	208	5.3mm	16mm	12mm	SOP16M	42	-	-	SOP16E13A	2000
16	220	5.6mm	24mm	12mm	SOM16M	42	SOM16E7A	100	SOM16E13A	2000
16	300	7.5mm	16mm	12mm	SOL16M	47	SOL16E7A	100	SOL16E13A	1000
18	300	7.5mm	24mm	12mm	SOL18M	41~42	-	-	SOL18E13A	1000
20	300	7.5mm	24mm	12mm	SOL20M	38	SOL20E7A	100	SOL20E13A	1000
24	300	7.5mm	24mm	12mm	SOL24M	31~33	SOL24E7A	100	SOL24E13A	1000
28	300	7.5mm	24mm	12mm	SOL28M	26~27	SOL28E7A	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
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



PART NUMBER

Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

INFO

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: -Tin = Sn100

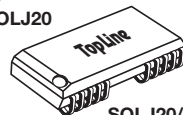


SOJ - SMALL OUTLINE J-LEAD



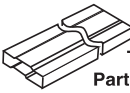
SOLJ20

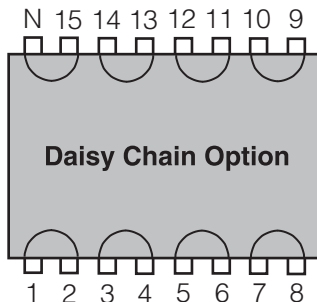
50 MIL PITCH (1.27MM)



SOLJ20/26

DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY WIDTH		TAPE INFO		 Tube Part Number	QTY	7" (180mm)		 Tape & Reel Part Number	QTY	13" (330mm)		 Tape & Reel Part Number	QTY
	MILS	METRIC	WIDTH	PITCH			XS1				XS1			
20	300	7.5mm	24mm	12mm	SOLJ20M	33~37			-	-			SOLJ20E13A	1000
24	300	7.5mm	24mm	12mm	SOLJ24M	31			-	-			SOLJ24E13A	1000
20/26	300	7.5mm	24mm	12mm	SOLJ20/26M	27			SOLJ20/26E7A	100			SOLJ20/26E13A	1000
24/26	300	7.5mm	24mm	12mm	SOLJ24/26M	25~30			-	-			SOLJ24/26E13A	1000
28	300	7.5mm	24mm	12mm	SOLJ28M	25~27			SOLJ28E7A	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



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

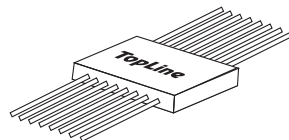
I TopLine supplies a variety of SOJ packages with 50 mil (1.27mm) lead pitch. The DRAM package uses 20 leads on. Tube quantities may vary. For completely isolated (no internal connections) add -ISO to end of part number. Solder plating on leads is Sn85/Pb15.



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



FLAT PACK



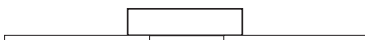
DUMMY COMPONENT ORDERING INFORMATION

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
16	.25" x .38"	All Straight	Side		FP16C50R.25x.38S
20	.27" x .50"	All Straight	Side		FP20F50R.27X.50S
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
36	.50" x .93"	All Straight	Bottom		FP36F50R.50X.93B
42	.64" x 1.06"	All Straight	Top		FP42F50R.64x1.06T
48	.64" x 1.31"	All Straight	Top		FP48F50R.64x1.21T
52	.64"x1.31"	All Straight	Top		FP52F50R.64x1.31T
25 MIL PITCH					
56	.40"x76"	All Straight	Top		FP56F25R.40x.76B

LEAD LOCATIONS



SIDE/SANDWICH
CODE S



BOTTOM BRAZED
CODE B



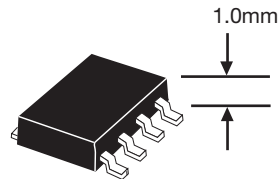
TOP BRAZED
CODE T

PART NUMBER

PACKAGING	CODE	LEAD PLATING	PART NBR SUFFIX
Carrier	C	Gold	Blank
Lead Frame	F	Solder Coat	-SC
		Daisy Chain	-DE
		Without Lid	-N
		ALLOY 42	-A



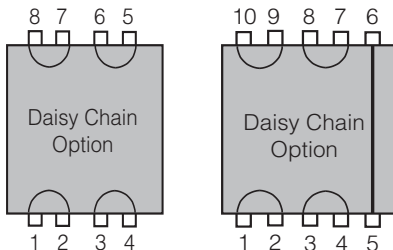
MSOP GULL WING MINIATURE SMALL OUTLINE PACKAGE



DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	BODY WIDTH		TAPE INFO		LEAD PITCH		 Tube Part Number		7" (180mm)  Tape & Reel Part Number	
	MILS	METRIC	WIDTH	PITCH	mils	mm	XS1	QTY	XS1	QTY
8	118	3mm	12mm	8mm	25.6mils	0.65mm	MSOP8M	50~98	MSOP8E7A	3000
10	118	3mm	12mm	8mm	19.7mils	0.50mm	MSOP10M	50~98	MSOP10E7A	3000

Daisy Chain available
add -DE to end of part number



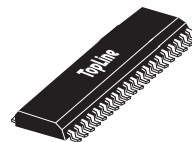
PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)



SSOP

SHRINK SMALL

OUTLINE PACKAGES



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)	36	0.8mm	24mm	12/16mm	SSOP36M30	31	SSOP36E13A30	1000
	48	0.636mm	32mm	12/16mm	SSOP48M25	30	SSOP48E13A25	1000
	56	0.636mm	32mm	12/16mm	SSOP56M25	26	SSOP56E13A25	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	HSOP30M30	30	HSOP30E13A30	500
	36	0.65mm	44mm	24mm	HSOP36M25	30	HSOP36E13A25	500
	44	0.65mm	44mm	24mm	HSOP44M25	30	HSOP44E13A25	500

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.



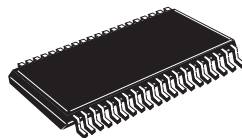
Lead Free Option. F = NiPd. Suffix -TIN = Sn100.



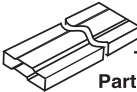
TSSOP

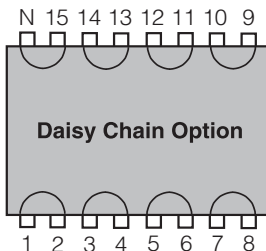
THIN SHRINK

SMALL OUTLINE PACKAGE



DUMMY COMPONENT ORDERING INFORMATION

BODY LENGTH	NBR LEAD		TAPE INFO		 Tube Part Number	QTY	 13" (330mm) Tape & Reel Part Number	QTY
	LEADS	PITCH	WIDTH	PITCH				
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	90-96	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	49-50	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								
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



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

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.



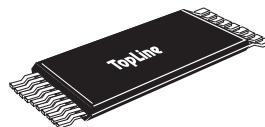
Lead Free. Suffix -TIN = Sn100.



TSOP - TYPE 1

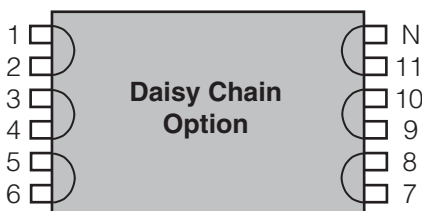
THIN SMALL

OUTLINE PACKAGE



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
32	0.5mm	8 x 20mm	32mm	12/16mm	TSOP32T19.7-T1	156	TSOP32E13A19.7-T1	1000
32	0.5mm	8 x 13.4mm	24mm	12mm	TSOP32ST19.7-T1	234	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	91	TSOP56E13A19.7-T1	1000



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Alloy42	A
Lead Free	-T (Sn100)

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. Tin Lead (SnPb) special order.



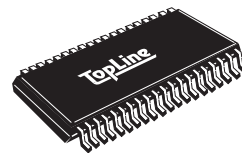
Lead Free. Suffix -TIN = Sn100.



TSOP - TYPE 2

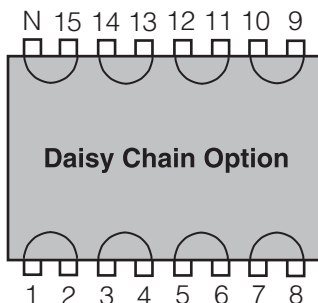
THIN SMALL

OUTLINE PACKAGE



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				
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
66	0.65mm	10 x 22.2mm	32mm	16mm	TSOP66T25-T2	108	TSOP66E13A25-T2	500~1000
86	0.5mm	10 x 22.2mm	32mm	16mm	TSOP86T19.7-T2	108	TSOP86E13A19.7-T2	500~1000



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Alloy42	A42
Lead Free	-TIN (Sn100)

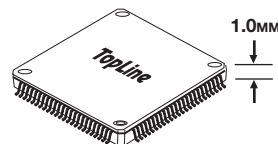
ISO

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.

Lead Free. Suffix -TIN = Sn100.

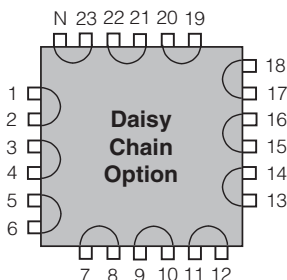
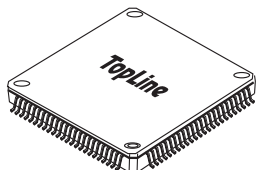


TQFP 1.0MM THICK THIN QUAD FLAT PACK



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		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



PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

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

I N F O 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. For Daisy Chain "Even" add -DE to end of part number. For completely isolated (no internal connections) add -ISO to end of part number. Solder plating Sn85/Pb15.

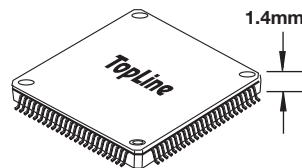
Lead Free. Suffix TIN = Sn100.



LQFP 1.4MM THICK

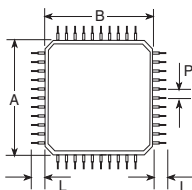
LOW PROFILE

QUAD FLAT PACK

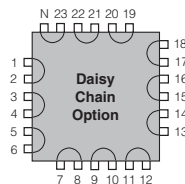


DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH		BODY SIZE A x B	TAPE INFO		Tray Part Number	QTY	13" (330mm) Tape & Reel Part Number		QTY
	MM	MILS		WIDTH	PITCH					
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
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".



PART NUMBER

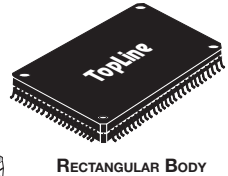
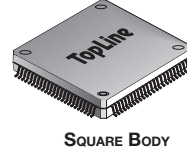
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

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 TIN = Sn100.



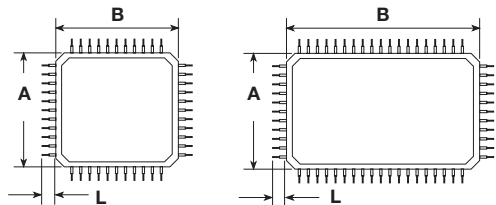
QFP QUAD FLAT PACK

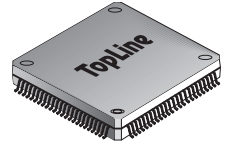


DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	2xL FOOTPRINT	LEAD MILS	PITCH MM	 Tray Part Number		7" (180mm)  Tape & Reel Part Number		13" (330mm)  Tape & Reel Part Number	
	ADDER MM			QTY	QTY	QTY	QTY		
10MM SQUARE BODY									
44	3.2mm	31.5	0.8	QFP44T30-3.2	96	QFP44E7A30-3.2	50	QFP44E13A30-3.2	750
44	3.9mm	31.5	0.8	QFP44T30-3.9	96	QFP44E7A30-3.9	50	QFP44E13A30-3.9	750
52	3.2mm	25.6	0.65	QFP52T25-3.2	96	-	-	QFP52E13A25-3.2	750
52	3.9mm	25.6	0.65	QFP52T25-3.9	96	-	-	QFP52E13A25-3.9	750
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	500
52	3.2mm	40	1.0	QFP52T40-3.2	84	-	-	QFP52E13A40-3.2	500
64	3.2mm	31.5	0.8	QFP64T30-3.2-2.0H	84	-	-	QFP64E13A30-3.2-2.0H	500
64	3.2mm	31.5	0.8	QFP64T30-3.2-2.7H	84	-	-	QFP64E13A30-3.2-2.7H	500
80	3.2mm	25.6	0.65	QFP80T25-3.2-2.0H	84	-	-	QFP80E13A25-3.2-2.0H	500
80	3.2mm	25.6	0.65	QFP80T25-3.2-2.7H	84	-	-	QFP80E13A25-3.2-2.7H	500
100	2.0mm	19.7	0.5	SQFP100T19.7-2.0	50	-	-	-	-
14MM x 20MM RECTANGULAR BODY									
64	3.2mm	40	1.0	QFP64T40-3.2	60	QFP64E7A40-3.2		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	QFP100E7A25-3.2	50	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	56mm	44mm
40mm Sq.	3.8mm	-	-

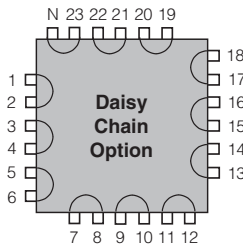




DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	2xL FOOTPRINT ADDER	LEAD PITCH		 Tray Part Number	QTY	7" (180mm)  Tape & Reel Part Number		13" (330mm)  Tape & Reel Part Number		QTY
	MM	MILS	MM			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	-	-	QFP240E13A19.7-2.6	200	
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



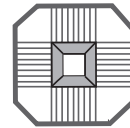
PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

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.

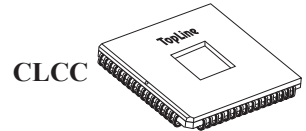
Lead Free option suffix TIN = Sn100.



CERQUAD & CLCC CERAMIC QUAD FLAT PACK



CERQUAD

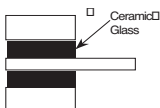


CLCC

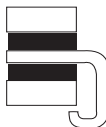
DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	LEAD PITCH		LEAD STYLE	SQUARE BODY SIZE		 Tray Part Number
	MILS	MM		INCH	METRIC (MM)	
28	50	1.27	J-lead	0.45	11.5	CLCC28J50
44	50	1.27	J-lead	0.65	16.5	CLCC44J50
52	50	1.27	J-lead	0.75	19.0	CLCC52J50
68	50	1.27	J-lead	0.95	24.1	CLCC68J50
84	50	1.27	J-lead	1.15	29.3	CLCC84J50
44	50	1.27	Flat	0.562	14.3	CERQUAD44F50
52	50	1.27	Flat	0.75	19.0	CERQUAD52F50
68	50	1.27	Flat	0.95	24.1	CERQUAD68F50
84	25	0.635	Flat	0.65	16.5	CERQUAD84F25
84	50	1.27	Flat	1.06	27.0	CERQUAD84F50
132	25	0.635	Flat	0.95	24.1	CERQUAD132F25
132	25	0.635	Flat	0.87	22.1	CERQUAD132F25
132	25	0.635	Gull-wing	0.87	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	CERQUAD208F19.7A
208	19.7	0.5	Gull-wing	1.10	28.0	CERQUAD208G19.7
240	19.7	0.5	Flat	1.26	32.0	CERQUAD240F19.7A
256	19.7	0.5	Flat	1.42	36.0	CERQUAD256F19.7A
304	19.7	0.5	Gull-wing	1.54	39.1	CERQUAD304G19.7
340	15	0.38	Flat	1.39	35.3	CERQUAD340F15
352	19.7	0.5	Flat	1.89	48.0	CERQUAD352F19.7A

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



FLAT LEAD
ON LEAD FRAME



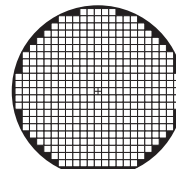
J-LEAD
CLCC



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
Alloy 42 Body	A



DUMMY WAFER ORDERING INFORMATION

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

TYPICAL WAFER THICKNESS BEFORE BACK GRINDING

4" wafer = 525µm (20 mils)
5" wafer = 625µm (24 mils)
6" wafer = 680µm (27 mils)
8" wafer = 725µm (29 mils)
12" wafer = 775µm (31mils)

OPTIONS

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



DUMMY COMPONENT ORDERING INFORMATION

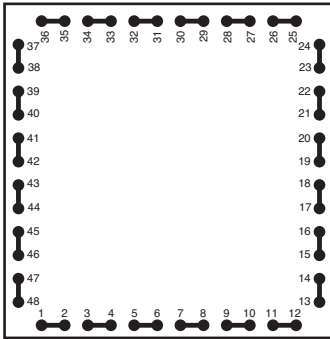
NBR BUMPS	PITCH	BUMP INFORMATION			DIE SIZE METRIC	NOTES	DIE PER BUMPED 5" WAFER QTY	 WAFFLE 2" SQ Tray Part Number	QTY
		HIGH	Ø DIA	MATERIAL					
48	457µm	140	178µm	Eutectic	6.3mm SQ	PB18	236	FC48D6.3E457	25
88	204µm	107	102µm	Eutectic	5.08mm SQ	PB08	340	FC88G5.08E204	36
112	152µm	85	88µm	Eutectic	5.08mm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

PART NUMBERING SYSTEM

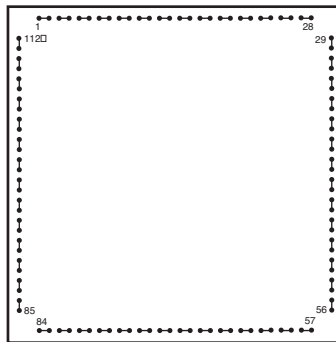
FC 48 D 6.3 E 457 - DC	
Flip Chip FC = Standard Flip Chip FCW = Bumped Wafer FCQ = Quartz Flip Chip FCWQ = Quartz Wafer FCN = Bumpless Chip FCWN = Bumpless Wafer	Die Size In millimeter 6.3 = 6.3mm SQ 10 x 15 = 10mm x 15mm
Number Bumps Actual Count	Bump Pitch in µm (1000m = 1.0µm)
Bump Diameter A = 100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

FLIP CHIP DAISY CHAIN

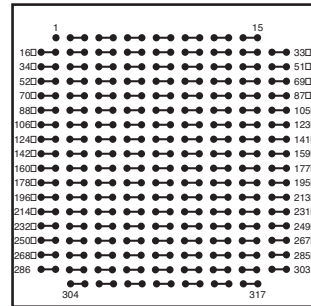
(BUMP VIEW)



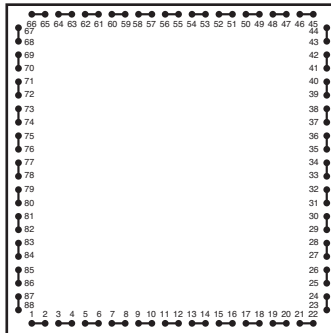
FC48 (PB18 - 250x250)



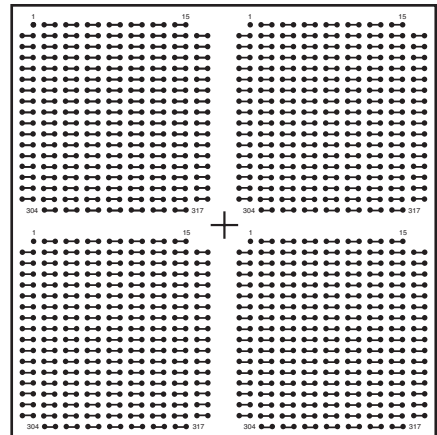
FC112 (PB06 -200x200)



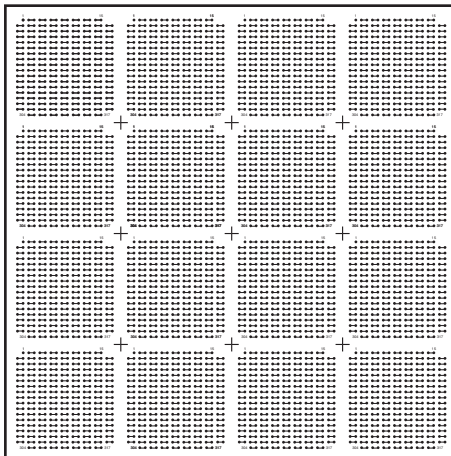
FC317 (FA10-200x200)



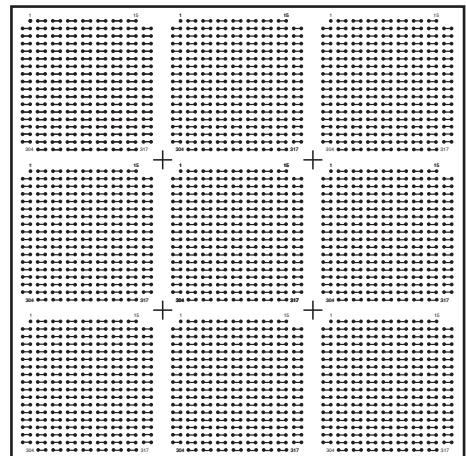
FC88 (PB08 - 200x200)



FC1268 (FA10 - 400x400)



FC5072 (FA10 - 800x800)



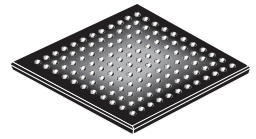
FC2853 (FA10 - 600x600)



WLP - CSP

WAFER LEVEL PRODUCT

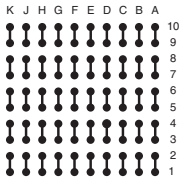
0.3MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	BALL MATRIX	SUBSTRATE	4" Wafer Part Number	QTY
1	100	3.0mm	Full	10x10	Si	WLP100T.3C-DC108D	256
2	144	3.6mm	Ful	12x12	Si	WLP144T.3C-DC127D	256
3	196	4.2mm	Full	14x14	Si	WLP196T.3C-DC148D	196
4	256	4.8mm	Full	16x16	Si	WLP256T.3C-DC168D	144
5	264	6.0mm	6-Row	17x17	Si	WLP264T.3C-DC173D	121
6	400	6.0mm	Full	26x26	Si	WLP400T.3C-DC208D	121
7	676	7.8mm	Full	26x26	Si	WLP676T.3C-DC260D	64
8	900	9.0mm	Full	30x30	Si	WLP900T.3C-DC307D	49

FIG.1



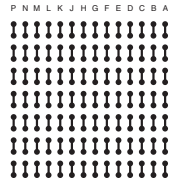
WLP100T.3C-DC108D

FIG.2



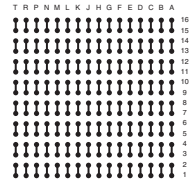
WLP144T.3C-DC127D

FIG.3



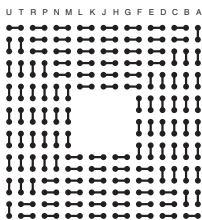
WLP196T.3C-DC148D

FIG.4



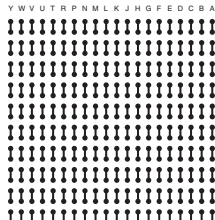
WLP256T.3C-DC168D

FIG.5



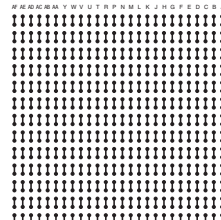
WLP264T.3C-DC173D

FIG.6



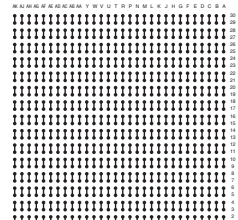
WLP400T.3C-DC208D

FIG.7



WLP676T.3C-DC260D

FIG.8



WLP900T.3C-DC307D

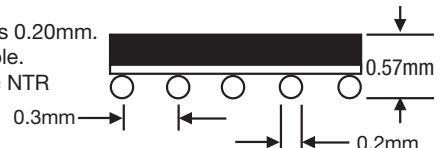
INFO

WLP - Wafer Level CSP. Total package height 0.57mm. Ball diameter is 0.20mm.

Silicon die with copper pillar design. Additional sizes are available.

Tape & Reel change "T" to "E" Diced Wafer Tape on Ring = NTR

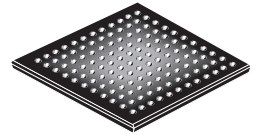
- Lead Free - All items Pb-Free RoHS with SnAgCu balls.



WLP - CSP

WAFER LEVEL PRODUCT

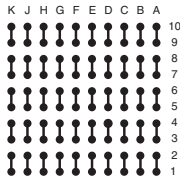
0.4MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

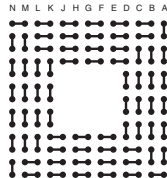
FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	BALL MATRIX	SUBSTRATE	XJ1	4" Waffle Part Number	QTY
1	100	4.0mm	Full	10x10	Si		WLP100T.4C-DC108D	196
2	144	6.0mm	4-Row	13x13	Si		WLP144T.4C-DC133D	144
3	196	5.6mm	Full	14x14	Si		WLP196T.4C-DC148D	121
4	256	6.4mm	Full	16x16	Si		WLP256T.4C-DC168D	81
5	400	8.0mm	Full	20x20	Si		WLP400T.4C-DC208D	64
6	676	10.4mm	Full	26x26	Si		WLP676T.4C-DC260D	49
7	900	12mm	Full	30x30	Si		WLP900T.4C-DC307D	36

FIG. 1



WLP100T.4C-DC108D

FIG. 2



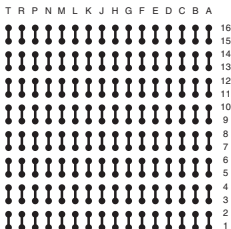
WLP144T.4C-DC133D

FIG. 3



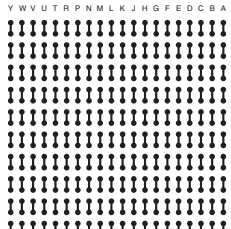
WLP196T.4C-DC148D

FIG. 4



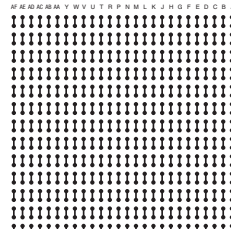
WLP256T.4C-DC168D

FIG. 5



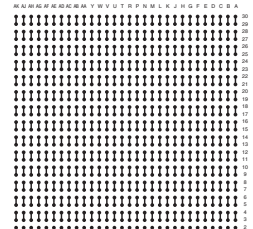
WLP400T.4C-DC208D

FIG. 6



WLP676T.4C-DC260D

FIG. 7



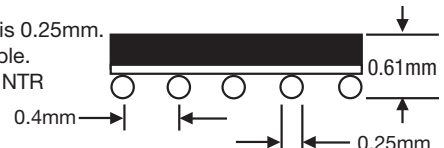
WLP900T.4C-DC307D

WLP - Wafer Level CSP. Total package height 0.61mm. Ball diameter is 0.25mm.

Silicon die with copper pillar design. Additional sizes are available.

Tape & Reel change "T" to "E" Diced Wafer Tape on Ring = NTR

☑ - Lead Free - All items Pb-Free RoHS with SnAgCu balls.

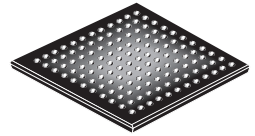




BGA - CSP

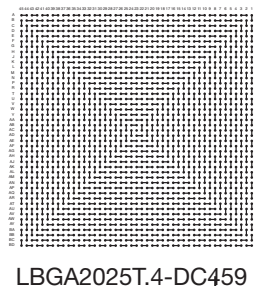
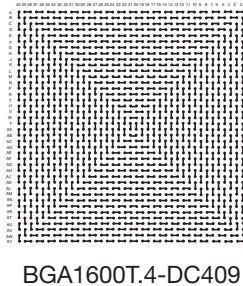
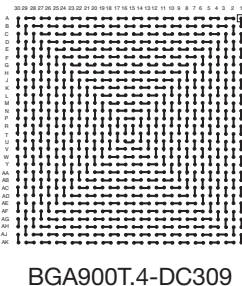
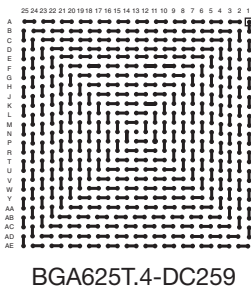
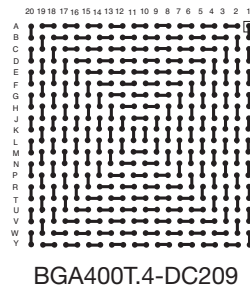
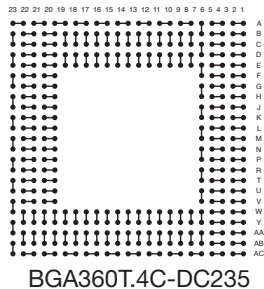
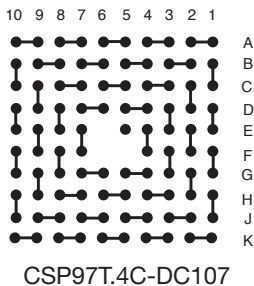
BALL GRID ARRAY

0.4MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

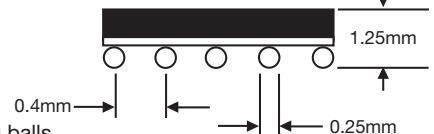
FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	BALL MATRIX	SUBSTRATE	Tray Part Number XJ1	QTY
1	97	5mm	Full	10x10	BT	CSP97T.4C-DC107	624
2	360	10mm	5-Row	23x23	BT	BGA360T.4C-DC235	250
3	400	10mm	Full	20x20	BT	BGA400T.4-DC209	240/250
4	625	12mm	Full	25x25	BT	BGA625T.4-DC259	189
5	900	15mm	Full	30x30	BT	BGA900T.4-DC309	126
6	1600	17mm	Full	40x40	BT	BGA1600T.4-DC409	90
7	2025	21mm	Full	45x45	BT	LBGA2025T.4-DC459	60



BGA - FR4 and BT Substrate. Ball diameter is 0.25mm.
For Internal Die, add suffix -D to end of part number
Depopulated "perimeter" rows are available.



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

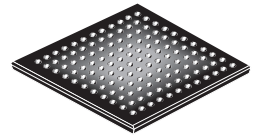




WLP - CSP

WAFER LEVEL PRODUCT

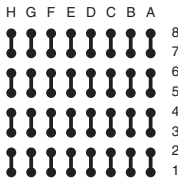
0.5MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

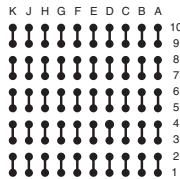
FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	BALL MATRIX	SUBSTRATE	XJ1	4" Wafer Part Number	QTY
1	64	4.0mm	Full	8x8	Si		WLP64T.5C-DC088D	196
2	100	5.0mm	Full	10x10	Si		WLP100T.5C-DC108D	144
3	144	6.0mm	Full	12x12	Si		WLP144T.5C-DC127D	121
4	196	7.0mm	Full	14x14	Si		WLP196T.5C-DC148D	81
5	256	8.0mm	Full	16x16	Si		WLP256T.5C-DC168D	64
6	400	10mm	Full	20x20	Si		WLP400T.5C-DC208D	49
7	676	13mm	Full	26x26	Si		WLP676T.5C-DC260D	36
8	900	15mm	Full	30x30	Si		WLP900T.5C-DC307D	25

FIG.1



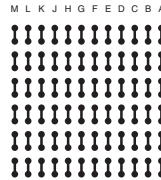
WLP64T.5C-DC088D

FIG.2



WLP100T.5C-DC108D

FIG.3



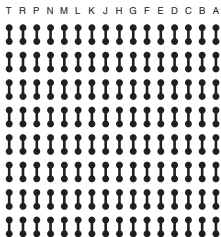
WLP144T.5C-DC127D

FIG.4



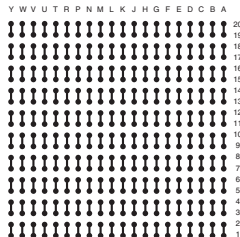
WLP196T.5C-DC148D

FIG.5



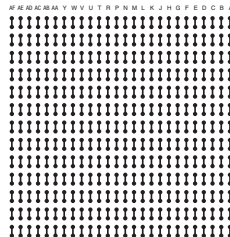
WLP256T.5C-DC168D

FIG.6



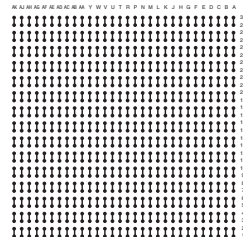
WLP400T.5C-DC208D

FIG.7



WLP676T.5C-DC260D

FIG.8



WLP900T.5C-DC307D

INFO

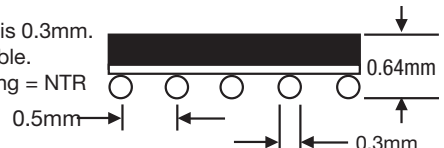
WLP - Wafer Level CSP. Total package height 0.64mm. Ball diameter is 0.3mm.

Silicon die with copper pillar design. Additional sizes are available.

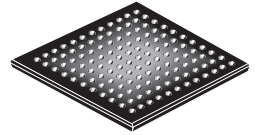
Tape & Reel change "T" to "E"

Diced Wafer Tape on Ring = NTR

- Lead Free - All items Pb-Free RoHS with SnAgCu balls.

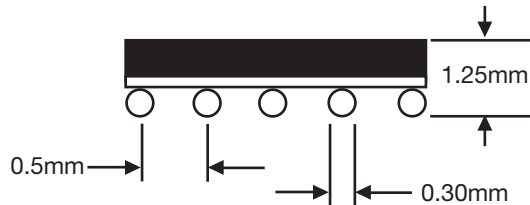


CSP BALL GRID ARRAY 0.5MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL ALIGNMENT	HEIGHT	BALL MATRIX	SUBSTRATE	Tray Part Number XJ1	QTY
1	6	1.5 x 1.0mm	Full	0.65mm	3 x 2	Si	CSP6E7A.5-DC023	Reel
2	40	5mm	2-Row	1.24mm	8 x 8	BT	CSP40T.5-DC082	624
3	56	6mm	2-Row	1.24mm	10 x 10	BT	CSP56T.5-DC102	608
4	84	6mm	3-Row	1.1mm	10 x 10	BT	CSP84T.5-DC104	608
5	84	7mm	3-Row	1.1mm	12 x 12	BT	CSP84T.5-DC123	476
6	96	8mm	2-Row	1.24mm	14 x 14	Pi	fBGA96T.5-DC144	360
7	132	8mm	3-Row	1.1mm	14 x 14	BT	CSP132T.5-DC145	360
8	228	12mm	3-Row	1.1mm	22 x 22	BT	LBGA228T.5-DC222	189
9	288	12mm	4-Row	1.1mm	22 x 22	BT	LBGA288T.5-DC221	189
10	484	12mm	Full	1.1mm	22 x 22	BT	LBGA484T.5-DC229	189
11	2025	25mm	Full	1.8mm	45 x 45	BT	LBGA2025T.5-DC459	44

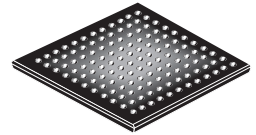


CSP - BT substrate. Total package height 1.25mm. Ball diameter is 0.3mm.
For Internal Die, add suffix -D to end of part number

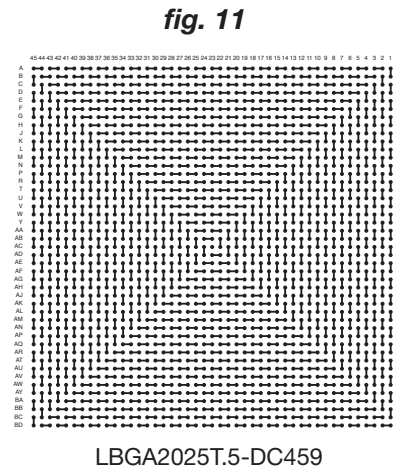
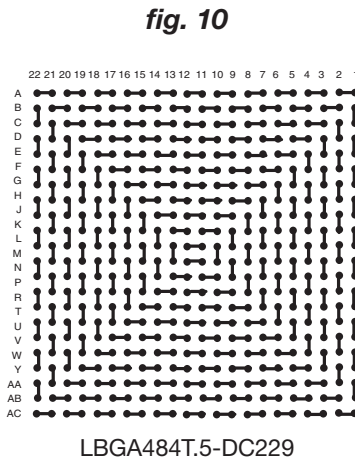
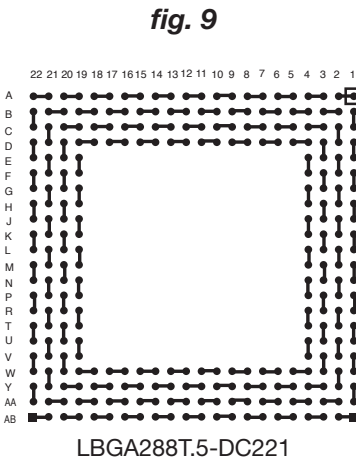
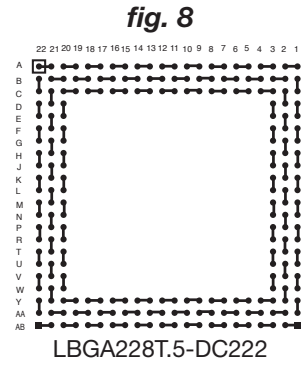
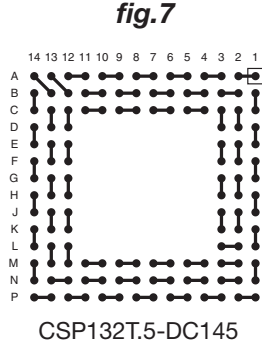
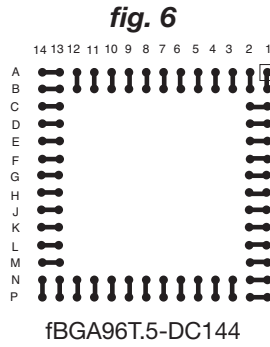
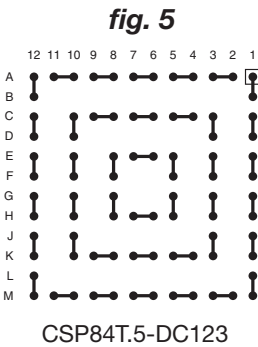
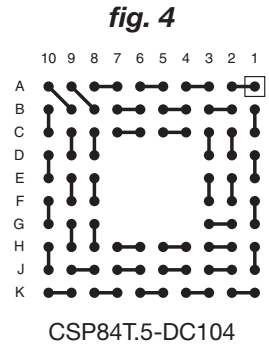
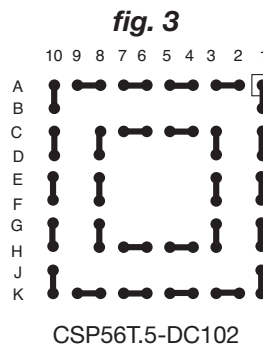
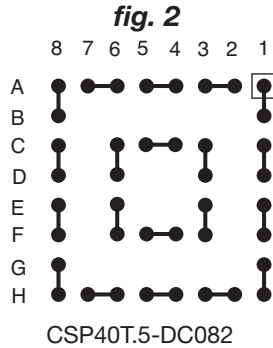
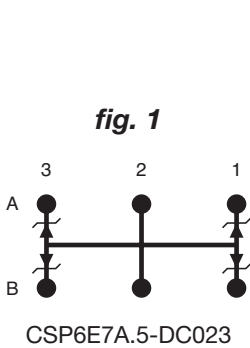


- Lead free option: Add "C" after pitch in part number for SnAgCu balls.

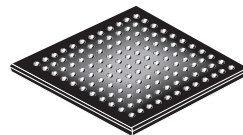
CSP BALL GRID ARRAY 0.5MM PITCH



BALL VIEW



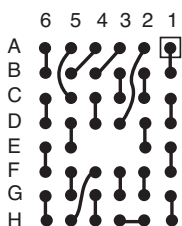
BGA & CSP BALL GRID ARRAY 0.65~0.8MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

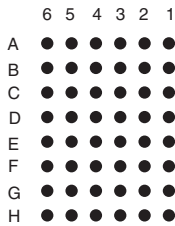
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	PITCH	BALL MATRIX	SUBSTRATE	 Tray Part Number	QTY
1A	46	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA46T.75-DC24	160
1C	48	6 x 7mm	Full	0.75mm	6 x 8	BT	BGA48T.75-6x8	160
2	36	6mm	Full	0.8mm	6 x 6	BT	BGA36T.8-DC069	608
1B	48	8 x 9mm	Full		6 x 8	FR4	LBGA48T.8-DC689	297
3	49	7mm	Full		7 x 7	BT	BGA49T.8-DC077	476
4	64	8mm	Full		8 x 8	BT	BGA64T.8-DC089	360
5	81	8mm	Full		9 x 9	BT	BGA81T.8-DC099	360
6	100	10mm	Full		10 x 10	BT	BGA100T.8-DC109	250
7	112	10mm	4-Row		11 x 11	FR4	LBGA112T.8-DC114	184
8	144	12mm	Full		12 x 12	FR4	LBGA144T.8-DC128	189
9	144	12mm	4-Row		13 x 13	FR4	LBGA144T.8-DC134	168/198
10	208	15mm	4-Row		17 x 17	BT	BGA208T.8-DC170	126
11	280	17mm	5-Row		19 x 19	FR4	LBGA280T.8-DC195	90
12	532	23mm	7-Row		26 x 26	FR4	LBGA532T.8-DC266	60
13	676	23mm	Full		26 x 26	BT	BGA676T.8-DC269	60
14	2025	40mm	Full		45 x 45	BT	LBGA2025T.8-DC459D	21
-	336	15mm	6-Row	0.65mm	20x20	FR4	BGA336T.65-DC203D	126
15	2025	32.5mm	Full	0.65mm	45 x 45	BT	LBGA2025T.65DC459D	24

fig. 1A



BGA46T.75-DC24

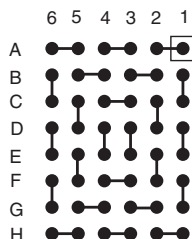
fig. 1C



BGA48T.75-6x8

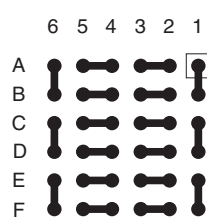
Ball View

fig. 1B



LBGA48T.8-DC689

fig. 2



BGA36T.8-DC069

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

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

LBGA -FR4 features near CSP dimensions with unencapsulated body.

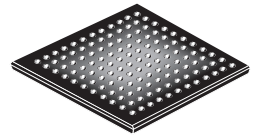
Eutectic Sn63 solder balls 0.46mm diameter.



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

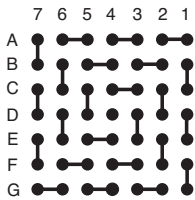


BGA & CSP BALL GRID ARRAY 0.75~0.8MM PITCH



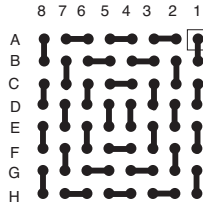
BALL VIEW

fig. 3



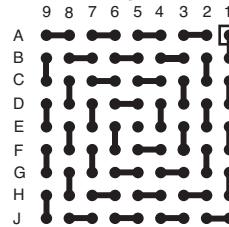
BGA49T.8-DC077

fig. 4



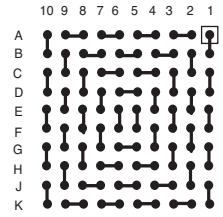
LBGA64T.8-DC089

fig. 5



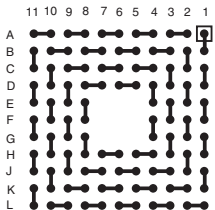
BGA81T.8-DC099

fig. 6



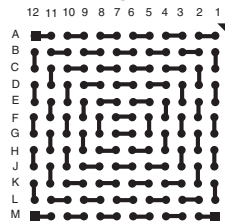
BGA100T.8-DC109

fig. 7



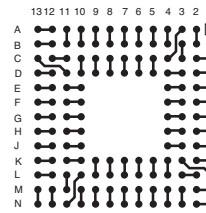
LBGA112T.8-DC114

fig. 8



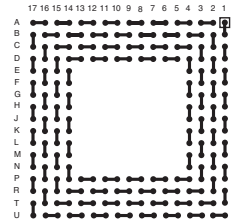
LBGA144T.8-DC128

fig. 9



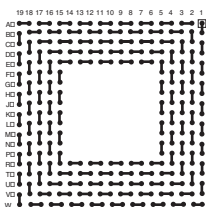
LBGA144T.8-DC134

fig. 10



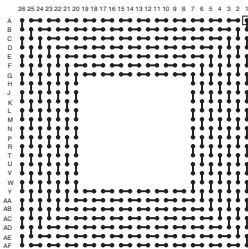
LBGA208T.8-DC170

fig. 11



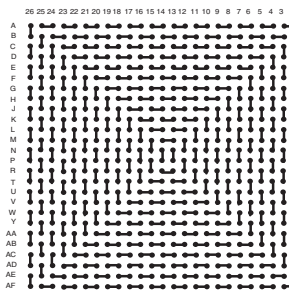
LBGA280T.8-DC195

fig. 12



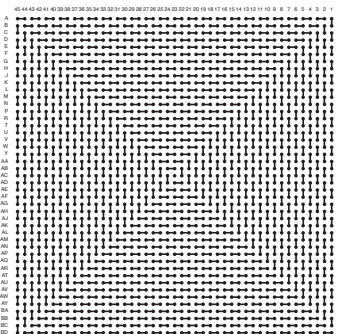
LBGA532T.8-DC266

fig. 13



LBGA676T.8-DC269

fig. 14~15

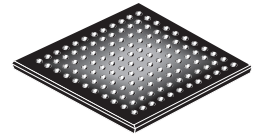


LBGA2025T.8-DC459
LBGA2025T.65-DC459

BGA

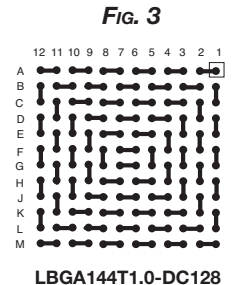
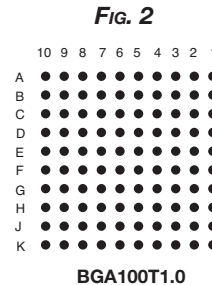
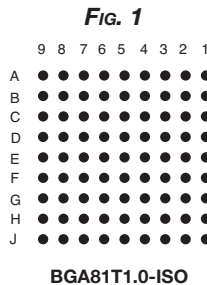
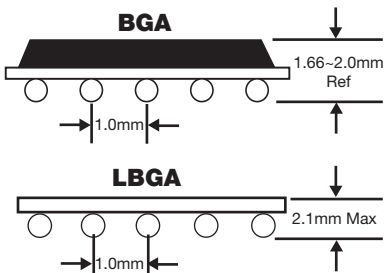
PLASTIC BALL GRID ARRAY

1.0MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

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



I N F O

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

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

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

BGA

PLASTIC BALL GRID ARRAY

1.0MM PITCH

BALL VIEW

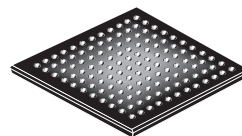
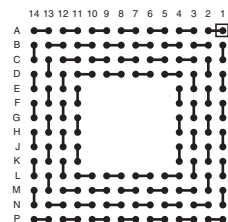
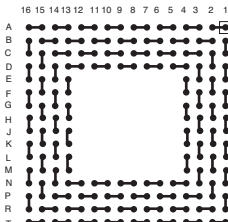


Fig. 4



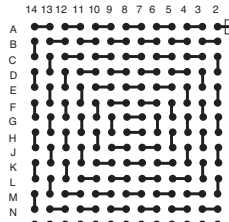
BGA160T1.0-DC147A

Fig. 5



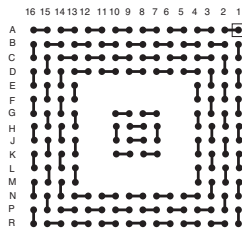
BGA192T1.0-DC160A

Fig. 6



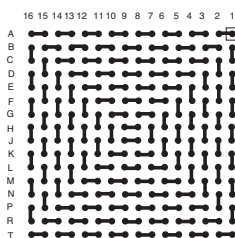
BGA196T1.0-DC149A

Fig. 7



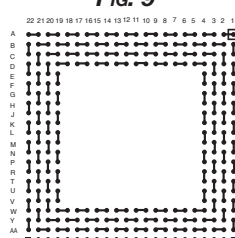
BGA208T1.0-DC164A

Fig. 8



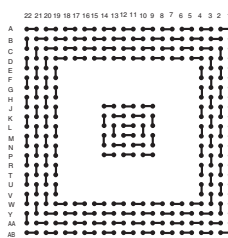
BGA256T1.0-DC169A

Fig. 9



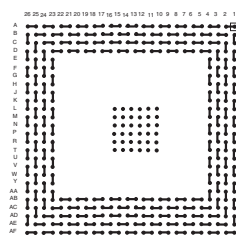
BGA288T1.0-DC221

Fig. 10



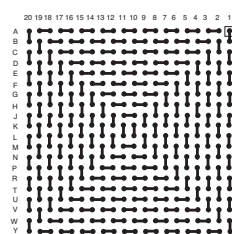
BGA324T1.0-DC224

Fig. 11



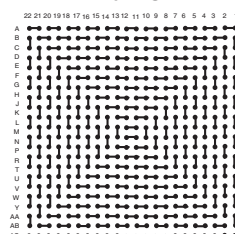
BGA388T1.0-DC264

Fig. 12



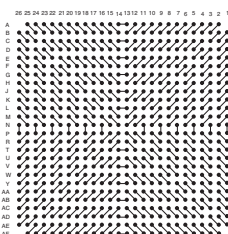
LBGA400T1.0-DC209

Fig. 13



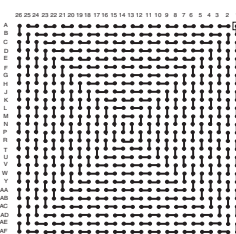
LBGA484T1.0-DC229A

Fig. 14



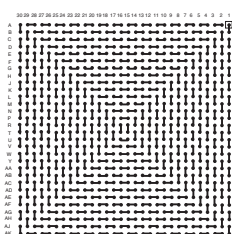
LBGA672T1.0-DC268

Fig. 15



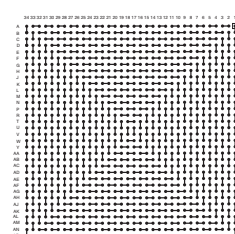
BGA676T1.0-DC269

Fig. 16



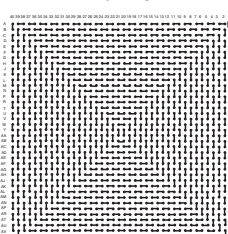
LBGA900T1.0-DC309

Fig. 17



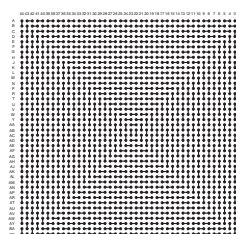
LBGA1156T1.0-DC349

Fig. 18



LBGA1600T1.0-DC409

Fig. 19

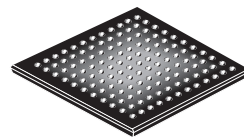


LBGA1936T1.0-DC449

BGA

PLASTIC BALL GRID ARRAY

1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR BALLS	BODY SIZE	BALL PATTERN	CENTER BALL	BALL MATRIX	 Tray Part Number STANDARD	 Tray Part Number UNENCAPSULATED	QTY
1	208	23mm	4-Row	-0-	17 x 17	BGA208T1.27-DC170	-	60
2	208	23mm	4-Row	-0-	17 x 17	BGA208T1.27-DC171	-	60
3	217	23mm	4-Row	3 x 3	17 x 17	BGA217T1.27-DC172	-	60
4	217	23mm	4-Row	3 x 3	17 x 17	BGA217T1.27-DC174	-	60
5	256	27mm	4-Row	-0-	20 x 20	BGA256T1.27-DC200	-	40
6	256	21mm	Full	-0-	16 x 16	-	LBGA256T1.27-DC61	60
7	272	27mm	4-Row	4 x 4	20 x 20	BGA272T1.27-DC202	-	40
8	352	35mm	4-Row	-0-	26 x 26	BGA352T1.27-DC70	-	24
9	357	25mm	Full	NA	19 x 19	-	LBGA357T1.27-DC73	24
10	388	35mm	4-Row	6 x 6	26 x 26	BGA388T1.27-DC72	-	24
11	1225	45mm	Full	-0-	35 x 35	-	LBGA1225T1.27-DC359	12

SIDE VIEW

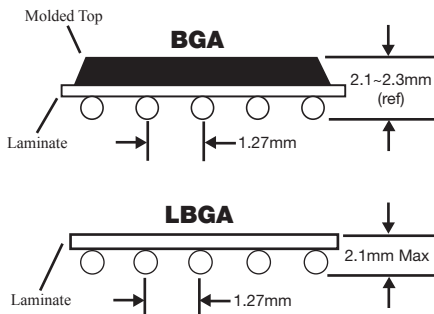
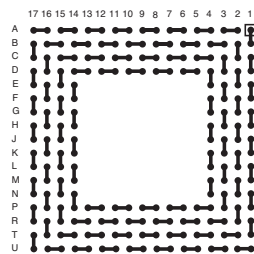
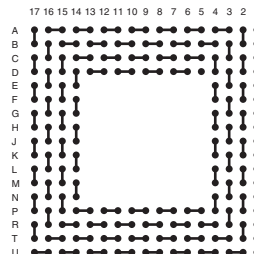


FIG. 1



BGA208T1.27-DC170

FIG. 2



BGA208T1.27-DC171

INFO BGA - Standard BGA plastic packages should be baked at 125°C for 24 hours prior to assembly to prevent delamination and the “popcorn” phenomena during the assembly process. Solder balls are eutetic Sn63/Pb37 30mil (0.75mm)

LBGA - Laminate Ball Grid Arrays offer the lowest cost when placement practice is the primary concern. Includes daisy chain laminate with 30mil (0.75mm) Sn63/Pb37 balls for soldering at 210°C.

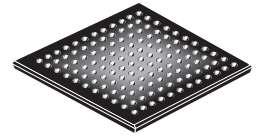
 - Lead Free available. SnAgCu = Add “C” after pitch in part number.



BGA

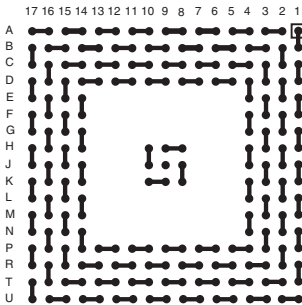
PLASTIC BALL GRID ARRAY

1.27MM PITCH



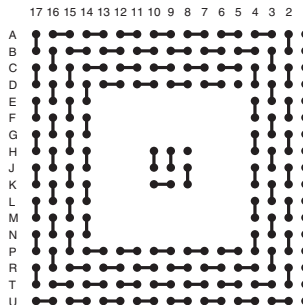
BALL VIEW

FIG. 3



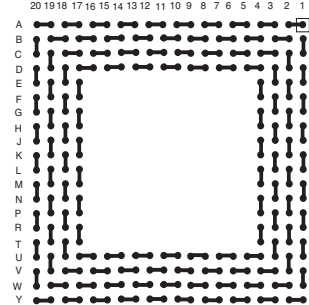
BGA217T1.27-DC172

FIG. 4



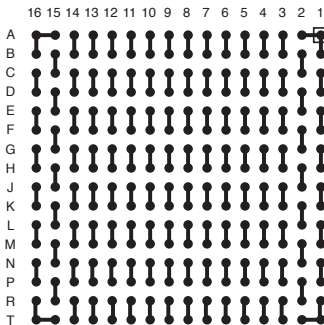
BGA217T1.27-DC174

FIG. 5



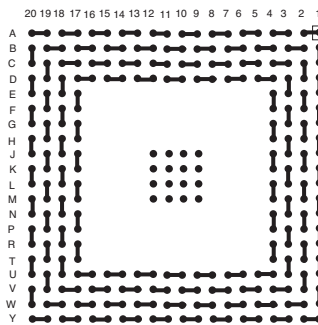
BGA256T1.27-DC200

FIG. 6



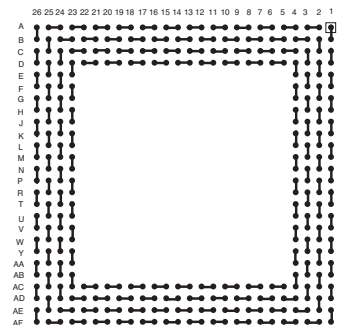
LPGA256T1.27-DC61

FIG. 7



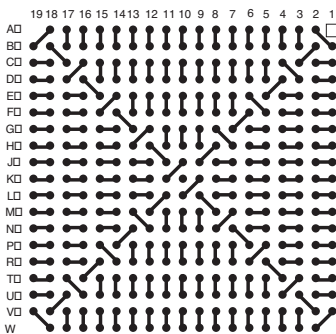
BGA272T1.27-DC202

FIG. 8



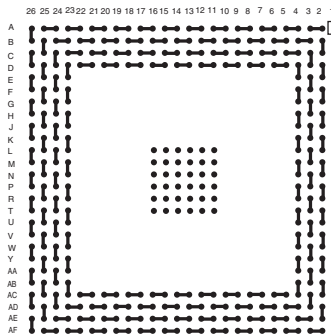
BGA352T1.27-DC70

FIG. 9



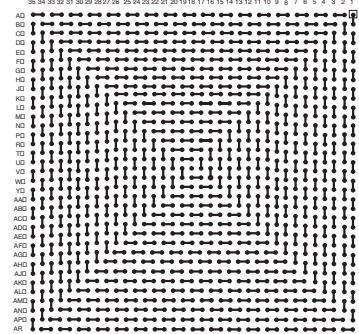
LPGA357T1.27-DC73

FIG. 10



BGA388T1.27-DC72

FIG. 11



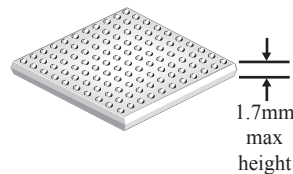
LPGA1225T1.27-DC359



CBGA

CERAMIC BALL GRID ARRAY

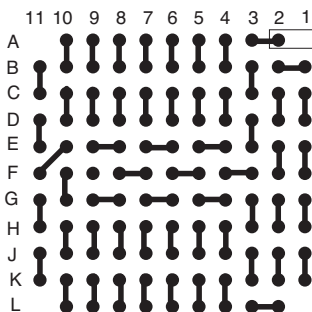
1.27MM PITCH



DUMMY COMPONENT ORDERING INFORMATION

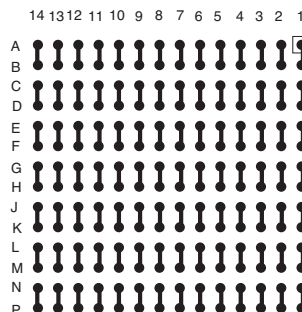
FIG	NBR BALLS	BODY SIZE	BALL PATTERN	BALL MATRIX	 Tray Part Number LOW TEMP 210°C XJ1 62/36/2 SnPbAg	 Tray Part Number HIGH TEMP 320°C XJ1 10/90 SnPb	QTY
1	121	15mm	Full Grid	11 x 11	CBGA121T1.27L-DC5	CBGA121T1.27-DC5	126
2	196	18.5mm	Full Grid	14 x 14	CBGA196T1.27L-DC11	CBGA196T1.27-DC11	84
3	256	21mm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

FIG. 1



CBGA121T1.27-DC5
(BALL VIEW)

FIG. 2



CBGA196T1.27-DC11
(BALL VIEW)

Ceramic Ball Grid Arrays are not sensitive to moisture and do not require baking prior to assembly. Ball diameter is 30 mils (0.75mm). Standard ball material is Sn10/Pb90 for high temperature soldering at 320°C to ceramic substrate. For low temperature soldering at 210°C to laminate substrate, specify Sn62/Pb36/Ag2 solder balls by adding -L to part number. Caution advised CTE mismatch > 25mm.



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

CBGA - CERAMIC BALL GRID ARRAY - 1.27MM PITCH

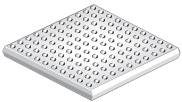
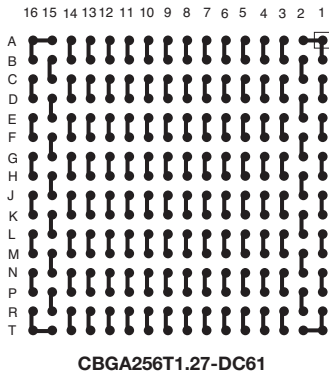
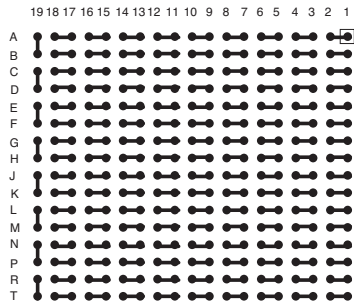


Fig. 3 (BALL VIEW)



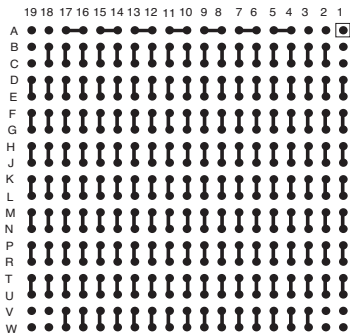
CBGA256T1.27-DC61

Fig. 4



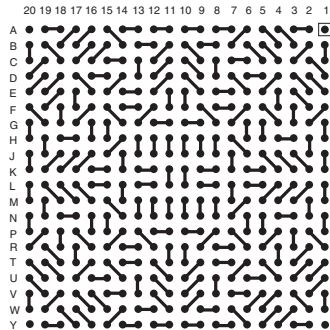
CBGA304T1.27-DC63

Fig. 5



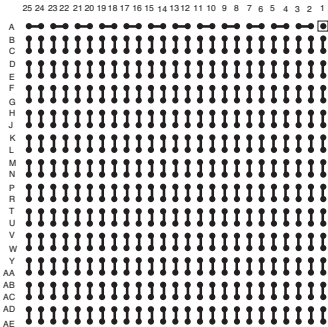
CBGA361T1.27-DC71

Fig. 6



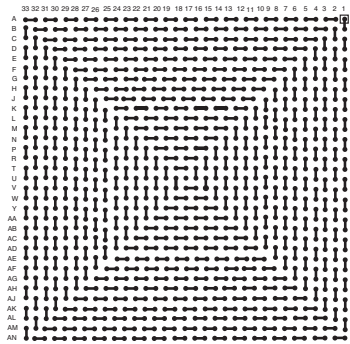
CBGA400T1.27-DC21

Fig. 7



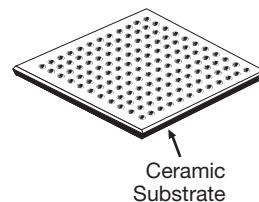
CBGA625T1.27-DC81

Fig. 8



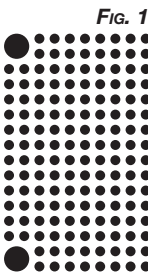
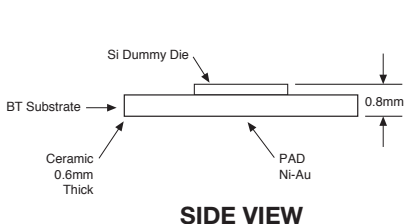
CBGA1089T1.27-DC339

CLGA CERAMIC LAND GRID ARRAY 0.5 ~ 0.8mm PITCH

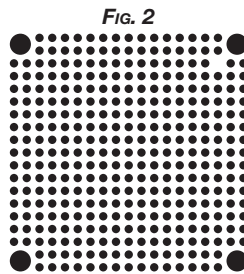


DUMMY COMPONENT ORDERING INFORMATION

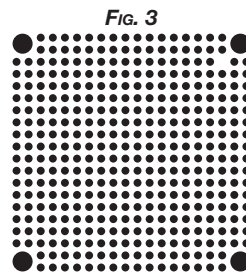
FIG	NBR PADS	BODY SIZE	PITCH	PAD MATRIX	PAD DIAMETER	DIE SIZE MIN-MAX	Tray Part Number XJ1	QTY
1	239	9mm	0.5mm	16x16	0.3mm	6mm	CLGA239T.5G-DC167D	260
2	344	13mm	0.65mm	19x19	0.4mm	8mm	CLGA344T.65G-DC197D	160
3	383	17mm	0.8mm	20x20	0.5mm	10mm	CLGA383T.8G-DC204D	90
4	559	13mm	0.5mm	24x24	0.3mm	8mm	CLGA559T.5G-DC247D	160
5	608	17mm	0.65mm	25x25	0.4mm	10mm	CLGA608T.65G-DC256D	90
5	608	21mm	0.8mm	25x25	0.5mm	12mm	CLGA608T.8G-DC256D	60
6	944	21mm	0.65mm	31x31	0.4mm	12mm	CLGA944T.65G-DC317D	60
7	1007	17mm	0.5mm	32x32	0.3mm	10mm	CLGA1007T.5G-DC327D	90



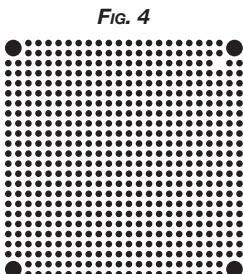
CLGA239T.5G-DC167D



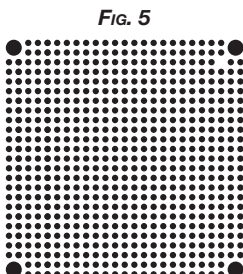
CLGA344T.65G-DC197D



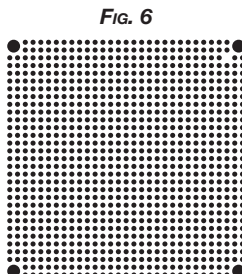
CLGA383T.8G-DC204D



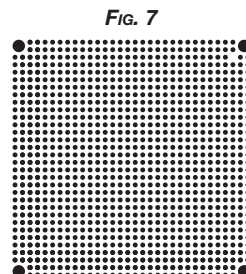
CLGA559T.5G-DC247D



CLGA608T.65G-DC256D



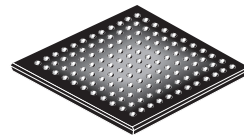
CLGA944T.65G-DC317D



CLGA1007T.5G-DC327D



BGA PLASTIC BALL GRID ARRAY 1.5MM PITCH

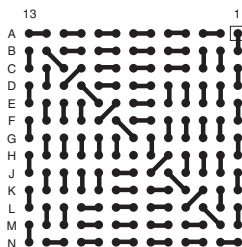


DUMMY COMPONENT ORDERING INFORMATION

NBR FIG	BODY BALLS	BALL SIZE	BALL PATTERN	MATRIX	 Tray Part Number	QTY
					XJ1	
1	169	23mm	Full Array	13 x 13	BGA169T1.5-DC10	60
2	225	27mm	Full Array	15 x 15	BGA225T1.5-DC15	40

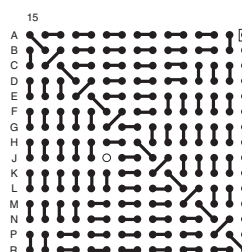
BGA DAISY CHAIN PATTERNS (BALL VIEW) - ILLUSTRATIONS NOT TO SCALE

Fig. 1



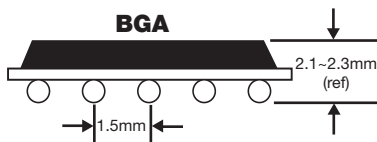
BGA169T1.5-DC10

Fig. 2



BGA225T1.5-DC15

SIDE 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 eutectic 63/37 SnPb 30mil (0.75mm)

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

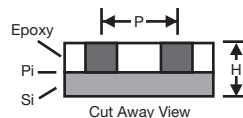


BGA

MAXIMUM BALL COUNT

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

eWLP EMBEDDED CSP DIE 0.3 ~ 0.4mm PITCH



DUMMY COMPONENT ORDERING INFORMATION

FIG	NBR PADS	DIE SIZE	(P) PITCH	PAD MATRIX	PAD DIAMETER	(H) DIE THICKNESS	 XJ1 Tray Part Number	QTY
1	4	0.56mm	0.3mm	2x2	0.15mm	200um and 360um	eWLP4T.3-DC022	400
2	16	1.16mm		4x4			eWLP16T.3-DC048	400
3	36	1.76mm		6x6			eWLP36T.3-DC067	225
4	64	2.36mm		8x8			eWLP64T.3-DC088	100
5	100	2.96mm		10x10			eWLP100T.3-DC108	100
6	144	3.56mm		12x12			eWLP144T.3-DC127	100
7	196	4.16mm		14x14			eWLP196T.3-DC148	49
1	4	0.76mm	0.4mm	2x2	0.20mm	200um and 360um	eWLP4T.4-DC022	625
2	16	1.56mm		4x4			eWLP16T.4-DC048	100
3	36	2.36mm		6x6			eWLP36T.4-DC067	100
4	64	3.16mm		8x8			eWLP64T.4-DC088	100
5	100	3.96mm		10x10			eWLP100T.4-DC108	49
6	144	4.76mm		12x12			eWLP144T.4-DC127	64
7	196	5.56mm		14x14			eWLP196T.4-DC148	36

Fig. 1

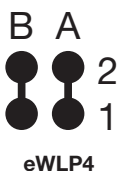


Fig. 2

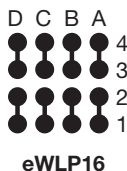


Fig. 3

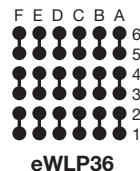


Fig. 4

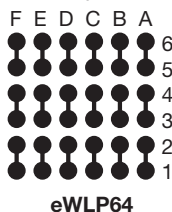


Fig. 5

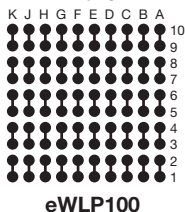


Fig. 6

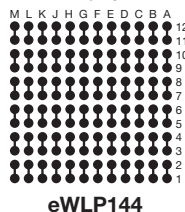
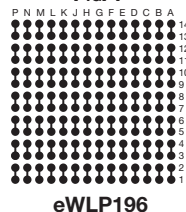
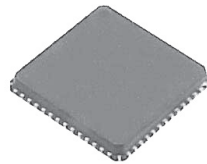


Fig. 7



IN
FO

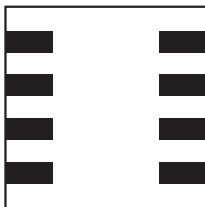
eWLP - New generation of thin CSP silicon die with copper (Cu) posts without surface treatment.
Application is embedding die inside PC boards.
Die thickness: 200um or 360um. Available die face up and face down.
Packaging available: Waffle Pack, T&R and Wafer on UV Tape and Ring.



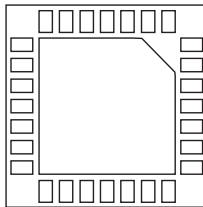
DUMMY COMPONENT ORDERING INFORMATION

BODY SIZE SQ	NBR LEAD		TAPE INFO		Tray Part Number	QTY	Tube Part Number	QTY
	LEADS	PITCH	WIDTH	PITCH				
QFN								
2mm	6	0.5mm	8mm	8mm	DFN6E7A.5	Reel	DFN6B.5	Bulk
2mm	8	0.5mm			DFN8E7A.5	Reel	DFN8B.5	Bulk
2mm	6	0.65mm			DFN6E7A.65	Reel	DFN6B.65	Bulk
2mm	8	0.5mm			DFN8E7A.5	Reel	DFN8B.5	Bulk
3mm	10	0.5mm			DFN10T.5	490	DFN10M.5	121
3mm	12	0.5mm	12mm	8mm	QFN12T.5	490	QFN12M.5	121
4mm	12	0.65mm			QFN12T.65	490	QFN12M.65	91
3mm	16	0.5mm			QFN16T.5	490	QFN16M.5	121
4mm	16	0.65mm			QFN16T.65	490	QFN16M.65	91
5mm	16	0.8mm			QFN16T.8	490	QFN16M.8	73
4mm	20	0.5mm			QFN20T.5	490	QFN20M.5	91
4mm	24	0.5mm			QFN24T.5	490	QFN24M.5	91
6mm	24	0.8mm			QFN24T.8	490	QFN24M.8	61
5mm	28	0.5mm			QFN28T.5	490	QFN28M.5	73
5mm	32	0.5mm			QFN32T.5	490	QFN32M.5	73
6mm	28	0.65mm			QFN28T.65	490	QFN28M.65	61
8mm	32	0.8mm	16mm	12mm	QFN32T.8	260	QFN32M.8	46
7mm	32	0.65mm	12mm	18mm	QFN32T.65	260	QFN32M.65	42
6mm	40	0.5mm			QFN40T.5	490	QFN40M.5	61
7mm	44	0.5mm	16mm	12mm	QFN44T.5	260	QFN44M.5	52
8mm	44	0.65mm			QFN44T.65	260	QFN44M.65	46
7mm	48	0.5mm			QFN48T.5	260	QFN48M.5	42
8mm	52	0.5mm			QFN52T.5	260	QFN52M.5	37
8mm	56	0.5mm			QFN56T.5	260	QFN56M.5	37
9mm	64	0.5mm	24mm	16mm	QFN64T.5	260	QFN64M.5	33
10mm	68	0.5mm			QFN68T.5	168	QFN68M.5	30
10mm	72	0.5mm			QFN72T.5	168	QFN72M.5	30
12mm	80	0.5mm			QFN80T.5	189	-	-

Bottom View of Pads



DFN - DUAL SIDE

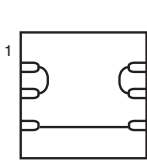


QFN

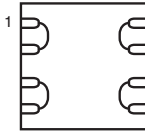
PART NUMBER

Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)
Lead Free	-F (NiPdAu)
Lead Free	-G (NiAu)

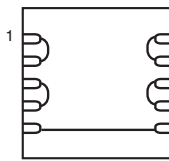
DAISY CHAIN (TOP VIEW)



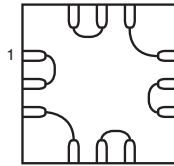
6L



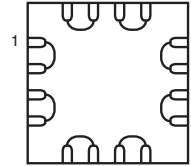
8L



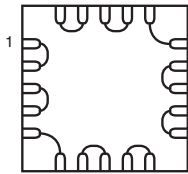
10L



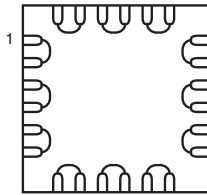
12L



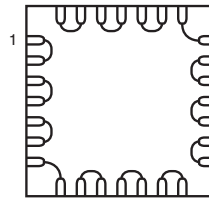
16L



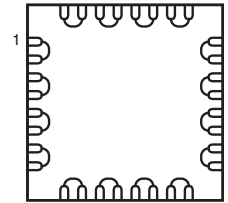
20L



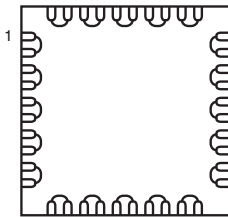
24L



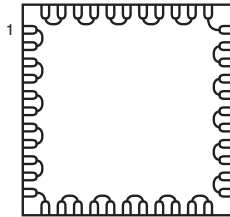
28L



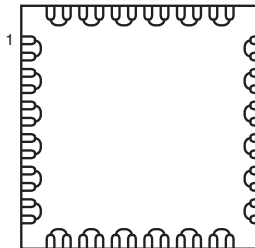
32L



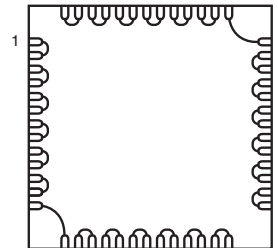
40L



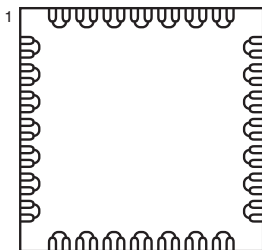
44L



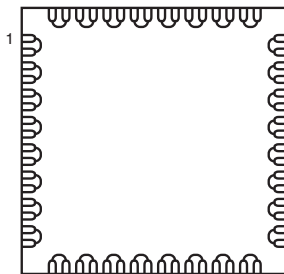
48L



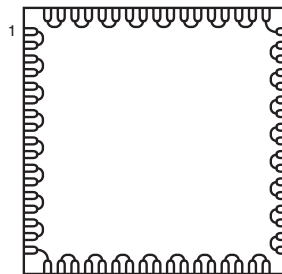
52L



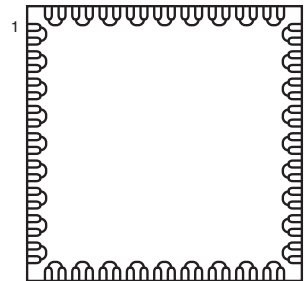
56L



64L



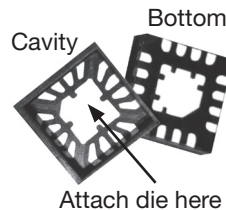
68L



72L

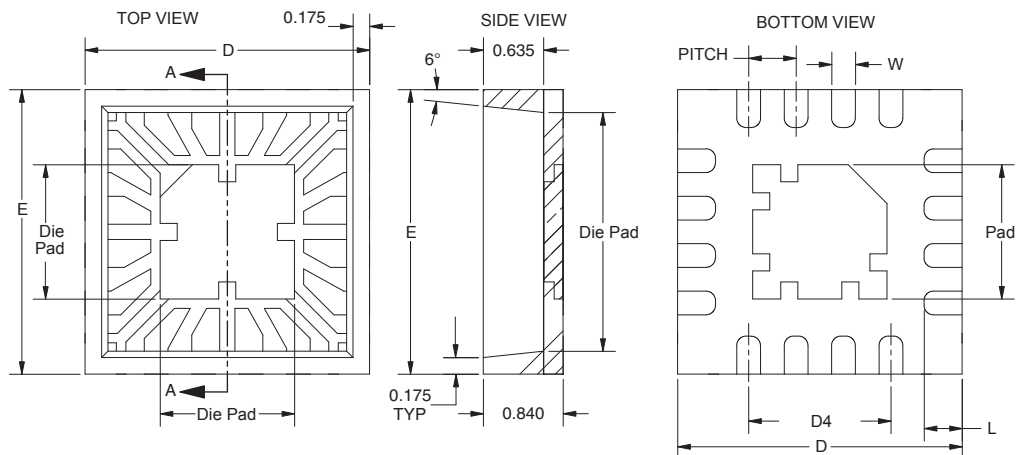
OPEN CAVITY M-QFN ATTACH YOUR DIE

See details pages 152-155



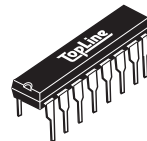
ORDERING INFORMATION

BODY SIZE SQ	NBR LEAD		DIE PAD SIZE mm	PART NUMBER	CERAMIC LID PART NBR (OPTIONAL)
	LEADS	PITCH			
Open Cavity					
3mm	8	0.65mm	1.4 SQ	M-QFN8W.65	C-LID3-BLACK
3mm	12	0.5mm	1.4 SQ	M-QFN12W.5	C-LID3-BLACK
3mm	16	0.5mm	1.4 SQ	M-QFN12W.5	C-LID3-BLACK
4mm	16	0.65mm	2.4 SQ	M-QFN16W.65	C-LID4-BLACK
4mm	20	0.5mm	2.4 SQ	M-QFN20W.5	C-LID4-BLACK
4mm	24	0.5mm	2.4 SQ	M-QFN24W.5	C-LID4-BLACK
5mm	28	0.5mm	3.4 SQ	M-QFN28W.5	C-LID5-BLACK
5mm	32	0.5mm	3.4 SQ	M-QFN32W.5	C-LID5-BLACK
5mm	40	0.4mm	3.4 SQ	M-QFN40W.4	C-LID5-BLACK
6mm	40	0.5mm	4.4 SQ	M-QFN40W.5	C-LID6-BLACK
6mm	48	0.4mm	4.4 SQ	M-QFN48W.4	C-LID6-BLACK
7mm	48	0.5mm	5.4 SQ	M-QFN48W.5	C-LID7-BLACK
8mm	56	0.5mm	6.4 SQ	M-QFN56W.5	C-LID8-BLACK
10mm	72	0.5mm	8.4 SQ	M-QFN72W.5	C-LID10-BLACK
12mm	80	0.5mm	10.4 SQ	M-QFN80W.5	C-LID12-BLACK

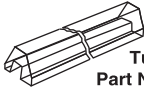


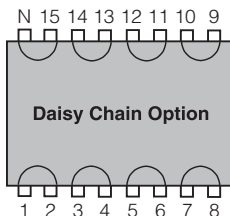


DIP DUAL INLINE PACKAGE



DUMMY COMPONENT ORDERING INFORMATION

NBR LEADS	CASE LENGTH INCH	CASE LENGTH METRIC	 Tube Part Number	QTY
300 MIL WIDE BODY				
2	.100	2.54mm	DIP2M3	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

PART NUMBER	
Options	Suffix
Standard	Blank
Daisy Chain	-DE
Isolated	-ISO
Lead Free	-TIN (Sn100)

INFO

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.

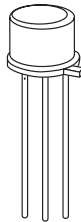


DUMMY COMPONENT ORDERING INFORMATION

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	-	-
Plastic	Solder	TO92-.2" 100	-	TO92T-.2" 2000
Metal	Solder	TO99 25	-	-
Plastic	Solder	TO220-3 25	TO220M-3 50	-
Metal	Nickel	TO254 25	-	-

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

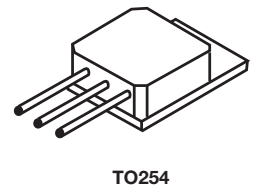
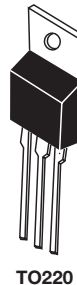
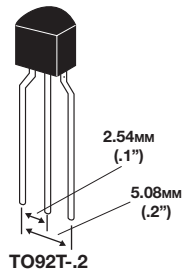
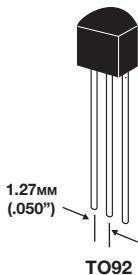
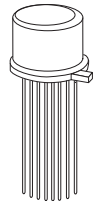
TO5 (1.25" LEAD LENGTH)
TO39 (.75" LEAD LENGTH)



TO18



TO75 6 LEAD
TO99 8 LEAD





SOLDER TERMINALS

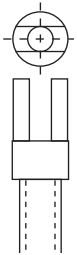
For Hand Soldering Proficiency

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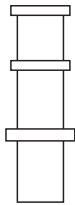
IPC COMPLIANT

DUMMY COMPONENT ORDERING INFORMATION

TERMINAL TYPE	 XM0 Bulk Part Number		 XM0 Bulk Part Number		 XM0 Bulk Part Number		 XM0 Bulk Part Number	
	PN	QTY	PN	QTY	PN	QTY	PN	QTY
Bifurcated	103005	5	103025	25	103100	100	103999	1000
Gold Cup	104005	5	104025	25	104100	100	104999	1000
Hook	105005	5	105025	25	105100	100	105999	1000
Pierced	106005	5	106025	25	106100	100	106999	1000
Turret	107005	5	107025	25	107100	100	107999	1000
20 AWG Wire Black	108020	5FT	108120	100 FT	108520	1000 FT	108920	5000 FT
22 AWG Wire Red	108022	5FT	108122	100 FT	108522	1000 FT	108922	5000 FT
24 AWG Wire Yellow	108024	5FT	108124	100 FT	108524	1000 FT	108924	5000 FT
26 AWG Wire Blue	108026	5FT	108126	100 FT	108526	1000 FT	108926	5000 FT
Terminal Holder	109000	1	-	-	-	-	-	-
Kit of Above	102000	1	-	-	-	-	-	-
Kit without Terminal Holder	101000	1	-	-	-	-	-	-



Bifurcated
Terminal
Brass
SnPb



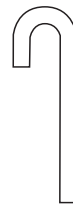
Turret
Terminal
Brass
SnPb



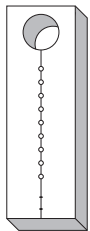
Gold Cup
Terminal
Brass
Au-Ni



Pierced
Terminal
Brass
SnPb



Hook
Terminal
Copper
SnPb



Terminal
Holder
FR4

INFO

IPC style terminals for hand soldering proficiency.
Also available in kit form



AXIAL LEAD COMPONENTS



CF - RESISTOR



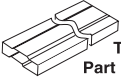
DO - DIODE

DUMMY COMPONENT ORDERING INFORMATION

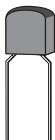
SIZE INCH Dia x L	SIZE METRIC Dia x L	LEAD DIA.	BODY	 Bulk Part Number QTY	 Tape Part Number QTY
.062" x .145"	1/8 Watt Size	0.5mm	Epoxy	CF18 100	CF18A 5000
.090" X .250"	1/4 Watt Size	0.6mm	Epoxy	CF14 100	CF14A 5000
.140" X .375"	1/2 Watt Size	0.6mm	Epoxy	CF12 100	CF12A 2500
.220" X .630"	1 Watt Size	0.8mm	Epoxy	CF100 100	CF100A 1K
GLASS CASE					
.070" X .154"	1.78 X 3.9mm	.020"	Glass	DO35 100	DO35A 5000
.107x.205"	2.72 x 5.2mm	.031"	Glass	DO41-GLASS 100	DO41A-GLASS 2500
MOLDED CASE					
.107" x .205"	2.72 x 5.2mm	.031"	Molded	DO41 100	DO41A 2500
.209" x .374"	5.3 x 9.5mm	.051"	Molded	DO201AD 100	DO201AD-A 1200

RADIAL LEAD COMPONENTS

DUMMY COMPONENT ORDERING INFORMATION

LEAD SPACE		CASE SIZE		 Tube Part Number		 Bulk Part Number		 Tape Part Number	
INCH	METRIC	INCH	METRIC	XR1	QTY	XR1	QTY	XR1	QTY
.1"	2.5mm	.2" SQ	5mm SQ	-	-	NR1	100	NR1A	2000
		.2" x .28"	5 x 7mm	-	-	EH5x7	100	EH5x7A	2000
		.2" x .6"	5 x 15mm	RS6M	35-40	RS6	300	Call	Call
		.2" x .8"	5 x 20mm	RS8M	25-30	RS8	200	Call	Call
		.2" x 1.0"	5 x 26mm	RS10M	20-24	RS10	150	Call	Call
.2"	5.7mm	.2" SQ	5mm	-	-	CK05	100	CK05T	2000
		.2" SQ	5mm	-	-	NR2	100	NR2A	2000
		.3" SQ	7.60mm	-	-	CK06	100	CK06T	1500
		.2 x .31	5 x 8mm	-	-	DD2	100	DD2T	1000
		.20 x .43	5 x 11mm	-	EH5x11	-	100	EH5X11A	1000
		.06 x .15	1/8w	-	-	CFR18	100	CFR18-AVI	2000

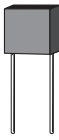
NR



CK05



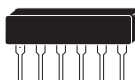
CK06



DD2



RS



EH

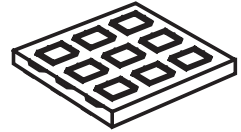


CFR





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 = Black	Blank = Black (standard) A = Amber N = Natural		
				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 CLIP10 = Clip Pair Holds 10 Trays + Cover			
				Insert			
				INSERT-PAPER = Rice Paper INSERT-TYVEK = White			
				Accessories			
				LABEL-BLANK = Unprinted Label (Roll 1000) LABEL-PP = Preprinted Form Roll (Roll 500)			

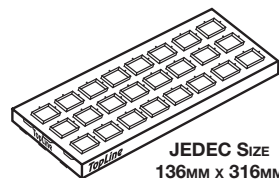
WAFFLE TRAY CAPACITY (EXAMPLE)*

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	16 x 16	256
4mm Sq	8 x 8	64	14 x 14	196
5mm Sq	7 x 7	49	12 x 12	144
6mm Sq	5 x 5	25	11 x 11	121
7mm Sq	5 x 5	25	9 x 9	81
8mm Sq	4 x 4	16	8 x 8	64
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



JEDEC Size
136mm x 316mm

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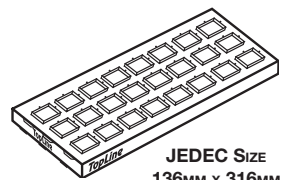
TRAY ORDERING INFORMATION

COMPONENT SIZE PER TRAY	COMPONENTS Row COLUMN	MATRIX XZ1	 Tray Part Number
5 x 5mm	576	16 x 36	BGATRAY5mm-16x36
5 x 5mm	624	16 x 39	BGATRAY5mm-16x39
5 x 5mm	640	16 x 40	BGATRAY5mm-16x40
6 x 6mm	360	12 x 30	BGATRAY6mm-12x30
6 x 6mm	608	16 x 38	BGATRAY6mm-16x38
7 x 7mm	416	13 x 32	BGATRAY7mm-13x32
7 x 7mm	476	14 x 34	BGATRAY7mm-14x34
8 x 8mm	348	12 x 29	BGATRAY8mm-12x29
8 x 8mm	360	12 x 30	BGATRAY8mm-12x30
9 x 9mm	250	10 x 25	BGATRAY9mm-10x25
10 x 10mm	184	8 x 23	BGATRAY10mm-8x23
10 x 10mm	240	10 x 24	BGATRAY10mm-10x24
10 x 10mm	250	10 x 25	BGATRAY10mm-10x25
11 x 11mm	176	8 x 22	BGATRAY11mm-8x22
12 x 12mm	189	9 x 21	BGATRAY12mm-9x21
12 x 12mm	198	9 x 22	BGATRAY12mm-9x22
13 x 13mm	160	8 x 20	BGATRAY13mm-8x20
14 x 14mm	152	8 x 19	BGATRAY14mm-8x19
14 x 14mm	119	7 x 17	BGATRAY14mm-7x17
15 x 15mm	126	7 x 18	BGATRAY15mm-7x18
16 x 16mm	119	7 x 17	BGATRAY16mm-7x17
17 x 17mm	90	6 x 15	BGATRAY17mm-6x15
19 x 19mm	84	6 x 14	BGATRAY19mm-6x14
21 x 21mm	60	5 x 12	BGATRAY21mm-5x12
23 x 23mm	60	5 x 12	BGATRAY23mm-5x12
25 x 25mm	44	4 x 11	BGATRAY25mm-4x11
27 x 27mm	40	4 x 10	BGATRAY27mm-4x10
31 x 31mm	27	3 x 9	BGATRAY31mm-3x9
35 x 35mm	24	3 x 8	BGATRAY35mm-3x8
37.5 x 37.5mm	21	3 x 7	BGATRAY37.5mm-3x7
40 x 40mm	21	3 x 7	BGATRAY40mm-3x7
42.5 x 42.5mm	12	2 x 6	BGATRAY42.5mm-2x6
45 x 45mm	12	2 x 6	BGATRAY45mm-2x6
47.5 x 47.5mm	12	2 x 6	BGATRAY47.5mm-2x6
6 x 7mm	160	10 x 16	BGATRAY6x7-10x16
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

INFO

Specify minimum temperature rating: 50°C, 75°C, 125°C, 130°C, 140°C, 150°C or 180°C

MATRIX TRAYS FOR QFP & QFN

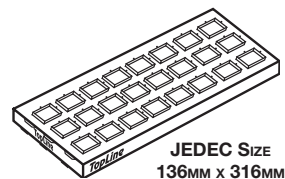


TRAY ORDERING INFORMATION

COMPONENT BODY SIZE	COMPONENT HEIGHT	COMPONENTS PER TRAY	MATRIX COLUMN X ROW	 Tray Part Number
XZ1				
QFP TRAY				
10mm Sq.	2.0mm	96	6 x 16	QTRAY10mm-6x16
14mm Sq.	2.0-2.7mm	84	6 x 14	QTRAY14mm-6x14
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				
7mm Sq.	1.4mm	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
QFN TRAY				
3mm Sq.	0.9mm	490	14 x 35	QFNTRAY3mm-14x35
4mm Sq.		490	14 x 35	QFNTRAY4mm-14x35
5mm Sq.		490	14 x 35	QFNTRAY5mm-14x35
6mm Sq.		490	14 x 35	QFNTRAY6mm-14x35
7mm Sq.		260	10 x 26	QFNTRAY7mm-10x26
8mm Sq.		260	10 x 26	QFNTRAY8mm-10x26
9mm Sq.		260	10 x 26	QFNTRAY9mm-10x26
10mm Sq.		168	8 x 21	QFNTRAY10mm-8x21



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 I (INCLUDING LEADS)				
8 x 13.4mm	1.0-1.2mm	234	13 x 18	TTRAY8x13.4mm-13x18
10 x 14mm		160	10 x 16	TTRAY10x14mm-10x16
8 x 20mm		156	12 x 13	TTRAY8x20mm-12x13
10 x 20mm		120	10 x 12	TTRAY10x20mm-10x12
12 x 20mm		96	8 x 12	TTRAY12x20mm-8x12
14 x 20mm		91	7 x 13	TTRAY14x20mm-7x13
TYPE II (BODY SIZE)				
.4" x .725" (10.16 x 18.4mm)	1.0-1.2mm	135	9 x 15	T2TRAY10x18.4-9x15
.4" x .825" (10.16 x 20.95mm)		117	9 x 13	T2TRAY10x21-9x13
.4" x .875" (10.16 x 22.22)		108	9 x 12	T2TRAY10x22-9x12

TRAY FOR J-LEAD, PLCC, LCC AND CLCC

COMPONENT SIZE	COMPONENT HEIGHT	COMPONENTS PER TRAY	MATRIX ROW X COLUMN	 Tray Part Number
XZ1				
PLCC32	4.4mm	128	8 x 16	PLCC32TRAY-8x16
PLCC44	4.4mm	40	4 x 10	PLCC44TRAY-4x10
PLCC44	3.6mm	84	6x14	PLCC44TRAY6x14
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

PART NUMBERING SYSTEM OPEN CAVITY QFN AND LIDS

Package Part Numbering System

<u>M-QFN</u>	<u>28</u>	<u>W</u>	<u>.8</u>	<u>-G6</u>
Model	Pins	Packaging	Pitch (mm)	Plating
M-QFN = Quad		Standard: W = 2" Waffle Optional: P = 4" Waffle		G5 Ni Pd Au (Thick Gold) G6 Ni Pd Au (Thin Gold)

Drawing Numbering System

<u>4</u>	<u>5</u>	<u>48</u>	<u>6</u>	<u>0</u>
Open Cavity Package	Pitch	Pins	Pad Design	Singulated
4 = QFN Quad Sides	0 = None 1 = 1.0mm 2 = 1.27mm 3 = 2.54mm 4 = 0.4mm 5 = 0.5mm 6 = 0.65mm 8 = 0.8mm 9 = Special		5 = Ni 1.27 ~ 4.57µm Pd 0.15 ~ 0.51µm Au 0.10 ~ 0.20µm 6 = Ni 0.50 ~ 2.00µm Pd 0.02 ~ 0.15µm Au 0.003 ~ 0.015µm	0 = Singulated Standard

Lid Part Numbering System

<u>C</u>	-	<u>LID</u>	<u>5</u>	<u>W</u>	- <u>BLACK</u>
Model		Shape	Size	Packaging	color
Flat Lids: T = Organic - Tape On C = Ceramic with B-Stage		LID - Flat Lid CAP=Dome Lid		Standard: W=2" Waffle Options: P=4" Waffle	Standard: C-LID= Black T-LID=White or Black
Dome Lids: R = R04003C G = Glass					

Lid Drawing Numbering System

<u>2</u>	<u>03</u>	<u>0</u>	<u>0</u>	<u>3</u>
Series	Body Size	Color	Material	Lid Shape
	03=3mm 04=4mm 05=5mm 06=6mm 07=7mm 08=8mm 09=9mm 10=10mm 12=12mm	Organic: 0=Standard 1=Black 2=Red 4=Yellow 5=Green 6=Blue 9=White Ceramic: 0=Black 9=White	Semiconductor Grade: 0=BT Organic 3=Shielded 5=Molded RF & Microwave: 2=Glass 6=Ceramic 4=Rogers R04003C Special Versions: 7 ~ 9 other	Flate Lid: 2=Tape On 3=B-Stage Dome Lid: 0=Tape On 7=B-Stage

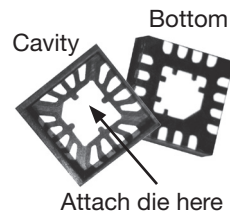
Packaging Codes - Quantity

	<u>W</u>	<u>P</u>
QFN	2" Waffle	4" Waffle
D/E Size		
3mm	100	256
4mm	64	196
5mm	36	144
6mm	25	121
7mm	25	81
8mm	16	64
9mm	16	49
10mm	9	49
12mm	9	36

OPEN CAVITY M-QFN

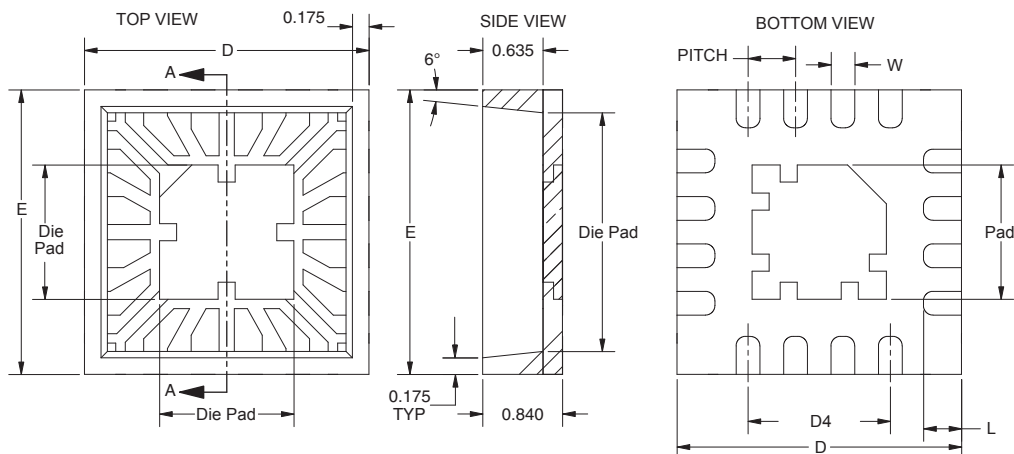
ATTACH YOUR DIE

Open Tool Packages



ORDERING INFORMATION

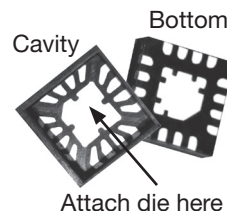
BODY D/E SIZE SQ	NBR LEAD		DIE PAD mm	CAVITY PACKAGE PART NUMBER	XH1	TRAY QTY
	LEADS	PITCH				
3mm	8	0.65mm	1.4 SQ	M-QFN8W.65	100	
3mm	12	0.5mm	1.4 SQ	M-QFN12W.5	100	
3mm	16	0.5mm	1.4 SQ	M-QFN16W.5	100	
4mm	16	0.65mm	2.4 SQ	M-QFN16W.65	64	
4mm	20	0.5mm	2.4 SQ	M-QFN20W.5	64	
4mm	24	0.5mm	2.4 SQ	M-QFN24W.5	64	
5mm	32	0.5mm	3.4 SQ	M-QFN32W.5	36	
5mm	40	0.4mm	3.4 SQ	M-QFN40W.4	36	
6mm	40	0.5mm	4.4 SQ	M-QFN40W.5	25	
6mm	48	0.4mm	4.4 SQ	M-QFN48W.4	25	
7mm	48	0.5mm	5.4 SQ	M-QFN48W.5	25	
8mm	56	0.5mm	6.0 SQ	M-QFN56W.5	16	
9mm	64	0.5mm	7.0 SQ	M-QFN64W.5	16	
10mm	72	0.5mm	8.0 SQ	M-QFN72W.5	9	
12mm	80	0.5mm	10 SQ	M-QFN80W.5	9	



OPEN CAVITY M-QFN

ATTACH YOUR DIE

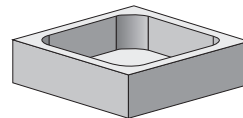
Road Map - check www.MirrorSemi.com



ORDERING INFORMATION

BODY D/E SIZE SQ	NBR LEAD		DIE PAD mm	CAVITY PACKAGE PART NUMBER	FLAT LID PART NBR (OPTIONAL)
	LEADS	PITCH			
3mm	20	0.4mm	1.4 SQ	M-QFN20W.4	T-LID3-BLACK
4mm	12	0.65mm	2.4 SQ	M-QFN12W.65	T-LID4-BLACK
4mm	12	0.8mm	2.4 SQ	M-QFN12W.8	T-LID4-BLACK
4mm	28	0.4mm	2.4 SQ	M-QFN28W.4	T-LID4-BLACK
5mm	16	0.8mm	3.4 SQ	M-QFN16W.8	T-LID5-BLACK
5mm	20	0.65mm	3.4 SQ	M-QFN20W.8	T-LID5-BLACK
5mm	20	0.8mm	3.4 SQ	M-QFN20W.8	T-LID5-BLACK
5mm	24	0.65mm	3.4 SQ	M-QFN24W.65	T-LID5-BLACK
5mm	28	0.5mm	3.4 SQ	M-QFN28W.5	T-LID5-BLACK
5mm	32	0.4mm	3.4 SQ	M-QFN32W.4	T-LID5-BLACK
5mm	36	0.4mm	3.4 SQ	M-QFN36W.4	T-LID5-BLACK
6mm	24	0.8mm	4.4 SQ	M-QFN24W.8	T-LID6-BLACK
6mm	28	0.65mm	4.4 SQ	M-QFN28W.65	T-LID6-BLACK
6mm	36	0.5mm	4.4 SQ	M-QFN36W.5	T-LID6-BLACK
7mm	28	0.8mm	5.4 SQ	M-QFN28W.8	T-LID7-BLACK
7mm	32	0.65mm	5.4 SQ	M-QFN32W.65	T-LID7-BLACK
7mm	44	0.5mm	5.4 SQ	M-QFN44W.65	T-LID7-BLACK
7mm	56	0.4mm	5.4 SQ	M-QFN56W.4	T-LID7-BLACK
7mm	64	0.4mm	5.4 SQ	M-QFN64W.4	T-LID7-BLACK
8mm	32	0.8mm	6.4 SQ	M-QFN32W.8	T-LID8-BLACK
8mm	40	0.65mm	6.4 SQ	M-QFN40W.65	T-LID8-BLACK
8mm	44	0.65mm	6.4 SQ	M-QFN44W.65	T-LID8-BLACK
8mm	52	0.5mm	6.4 SQ	M-QFN52W.5	T-LID8-BLACK
8mm	68	0.4mm	6.4 SQ	M-QFN68W.4	T-LID8-BLACK
9mm	72	0.4mm	7.4 SQ	M-QFN72W.4	T-LID9-BLACK
9mm	76	0.4mm	7.4 SQ	M-QFN76W.4	T-LID9-BLACK
10mm	68	0.5mm	8.4 SQ	M-QFN68W.5	T-LID10-BLACK
10mm	88	0.4mm	8.4 SQ	M-QFN88W.4	T-LID10-BLACK
12mm	100	0.4mm	10.4 SQ	M-QFN100W.4	T-LID12-BLACK

DOMES LIDS FOR M-QFN **COVERS FOR TALL DIE**

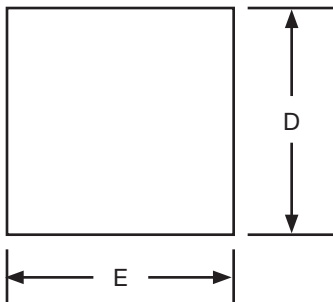


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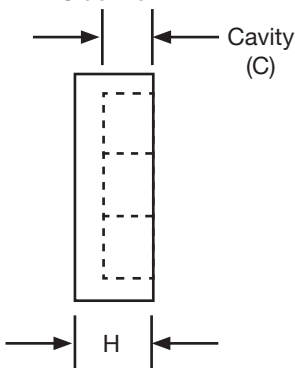
D / E BODY SIZE SQ	SHEILDED ALUMINUM	BT ORGANIC BLACK	RO-4003C WHITE	GLASS CLEAR
3mm	Z-CAP3-ALUM	R-CAP3-BLACK	R-CAP3-WHITE	G-CAP3-GLASS
4mm	Z-CAP4-ALUM	R-CAP4-BLACK	R-CAP4-WHITE	G-CAP4-GLASS
5mm	Z-CAP5-ALUM	R-CAP5-BLACK	R-CAP5-WHITE	G-CAP5-GLASS
6mm	Z-CAP6-ALUM	R-CAP6-BLACK	R-CAP6-WHITE	G-CAP6-GLASS
7mm	Z-CAP7-ALUM	R-CAP7-BLACK	R-CAP7-WHITE	G-CAP7-GLASS
8mm	Z-CAP8-ALUM	R-CAP8-BLACK	R-CAP8-WHITE	G-CAP8-GLASS
9mm	Z-CAP9-ALUM	R-CAP9-BLACK	R-CAP9-WHITE	G-CAP9-GLASS
10mm	Z-CAP10-ALUM	R-CAP10-BLACK	R-CAP10-WHITE	G-CAP10-GLASS
12mm	Z-CAP12-ALUM	R-CAP12-BLACK	R-CAP12-WHITE	G-CAP12-GLASS

SERIES	(C) CAVITY	H
R-CAP	0.55mm	0.8mm
G-CAP	0.60mm	1.1mm
Z-CAP	1.0mm	1.6mm

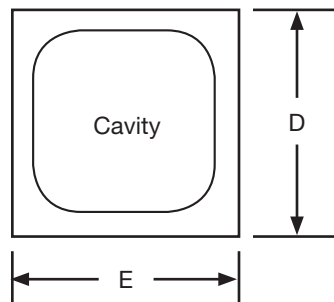
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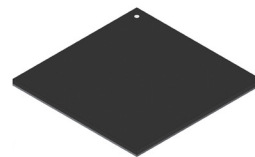


Side View



Bottom View





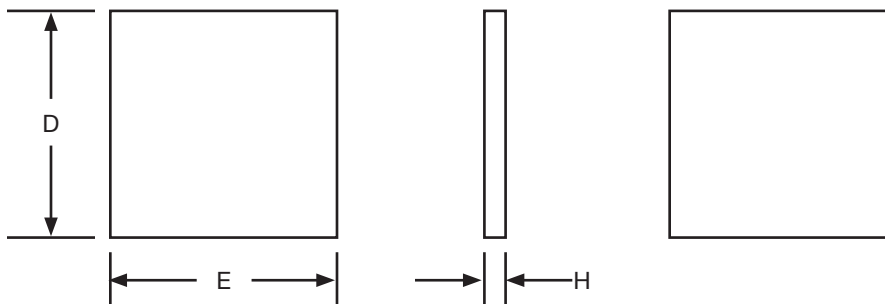
ORDERING INFORMATION

D / E Body Size SQ	LATENT CURE ADHESIVE BLACK	LATEX CURE ADHESIVE BLACK	TAPE ON NON-ADHESIVE GLASS	TAPE ON NON-ADHESIVE WHITE	TAPE ON NON-ADHESIVE BLACK
3mm	B-LID3-BLACK	C-LID3-BLACK	G-LID3-GLASS	T-LID3-WHITE	T-LID3-BLACK
4mm	B-LID4-BLACK	C-LID4-BLACK	G-LID4-GLASS	T-LID4-WHITE	T-LID4-BLACK
5mm	B-LID5-BLACK	C-LID5-BLACK	G-LID5-GLASS	T-LID5-WHITE	T-LID5-BLACK
6mm	B-LID6-BLACK	C-LID6-BLACK	G-LID6-GLASS	T-LID6-WHITE	T-LID6-BLACK
7mm	B-LID7-BLACK	C-LID7-BLACK	G-LID7-GLASS	T-LID7-WHITE	T-LID7-BLACK
8mm	B-LID8-BLACK	C-LID8-BLACK	G-LID8-GLASS	T-LID8-WHITE	T-LID8-BLACK
9mm	B-LID9-BLACK	C-LID9-BLACK	G-LID9-GLASS	T-LID9-WHITE	T-LID9-BLACK
10mm	B-LID10-BLACK	C-LID10-BLACK	G-LID10-GLASS	T-LID10-WHITE	T-LID10-BLACK
12mm	B-LID12-BLACK	C-LID12-BLACK	G-LID12-GLASS	T-LID12-WHITE	T-LID12-BLACK

Top View

Side View

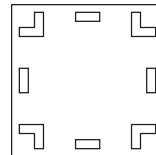
Bottom View



<u>MATERIAL</u>	<u>ADHESIVE PREFORM</u>	<u>LID SERIES</u>	<u>THICK H</u>
BT	None	T-LID BLACK	0.2mm
BT	Yes	B-LID BLACK	0.3mm
CERAMIC	Yes	C-LID-BLACK	0.35mm
RO-4003C	None	T-LID WHITE	0.2mm
GLASS	None	G-LID GLASS	0.63mm

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SILICON TEST DIE FOR BONDING PRACTICE DAISY CHAIN & ISOLATED



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FIG.	CIRCUIT	DIE SIZE	PAD SIZE	NBR PADS	TRAY QTY	PART NUMBER
Fig. 1	Daisy Chain	1.0x1.0mm	60x160µm	8 Pair	100	TD8-1.0-DC
Fig. 2	Daisy Chain	2.5x2.5mm	60x160µm	16 Pair	100	TD16-2.5-DC
Fig. 3	Daisy Chain	4.0x4.0mm	60x360µm	24 Pair	64	TD24-4.0-DC
Fig. 4	Isolated	1.0x1.0mm	60µm SQ	16	100	TD16-1.0-ISO
Fig. 5	Isolated	2.5x2.5mm	60µm SQ	32	100	TD32-2.5-ISO
Fig. 6	Isolated	4.0x4.0mm	60µm SQ	48	64	TD48-4.0-ISO
Fig. 7	Differential Pair	1.0x1.0mm	60x160µm	2 + GND	100	TD2-1.0-DIF
Fig. 8	Differential Pair	2.5x2.5mm	60x160µm	2 + GND	100	TD2-2.5-DIF
Fig. 9	Differential Pair	4.0x4.0mm	60x160µm	2 + GND	64	TD2-4.0-DIF
Fig. 10	Fully Plated	1.0x1.0mm	900µm SQ	1	100	TD1-1.0-BUS
Fig. 11	Fully Plated	2.5x2.5mm	2400µm SQ	1	100	TD1-2.5-BUS
Fig. 12	Fully Plated	4.0x4.0mm	3900µm SQ	1	64	TD1-4.0-BUS

Not to Scale

Fig. 1
TD8-1.0DC

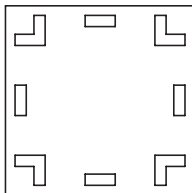


Fig. 2
TD16-2.5-DC

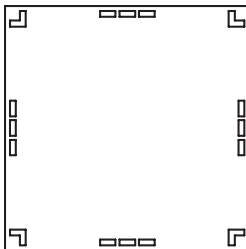
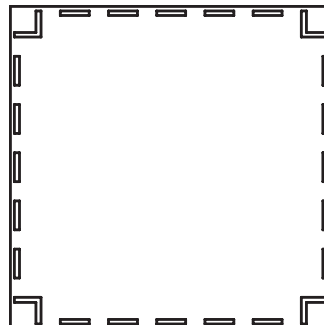


Fig. 3
TD24-4.0-DC



INFO

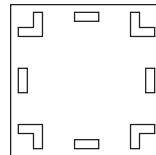
Die Material is Silicon (Si) 250µm (10mil) thick.

Metallization 1.0µm Aluminum (Al) over 0.75µm SiO₂

Wire bondable with Gold (Au) or Aluminum (Al) wire.

Applications: Wire Bonding Practice or for RF / impedance characterization trials.

SILICON TEST DIE FOR BONDING PRACTICE OUTLINE DRAWINGS



ORDERING INFORMATION

Not to Scale

Fig. 4
TD16-1.0-ISO

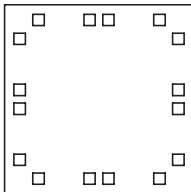


Fig. 5
TD32-2.5-ISO

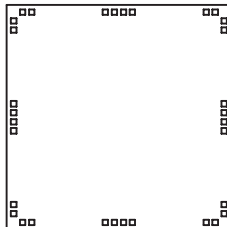


Fig. 6
TD48-4.0-ISO

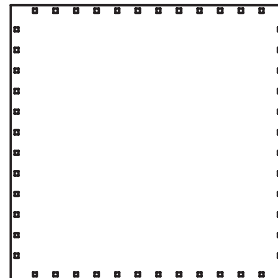


Fig. 7
TD2-1.0-DIF

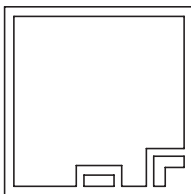


Fig. 8
TD2-2.5-DIF

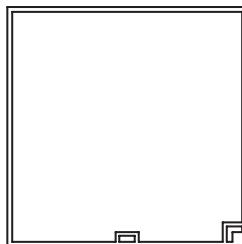


Fig. 9
TD2-4.0-DIF

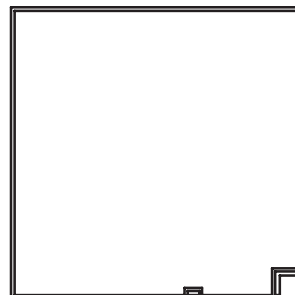


Fig. 10
TD1-1.0-SUS

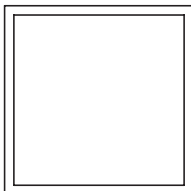


Fig. 11
TD1-2.5-BUS

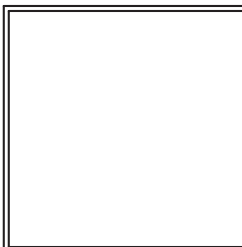
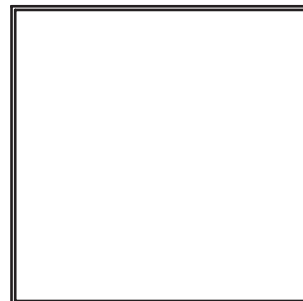


Fig. 12
TD1-4.0-BUS



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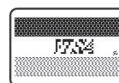


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