

SSOP

Small Shrink Outline Package



The Small Shrink Outline Package (SSOP) body size is compressed and the lead pitch is tightened to obtain a small version of the standard SOIC packages. Lead counts range from 8 to 64. Body sizes are 209 and 300 mils. The SSOP package is JEDEC and EIAJ compliant. The package leads are solder plated.

SSOP Small Shrink Outline Package

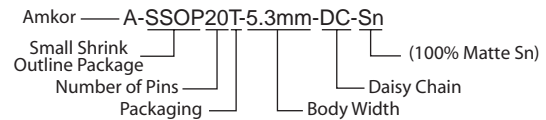
Part Description	Number of Pins	Body Width	Pitch	Quantity Per Tube	Tape Width	Tape Pitch	Quantity 13" Reel
A-SSOP14T-5.3mm	14	5.3mm	.65mm	100	16mm	12mm	1,000
A-SSOP16T-5.3mm	16	5.3mm	.65mm	80	16mm	12mm	1,000
A-SSOP20T-5.3mm	20	5.3mm	.65mm	62	16mm	12mm	1,000
A-SSOP24T-5.3mm	24	5.3mm	.65mm	66	16mm	12mm	1,000
A-SSOP28T-5.3mm	28	5.3mm	.65mm	47	16/24mm	12mm	1,000
A-SSOP36T-7.6mm	36	7.6mm	.8mm	31	24mm	12mm	1,000
A-SSOP48T-7.6mm	48	7.6mm	.635mm	30	32mm	12/16mm	1,000
A-SSOP56T-7.6mm	56	7.6mm	.635mm	26	32mm	12/16mm	500

Notes

- Tube quantity may vary.
- Parts available on Tape and Reel upon special request.
- 209 and 300 mil body widths.
- JEDEC and EIAJ package outline standard compliance.
- High-conductivity copper leadframes.
- Eutectic solder plating is 85/15 Sn/Pb.
- Moisture sensitivity is JEDEC level 3.
- Lead-free available with 100% Matte Sn alloy.



Part Description System



- Add "T" for Tubes or "TR" for Tape and Reel to end of part number.
- Add "ePad" to beginning of part number when ordering ExposedPad™ package.
- Add "Sn" to end of part number for Lead-Free.



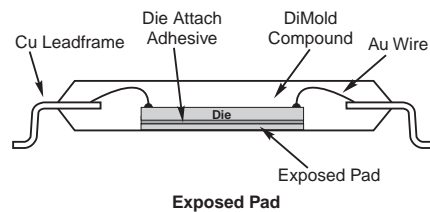
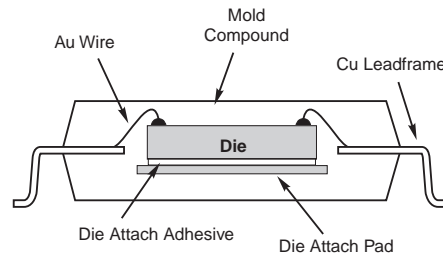
Looking for Lead-Free?

This symbol indicates that lead-free parts are available!



For kits see pages 68, 79, 84 and 62.

Practical Components is the exclusive distributor of Amkor Technology Mechanical Components.



Note: Drawings not to scale.

The Thin Shrink Small Outline Package (TSSOP) offers smaller body sizes, smaller lead pitches and package thickness (0.9mm thick) than standard SOIC packages. Body widths are 3.0mm, 4.4mm and 6.1mm. Lead counts range from 8 to 80. This package conforms to JEDEC package outlines.



TSSOP Thin Shrink Small Outline Package

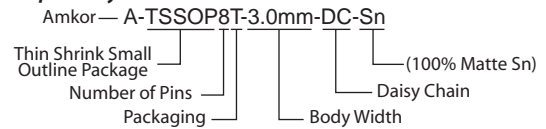
Part Description	Number of Pins	Body Width	Pitch	Tape Width	Tape Pitch	Quantity Per Tube	Quantity Per Reel
A-TSSOP8T-3.0mm	8	3.0mm	.65mm	12mm	8mm	98	2,500
A-TSSOP8T-4.4mm	8	4.4mm	.65mm	12/16mm	8mm	100	1,000/2,500
A-TSSOP10T-3.0mm	10	3.0mm	.5mm	12mm	8mm	98	2,500
A-TSSOP14T-4.4mm	14	4.4mm	.65mm	12/16mm	8mm	96	1,000/2,500
A-TSSOP16T-4.4mm	16	4.4mm	.65mm	12/16mm	8mm	96	1,000/2,500
A-TSSOP20T-4.4mm	20	4.4mm	.65mm	16mm	8/12mm	74	1,000/2,500
A-TSSOP24T-4.4mm	24	4.4mm	.65mm	16mm	8/12mm	62	1,000/2,500
A-TSSOP28T-4.4mm	28	4.4mm	.65mm	16mm	8/12mm	50	1,000
A-TSSOP28T-6.1mm	28	6.1mm	.65mm	24mm	12mm	50	1,000
A-TSSOP44T-4.4mm	44	4.4mm	.5mm	24mm	12mm	42	1,000
A-TSSOP48T-6.1mm	48	6.1mm	.5mm	24mm	12mm	39	1,000
A-TSSOP56T-4.4mm	56	4.4mm	.4mm	24mm	12mm	42	1,000
A-TSSOP56T-6.1mm	56	6.1mm	.5mm	24mm	12mm	35	1,000
A-TSSOP64T-6.1mm	64	6.1mm	.5mm	N/A	N/A	28	N/A
A-TSSOP80T-6.1mm	80	6.1mm	.4mm	N/A	N/A	28	N/A

Notes

- 0.9mm body thickness for 4.4 and 6.1mm body widths.
- 0.85mm body thickness for 3.0mm body width.
- JEDEC package outline is standard.
- High conductivity copper leadframes.
- Very low-stress mold compound.
- Tube quantity may vary.
- Parts available on Tape and Reel upon request..
- Lead-free available with 100% Matte Sn alloy.

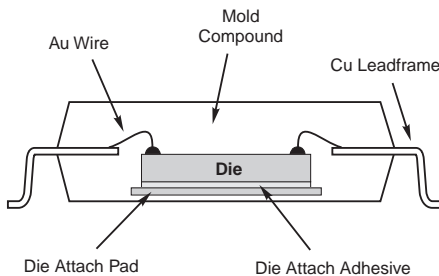


Part Description System



- Add "T" for Tubes or "TR" for Tape and Reel to end of part number.
- Add "Sn" to end of part number for Lead-Free.

TSSOP Package



For recommended kit see page 64.

Surface Mount Resistors (SMR) are best suited for commercial industrial and automotive applications. Chip Resistors are suitable for a wide range of solder processes, and are ideal for high-speed electronic assembly equipment. Chip Resistor body size range from 01005 to 1210. Seven-inch reels are standard, but eleven and thirteen-inch reels are available

upon special request. Paper carrier tape is standard for Chip Resistors. In addition, Zero-Ohm Chip Resistors have a copper wire internally. This creates a short condition. Zero-Ohm Chip Resistors can be used to check for continuity after soldering.

SMR Surface Mount Resistors—Lead-Free

Part Description	Body Size		Metric	Tape Width	Tape Pitch	Quantity 7" Reel
	(Inch)	(mm)				
01005SMR-PA-Sn-0	.01" x .005"	0.4 x 0.2mm	0402	8mm	2mm	20,000
0201SMR-PA-Sn-0	.02" x .01"	0.6 x .03mm	0603	8mm	2mm	15,000
0402SMR-PA-Sn-0	.04" x .02"	1.0 x 0.5mm	1005	8mm	2mm	10,000
0603SMR-PA-Sn-0	.06" x .03"	1.6 x 0.8mm	1608	8mm	4mm	5,000
0805SMR-PA-Sn-0	.08" x .05"	2.0 x 1.2mm	2012	8mm	4mm	5,000
1206SMR-PA-Sn-0	.12" x .06"	3.2 x 1.6mm	3216	8mm	4mm	5,000
1210SMR-PA-Sn-0	.12" x .10"	3.2 x 2.6mm	3225	8mm	4mm	4,000

Notes

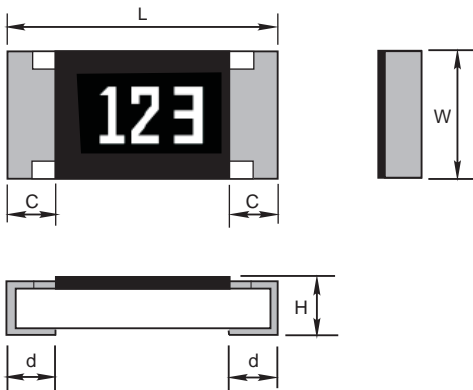
- Surface mount resistors come packaged on paper carrier tape and 7" reels (larger quantities are available upon request).
- Plastic carrier tape is non-standard for surface mount resistors.
- The numeric section of the part number refers to the physical body size (in inches) of the component. For example: Part number 0402SMR-PA has a body size of .04" length by .02" width.
- Chip resistor arrays are available (call for availability).
- Resistors are now only available standard lead-free with 100% Sn over Ni.



Part Description System

Body Size in Inches — 0402SMR-PA — Tape Type
 Surface Mount Resistor

- Tape Type: PA=Paper Tape, PL=Plastic Tape.



For kits see pages 83, 63, 64, 68, 70, 61, 75, 76, 77, 79, 81, 84 and 62.

SMR Component Dimensions

Metric	Inch	L	W	H	c	d	* Unit weight/pc.
0402	01005	0.4 +/- 0.02	0.2 +/- 0.02	0.12 +/- 0.02	0.1 +/- 0.03	0.1 +/- 0.03	—
0603	0201	0.6 +/- 0.03	0.3 +/- 0.03	0.23 +/- 0.03	0.1 +/- 0.05	0.15 +/- 0.05	0.16mg
1005	0402	1.0 +/- 0.05	0.5 +/- 0.05	0.35 +/- .05	0.2 +/- 0.1	0.25 + 0.05 - 0.10	0.6mg
1608	0603	1.6 +/- 0.1	0.8 + 0.15 - 0.05	0.45 +/- 0.10	0.3 +/- 0.1	0.3 +/- 0.1	2mg
2012	0805	2.0 +/- 0.1	1.25 +/- 0.10	0.55 +/- 0.10	0.4 +/- 0.2	0.4 +/- 0.2	5mg
3216	1206	3.2 +/- 0.15	1.6 +/- 0.15	0.55 +/- 0.10	0.5 +/- 0.25	0.5 +/- 0.25	9mg
3225	1210	3.2 +/- 0.15	2.5 +/- 0.15	0.55 +/- 0.15	0.5 +/- 0.25	0.5 +/- 0.25	16mg

Unit: mm *Values for reference

Surface Mount Multilayer Ceramic (SMC) capacitors come in case sizes ranging from 01005 to 2225. The most popular case sizes are listed in the table below. Parts on tape and reel are available on paper tape or plastic

tape. Larger size reels are available upon special request. Practical Components has lead-free PCB test boards available for the 01005 through 1206 case sizes.

SMC Surface Mount Ceramic Capacitors—Plastic Tape

Part Description	Body Size	Body Size	Tape Width	Tape Pitch	Quantity 7" Reel	Lead-Free Plating
0805SMC-PL-Sn	.08" x .05"	2.0 x 1.2mm	8mm	4mm	4,000	Sn
1206SMC-PL-Sn	.12" x .06"	3.2 x 1.6mm	8mm	4mm	3,000	Sn
1210SMC-PL-Sn	.12" x .10"	3.2 x 2.6mm	8mm	4mm	4,000	Sn
1812SMC-PL-Sn	.18" x .12"	4.5 x 3.2mm	12mm	8mm	1,100	Sn
1825SMC-PL-Sn	.18" x .25"	4.5 x 6.4mm	12mm	8mm	1,000	Sn

SMC Surface Mount Ceramic Capacitors—Paper Tape

Part Description	Body Size	Body Size	Tape Width	Tape Pitch	Quantity 7" Reel	Lead-Free Plating
01005SMC-PA-Sn	.01" x .005"	0.4 x 0.2mm	8mm	2mm	15K~20K	Sn
0201SMC-PA-Sn	.02" x .01"	0.6 x 0.3mm	8mm	2mm	15,000	Sn
0402SMC-PA-Sn	.04" x .02"	1.0 x 0.5mm	8mm	2mm	10,000	Sn
0603SMC-PA-Sn	.06" x .03"	1.6 x 0.8mm	8mm	4mm	4,000	Sn
0805SMC-PA-Sn	.08" x .05"	2.0 x 1.2mm	8mm	4mm	5,000	Sn
1206SMC-PA-Sn	.12" x .06"	3.2 x 1.6mm	8mm	4mm	4,000	Sn

Notes

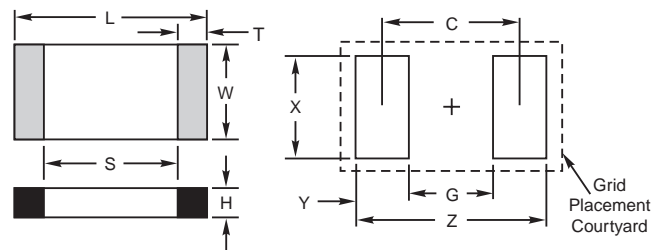
- Surface mount capacitors come on standard 7" reels (larger quantity reels are available upon request).
- Plastic carrier tape is non-standard for some carrier sizes.
- The numeric section of the part number refers to the physical body size (in inches) of the component. For example: Part number 0805SMC-PL has a body size of .08" length by .05" width.
- Chip capacitor arrays are available. Call for details.
- Capacitors are now only available standard lead-free with 100% Sn over Ni. SnPb is available upon request based on availability.

Part Description System

Body Size in Inches — 0402SMC-PA — Tape Type

Surface Mount Ceramic Capacitor

- Tape Type: PA = Paper Tape, PL = Plastic Tape



For kits see pages 75 and 77.

SMC Component Dimensions

Component Dimensions (mm) (in)	L (mm)		S (mm)		W (mm)		T (mm)		H (mm)
	Min	Max	Min	Max	Min	Max	Min	Max	Max
0603 (0201)	0.57	0.63	—	—	0.27	0.33	—	—	0.33
1005 (0402)	0.90	1.10	0.30	0.65	0.40	0.60	0.10	0.30	0.60
1608 (0603)	1.45	1.75	0.45	0.97	0.65	0.95	0.20	0.50	0.85
2012 (0805)	1.80	2.20	0.30	1.11	1.05	1.45	0.25	0.75	1.10
3216 (1206)	3.00	3.40	1.50	2.31	1.40	1.80	0.25	0.75	1.35
3225 (1210)	3.00	3.40	1.50	2.31	2.30	2.70	0.25	0.75	1.35
4532 (1812)	4.20	4.80	2.30	3.46	3.00	3.40	0.25	0.95	1.35

SMC Land Pattern Dimensions

Component Identifier (mm) (in)	Z (mm)	G (mm)	X (mm)	Y (mm) Ref	C (mm) Ref	Placement Grid (No. of Grid Elements)
0603 (0201)	0.72	0.26	0.32	0.23	0.49	—
1005 (0402)	2.20	0.40	0.70	0.90	1.40	2 x 6
1608 (0603)	2.80	0.60	1.00	1.10	1.70	4 x 6
2012 (0805)	3.20	0.60	1.50	1.30	1.90	4 x 8
3216 (1206)	4.40	1.20	1.80	1.60	2.80	4 x 10
3225 (1210)	4.40	1.20	2.70	1.60	2.80	6 x 10
4532 (1812)	5.80	2.00	3.40	1.60	3.90	8 x 12