

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. Lead-free versions of SMC components are also available. Practical Components has lead-free PCB test boards available for the 0201 through 1206 case sizes.

**SMC Surface Mount Ceramic Capacitors—Plastic Tape**

Part Number	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 Number	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**

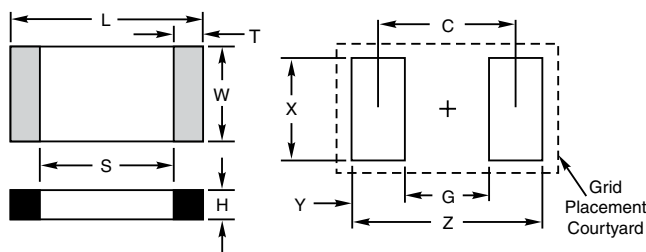
- Surface mount capacitors come on standard 7" reels (larger quantity reels are available upon request).
- Plastic carrier tape is non-standard for some carrier sizes.
- The numeric section of the part number refers to the physical body size (in inches) of the component. For example: Part number 0805SMC-PL 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 Number System**

Body Size in Inches — 0402SMC-PA — Tape Type  
 Surface Mount Ceramic Capacitor

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



**SMC Component Dimensions**

Component Dimensions (mm) (in)	L (mm)		S (mm)		W (mm)		T (mm)		H (mm) Max
	Min	Max	Min	Max	Min	Max	Min	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

# SMR

## Lead-Free Surface Mount Resistors

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.

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

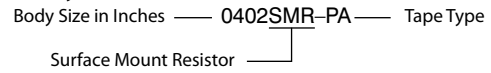
Part Number	Body Size		Metric	Tape Width	Tape Pitch	Quantity 7" Reel
	(Inch)	(mm)				
01005SMR-PA-Sn-0 <b>NEW</b>	.01" x .005"	0.4 x 0.2mm	0402	8mm	2mm	20,000
0201SMR-PA-Sn-0	.02" x .01"	0.6 x .03mm	0603	8mm	2mm	15,000
0402SMR-PA-Sn-0	.04" x .02"	1.0 x 0.5mm	1005	8mm	2mm	10,000
0603SMR-PA-Sn-0	.06" x .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

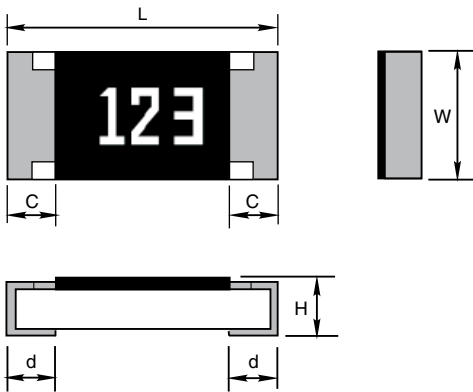
- Surface mount resistors come packaged on paper carrier tape and 7" reels (larger quantities are available upon request).
- Plastic carrier tape is non-standard for surface mount resistors.
- The numeric section of the part number refers to the physical body size (in inches) of the component. For example: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



#### Part Number System



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



For recommended kits see pages 52, 53, 58, 61, 62, 67, 73 and 70

### 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 Molded Tantalum Capacitors (SMTA) are polarized capacitors with solderable terminations. Surface Mount Tantalum packages are identified by case size i.e.: A, B, C and D. These case sizes stand for metric footprints of length and width. For example: A = 3.2 x 1.6mm; B = 3.5 x 2.8mm; C = 6.0 x 3.2mm; D = 7.3 x 4.3mm.

**SMTA Surface Mount Tantalum Capacitors**

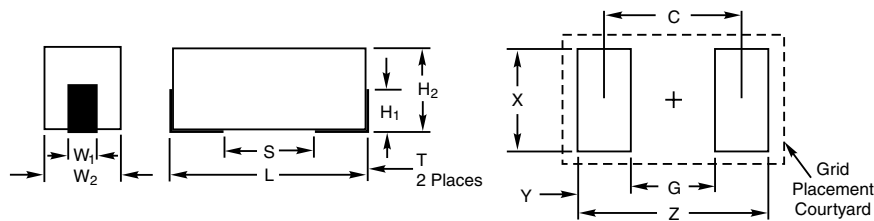
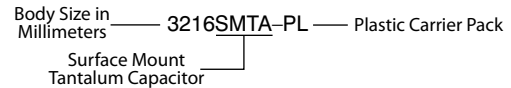
Part Number	Body Size	Case Size	Tape Width	Tape Pitch	Quantity 7" Reel
1608SMTA-PL-Sn <b>NEW</b>	1.6 x .85mm	R (smaller than A case)	8mm	4mm	3,500
3216SMTA-PL-Sn	3.2 x 1.6mm	A	8mm	4mm	2,000
3528SMTA-PL-Sn	3.5 x 2.8mm	B	8mm	4mm	2,000
6032SMTA-PL-Sn	6.0 x 3.2mm	C	12mm	8mm	500/750
7343SMTA-PL-Sn	7.3 x 4.3mm	D	12mm	8mm	500/750

**Notes**

- Components are molded, surface mount tantalums.
- Conformal coated tantalums are available.
- Please call for availability of mil-spec surface mount tantalums.
- Standard reel size is 7" (larger sizes are available upon request).
- All tantalum capacitors are on plastic carrier pack.
- Tantalums are now available as standard lead-free with 100% Sn finish.
- SnPb is available upon request based on availability.



**Part Number System**



Surface Mount Electrolytic (SME) capacitors are measured according to the diameter of the can mounted on top of the terminations. Sizes range from 3mm to 24mm in diameter. The most popular sizes are listed below. Please call if different sizes are needed. These components come packaged on plastic embossed carrier tape. Standard reel sizes are 15".

**SME Surface Mount Electrolytic Capacitors**

Part Number	Body Size	Tape Width	Tape Pitch	Quantity 15" Reel
3mm-SME-PL-Sn	3mm	12mm	8mm	2,000
4mm-SME-PL-Sn	4mm	12mm	8mm	2,000
5mm-SME-PL-Sn	5mm	12mm	12mm	1,000
6.3mm-SME-PL-Sn	6.3mm	16mm	12mm	1,000
8mm-SME-PL-Sn	8mm	16mm	12mm	1,000
10mm-SME-PL-Sn	10mm	24mm	16mm	500
18mm-SME-PL-Sn	18mm	44mm	32mm	125

**Notes**

- Surface mount electrolytic capacitors come standard on 15" reels.
- Components are measured by the diameter of the electrolytic can.
- Lead-free available with 100% Sn.



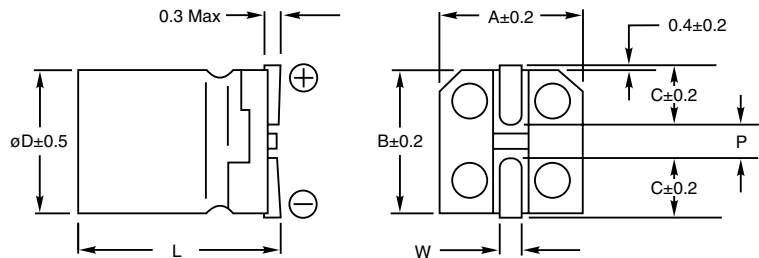
Lead spacing and wire diameter

Unit: mm

øD	L	A	B	C	W	P
4	5.3±0.2	4.3	4.3	2.0	0.5±0.8	1.0
5	5.3±0.2	5.3	5.3	2.3	0.5±0.8	1.5
6.3	5.3±0.2	6.6	6.6	2.7	0.5±0.8	2.0
8	6.3±0.3	8.4	8.4	3.4	0.5±0.8	2.3
8	10±0.5	8.4	8.4	3.0	0.7±1.1	3.1
10	10±0.5	10.4	10.4	3.3	0.7±1.1	4.7
18	16.5	19.0	21.0	6.5	1.2±0.3	6.7

**Part Number System**

Body Size — 3mm-SME-PL — Plastic Carrier Pack  
 Surface Mount Electrolytic Capacitor



**MELF Diodes**

Metal Electrode Face Components

Metal Electrode Face Components (MELF) have metallized terminals at each end of a cylindrical body. MELF components are designed to fit the same footprints as flat components i.e., 0805 (.08" x .05") and the 0603 (.06" x .03"). MELF packages are available on plastic tape and reel.

**MELF Metal Electrode Face Component Diodes**

Part Number	Body Size	Quantity 7" Reel	Tape Width	Tape Pitch	Quantity 13" Reel
SOD80-TR-Sn	1.4 x 3.4mm	2,500	8mm	4mm	10,000
SOD80 Package is also known as LL-34 or DO-213AA.					
SM1-TR-Sn	2.6 x 5.0mm	1,500	12mm	4mm	5,000
Package is also known as LL-41 or DO-213AB.					

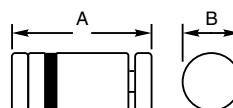
**Notes**

- MELF Diodes are cylindrical glass or plastic packages with Sn termination for lead-free.

Package	SOD80 (LL34)	SM1 (LL41)
Dimension A	3.4mm	5.0mm
Dimension B	1.5mm	2.8mm

**Part Number System**

Device/Package — SOD80-TR — Tape and Reel



# MELF Resistors

## Metal Electrode Leadless Face

Metal Electrode Leadless Face (MELF) Resistors are round or cylindrical in shape. They are available in embossed plastic tape on 7" reels. The terminals on MELF resistors are force-fitted steel caps with Sn plated termination. Parts are also available in Zero-Ohm value. Land pattern sizes for MELF resistors are the same as SMD chip resistor.

### MELF Metal Electrode Leadless Face Component Resistors

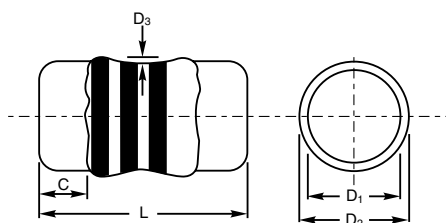
Part Number	Body Size		Tape Width	Tape Pitch	Quantity 7" Reel
	(Inch)	(mm)			
0805SMR-MELF-PL-Sn	.08" x .05"	2.0 x 1.27mm	8mm	4mm	3,000
1206SMR-MELF-PL-Sn	.12" x .06"	3.0 x 1.5mm	8mm	4mm	2,000
1406SMR-MELF-PL-Sn	.14" x .06"	3.56 x 1.5mm	8mm	4mm	3,000
2309SMR-MELF-PL-Sn	.23" x .09"	5.84 x 2.29mm	12mm	4mm	1,500

#### Notes

- MELF is the acronym for Metal Electrode Leadless Face.
- 90/10 solder plated end caps.
- Suitable for reflow and wave soldering.
- Meets or exceeds EIAJ-8009, EIA-PDP-100.
- Force fitted steel caps are tin plated. SnPb is available upon request based on availability.
- Tape type is plastic.

#### Part Number System

Body Size in Inches — 0805SMR-MELF-PL — Tape Type  
 Surface Mount Resistor — Cylindrical MELF Type Carbon Film Resistor



Case Size	Size Code Dimensions				
	L	C Min	D <sub>1</sub>	D <sub>2</sub> Max	D <sub>3</sub> Max
<b>0805</b>	2.0±0.1 (0.079±0.004)	0.3 (0.012)	1.25±0.05 (0.049±0.002)	1.35 (0.053)	0.07 (0.003)
<b>1406</b>	3.5±0.2 (0.138±0.008)	0.5 (0.02)	1.45±0.10 (0.057±0.004)	1.55 (0.061)	0.10 (0.004)
<b>1206</b>	3.2±0.2 (0.126±0.008)		1.55±0.15 (0.061±0.006)	1.75 (0.069)	0.10 (0.004)
<b>2309</b>	5.9±0.2 (0.232±0.008)		2.2±0.10 (0.087±0.004)	2.40 (0.094)	0.15 (0.006)

Unit: mm (Inch)

SOT package is a rectangular surface mount transistor diode with three or more gull-wing leads. The leads are on the two length sides of the package. SOT packages are JEDEC compliant. Popular sizes are the SOT23, SOT143, SOT223 and SOT89.

### SMT Surface Mount Transistors

Part Number	Number of Pins	Body Size "W"	Body Leads "L"	SC Device	Tape Width	Tape Pitch	Quantity Per Reel
SC90-TR-Sn	3	1.6mm	1.6mm	SC-75A	8mm	4mm	3,000
SOT323-TR-Sn	3	2.0mm	2.1mm	SC-70	8mm	4mm	3,000
SOT353-TR-Sn	5	2.0mm	2.1mm	SC-88A	8mm	4mm	3,000
SOT363-TR-Sn	6	2.0mm	2.1mm	SC-88	8mm	4mm	3,000
SOT23-TR-Sn	3	2.9mm	2.4mm	TO-236AB	8mm	4mm	3,000
SOT25-TR-Sn	5	2.9mm	2.8mm	SC-74A	8mm	4mm	3,000
SOT26-TR-Sn	6	2.9mm	2.8mm	SC-74	8mm	4mm	3,000
SOT143-TR-Sn	4	2.9mm	2.5mm	TO-253AA	8mm	4mm	3,000
SOT89-TR-Sn	3	4.5mm	4.0mm	SC-62/TO-243AA	12mm	8mm	1,000
SOT223-TR-Sn	3	6.5mm	7.0mm	SC-73/TO-261AA	12mm	8mm	1,000
DPAK-TR-Sn		6.5mm	9.5mm	SC-63/TO-252-AA	16mm	8mm	2,500
D2PAK-TR-Sn		10.0mm	15.2mm	TO-263AB	24mm	12mm	800/1,000

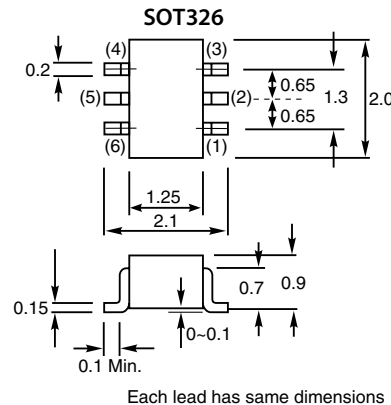
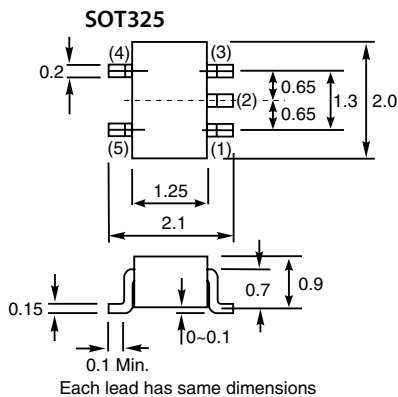
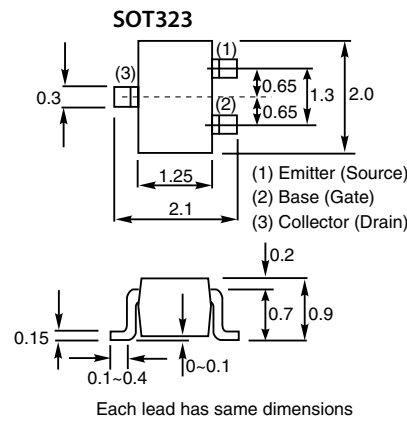
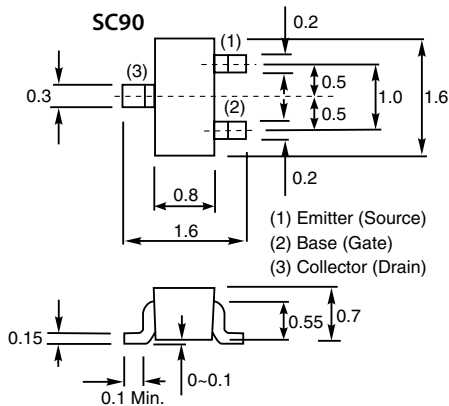
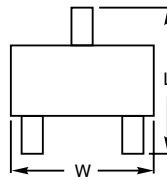
#### Notes

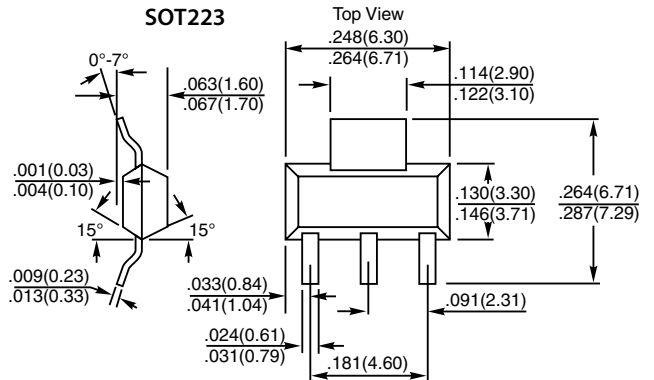
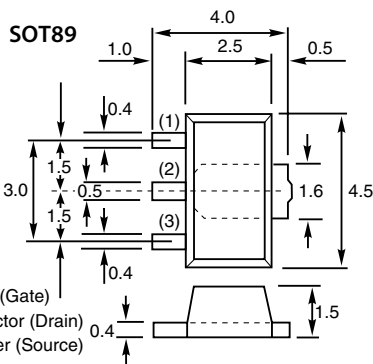
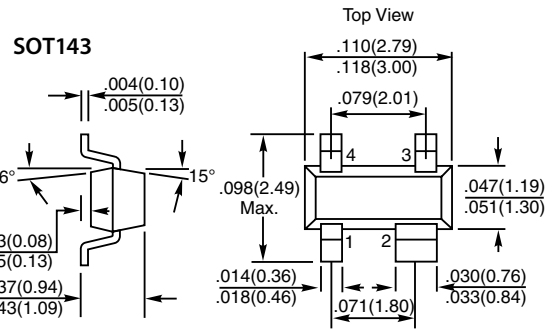
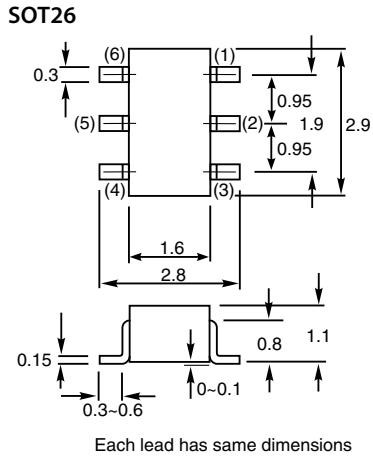
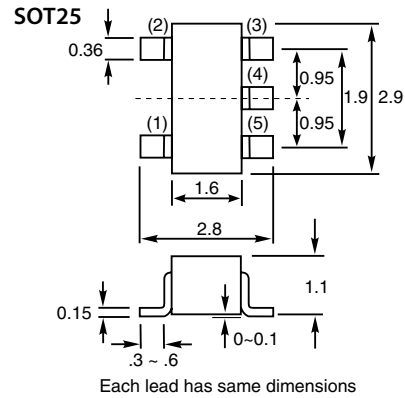
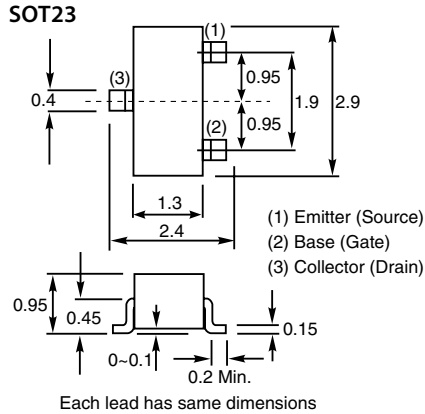
- Carrier pack is plastic for surface mount transistors.
- Tape type is plastic.
- Parts only available on Tape and Reel.
- Tin-Lead solder plating available upon request based on availability.
- Lead-free available with 100% Sn alloy.



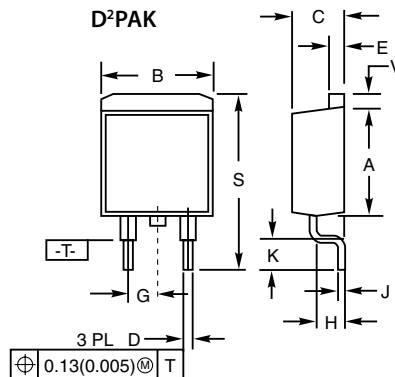
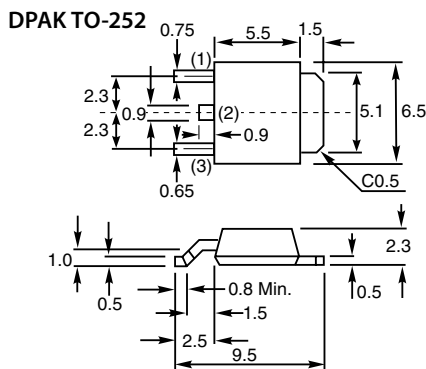
#### Part Number System

Transistor Package — SOT326-TR — Packaging





Notes:  
1. Dimensioning and tolerancing per ANSI Y14.5M, 1982.  
2. Controlling Dimension: Inch.



Dim.	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40