



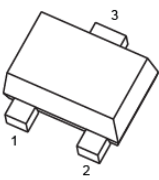
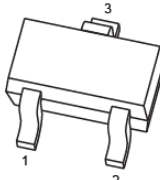
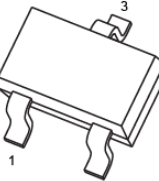
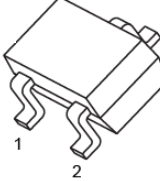
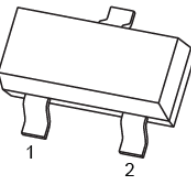
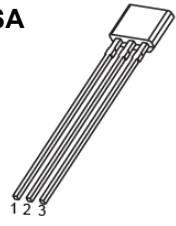
## AD-DTA124E Series Digital Transistor (Built-In Resistors)

**AD-DTA124EM/DTA124EE/DTA124EUA/DTA124EKA /DTA124ECA/DTA124ESA**  
**Digital transistor (PNP)**

### FEATURES

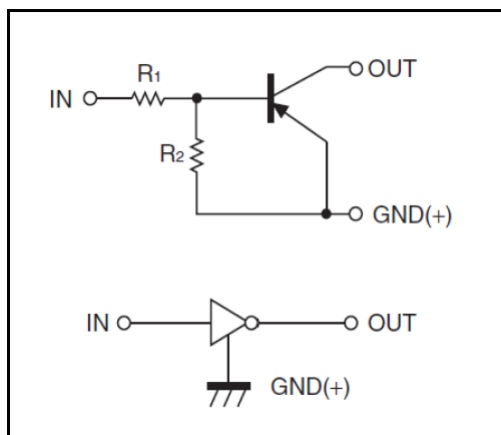
- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit)
- The bias resistors consist of thin-film resistors with complete isolation to allow positive biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- Only the on/off conditions need to be set for operation, making device design easier
- AEC-Q101 qualified

### PIN CONNECTIONS AND MARKING

|                                                                                                                                                     |                                             |                                                                                                                                                                       |                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>AD-DTA124EM</b><br><br><b>MARKING: <math>\bar{1}5</math></b>  | <b>SOT-723</b><br>1. IN<br>2. GND<br>3. OUT | <b>AD-DTA124EE</b><br><br><b>MARKING: <math>\bar{1}5</math></b>                   | <b>SOT-523</b><br>1. IN<br>2. GND<br>3. OUT   |
| <b>AD-DTA124EUA</b><br><br><b>MARKING: <math>\bar{1}5</math></b> | <b>SOT-323</b><br>1. IN<br>2. GND<br>3. OUT | <b>AD-DTA124EKA</b><br><br><b>MARKING: <math>\bar{1}5</math></b>                  | <b>SOT-23-3L</b><br>1. IN<br>2. GND<br>3. OUT |
| <b>AD-DTA124ECA</b><br><br><b>MARKING: <math>\bar{1}5</math></b> | <b>SOT-23</b><br>1. IN<br>2. GND<br>3. OUT  | <b>AD-DTA124ESA</b><br><b>MARKING:</b><br>$\bar{A}124$<br>E XXX <sup>1)</sup><br> | <b>TO-92S</b><br>1. GND<br>2. OUT<br>3. IN    |

1) XXX = Date code

## EQUIVALENT CIRCUIT

MAXIMUM RATINGS ( $T_j = 25^\circ\text{C}$  unless otherwise specified)

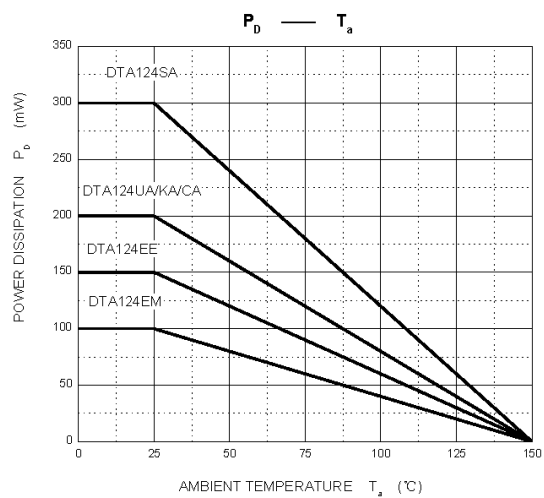
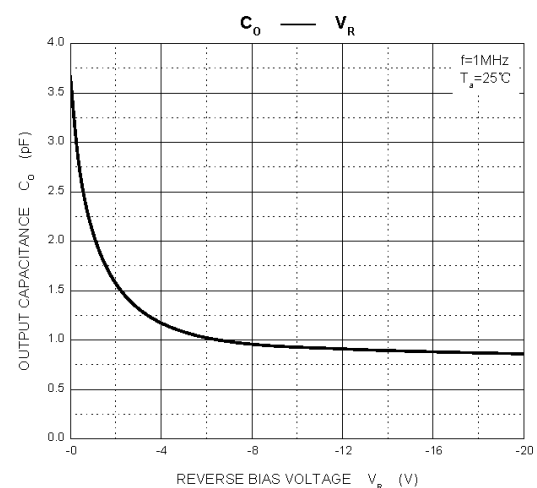
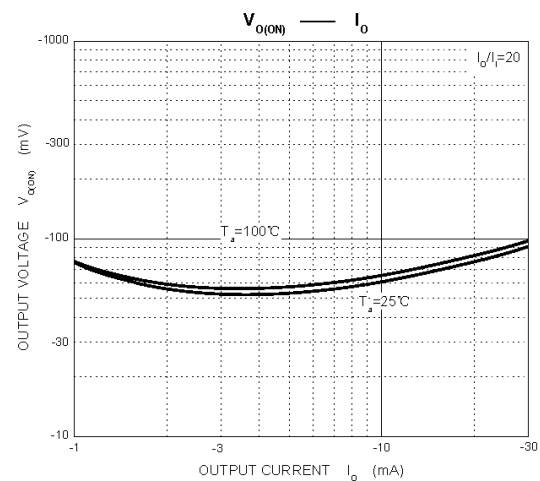
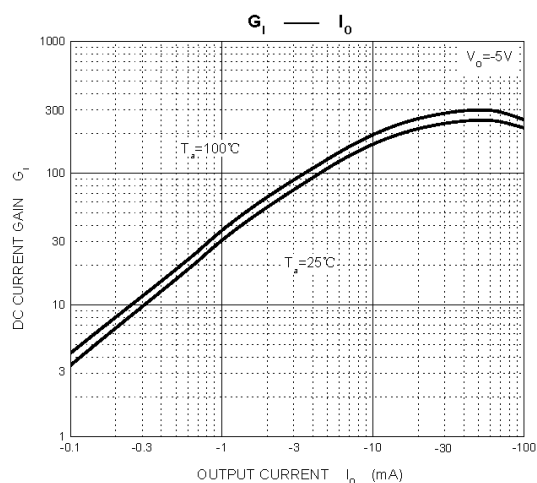
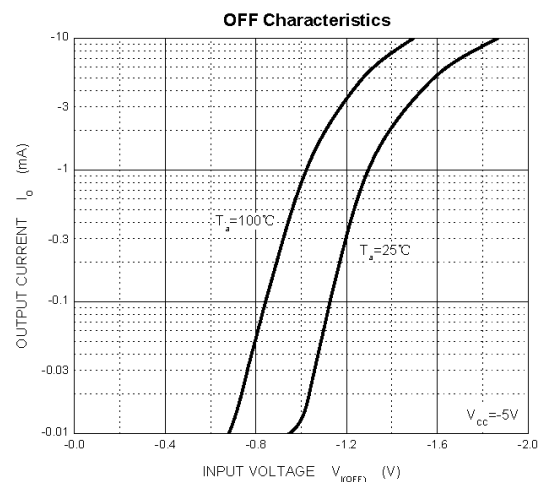
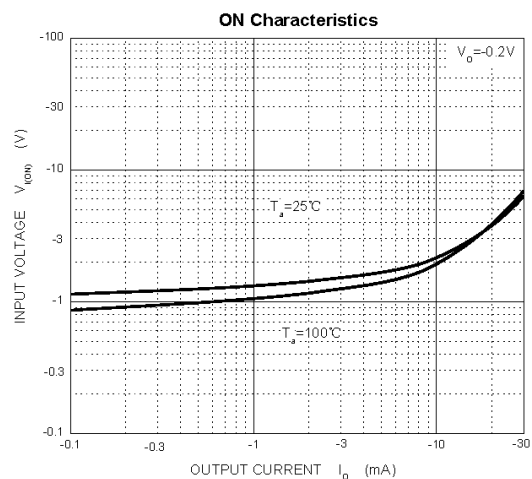
| Parameter                                        | Symbol         | Value     |     |     |     |     |     | Unit             |
|--------------------------------------------------|----------------|-----------|-----|-----|-----|-----|-----|------------------|
|                                                  |                | M         | E   | UA  | CA  | KA  | SA  |                  |
| Supply voltage                                   | $V_{CC}$       | -50       |     |     |     |     |     | V                |
| Input voltage                                    | $V_{IN}$       | -40 ~ 10  |     |     |     |     |     | V                |
| Output current                                   | $I_O^{(1)}$    | -30       |     |     |     |     |     | mA               |
| Peak collector current                           | $I_{CM}^{(1)}$ | -100      |     |     |     |     |     | mA               |
| Maximum power dissipation                        | $P_D^{(1)}$    | 100       | 150 | 200 | 200 | 200 | 300 | mW               |
| Operating junction and storage temperature range | $T_j, T_{stg}$ | -55 ~ 150 |     |     |     |     |     | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS ( $T_j = 25^\circ\text{C}$  unless otherwise specified)

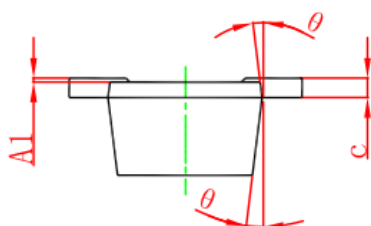
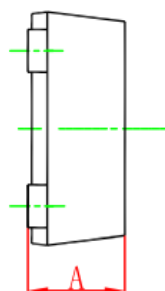
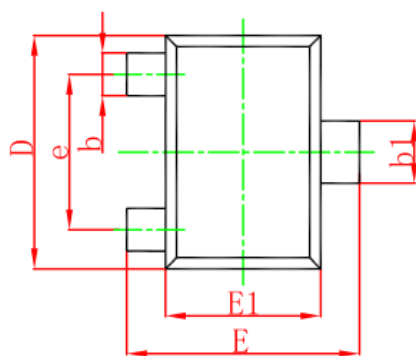
| Parameter            | Symbol       | Test condition                       | Min  | Typ | Max   | Unit      |
|----------------------|--------------|--------------------------------------|------|-----|-------|-----------|
| Input voltage        | $V_{I(off)}$ | $V_{CC} = -5V, I_O = -100\mu A$      | -0.5 | -   | -     | V         |
|                      | $V_{I(on)}$  | $V_O = -0.3V, I_O = -5mA$            | -    | -   | -3    |           |
| Output voltage       | $V_{O(on)}$  | $I_O/I_I = -10mA/-0.5mA$             | -    | -   | -0.3  | V         |
| Input current        | $I_I$        | $V_I = -5V$                          | -    | -   | -0.36 | mA        |
| Output current       | $I_{O(off)}$ | $V_{CC} = -50V, V_I = 0V$            | -    | -   | -0.5  | $\mu A$   |
| DC current gain      | $G_I$        | $V_O = -5V, I_O = -5mA$              | 56   | -   | -     | -         |
| Input resistance     | $R_I$        |                                      | 15.4 | 22  | 28.6  | $k\Omega$ |
| Resistance ratio     | $R_2/R_1$    |                                      | 0.8  | 1   | 1.2   |           |
| Transition frequency | $f_T$        | $V_O = -10V, I_O = -5mA, f = 100MHz$ | -    | 250 | -     | MHz       |

1) Maximum allowed temperature  $T_j = 25^\circ\text{C}$ .

## TYPICAL CHARACTERISTICS

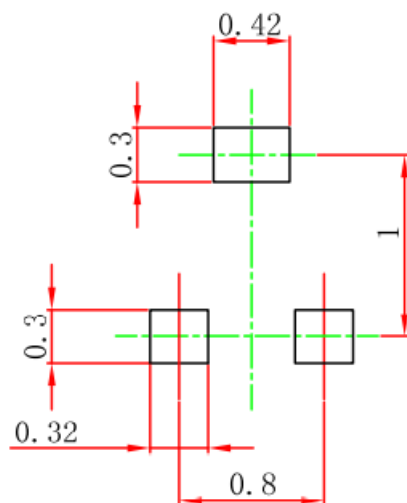


## SOT-723 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.430                     | 0.500 | 0.017                | 0.020 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| b      | 0.170                     | 0.270 | 0.007                | 0.011 |
| b1     | 0.270                     | 0.370 | 0.011                | 0.015 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 1.150                     | 1.250 | 0.045                | 0.049 |
| E      | 1.150                     | 1.250 | 0.045                | 0.049 |
| E1     | 0.750                     | 0.850 | 0.030                | 0.033 |
| e      | 0.800TYP.                 |       | 0.031TYP.            |       |
| θ      | 7° REF.                   |       | 7° REF.              |       |

## SOT-723 SUGGESTED PAD LAYOUT

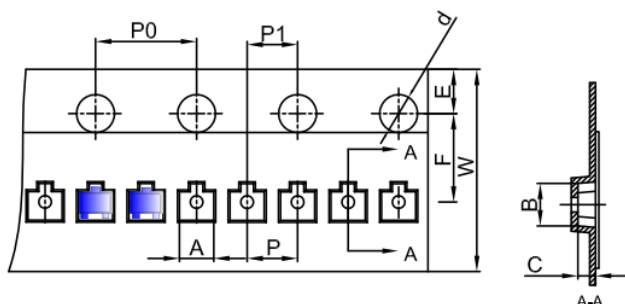


Note:

1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-723 TAPE AND REEL

### SOT-723 Embossed Carrier Tape

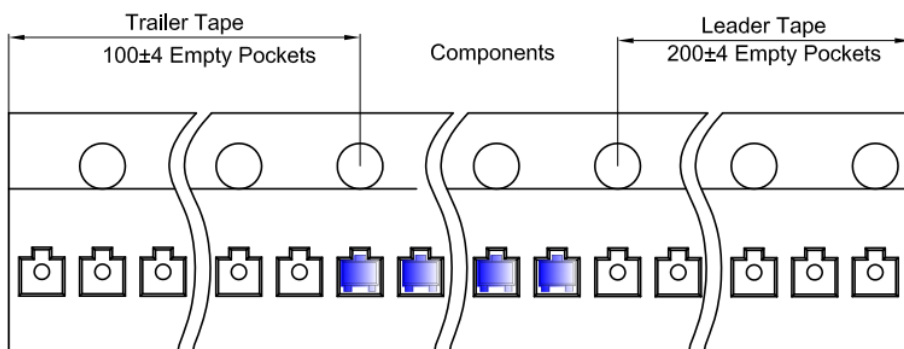


#### Packaging Description:

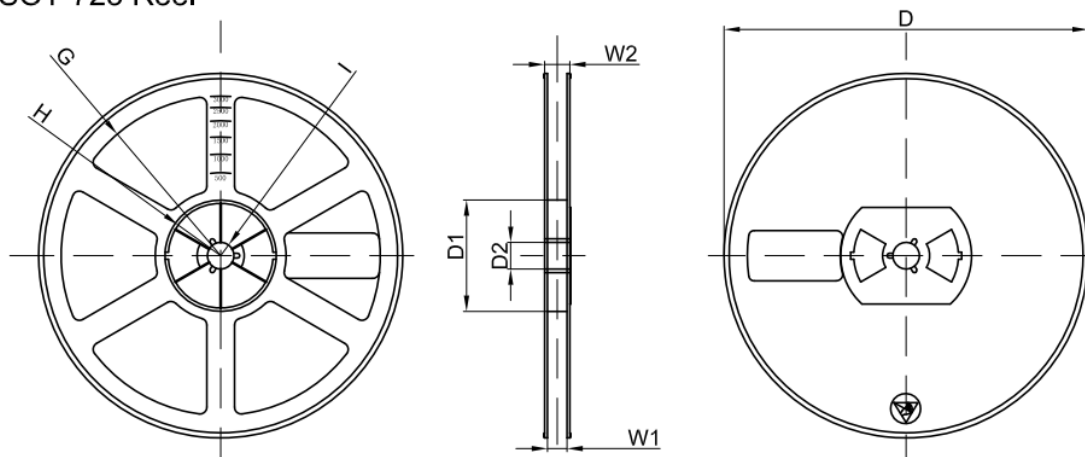
SOT-723 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 8,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-723                      | 1.33 | 1.45 | 0.61 | Ø1.50 | 1.75 | 3.50 | 4.00 | 2.00 | 2.00 | 8.00 |

### SOT-723 Tape Leader and Trailer



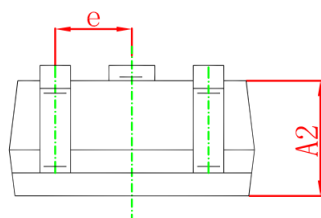
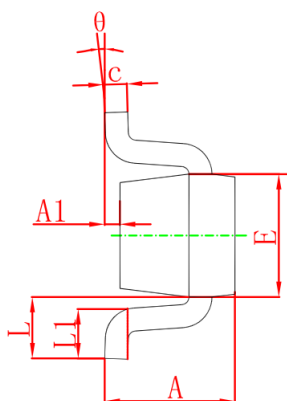
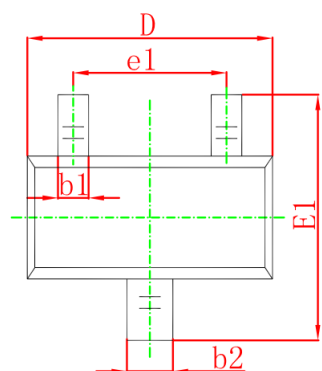
### SOT-723 Reel



| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

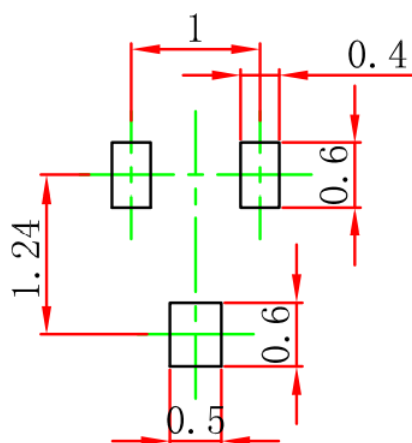
| REEL     | Reel Size | Box         | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|-------------|--------------|-------------|-----------------|----------|
| 8000 pcs | 7 inch    | 120,000 pcs | 203×203×195  | 480,000 pcs | 438×438×220     |          |

## SOT-523 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.700                     | 0.900 | 0.028                | 0.035 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.700                     | 0.800 | 0.028                | 0.031 |
| b1     | 0.150                     | 0.250 | 0.006                | 0.010 |
| b2     | 0.250                     | 0.350 | 0.010                | 0.014 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 0.700                     | 0.900 | 0.028                | 0.035 |
| E1     | 1.450                     | 1.750 | 0.057                | 0.069 |
| e      | 0.500 TYP.                |       | 0.020 TYP.           |       |
| e1     | 0.900                     | 1.100 | 0.035                | 0.043 |
| L      | 0.400 REF.                |       | 0.016 REF.           |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-523 SUGGESTED PAD LAYOUT

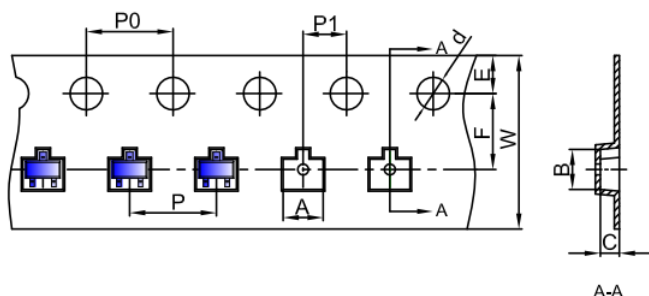


Note:

1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-523 TAPE AND REEL

### SOT-523 Embossed Carrier Tape



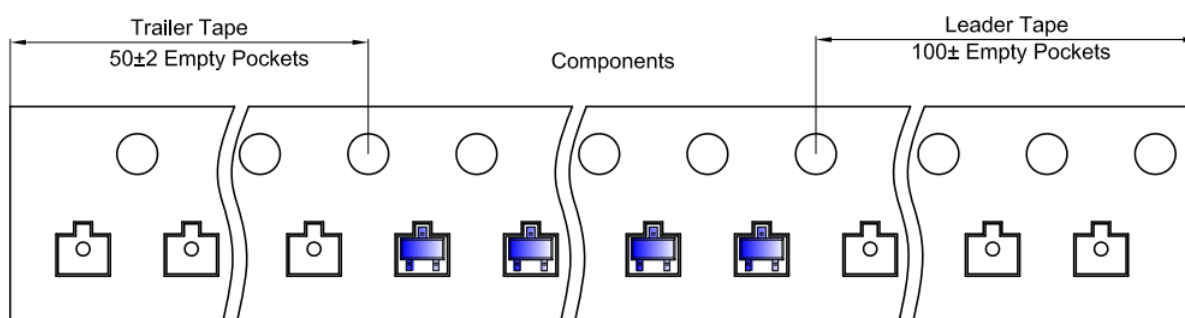
#### Packaging Description:

SOT-523 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

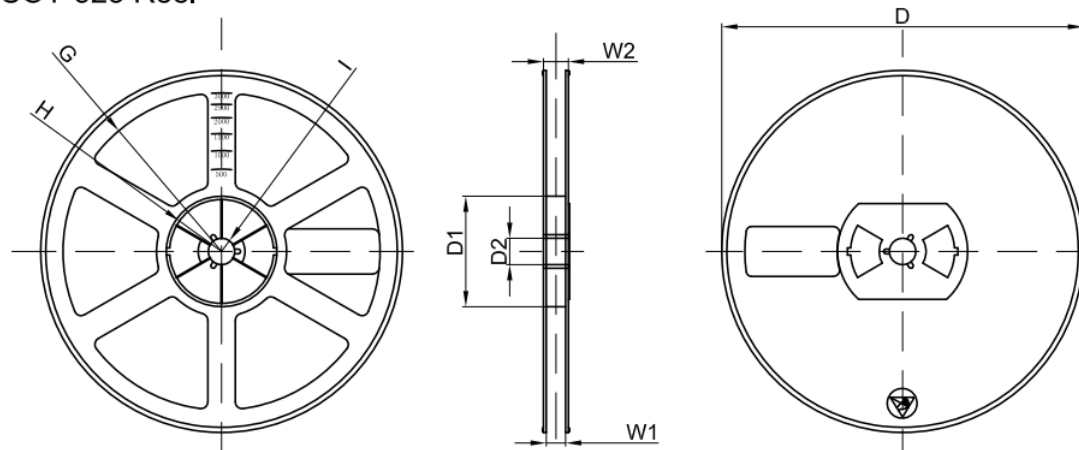
Dimensions are in millimeter

| Pkg type | A    | B    | C     | d     | E    | F    | P0   | P    | P1   | W    |
|----------|------|------|-------|-------|------|------|------|------|------|------|
| SOT-523  | 1.85 | 1.85 | 0.875 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

### SOT-523 Tape Leader and Trailer



### SOT-523 Reel

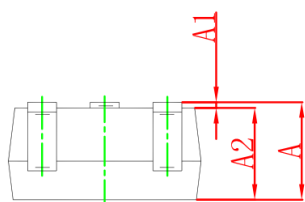
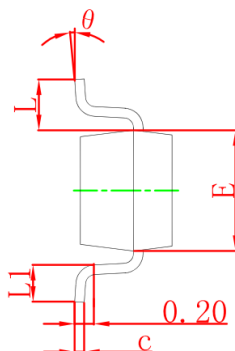
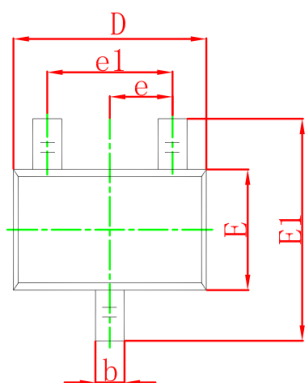


Dimensions are in millimeter

| Reel Option | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
|-------------|---------|-------|-------|--------|--------|-------|------|-------|
| 7"Dia       | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

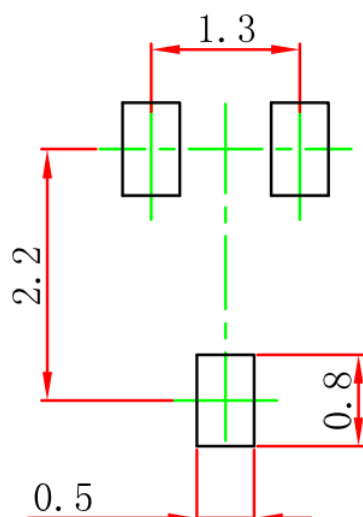
| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 45,000 pcs | 203×203×195  | 180,000 pcs | 438×438×220     |          |

## SOT-323 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.000 | 0.035                | 0.039 |
| b      | 0.200                     | 0.400 | 0.008                | 0.016 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.000                     | 2.200 | 0.079                | 0.087 |
| E      | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                     | 2.450 | 0.085                | 0.096 |
| e      | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1     | 1.200                     | 1.400 | 0.047                | 0.055 |
| L      | 0.525 REF                 |       | 0.021 REF            |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-323 SUGGESTED PAD LAYOUT

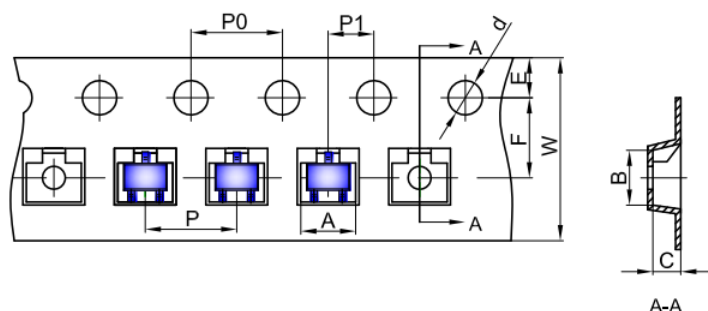


Note:

1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-323 TAPE AND REEL

### SOT-323 Embossed Carrier Tape



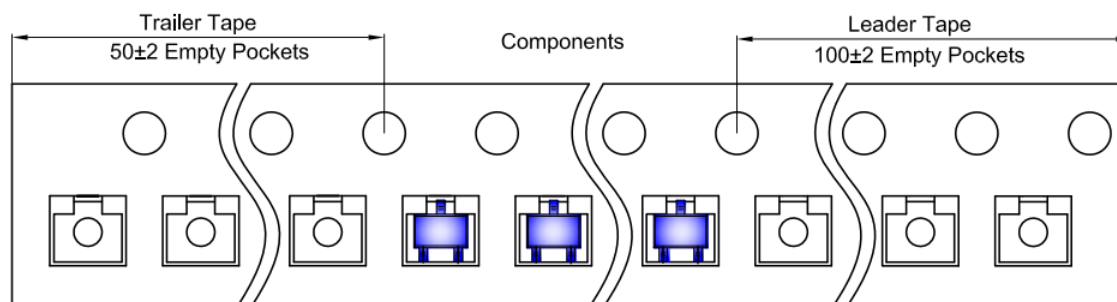
#### Packaging Description:

SOT-323 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

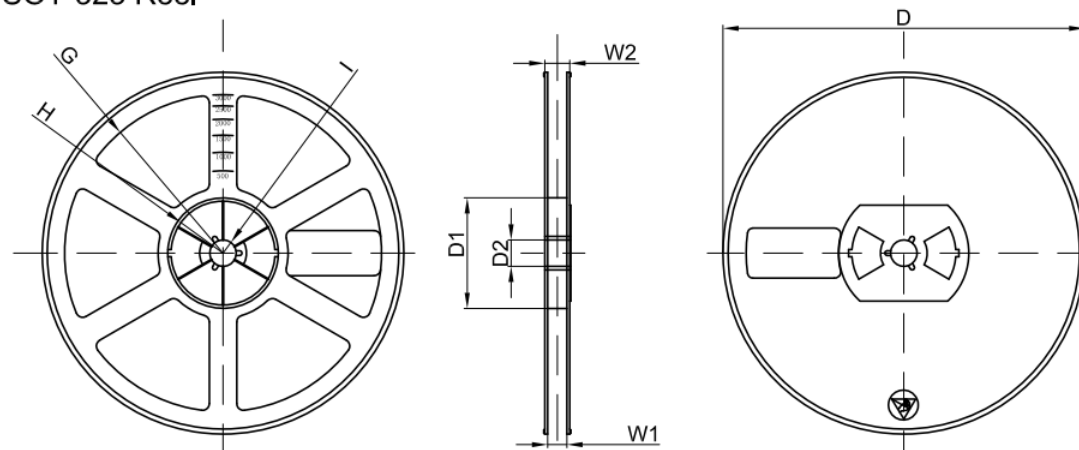
Dimensions are in millimeter

| Pkg type | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
|----------|------|------|------|-------|------|------|------|------|------|------|
| SOT-323  | 2.25 | 2.55 | 1.19 | Ø1.55 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

### SOT-323 Tape Leader and Trailer



### SOT-323 Reel

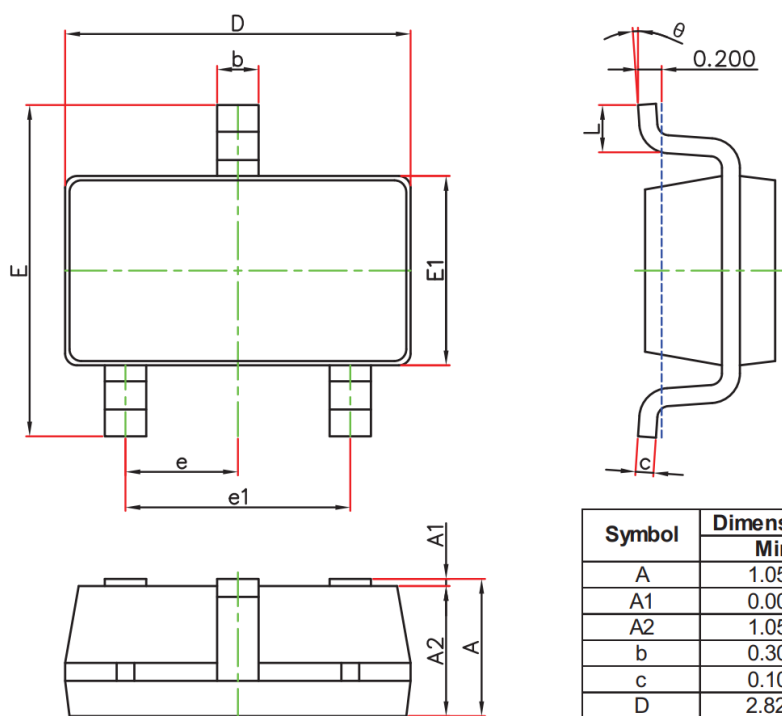


Dimensions are in millimeter

| Reel Option | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
|-------------|---------|-------|-------|--------|--------|-------|------|-------|
| 7"Dia       | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

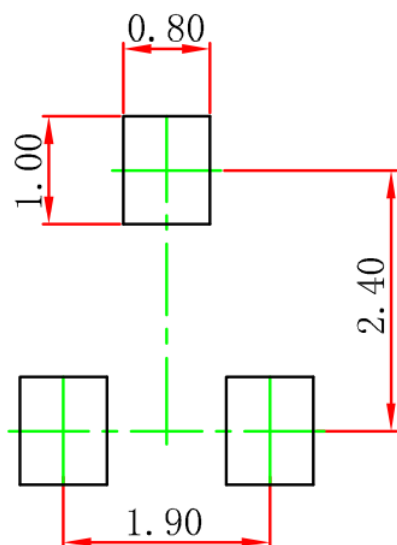
| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 45,000 pcs | 203×203×195  | 180,000 pcs | 438×438×220     |          |

## SOT-23-3L PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23-3L SUGGESTED PAD LAYOUT

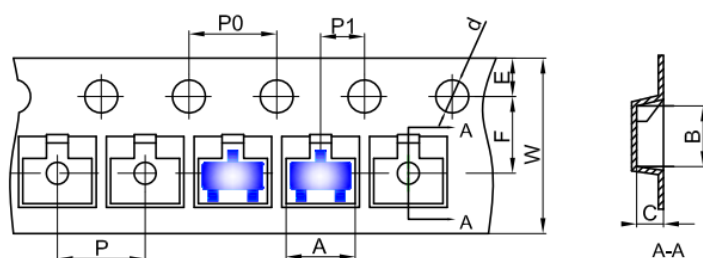


### Note:

1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-23-3L TAPE AND REEL

### SOT-23-3L Embossed Carrier Tape

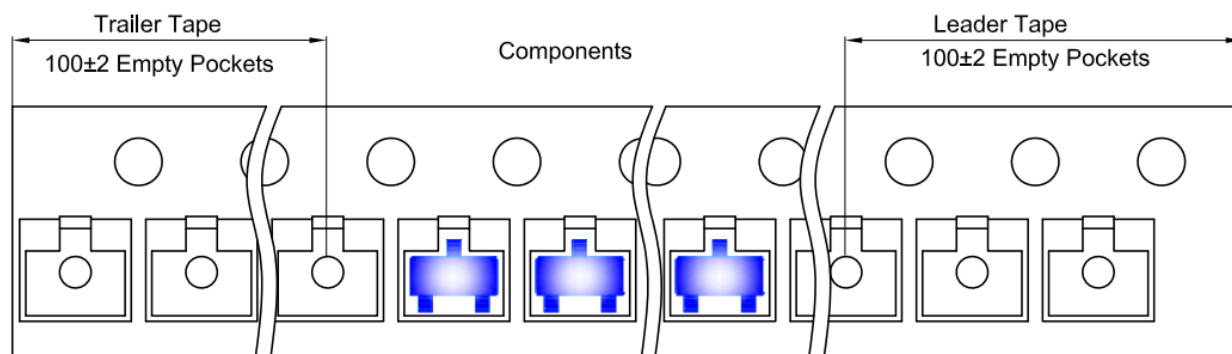


#### Packaging Description:

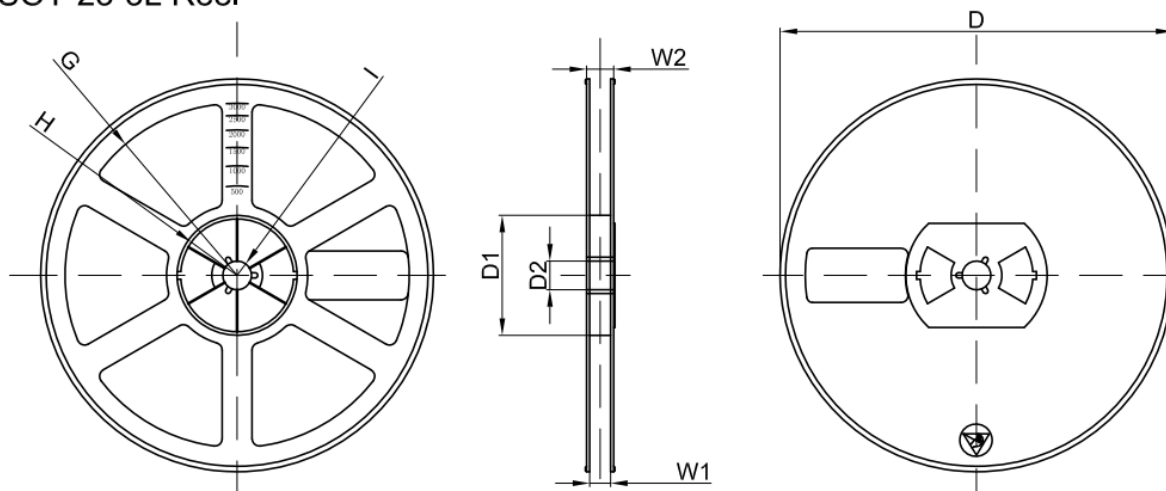
SOT-23-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 18.0cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-23-3L                    | 3.18 | 3.28 | 1.32 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

### SOT-23-3L Tape Leader and Trailer



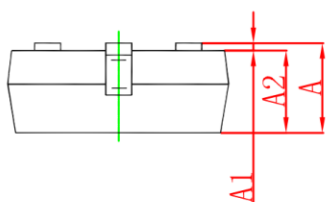
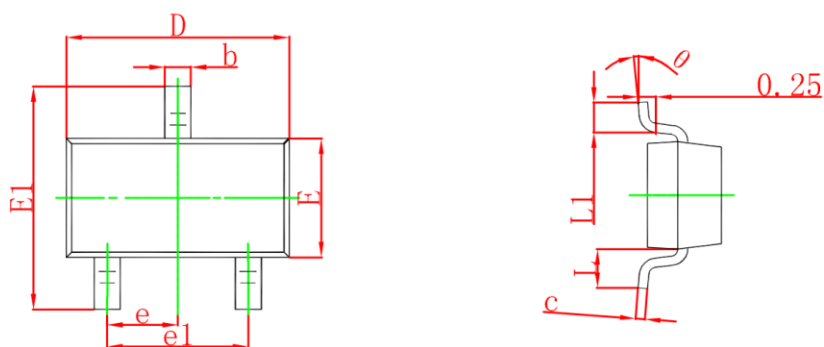
### SOT-23-3L Reel



| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø180.00 | 60.00 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 13.10 |

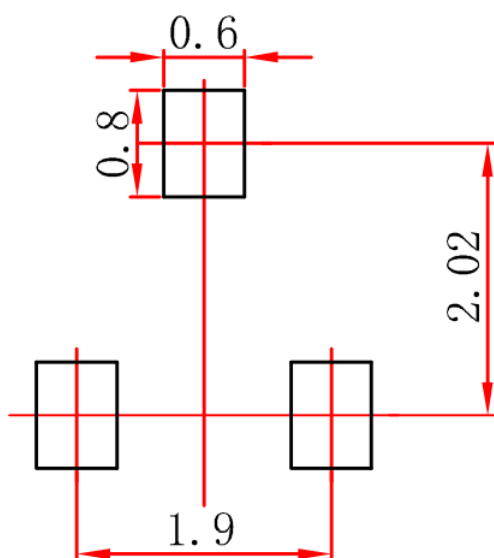
| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 30,000 pcs | 203×203×195  | 120,000 pcs | 438×438×220     |          |

## SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions in Millimeters |       | Dimensions in Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 SUGGESTED PAD LAYOUT

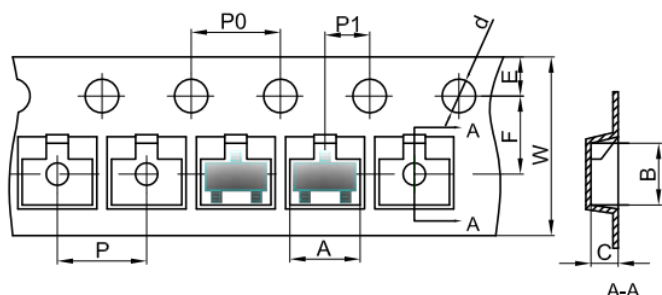


Note:

1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## SOT-23 TAPE AND REEL

### SOT-23 Embossed Carrier Tape



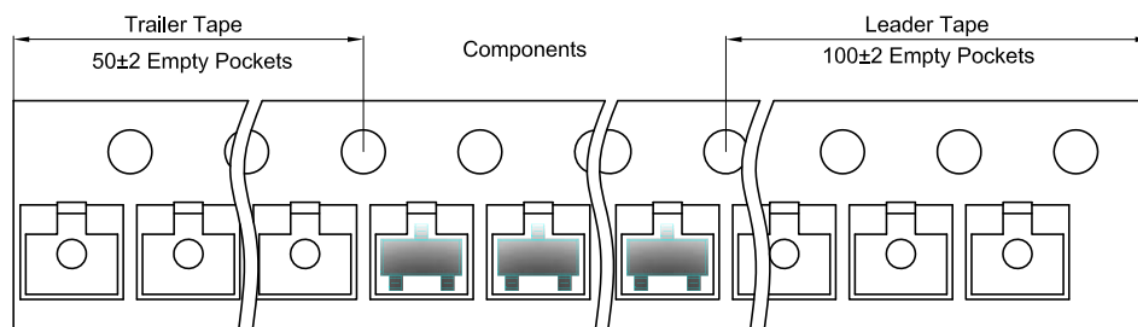
#### Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

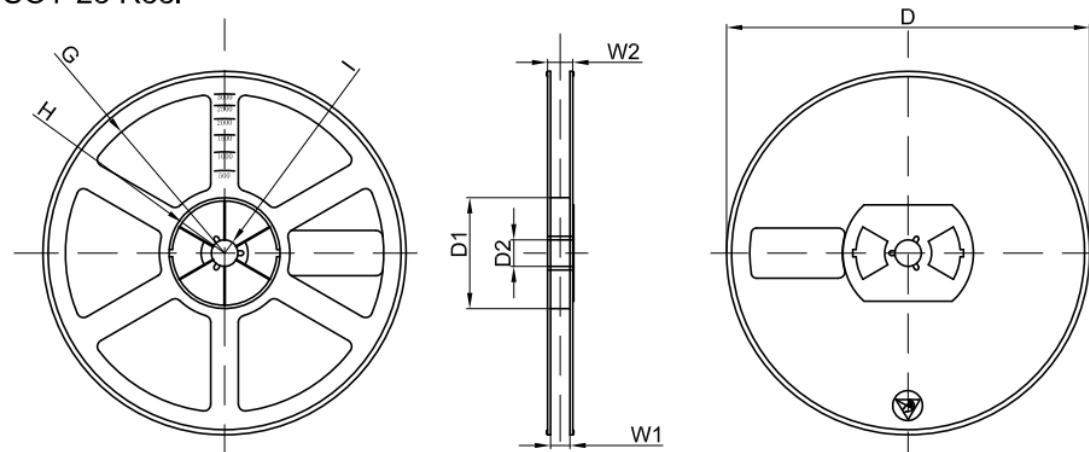
Dimensions are in millimeter

| Pkg type | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
|----------|------|------|------|-------|------|------|------|------|------|------|
| SOT-23   | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

### SOT-23 Tape Leader and Trailer



### SOT-23 Reel

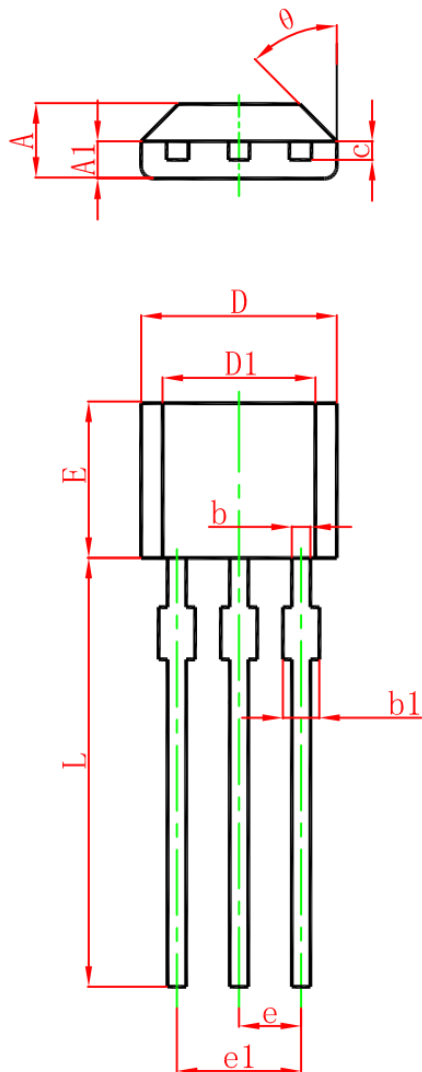


Dimensions are in millimeter

| Reel Option | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
|-------------|---------|-------|-------|--------|--------|-------|------|-------|
| 7"Dia       | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

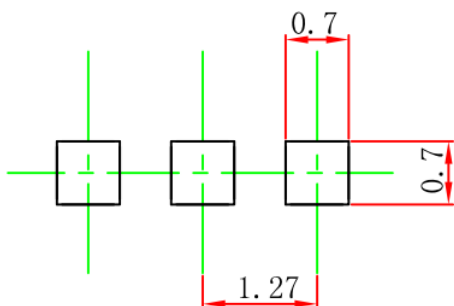
| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 45,000 pcs | 203×203×195  | 180,000 pcs | 438×438×220     |          |

## TO-92S PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 1.420                     | 1.620  | 0.056                | 0.064 |
| A1     | 0.660                     | 0.860  | 0.026                | 0.034 |
| b      | 0.330                     | 0.480  | 0.013                | 0.019 |
| b1     | 0.400                     | 0.510  | 0.016                | 0.020 |
| c      | 0.330                     | 0.510  | 0.013                | 0.020 |
| D      | 3.900                     | 4.100  | 0.154                | 0.161 |
| D1     | 2.280                     | 2.680  | 0.090                | 0.106 |
| E      | 3.050                     | 3.250  | 0.120                | 0.128 |
| e      | 1.270 TYP.                |        | 0.050 TYP.           |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 15.100                    | 15.500 | 0.594                | 0.610 |
| θ      | 45° TYP.                  |        | 45° TYP.             |       |

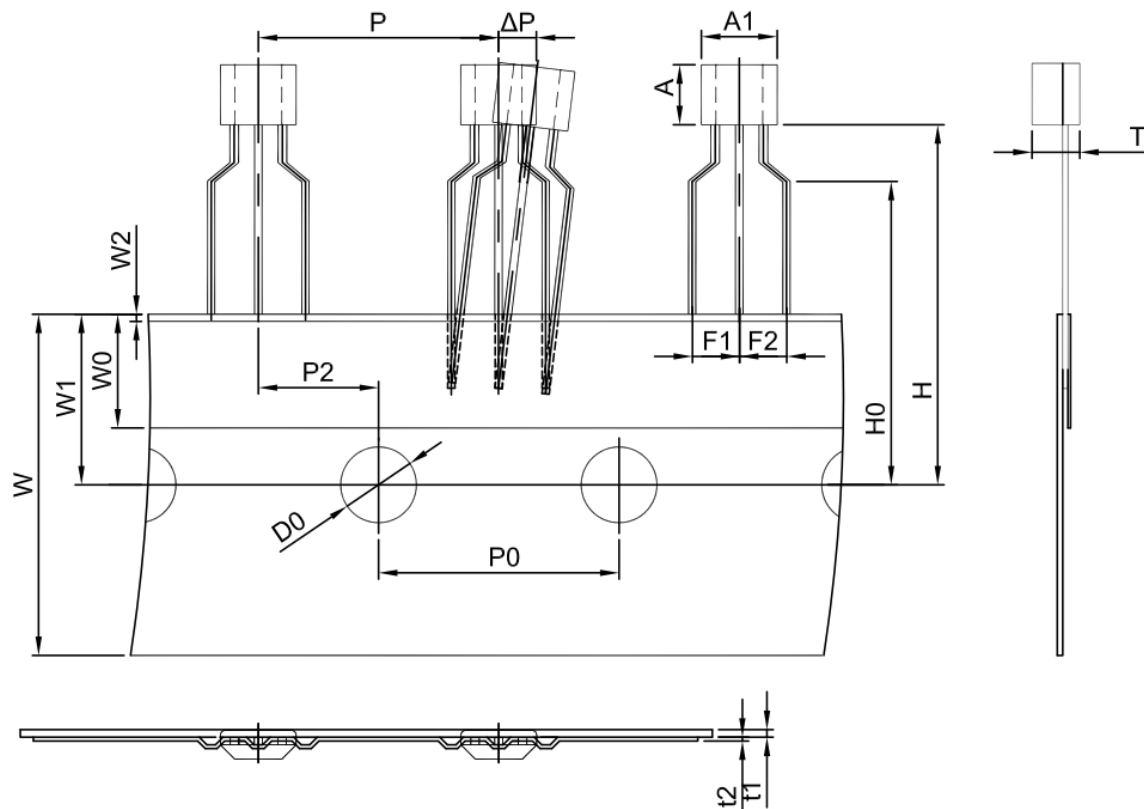
## TO-92S SUGGESTED PAD LAYOUT



## Note:

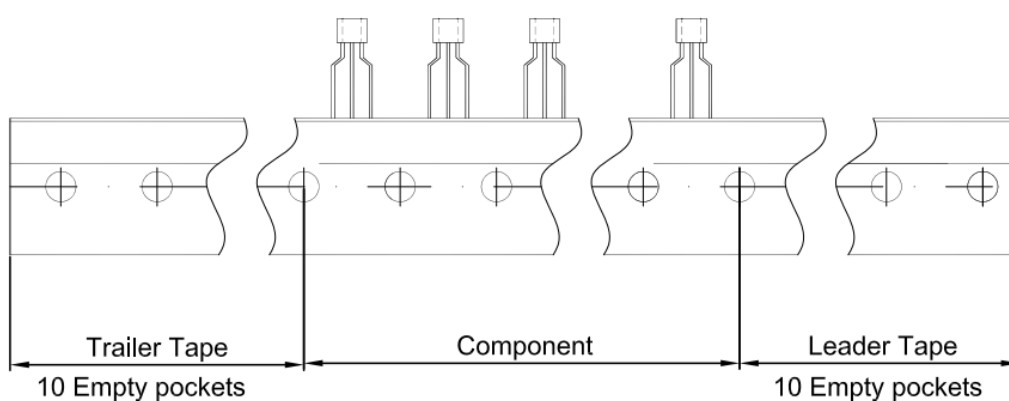
1. Controlling dimension in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purpose only.

## TO-92S PACKAGE TAPING DIMENSION



Dimiensions are in millimeter

| A1  | A    | T    | P    | P0   | P2   | F1  | F2  | W    |
|-----|------|------|------|------|------|-----|-----|------|
| 4.0 | 3.15 | 1.52 | 12.7 | 12.7 | 6.35 | 2.5 | 2.5 | 18.0 |
| W0  | W1   | W2   | H    | H0   | D0   | t1  | t2  | ΔP   |
| 6.0 | 9.0  | 1.0  | 19.0 | 16.0 | 4.0  | 0.4 | 0.2 | 0    |



| Package | Box      | Box Size(mm) | Carton     | Carton Size(mm) |
|---------|----------|--------------|------------|-----------------|
| TO-92S  | 3000 pcs | 333×162×43   | 30,000 pcs | 350×340×250     |

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