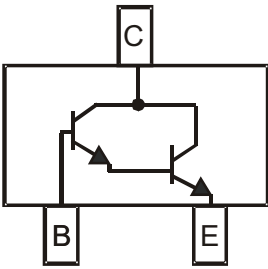


# MPSA13 MPSA14 NPN Darlington Transistor

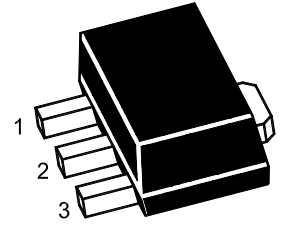
## Features

- Ideal for Medium Power Amplification and Switching
- High Current Gain

## Equivalent Circuit



## SOT-89



1.Base 2.Emitter 3.Collector

### Marking Code:

MPSA13 : A13

MPSA14 : A14

## Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Parameter                 | Symbol    | Value       | Unit |
|---------------------------|-----------|-------------|------|
| Collector Base Voltage    | $V_{CB0}$ | 30          | V    |
| Collector Emitter Voltage | $V_{CEO}$ | 30          | V    |
| Emitter Base Voltage      | $V_{EBO}$ | 10          | V    |
| Collector Current         | $I_C$     | 300         | mA   |
| Maximum Power Dissipation | $P_D$     | 500         | mW   |
| Junction Temperature      | $T_J$     | 150         | °C   |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C   |

## Thermal Characteristics

| Parameter                              | Symbol          | Value | Unit |
|--|-----------------|-------|------|
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 250   | °C/W |



# MPSA13 MPSA14 NPN Darlington Transistor

## Electrical Characteristics

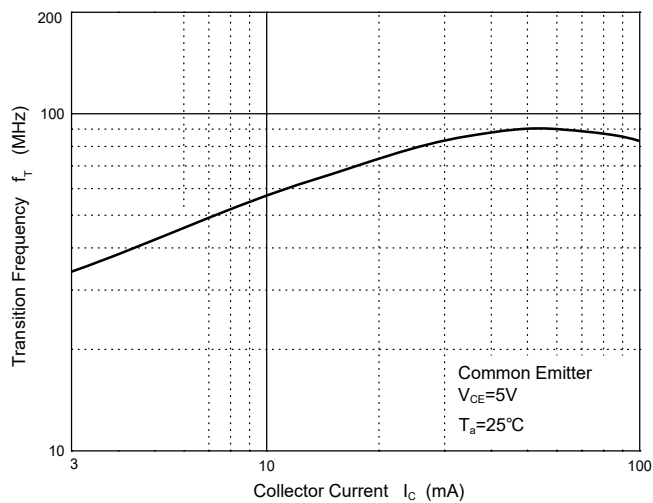
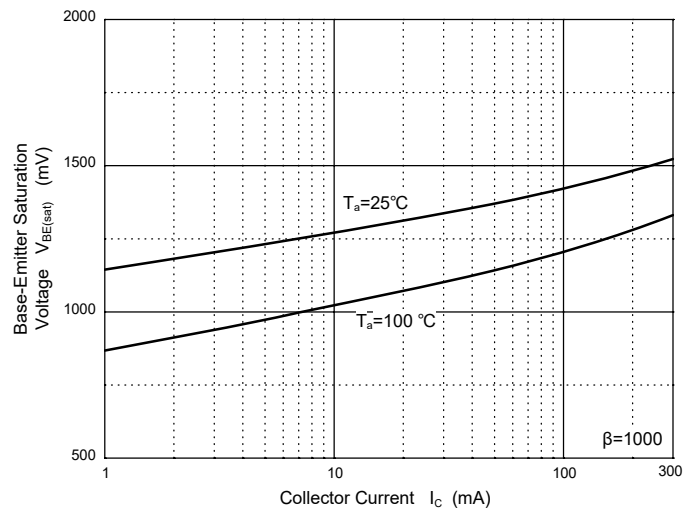
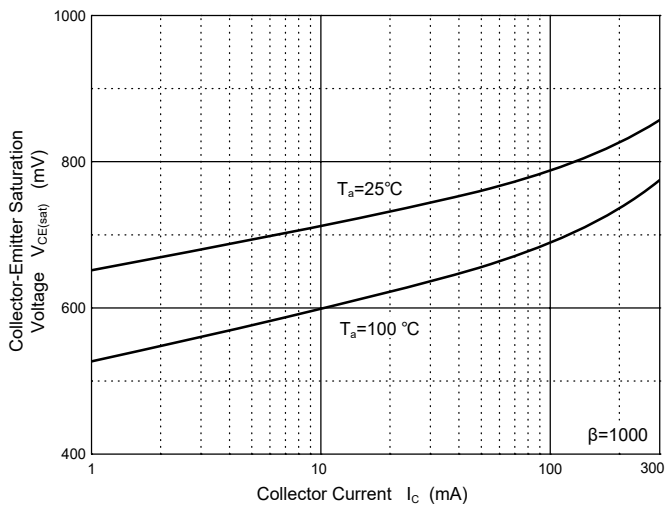
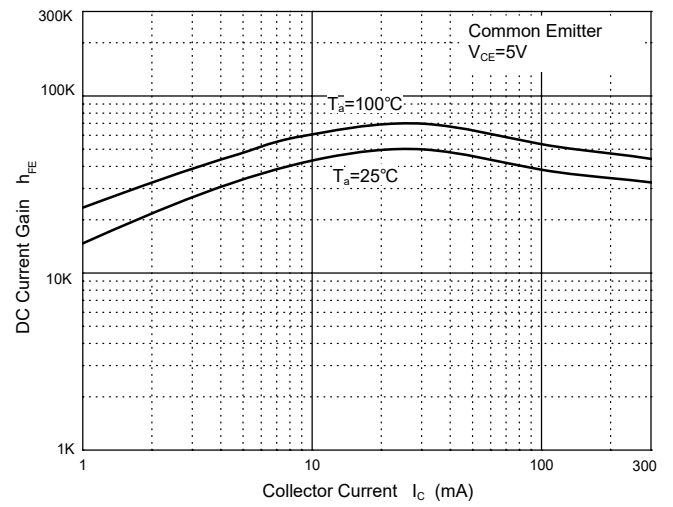
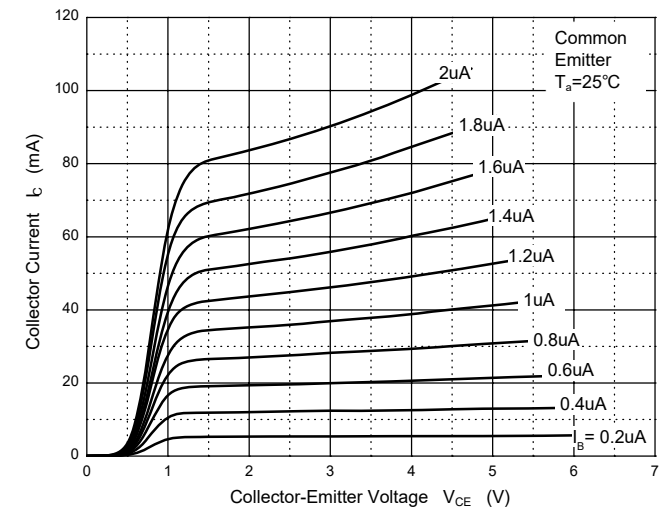
Ratings at 25°C ambient temperature unless otherwise specified.

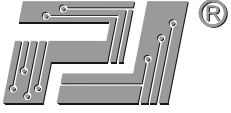
| Parameter  | Symbol        | Min.  | Max. | Unit |
|--|---------------|-------|------|------|
| DC Current Gain<br>at $V_{CE} = 5\text{ V}$ , $I_C = 10\text{ mA}$                             | $H_{FE}$      | 5000  | --   | --   |
| MMBTA13  |               | 10000 | --   |      |
| MMBTA14  |               | 10000 | --   |      |
| at $V_{CE} = 5\text{ V}$ , $I_C = 100\text{ mA}$   |               | 20000 | --   |      |
| Collector Base Cutoff Current<br>at $V_{CB} = 30\text{ V}$                                     | $I_{CBO}$     | --    | 100  | nA   |
| Emitter Base Cutoff Current<br>at $V_{EB} = 10\text{ V}$                                       | $I_{EBO}$     | --    | 100  | nA   |
| Collector Base Breakdown Voltage<br>at $I_C = 100\text{ }\mu\text{A}$                          | $V_{(BR)CBO}$ | 30    | --   | V    |
| Collector Emitter Breakdown Voltage<br>at $I_C = 100\text{ }\mu\text{A}$                       | $V_{(BR)CEO}$ | 30    | --   | V    |
| Emitter Base Breakdown Voltage<br>at $I_E = 100\text{ }\mu\text{A}$                            | $V_{(BR)EBO}$ | 10    | --   | V    |
| Collector Emitter Saturation Voltage<br>at $I_C = 100\text{ mA}$ , $I_B = 0.1\text{ mA}$       | $V_{CE(sat)}$ | --    | 1.5  | V    |
| Base Emitter Saturation Voltage<br>at $I_C = 100\text{ mA}$ , $I_B = 0.1\text{ mA}$            | $V_{BE(sat)}$ | --    | 2    | V    |
| Transition Frequency<br>at $V_{CE} = 5\text{ V}$ , $I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$ | $F_T$         | 125   | --   | MHz  |
| Output Capacitance<br>at $V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$                           | $C_{ob}$      | --    | 12   | pF   |



# MPSA13 MPSA14 NPN Darlington Transistor

## Typical Characteristic Curves



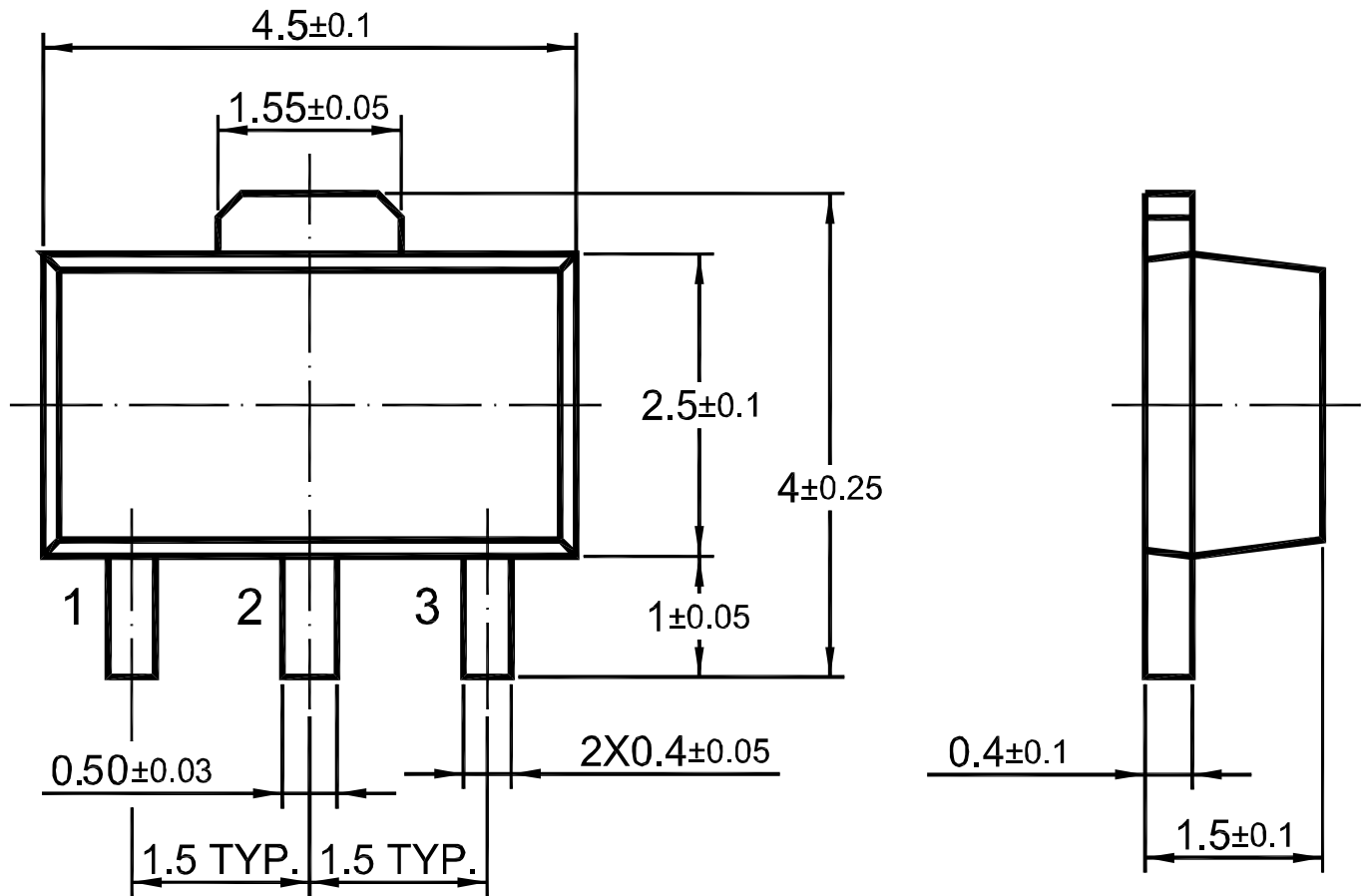


# MPSA13 MPSA14 NPN Darlington Transistor

## Package Outline

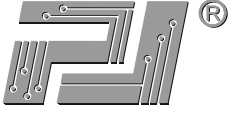
SOT-89

Dimensions in mm



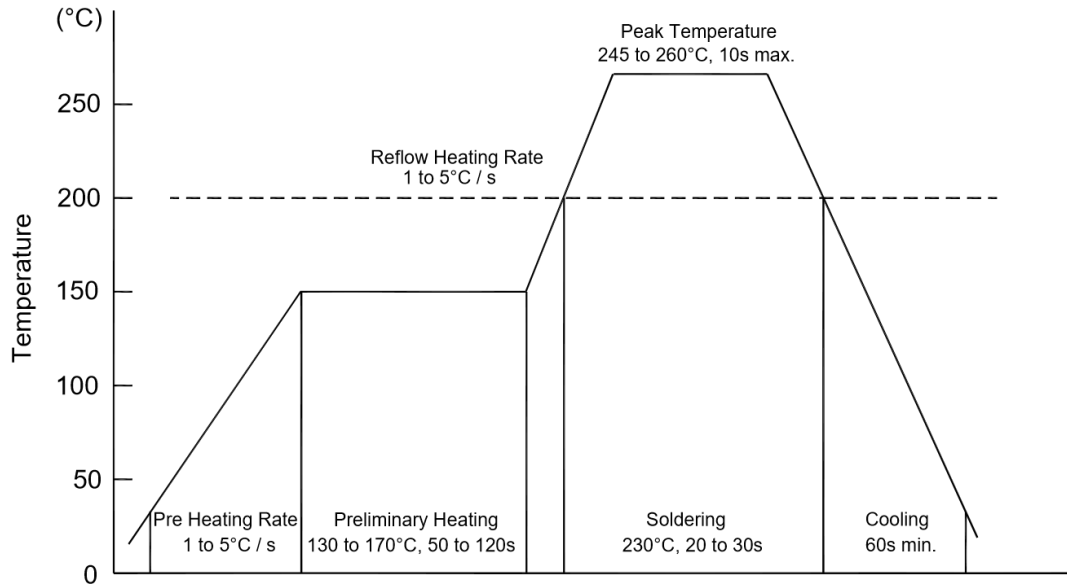
## Ordering Information

| Device         | Package | Shipping               |
|----------------|---------|------------------------|
| MPSA13, MPSA14 | SOT-89  | 1,000PCS/Reel&7inches  |
|                |         | 3,000PCS/Reel&13inches |



## Conditions of Soldering and Storage

### ◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

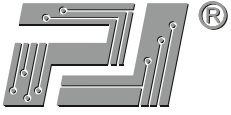
- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

### ◆ Conditions of hand soldering

- Temperature: 370 °C
- Time: 3s max.
- Times: one time

### ◆ Storage conditions

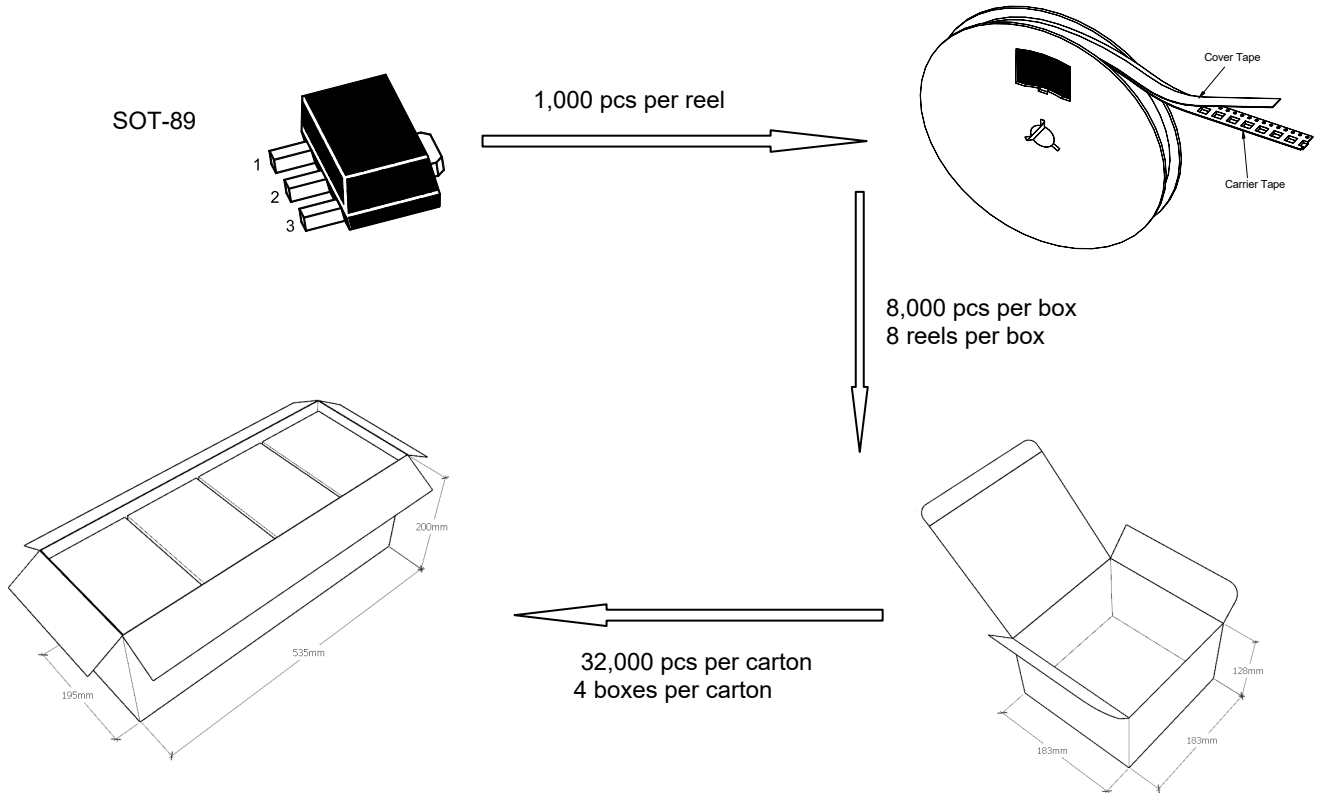
- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing



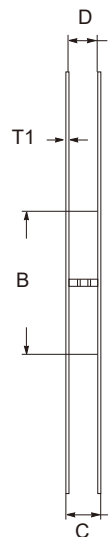
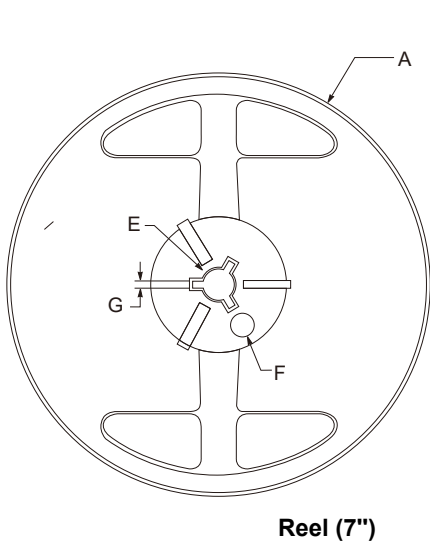
# MPSA13 MPSA14 NPN Darlington Transistor

## Package Specifications

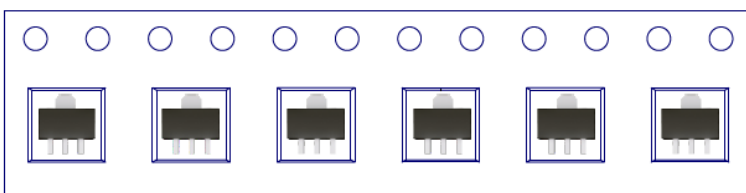
- The method of packaging (1,000PCS/Reel&7inches)

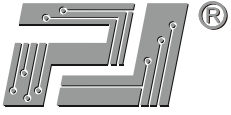


## ◆ Embossed tape and reel data



| symbol | Value(unit:mm)      |
|--------|---------------------|
| A      | $\Phi 179 \pm 1$    |
| B      | $60.5 \pm 0.2$      |
| C      | $15.3 \pm 0.3$      |
| D      | 12.5~13.7           |
| E      | $\Phi 13.5 \pm 0.2$ |
| F      | $\Phi 10.0 \pm 0.2$ |
| G      | $2.7 \pm 0.2$       |
| T1     | $1.0 \pm 0.2$       |

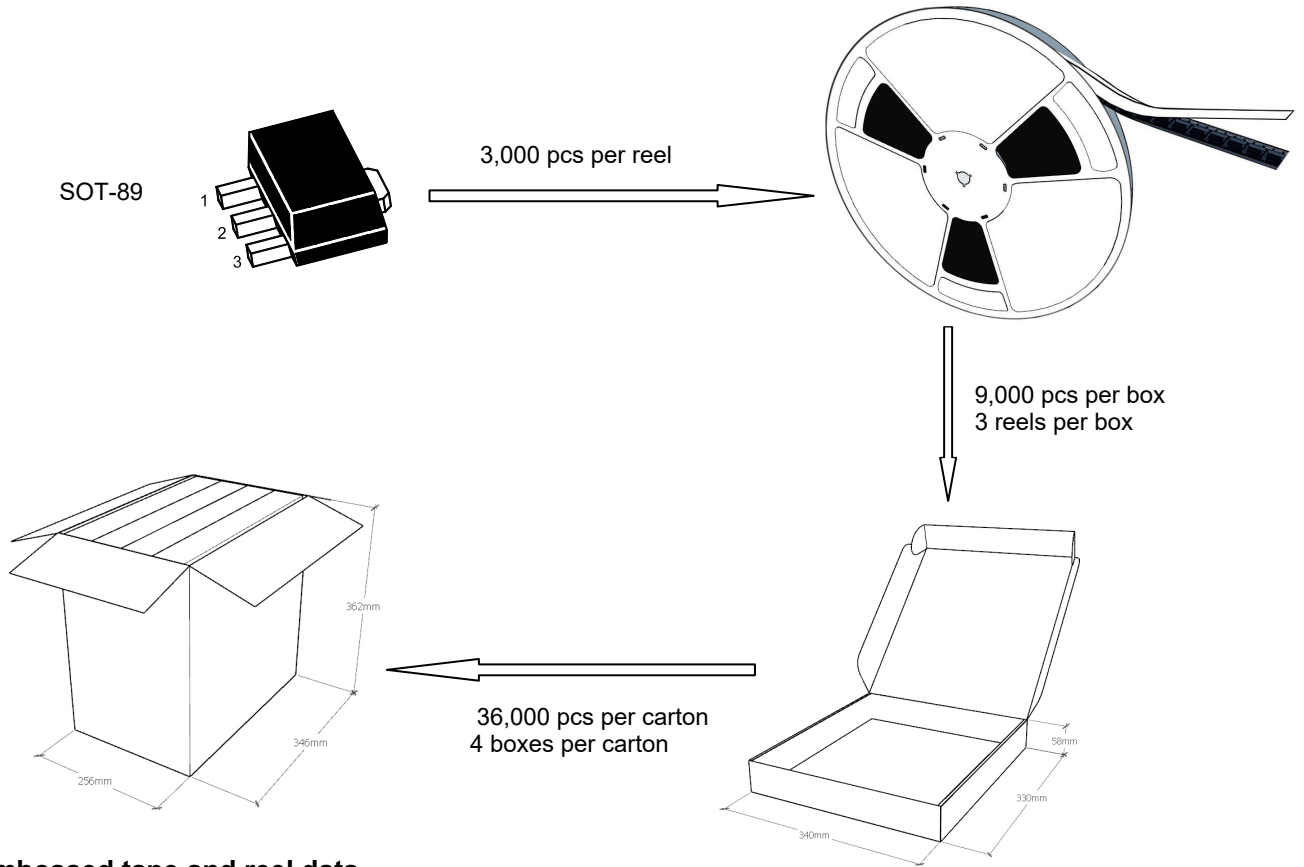




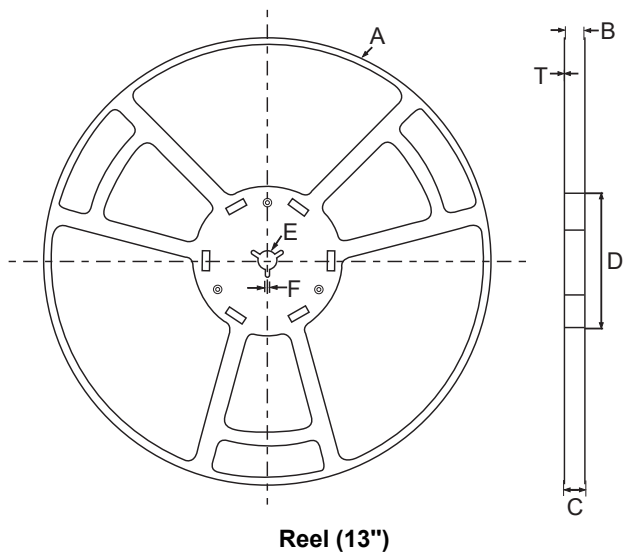
# MPSA13 MPSA14 NPN Darlington Transistor

## Package Specifications

- The method of packaging (3,000PCS/Reel&13inches)



## ◆ Embossed tape and reel data



| symbol | Value(unit:mm)      |
|--------|---------------------|
| A      | $\Phi 330 \pm 1$    |
| B      | $12.7 \pm 0.5$      |
| C      | $16.5 \pm 0.3$      |
| D      | $\Phi 99.5 \pm 0.5$ |
| E      | $\Phi 13.6 \pm 0.3$ |
| F      | $2.8 \pm 0.3$       |
| T1     | $1.9 \pm 0.2$       |

