



# 2SA1419/2SC3649

## Bipolar Transistor

(-)160V, (-)1.5A, Low  $V_{CE(sat)}$ , (PNP)NPN Single PCP

ON Semiconductor®

<http://onsemi.com>

### Features

- Adoption of FBET, MBIT processes
- High breakdown voltage and large current capacity
- Ultrasmall size making it easy to provide high-density, small-sized hybrid IC's

### Specifications ( ) : 2SA1419

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

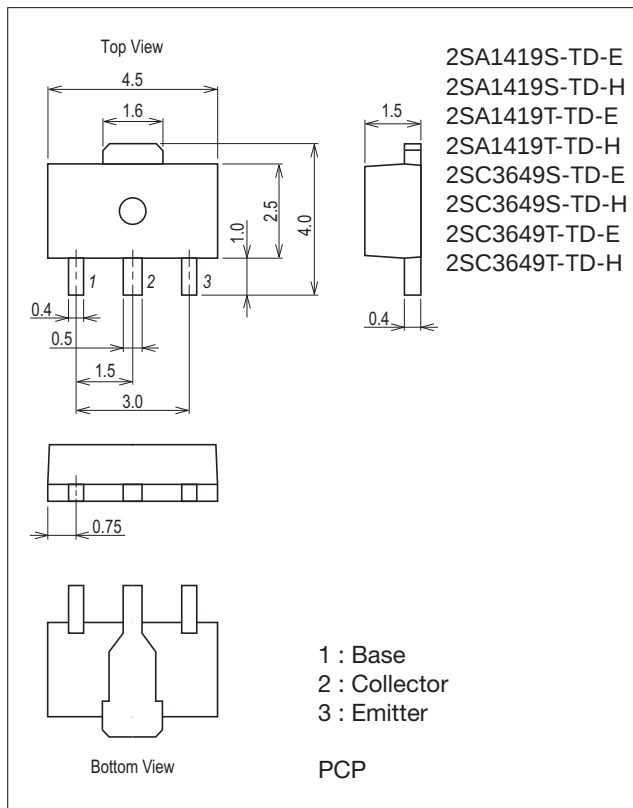
| Parameter                    | Symbol    | Conditions                                                    | Ratings     | Unit |
|------------------------------|-----------|---------------------------------------------------------------|-------------|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                                                               | (-)180      | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                                                               | (-)160      | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                                                               | (-)6        | V    |
| Collector Current            | $I_C$     |                                                               | (-)1.5      | A    |
| Collector Current (Pulse)    | $I_{CP}$  |                                                               | (-)2.5      | A    |
| Collector Dissipation        | $P_C$     |                                                               | 500         | mW   |
|                              |           | When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm) | 1.5         | W    |
| Junction Temperature         | $T_j$     |                                                               | 150         | °C   |
| Storage Temperature          | $T_{stg}$ |                                                               | -55 to +150 | °C   |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

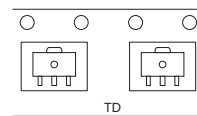
7007B-004



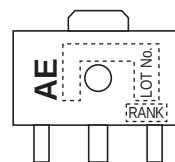
### Product & Package Information

- Package : PCP
- JEITA, JEDEC : SC-62, SOT-89, TO-243
- Minimum Packing Quantity : 1,000 pcs./reel

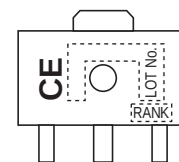
### Packing Type: TD



### Marking

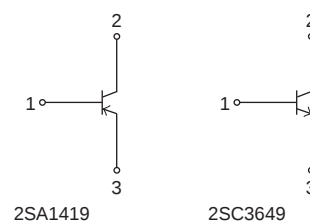


2SA1419



2SC3649

### Electrical Connection



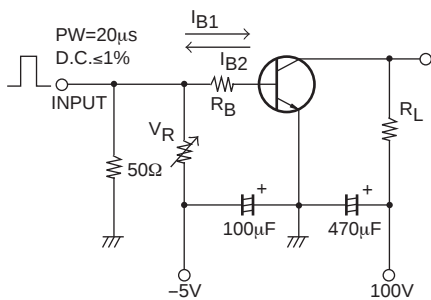
**Electrical Characteristics** at Ta=25°C

| Parameter                               | Symbol        | Conditions                   | Ratings   |              |              | Unit    |
|-----------------------------------------|---------------|------------------------------|-----------|--------------|--------------|---------|
|                                         |               |                              | min       | typ          | max          |         |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB}=(-)120V, I_E=0A$     |           |              | (-) $1$      | $\mu A$ |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=(-)4V, I_C=0A$       |           |              | (-) $1$      | $\mu A$ |
| DC Current Gain                         | $h_{FE1}$     | $V_{CE}=(-)5V, I_C=(-)100mA$ | 100*      |              | 400*         |         |
|                                         | $h_{FE2}$     | $V_{CE}=(-)5V, I_C=(-)10mA$  | 80        |              |              |         |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=(-)10V, I_C=(-)50mA$ |           | 120          |              | MHz     |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=(-)10V, f=1MHz$      |           | (22) $14$    |              | pF      |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)500mA, I_B=(-)50mA$  |           | (-200) $130$ | (-500) $450$ | mV      |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=(-)500mA, I_B=(-)50mA$  |           | (-) $0.85$   | (-) $1.2$    | V       |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=(-)10\mu A, I_E=0A$     | (-) $180$ |              |              | V       |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$  | (-) $160$ |              |              | V       |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=(-)10\mu A, I_C=0A$     | (-) $6$   |              |              | V       |
| Turn-ON Time                            | $t_{on}$      | See specified Test Circuit.  |           | (40) $40$    |              | ns      |
| Storage Time                            | $t_{stg}$     |                              |           | (0.7) $1.2$  |              | $\mu s$ |
| Fall Time                               | $t_f$         |                              |           | (40) $80$    |              | ns      |

\* : The 2SA1419 / 2SC3649 are classified by 100mA  $h_{FE}$  as follows :

| Rank     | R          | S          | T          |
|----------|------------|------------|------------|
| $h_{FE}$ | 100 to 200 | 140 to 280 | 200 to 400 |

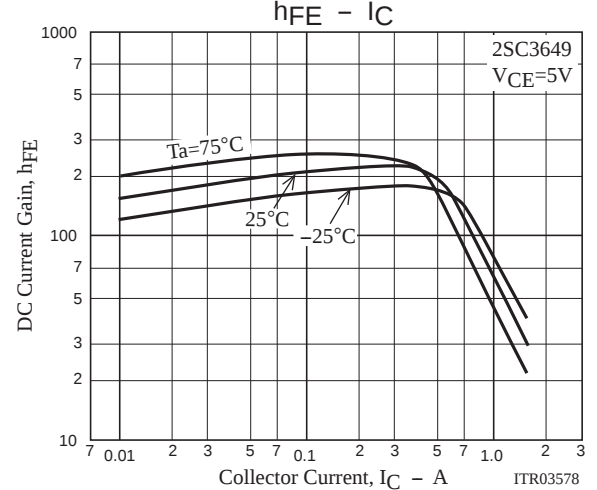
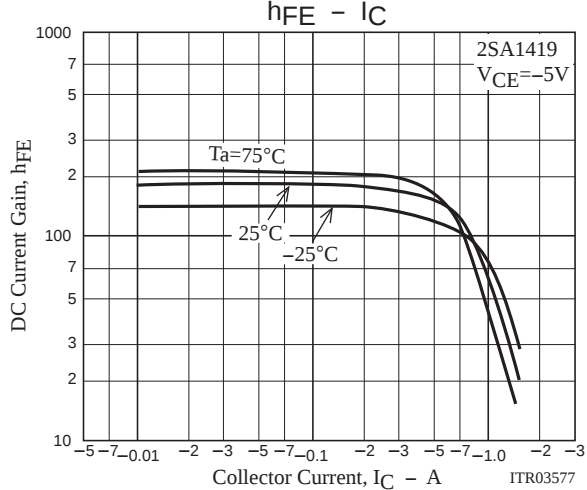
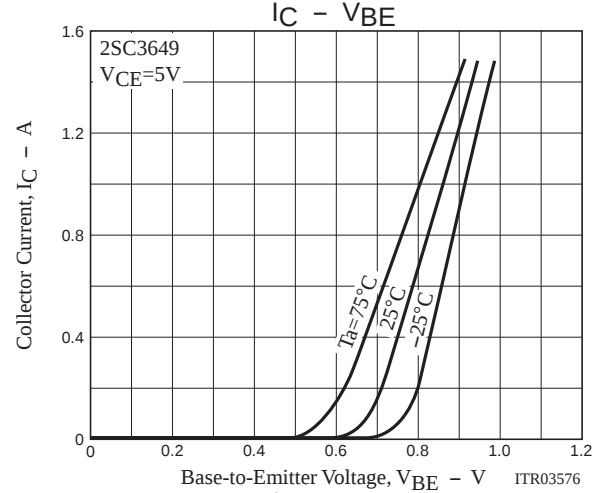
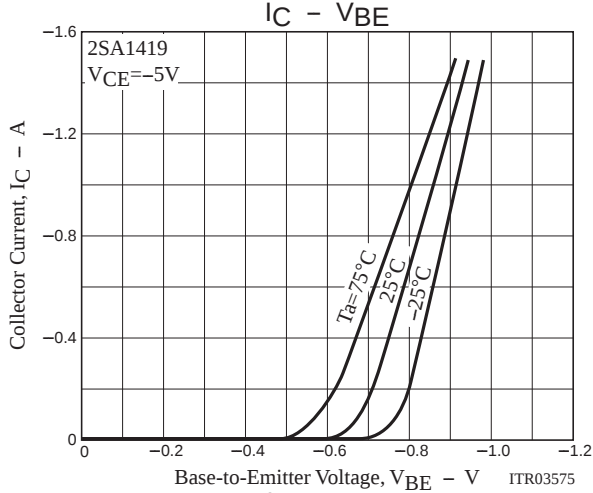
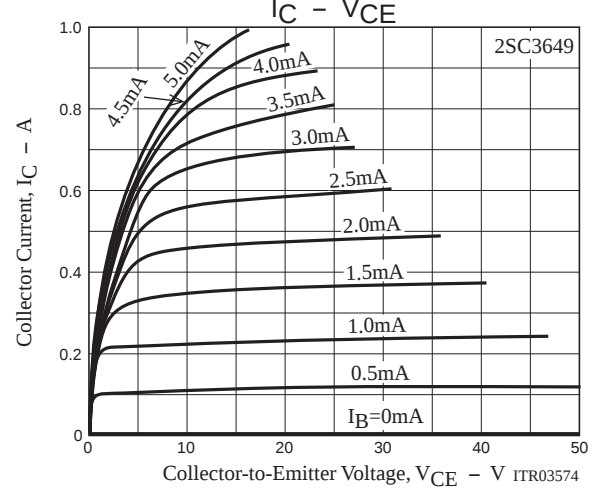
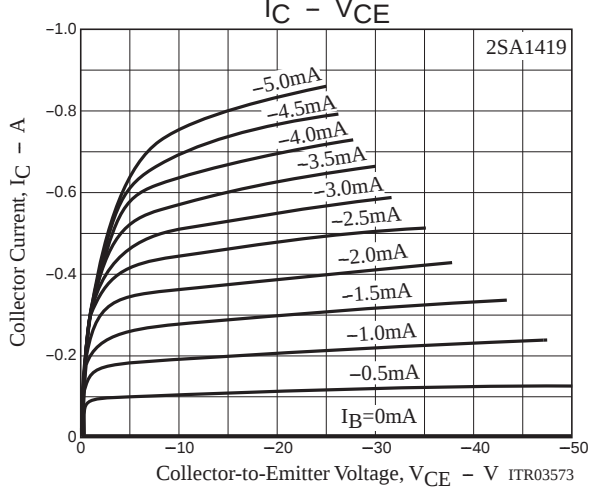
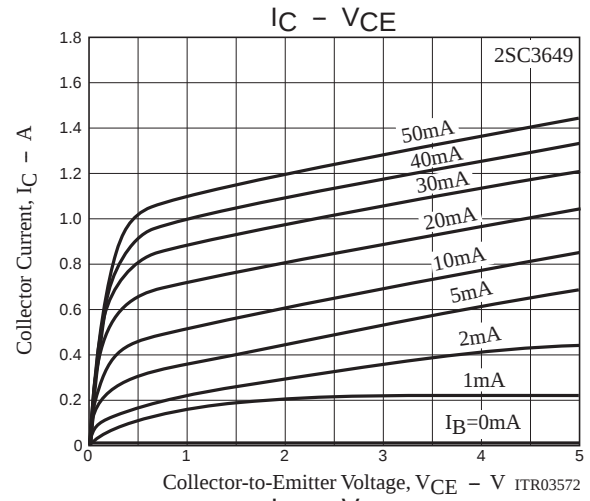
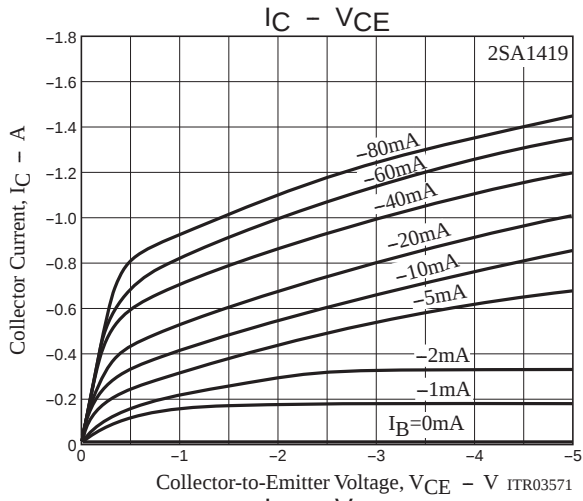
**Switching Time Test Circuit**

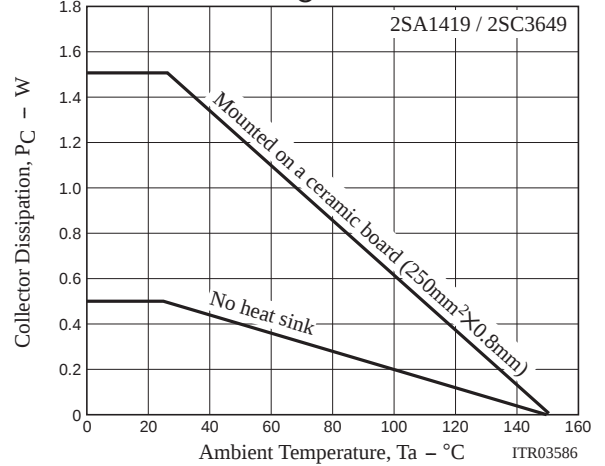
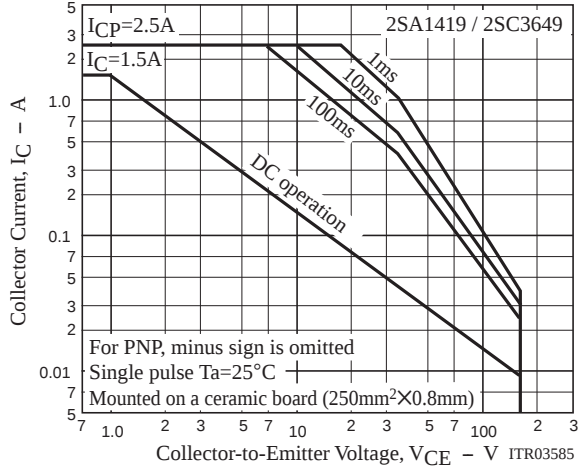
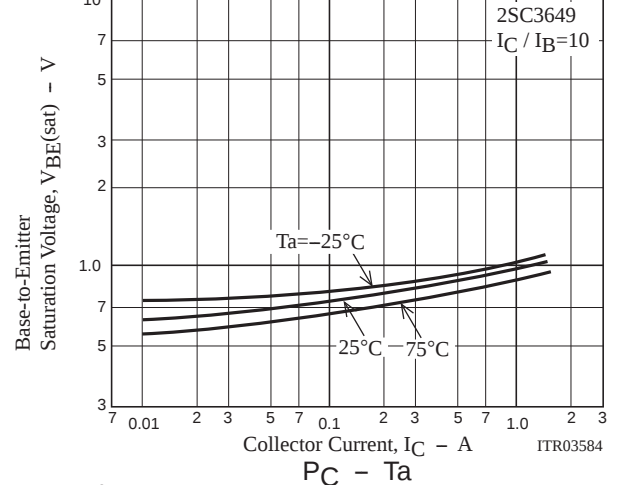
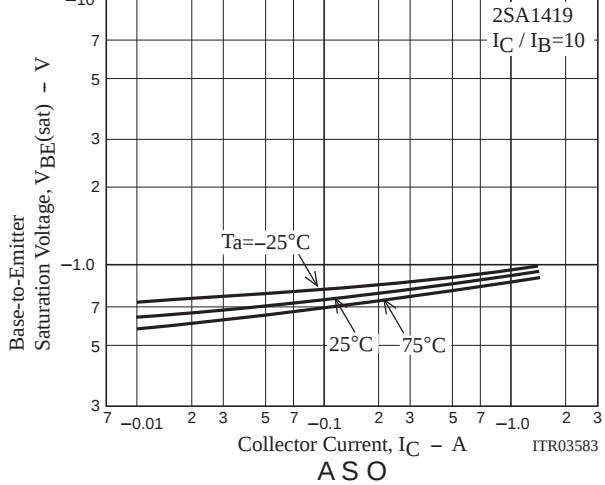
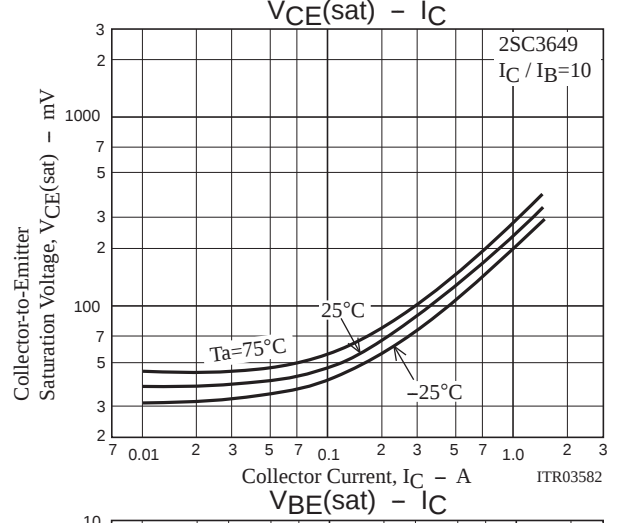
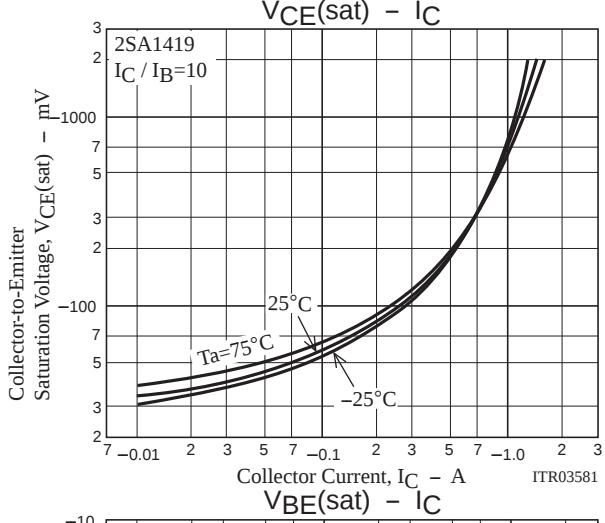
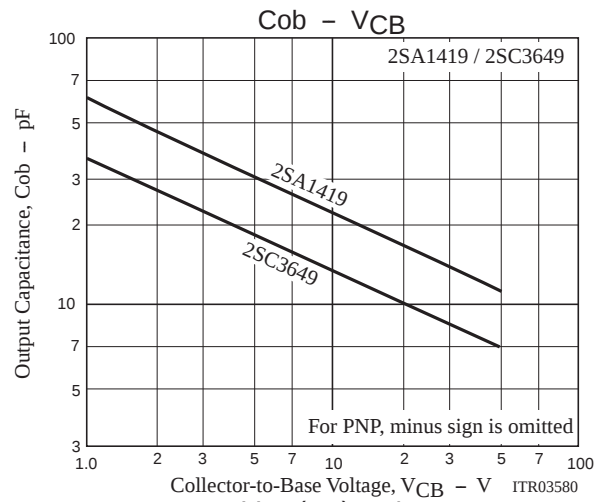
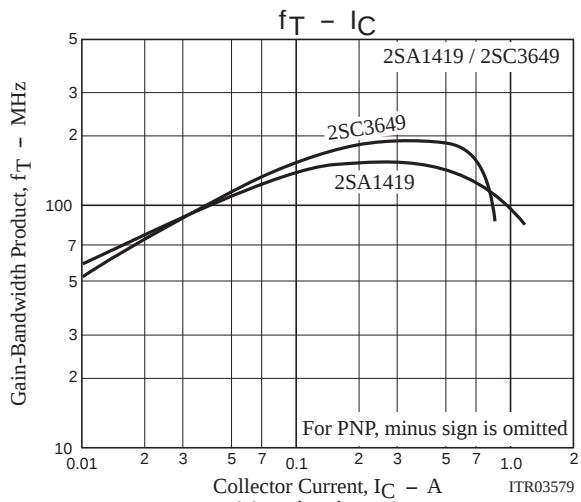


$I_C=10I_{B1}=-10I_{B2}=0.7A$   
(For PNP, the polarity is reversed)

**Ordering Information**

| Device        | Package | Shipping       | memo                     |
|---------------|---------|----------------|--------------------------|
| 2SA1419S-TD-E | PCP     | 1,000pcs./reel | Pb Free                  |
| 2SA1419S-TD-H | PCP     | 1,000pcs./reel | Pb Free and Halogen Free |
| 2SA1419T-TD-E | PCP     | 1,000pcs./reel | Pb Free                  |
| 2SA1419T-TD-H | PCP     | 1,000pcs./reel | Pb Free and Halogen Free |
| 2SC3649S-TD-E | PCP     | 1,000pcs./reel | Pb Free                  |
| 2SC3649S-TD-H | PCP     | 1,000pcs./reel | Pb Free and Halogen Free |
| 2SC3649T-TD-E | PCP     | 1,000pcs./reel | Pb Free                  |
| 2SC3649T-TD-H | PCP     | 1,000pcs./reel | Pb Free and Halogen Free |





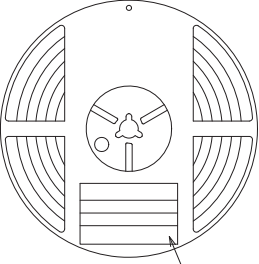
Bag Packing Specification

2SA1419S-TD-E, 2SA1419S-TD-H, 2SA1419T-TD-E, 2SA1419T-TD-H, 2SC3649S-TD-E, 2SC3649S-TD-H, 2SC3649T-TD-E, 2SC3649T-TD-H

1. Packing Format

| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) |           |           | Packing format                                              |                                                                    |
|--------------|-------------------|-------------------------------------------|-----------|-----------|-------------------------------------------------------------|--------------------------------------------------------------------|
|              |                   | Reel                                      | Inner box | Outer box | Inner BOX (C-1)                                             | Outer BOX (A-7)                                                    |
| PCP          | PCP               | 1,000                                     | 4,000     | 24,000    | 4 reels contained<br>Dimensions:mm (external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm (external)<br>440×195×210 |

Packing method



Reel label

Reel label, Inner box label  
(unit:mm)

Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Type No. →

LOT No. →

Quantity →

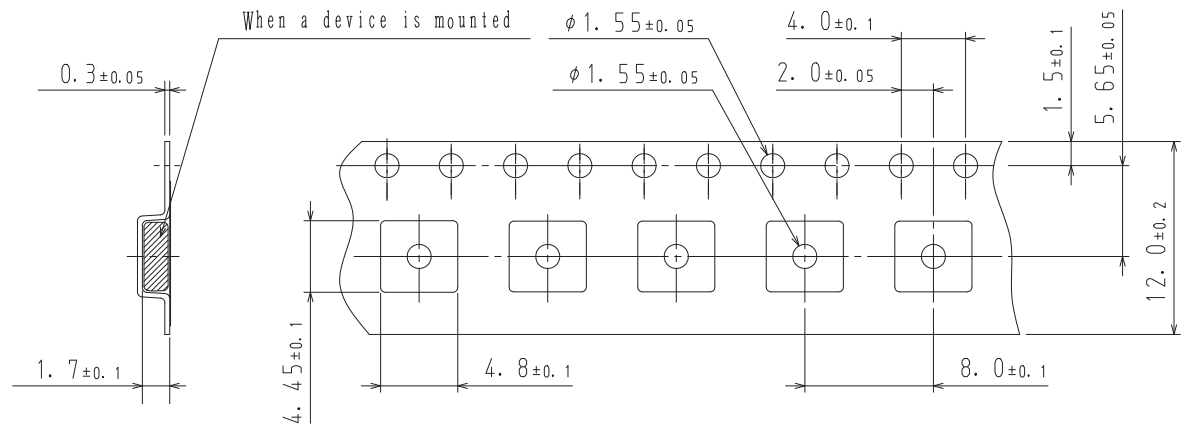
Origin →

NOTE (1)  
The LEAD FREE \* description shows that the surface treatment of the terminal is lead free.

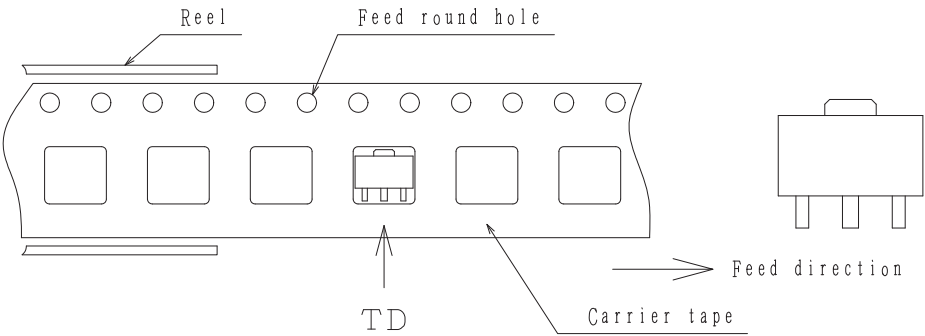
|             |                |
|-------------|----------------|
| Label       | JEITA Phase    |
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

2. Taping configuration

2-1. Carrier tape size (unit:mm)



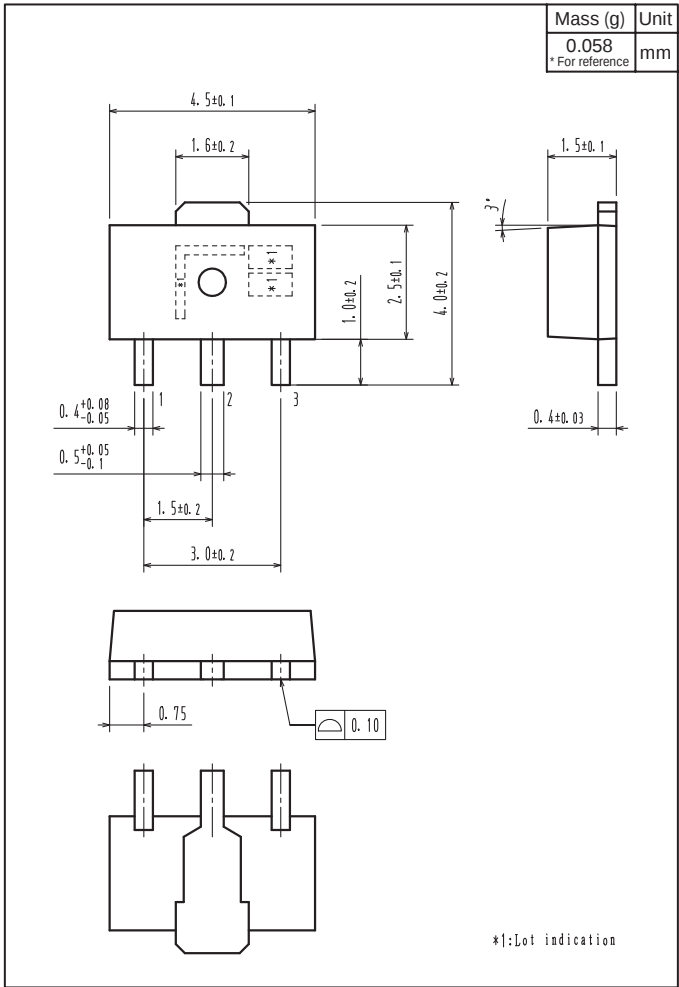
2-2. Device placement direction



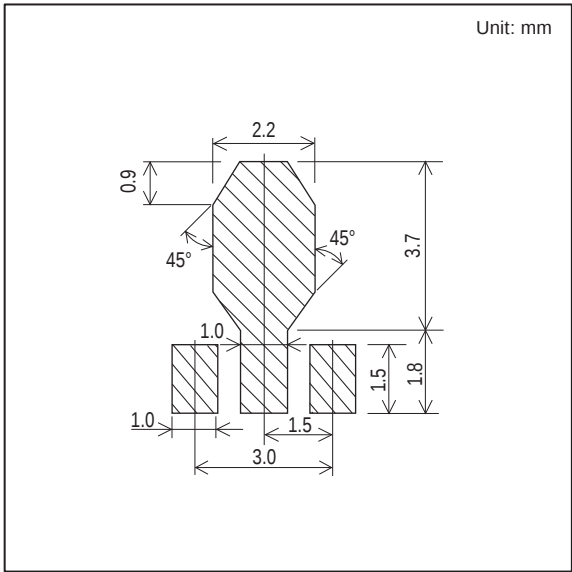
Those with pin 1 index on the feed hole side.....TD

Outline Drawing

2SA1419S-TD-E, 2SA1419S-TD-H, 2SA1419T-TD-E, 2SA1419T-TD-H, 2SC3649S-TD-E, 2SC3649S-TD-H, 2SC3649T-TD-E, 2SC3649T-TD-H



Land Pattern Example



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