



SANYO Semiconductors

## DATA SHEET

An ON Semiconductor Company

# 2SA1419/2SC3649 — High-Voltage Switching Applications

PNP / NPN Epitaxial Planar Silicon Transistor

## 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

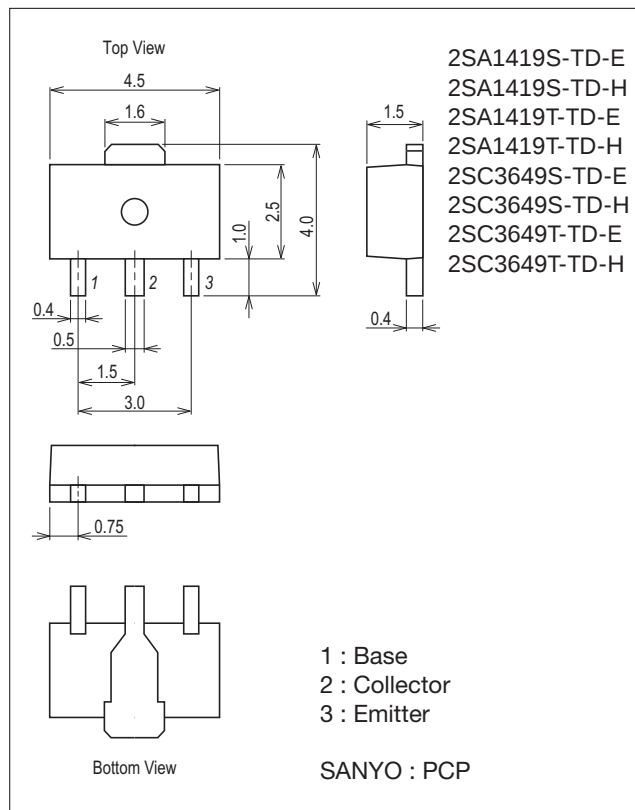
Absolute Maximum Ratings at Ta=25°C

| Parameter                    | Symbol           | Conditions                                                    | Ratings     | Unit |
|------------------------------|------------------|---------------------------------------------------------------|-------------|------|
| Collector-to-Base Voltage    | V <sub>CB0</sub> |                                                               | (-)180      | V    |
| Collector-to-Emitter Voltage | V <sub>CE0</sub> |                                                               | (-)160      | V    |
| Emitter-to-Base Voltage      | V <sub>EB0</sub> |                                                               | (-)6        | V    |
| Collector Current            | I <sub>C</sub>   |                                                               | (-)1.5      | A    |
| Collector Current (Pulse)    | I <sub>CP</sub>  |                                                               | (-)2.5      | A    |
| Collector Dissipation        | P <sub>C</sub>   |                                                               | 500         | mW   |
|                              |                  | When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm) | 1.5         | W    |
| Junction Temperature         | T <sub>j</sub>   |                                                               | 150         | °C   |
| Storage Temperature          | T <sub>stg</sub> |                                                               | -55 to +150 | °C   |

## Package Dimensions

unit : mm (typ)

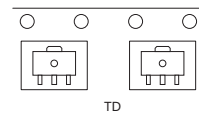
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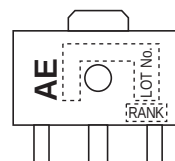
## Product & Package Information

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

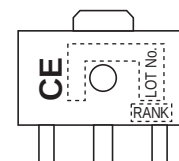
## Packing Type: TD



## Marking

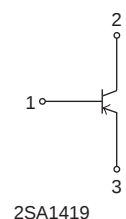


2SA1419

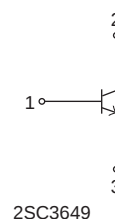


2SC3649

## Electrical Connection



2SA1419



2SC3649

SANYO Semiconductor Co., Ltd.

<http://www.sanyosemi.com/en/network/>

## 2SA1419 / 2SC3649

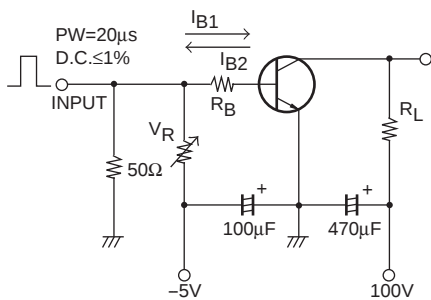
### Electrical Characteristics at Ta=25°C

| 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 |

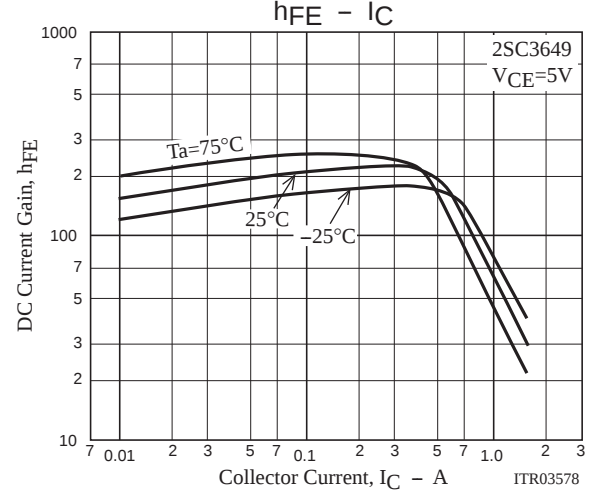
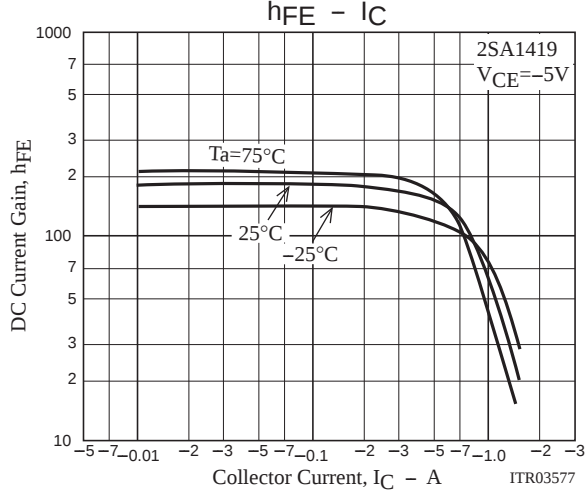
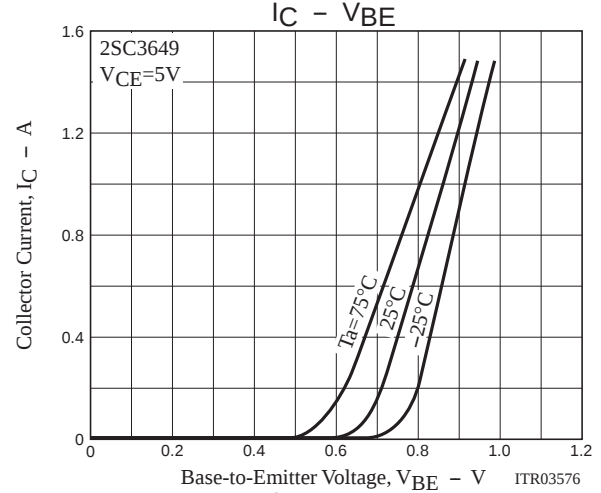
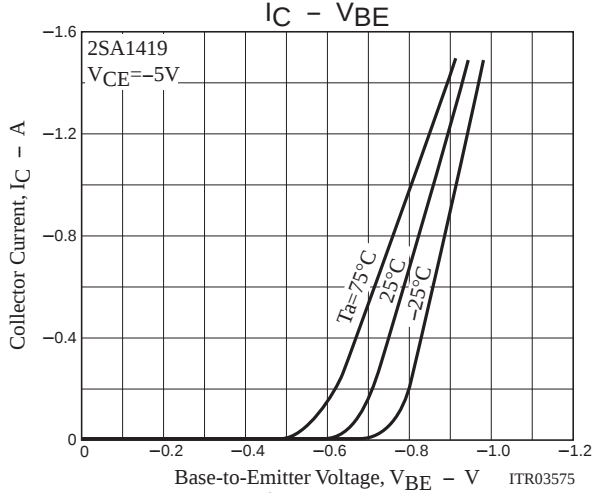
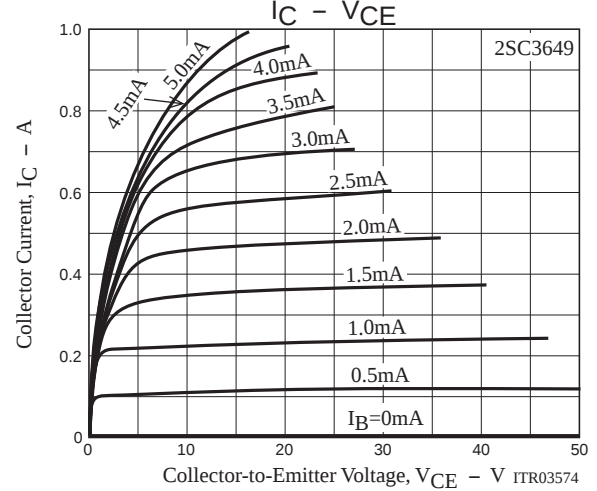
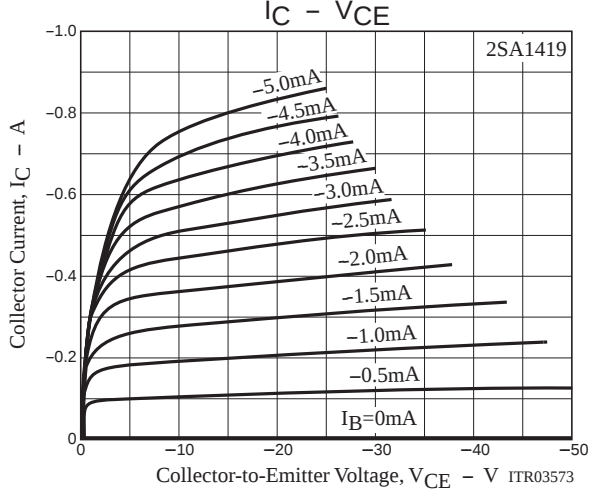
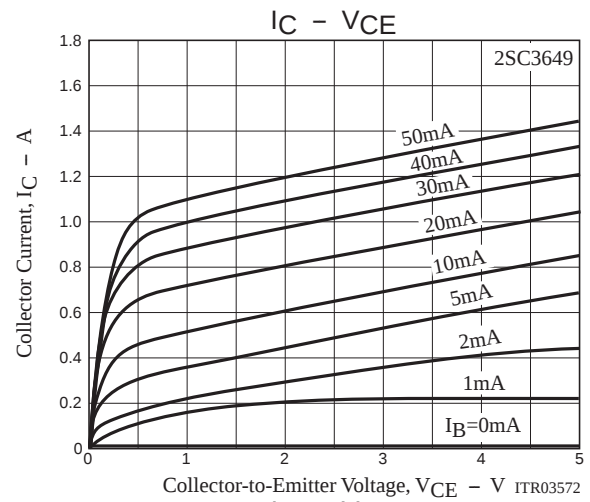
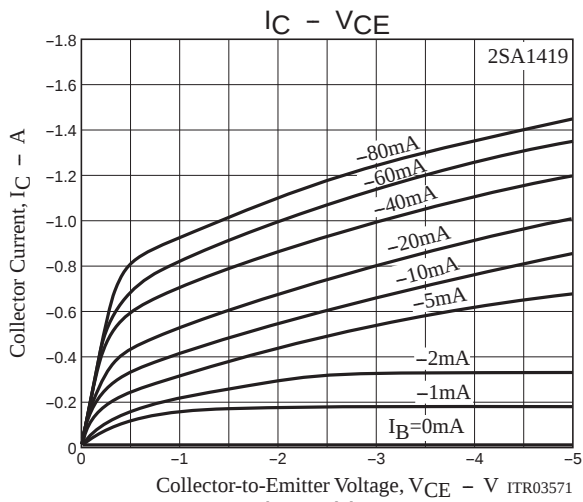
### Switching Time Test Circuit

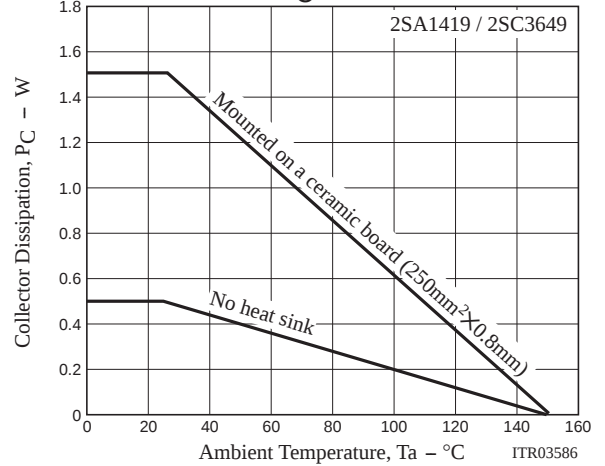
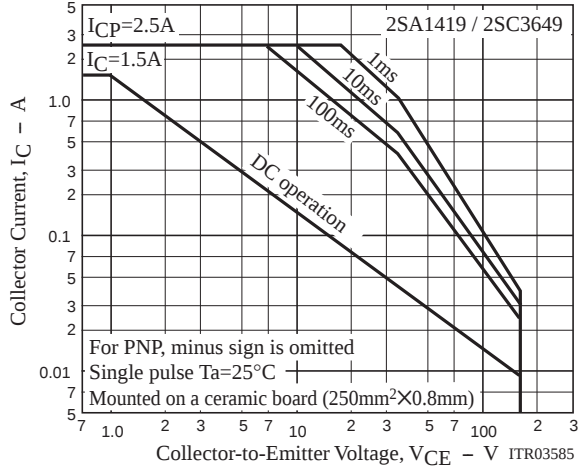
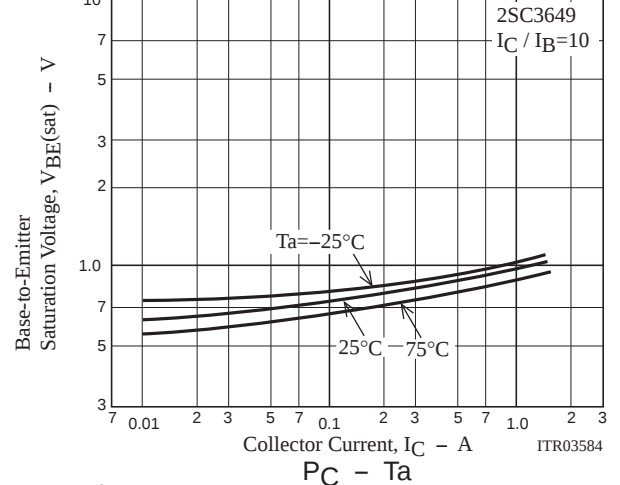
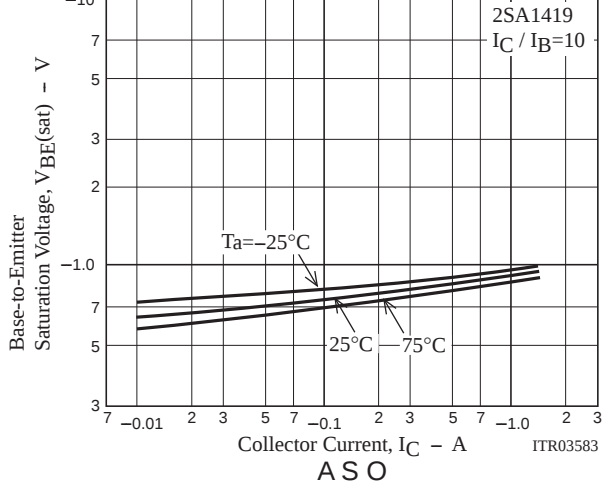
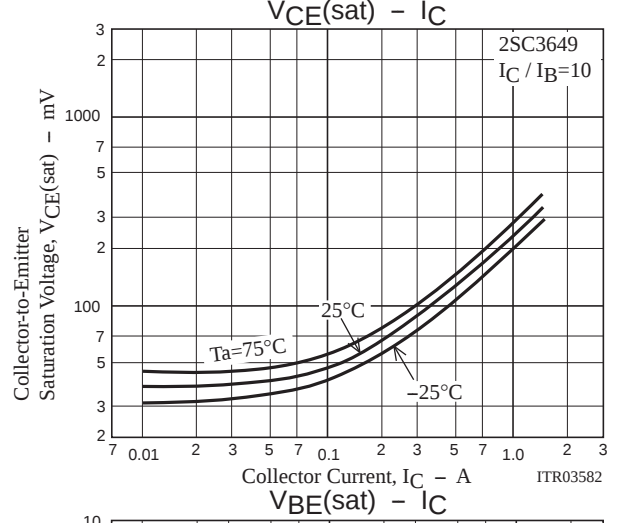
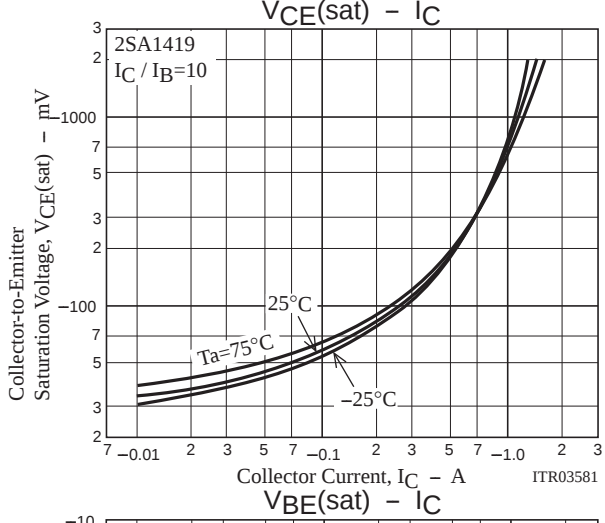
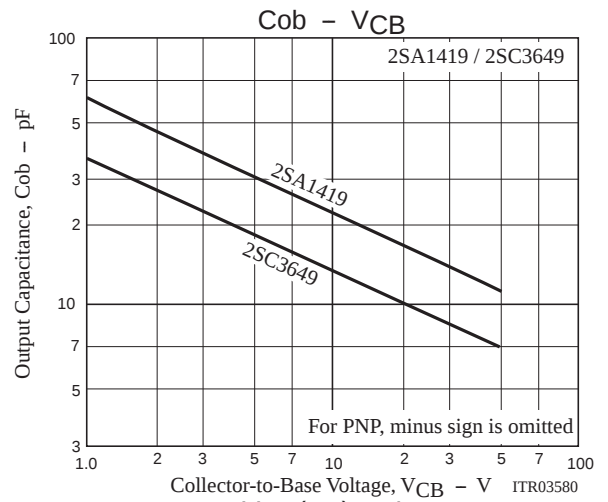
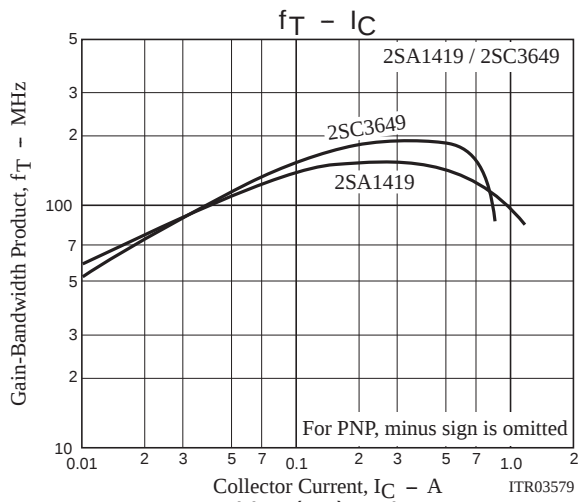


$I_C=10I_{B1}=-10I_{B2}=0.7A$   
(For PNP, the polarity is reversed)

### 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 |





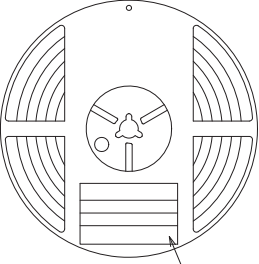
Bag Packing Specification

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)

|          |   |                                                                 |
|----------|---|-----------------------------------------------------------------|
| Type No. | → | (P) TYPE 000000000                                              |
| LOT No.  | → | (1) LOT 00                                                      |
| Quantity | → | (Q) QTY 0,000 (1) LEAD FREE *                                   |
| Origin   | → | (2) SPECIAL<br>*Z0722005310C*<br>ASSEMBLY:*** ( DIFFUSION:*** ) |

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  |

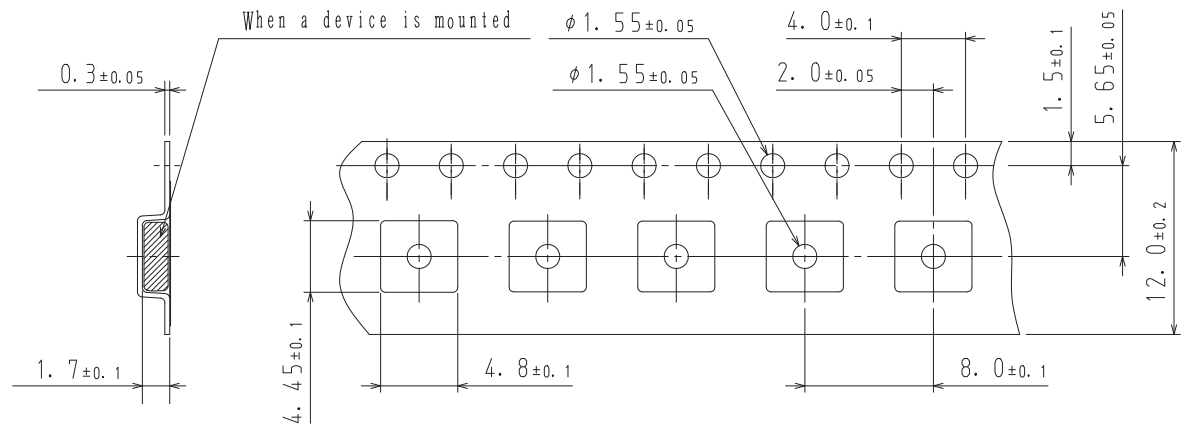
Outer box label

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

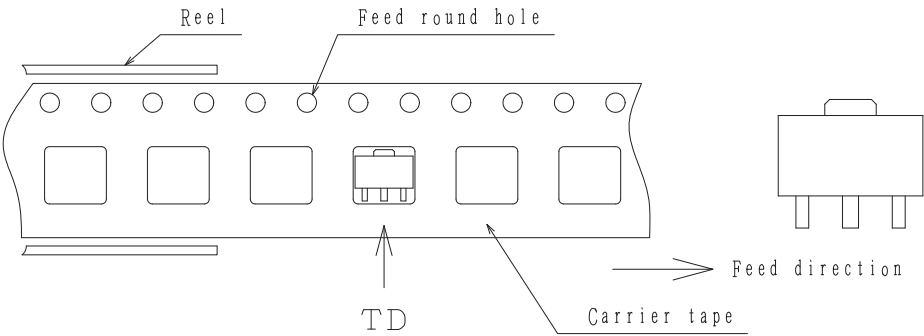
|                                |                           |
|--------------------------------|---------------------------|
| TYPE CODE                      |                           |
| *000000000000*                 |                           |
| TYPE                           | 00000000                  |
| QTY                            | 0,000 PCS (1) LEAD FREE * |
| LOT                            | 00000000                  |
| PACKAGE                        | 00000000                  |
| SPECIAL                        | *Z0722005310C*            |
| ASSEMBLY:*** ( DIFFUSION:*** ) |                           |

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



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