



SANYO Semiconductors

## DATA SHEET

An ON Semiconductor Company

# 2SC6099 — NPN Epitaxial Planar Silicon Transistor

## High-Voltage Switching Applications

### Applications

- DC / DC converter, relay drivers, lamp drivers, motor drivers, inverter

### Features

- Adoption of FBET, MBIT process
- Low collector-to-emitter saturation voltage
- High allowable power dissipation
- Large current capacity
- High-speed switching

### Specifications

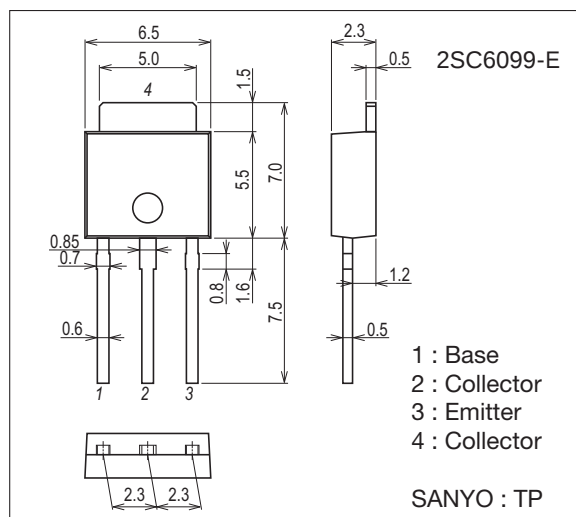
Absolute Maximum Ratings at Ta=25°C

| Parameter                    | Symbol | Conditions | Ratings | Unit |
|------------------------------|--------|------------|---------|------|
| Collector-to-Base Voltage    | VCBO   |            | 120     | V    |
| Collector-to-Emitter Voltage | VCES   |            | 120     | V    |
| Collector-to-Emitter Voltage | VCEO   |            | 100     | V    |
| Emitter-to-Base Voltage      | VEBO   |            | 6.5     | V    |
| Collector Current            | IC     |            | 2       | A    |
| Collector Current (Pulse)    | ICP    |            | 3       | A    |
| Base Current                 | IB     |            | 400     | mA   |

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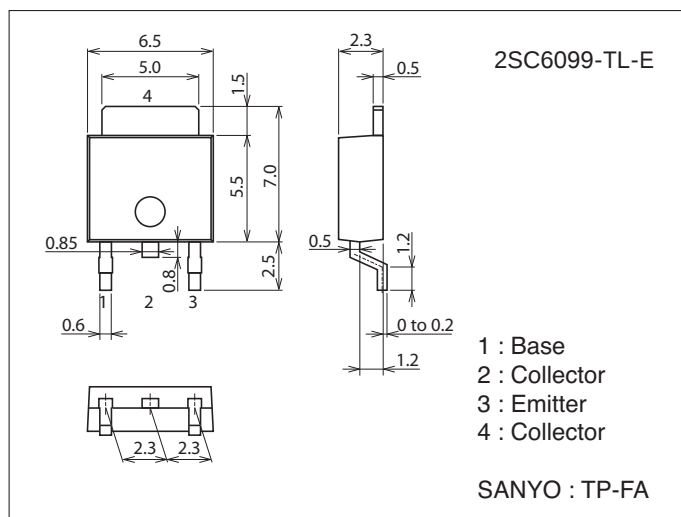
### Package Dimensions unit : mm (typ)

7518-003



### Package Dimensions unit : mm (typ)

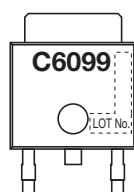
7003-003



### Product & Package Information

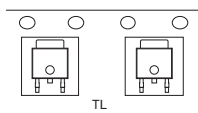
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

### Marking (TP, TP-FA)

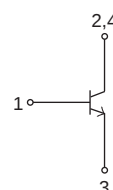


- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252
- Minimum Packing Quantity : 700 pcs./reel

### Packing Type (TP-FA) : TL



### Electrical Connection



SANYO Semiconductor Co., Ltd.

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

## 2SC6099

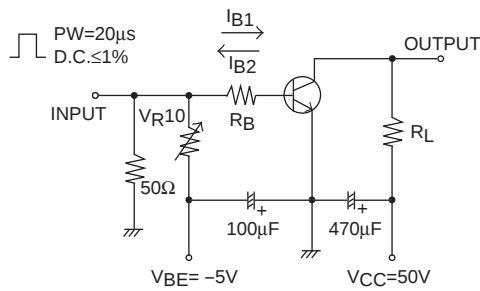
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| Parameter             | Symbol           | Conditions           | Ratings     | Unit |
|-----------------------|------------------|----------------------|-------------|------|
| Collector Dissipation | P <sub>C</sub>   |                      | 0.8         | W    |
|                       |                  | T <sub>C</sub> =25°C | 15          | W    |
| Junction Temperature  | T <sub>J</sub>   |                      | 150         | °C   |
| Storage Temperature   | T <sub>stg</sub> |                      | -55 to +150 | °C   |

### Electrical Characteristics at T<sub>a</sub>=25°C

| Parameter                               | Symbol               | Conditions                                  | Ratings |      |     | Unit |
|-----------------------------------------|----------------------|---------------------------------------------|---------|------|-----|------|
|                                         |                      |                                             | min     | typ  | max |      |
| Collector Cutoff Current                | I <sub>CBO</sub>     | V <sub>CB</sub> =80V, I <sub>E</sub> =0A    |         |      | 1   | μA   |
| Emitter Cutoff Current                  | I <sub>EBO</sub>     | V <sub>EB</sub> =4V, I <sub>C</sub> =0A     |         |      | 1   | μA   |
| DC Current Gain                         | h <sub>FE</sub>      | V <sub>CE</sub> =5V, I <sub>C</sub> =100mA  | 300     |      | 600 |      |
| Gain-Bandwidth Product                  | f <sub>T</sub>       | V <sub>CE</sub> =10V, I <sub>C</sub> =300mA |         | 300  |     | MHz  |
| Output Capacitance                      | C <sub>ob</sub>      | V <sub>CB</sub> =10V, f=1MHz                |         | 13   |     | pF   |
| Collector-to-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> =1A, I <sub>B</sub> =100mA   |         | 110  | 165 | mV   |
| Base-to-Emitter Saturation Voltage      | V <sub>BE(sat)</sub> | I <sub>C</sub> =1A, I <sub>B</sub> =100mA   |         | 0.9  | 1.2 | V    |
| Collector-to-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | I <sub>C</sub> =10μA, I <sub>E</sub> =0A    | 120     |      |     | V    |
| Collector-to-Emitter Breakdown Voltage  | V <sub>(BR)CES</sub> | I <sub>C</sub> =100μA, R <sub>BE</sub> =0Ω  | 120     |      |     | V    |
| Collector-to-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | I <sub>C</sub> =1mA, R <sub>BE</sub> =∞     | 100     |      |     | V    |
| Emitter-to-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | I <sub>E</sub> =10μA, I <sub>C</sub> =0A    | 6.5     |      |     | V    |
| Turn-On Time                            | t <sub>on</sub>      | See specified Test Circuit.                 |         | 40   |     | ns   |
| Storage Time                            | t <sub>stg</sub>     |                                             |         | 1100 |     | ns   |
| Fall Time                               | t <sub>f</sub>       |                                             |         | 40   |     | ns   |

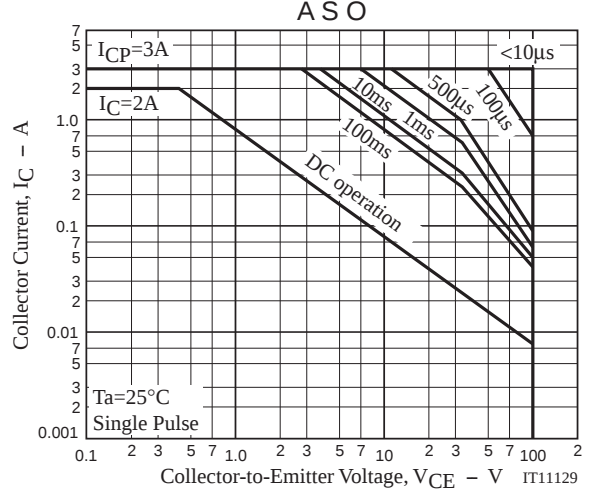
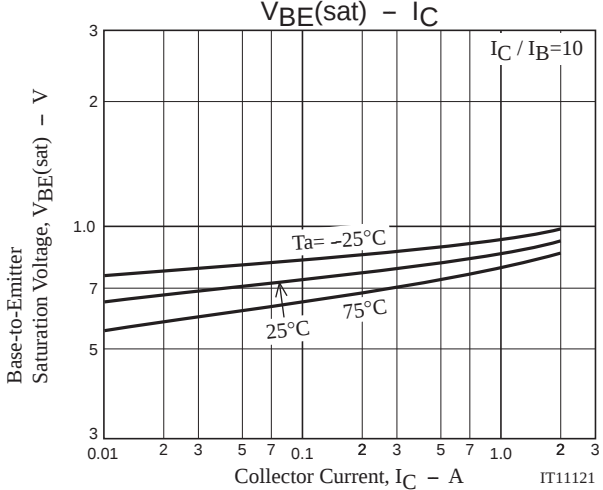
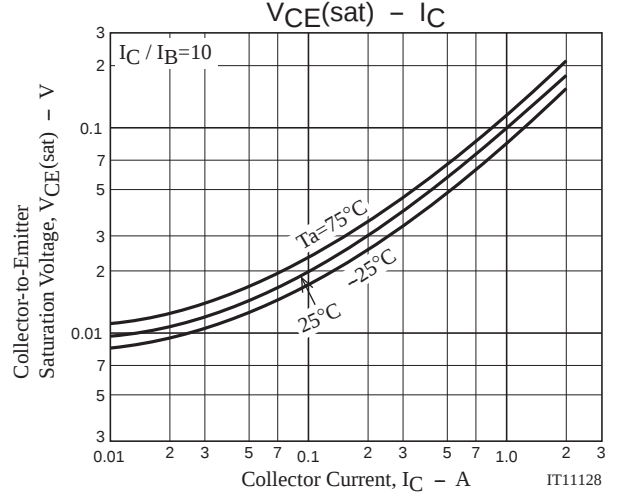
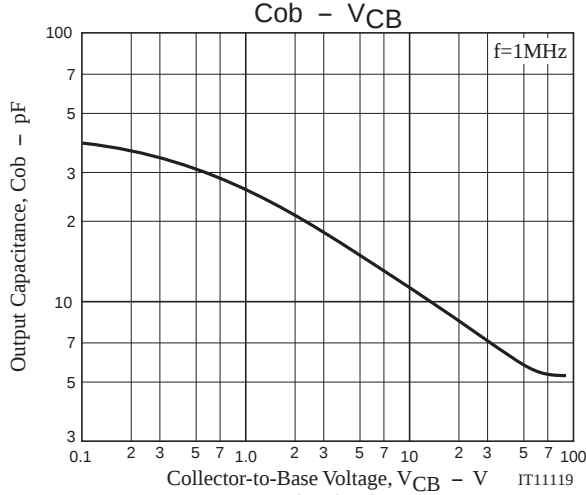
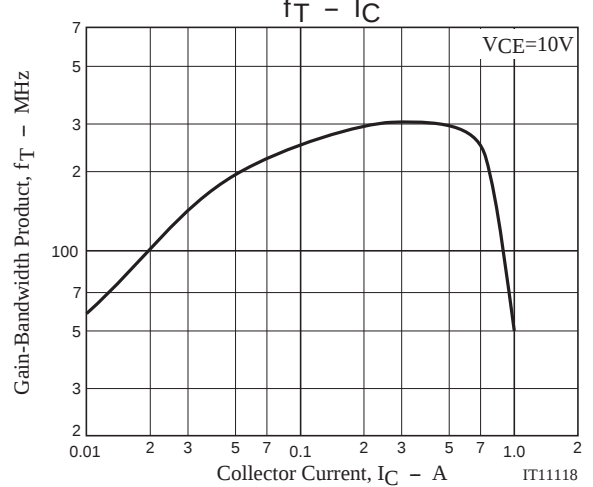
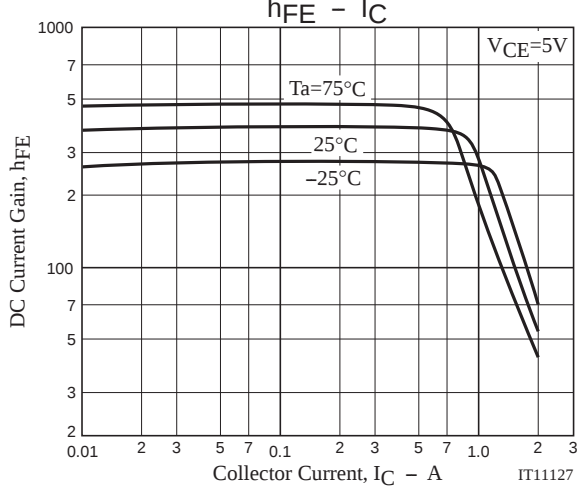
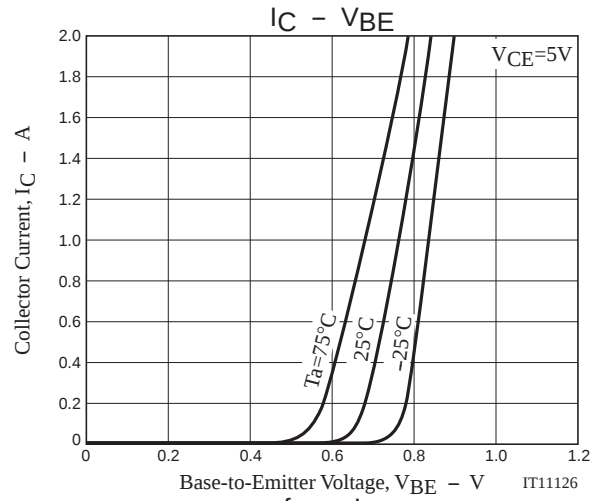
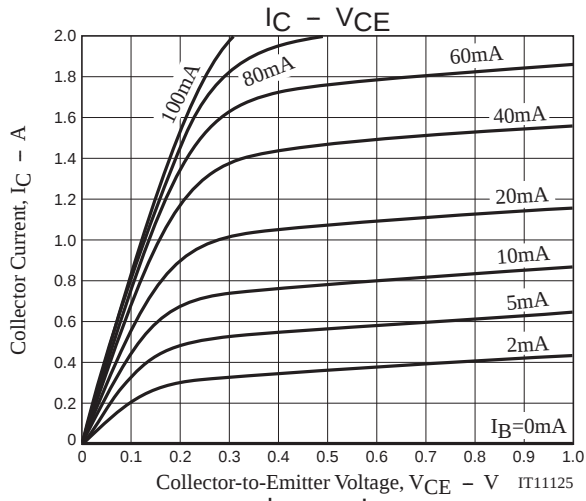
### Switching Time Test Circuit

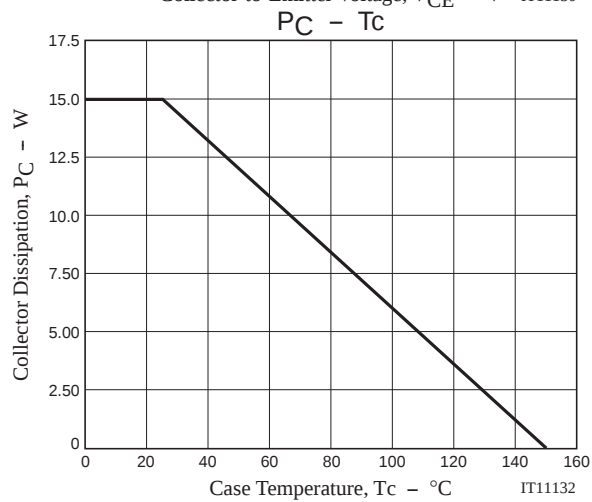
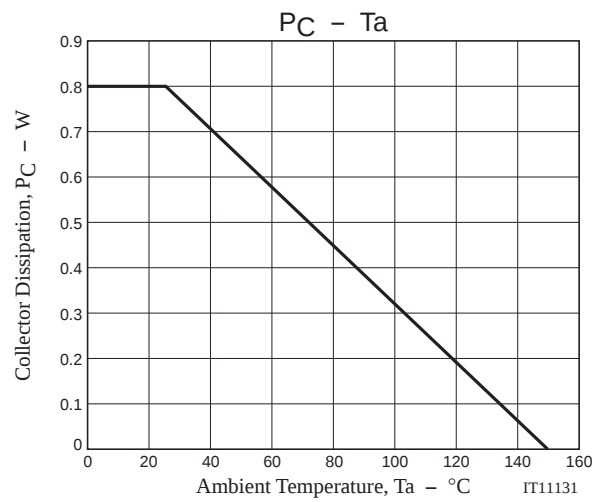
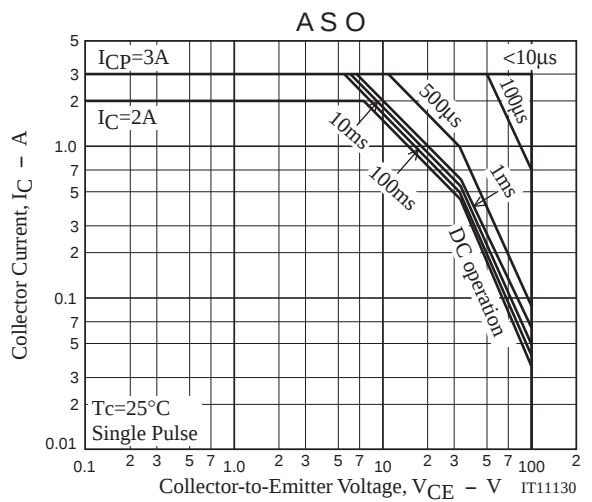


$$I_C = 10I_{B1} = -10I_{B2} = 0.5A$$

### Ordering Information

| Device       | Package | Shipping     | memo    |
|--------------|---------|--------------|---------|
| 2SC6099-E    | TP      | 500pcs./bag  | Pb Free |
| 2SC6099-TL-E | TP-FA   | 700pcs./reel |         |





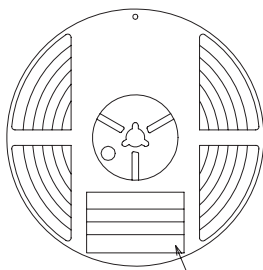
## Taping Specification

2SC6099-TL-E

## 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)                                                    |
| TP-FA        | TP                | 700                                       | 2,100     | 12,600    | 3 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

Type No.  
LOT No.  
Quantity  
Origin

Reel label, Inner box label  
(unit:mm)

|             |                                |
|-------------|--------------------------------|
| (P) TYPE    | 000000000                      |
| (1) LOT     | 00                             |
| (Q) QTY     | 0,000 (1) LEAD FREE *          |
| (Z) SPECIAL |                                |
|             | *20722005310C*                 |
|             | ASSEMBLY:**** (DIFFUSION:****) |

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 |                                |
|           | *oooooooooooo*                 |
| TYPE      | ooooooo                        |
| QTY       | 0,000 PCS (1) LEAD FREE *      |
| LOT       | ooooooo                        |
| PACKAGE   | ooooooo                        |
| SPECIAL   |                                |
|           | *20722005310C*                 |
|           | ASSEMBLY:**** (DIFFUSION:****) |

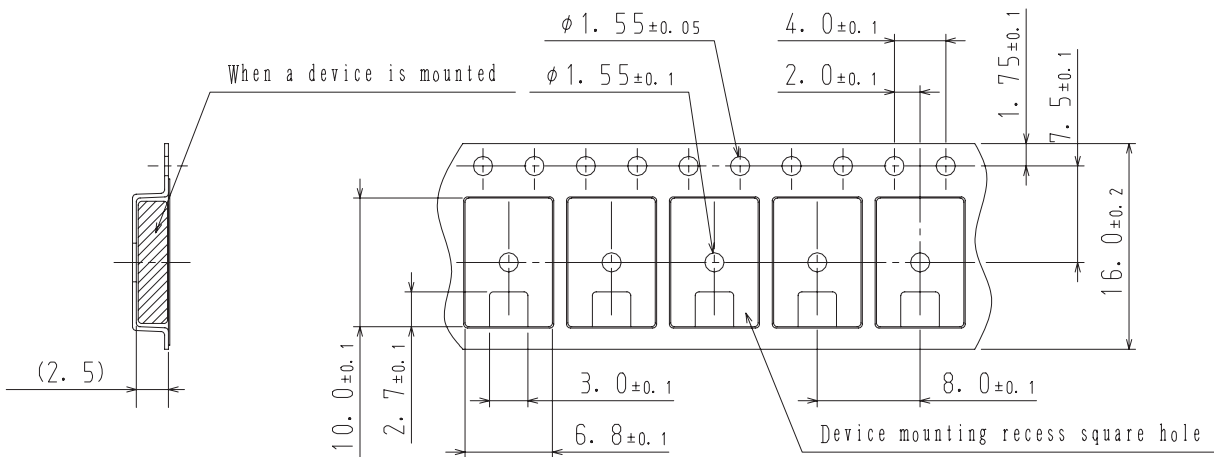
## NOTE (1)

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

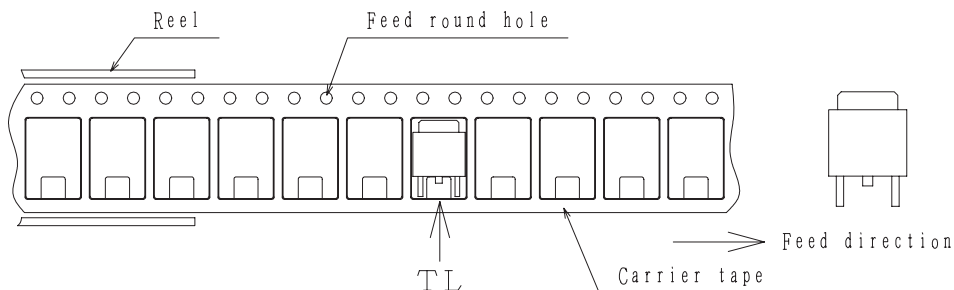
| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

## Taping configuration

## 1. Carrier tape size (unit:mm)



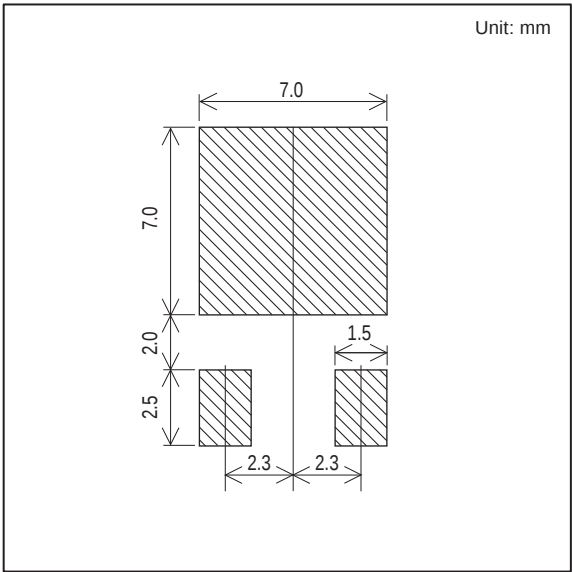
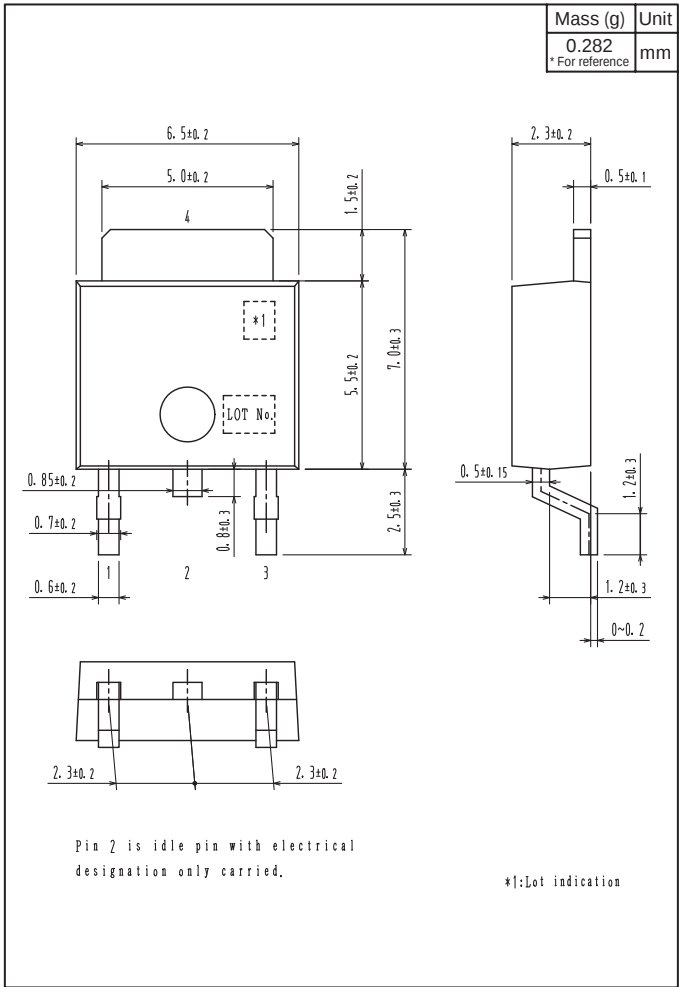
## 2. Device placement direction



Those with one electrode terminal on the feed hole side.....TL

Outline Drawing  
2SC6099-TL-E

Land Pattern Example

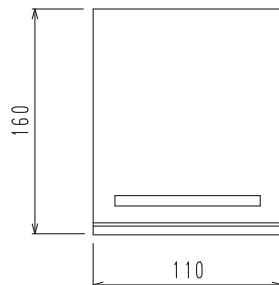
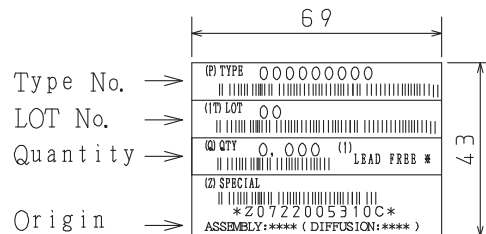


**Bag Packing Specification**

2SC6099-E

1. Packing Format

| Package Name | Maximum Number of devices contained (pcs) |                                           |             |             |
|--------------|-------------------------------------------|-------------------------------------------|-------------|-------------|
|              | Bag                                       | Inner box                                 | Outer box   |             |
| TP           | 500                                       | B-1                                       | A-1         | A-2         |
|              |                                           | 10, 000                                   | 50, 000     | 30, 000     |
|              |                                           | Packing format (Dimensions:mm (external)) |             |             |
|              |                                           | Inner box                                 | Outer box   |             |
|              |                                           | B-1                                       | A-1         | A-2         |
|              |                                           | 445×225×55                                | 470×250×300 | 470×250×190 |

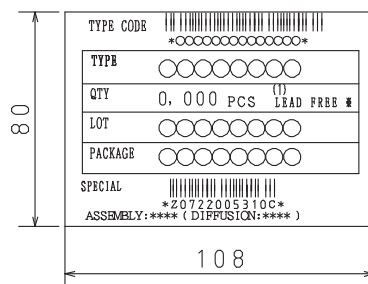
2. Bag dimensions  
(unit:mm)3. Bag label, Inner box label  
(unit:mm)4. Outer box label  
(unit:mm)

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

## 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  |





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